PHILOSOPHICAL

TRANSACTIONS,

OF THE

ROYAL SOCIETY

OF

LONDON.

FOR THE YEAR MDCCCXXIV.

PART I.

LONDON:

PRINTED BY W. NICOL, SUCCESSOR TO W. BULMER AND CO.
CLEVELAND-ROW, ST. JAMES'S;
AND SOLD BY G. AND W. NICOL, PALL-MALL, PRINTERS TO THE ROYAL SOCIETY.

MDCCCXXIV.

ADVERTISEMENT.

THE Committee appointed by the *Royal Society* to direct the publication of the *Philosophical Transactions*, take this opportunity to acquaint the Public, that it fully appears, as well from the council-books and journals of the Society, as from repeated declarations which have been made in several former *Transactions*, that the printing of them was always, from time to time, the single act of the respective Secretaries, till the Forty-seventh Volume: the Society, as a Body, never interesting themselves any further in their publication, than by occasionally recommending the revival of them to some of their Secretaries, when, from the particular circumstances of their affairs, the *Transactions* had happened for any length of time to be intermitted. And this seems principally to have been done with a view to satisfy the Public, that their usual meetings were then continued, for the improvement of knowledge, and benefit of mankind, the great ends of their first institution by the Royal Charters, and which they have ever since steadily pursued.

But the Society being of late years greatly enlarged, and their communications more numerous, it was thought advisable that a Committee of their members should be appointed, to reconsider the papers read before them, and select out of them such as they should judge most proper for publication in the future *Transactions;* which was accordingly done upon the 26th of March, 1752. And the grounds of their choice are, and will continue to

be, the importance and singularity of the subjects, or the advantageous manner of treating them; without pretending to answer for the certainty of the facts, or propriety of the reasonings, contained in the several papers so published, which must still rest on the credit or judgment of their respective authors.

It is likewise necessary on this occasion to remark, that it is an established rule of the Society, to which they will always adhere, never to give their opinion, as a Body, upon any subject, either of Nature or Art, that comes before them. And therefore the thanks, which are frequently proposed from the Chair, to be given to the authors of such papers as are read at their accustomed meetings, or to the persons through whose hands they received them, are to be considered in no other light than as a matter of civility, in return for the respect shown to the Society by those communications. The like also is to be said with regard to the several projects, inventions, and curiosities of various kinds, which are often exhibited to the Society; the authors whereof, or those who exhibit them, frequently take the liberty to report, and even to certify in the public news-papers, that they have met with the highest applause and approbation. And therefore it is hoped, that no regard will hereafter be paid to such reports and public notices; which in some instances have been too lightly credited, to the dishonour of the Society.

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WITH THE

NAMES OF THE DONORS.

PRESENTS.	DONORS.
ACADEMIÆ et SOCIETATES.	
Magnæ Britanniæ.	
ROYAL INSTITUTION.—A Journal of Science, Literature and the Arts, edited at the Royal Institution of Great Britain, No. 30—32. 8° *London*, 1823	The Managers of the Royal Institution.
SOCIETY FOR THE ENCOURAGEMENT OF ARTS, MANUFACTURES AND COMMERCE.—Transactions of the Society instituted at London for the Encouragement of Arts, Manufactures, and Commerce, with the Premiums offered in the year 1822. Vol. XLI. 8° *London*, 1823	The Society for Encouragement of Arts, &c. Jan. 29, 1824.
MEDICAL AND CHIRURGICAL SOCIETY OF LONDON.—Medico-Chirurgical Transactions, published by the Medical and Chirurgical Society of London. Vol. XII. Part II. 8°. *London*, 1823	The Medical and Chirurgical Society, Nov. 20, 1823.
HORTICULTURAL SOCIETY. Transactions of the Horticultural Society of London, Vol. V. Part II. and III. 4°. *London*, 1823	The Horticultural Society, Nov. 20, 1823.
——————— Report of the Garden Committee on the formation and progress of the Garden, drawn up for the information of the Fellows of the Society, as directed by the Bye-Laws. 4° *London*, 31st March, 1823.	———————
CAMBRIDGE PHILOSOPHICAL SOCIETY. Transactions of the Cambridge Philosophical Society, Vol. II. Part I 4°.	The Cambridge Philosophical Society, June 3, 1824.
ROYAL SOCIETY OF EDINBURGH. Transactions of the Royal Society of Edinburgh, Vol. X. Part I. 4°. *Edinburgh*, 1824.	The Royal Society of Edinburgh, May 6, 1824.
Galliæ.	
ACADÉMIE DES SCIENCES ARTS ET BELLES-LETTRES DE DIJON. Académie des Sciences Arts et Belles-Lettres de Dijon, Séance publique du 24 Août, 1821. 8°. *Dijon*, 1822.	The Academy of Sciences and Literature of Dijon, Feb. 5, 1824.

PRESENTS.	DONORS.
ACADEMIÆ et SOCIETATES.	
ÉCOLE POLYTECHNIQUE. Journal de l'École Polytechnique, publié par le Conseil d'Instruction de cet Établissement, Tome XI. et XII. 4°. *à Paris*, 1820—23.	Le Conseil de l'École Polytechnique, Nov. 20, 1823.
Germaniæ.	
SOCIETAS REGIA SCIENTIARUM GOTTINGENSIS. Commentationes Societatis Regiæ Scientiarum Gottingensis recentiores Vol. V. An. D. 1819—22. 4° *Gottingæ*, 1823.	The Royal Society of Sciences at Gottingen, Jan. 22, 1824.
ACADEMIA LEOPOLDINO-CÆSAREA. Nova Acta Physico-Medica Academiæ Cæsareæ Leopoldino-Carolinæ Naturæ Curiosorum. Tom. I. Parts I. et II.	The Cæsarean Academy of Natural Historians at Bonn, May 27, 1824.
——— Verhandlungen der Kaiserlichen Leopoldinisch-Carolinischen Akademie der Naturforscher. 4° Bonn, 1823.	
Russiæ.	
ACADEMIA SCIENTIARUM IMPERIALIS PETROPOLITANA. Mémoires de l'Académie Impériale des Sciences de St. Petersbourg Tom VIII. avec l'Histoire de l'Académie pour les Années 1817 et 18. 4° *St. Petersbourg*, 1822.	The Imperial Academy of Sciences of St. Petersbourgh, Nov. 20, 1823.
Italiæ.	
ACADÉMIE DES SCIENCES, &c. DE TURIN. Mémorie della Reale Academia delle Scienze di Torino. Tom. XXV. et XXVI. 4° *Torino*, 1820—21.	The Royal Academy of Sciences of Turin, Nov. 20, 1823.
SOCIETA ITALIANA. Memorie di Matematica e di Fisica della Società Italiana delle Scienze residente in Modena. Tomo XIX. Parte contenente le Memorie di Fisica. 4° *Modena*, 1823.	La Società Italiana, March 25, 1824.
ALDERSON (JOHN) M. D. An Essay on Apparitions, in which their appearance is accounted for by causes wholly independent of preternatural agency. New edition, revised and corrected. 8° *London*, 1823.	Dr. John Alderson, Nov. 27, 1823.
AMPÈRE, (M.) Receuil d'Observations Electro-Dynamiques, contenant diverses Mémoires, Notices, Extraits de Lettres, ou d'ouvrages périodiques sur les Sciences, rélatifs à l'action mutuelle de deux courans électriques, à celle qui existe entre un courant électrique et un Aimant, ou le globe terrestre, et à celle de deux Aimans l'un sur l'autre. 8° *Paris*, 1822.	M. Ampère, May 20, 1824.
ANNALS OF PHILOSOPHY, New Series, No. 31–42 8° *London*, 1823.	Mr. R. Phillips.
ASTRONOMIA, *v.* BESSEL. HARDING. LITTROW. ROBINSON. STRUVE.	
——— Connaissance des Tems ou des Mouvemens Célestes à l'Usage des Astronomes et des Navigateurs pour l'An 1826, publiée par le Bureau des Longitudes. 8° *Paris*, 1823.	Le Bureau des Longitudes de France, April 1, 1824.

PRESENTS.	DONORS.
ASTRONOMIA. Astronomisches Jahrbuch für das Jahr 1825, nebst einer Sammlung der neusten in die astronomisches Wissenschaften einschlagenden Abhandlungen, Beobachtungen, und Nachrichten. Von. J. E. Bode. 50 Band. 8° *Berlin*, 1822.	Professor Bode, Nov. 20, 1823.
——————Astronomische Nachrichten, No. 33-57. 4°.	Professor H.C. Schumacher, Nov. 20, 1823.
——————Astronomische Hülfstafeln für 1823–1824. 8° *Copenhagen.*	———
BARLOW (PETER) An Elementary Investigation of the Theory of Numbers, with its application to the indeterminate and Diophantine Analysis, the analytical and geometrical division of the Circle, and several other curious Algebraical and Arithmetical Problems. 8° *London*, 1811.	Professor Barlow, May 13, 1824.
——————New Mathematical Tables, containing the factors, squares, cubes, square roots, cube roots, reciprocals, and hyperbolic Logarithms of all Numbers from 1 to 10,000; Tables of powers and prime numbers, an extensive Table of Formulæ, or general Synopsis of the most important particulars relating to the doctrines of Equations, Series, Fluxions, Fluents, &c. &c. &c. 8° *London*, 1814.	———
——————An Essay on Magnetic Attractions and on the Laws of Terrestrial and Electro-Magnetism; comprising a popular course of curious and interesting Experiments on the latter subject, and an easy Experimental Method of correcting the Local Attraction of Vessels on the Compass in all parts of the World. 8° *London*, 1823.	———
——————An Essay on the Strength and Stress of Timber, founded upon Experiments performed at the Royal Military Academy, on Specimens selected from the Royal Arsenal and His Majesty's Dock Yard, Woolwich, preceded by an Historical Review of former Theories and Experiments, with numerous Tables and Plates; also, an Appendix on the Strength of Iron and other materials. 8° *London*, 1824.	———
BELL, (THOMAS) *v.* ZOOLOGICAL JOURNAL.	
BENOIT, (P. M. N.) Théorie générale des Pèse-Liqueurs appliquée à la construction et à l'emploi de toutes sortes d'aréomètres entièrement comparables; avec des Tables aréométriques très étendues, donnant les pesanteurs spécifiques correspondant aux divers degrés des Pèse-Liqueurs en usage; le titre des Eaux-de-vie, des Acides sulfuriques, &c. 8° *à Paris*, 1821.	M. Benoit, Nov. 20, 1823.
BERTHEVIN et TREUIL, (*MM.*) Élémens d'Arithmétique Complémentaire, ou Méthode Nouvelle par laquelle à l'aide des Complémens Arithmétiques on exécute toutes les opérations de Calcul. 8vo. *à Paris*, 1823.	MM. Berthevin et Treuil, Nov. 20, 1823.
BESSEL (F. W. VON) Astronomische Beobachtungen auf der Königlichen Universitäts Sternwarte in Königsberg. Siebente Abtheilung — vom 1 Januar bis 31 December, 1821. fol. *Königsberg*, 1822.	F. W. von Bessel, Nov. 20, 1823.

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BESSEL (F. W. VON) Achte Abtheilung, vom 1 Januar bis 31 December. fol. *Königsberg*, 1823.	F. W. von Bessel, Nov. 20, 1823.
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BOSTOCK (JOHN) M. D. An Elementary System of Physiology, Vol. I. 8° *London*, 1824.	Dr. John Bostock, April 29, 1824.
BOURNON (*M. le Comte* DE) Observations sur quelques-uns des Minéraux soit de l'Ile de Ceylan, soit de la Côte de Coromandel rapportés par M. Leschenault de Latour. 4° *Paris*, 1823.	M. le Comte de Bournon, Nov. 20, 1823.
BRANDES (*Prof.* ENRICO GUGLIELMO) Considerazioni sull' Abassamento straordinario del Barometro nel dì 25 Decembre, 1821, del Sig. Prof. Enr. Gug. Brandes Breslavia spedite alla Società Italiana residente in Modena, tradotte dal Tedesco. 4°	Professor E. G. Brandes, March 25, 1824.
BRESCHET, EDWARDS et VAVASSEUR *(MM.)* Recherches Expérimentales sur les Fonctions du Système Nerveux, Premier Mémoire, de l'Influence du Système Nerveux sur la Digestion stomachale. 8°.	MM. Breschet, Edwards, et Vavasseur, June 5, 1823.
BRIDGEWATER (*Rev. Earl of*) Note (C) indicated at page 113 in the third Part of the Letter on Inland Navigation to the Parisians and French Nation. 8° *No date.*	The Rev. the Earl of Bridgewater, March 18, 1824.
BUCK, (JOHN) A new General and Algebraical Solution of the higher orders of Equations, with Solutions of Equations, to the tenth degree inclusive. 8° *London*, 1823.	Mr. John Buck, Nov. 20, 1823.
CATALOGUS. An Account of Greek Manuscripts, chiefly Biblical, which had been in the possession of the late Professor Carlyle, the greater part of which are now deposited in the Archiepiscopal Library at Lambeth Palace. 8° *London, no date.*	Archbishop of Canterbury, Nov. 23, 1823.
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CHEVALIER (THOMAS) F. R. S. Lectures on the General Structure of the Human Body, and on the Anatomy and Functions of the Skin, delivered before the Royal College of Surgeons in London, in the Courses for 1823. 8° *London*, 1823.	Thomas Chevalier, Esq. Nov. 27, 1823.
CHEVREUL (M. E.) Considérations Générales sur l'Analyse Organique et sur ses applications. 8° *à Paris*, 1824.	M. Chevreul, May 20, 1824.
——————— Recherches Chimiques sur les Corps Gras d'Origine Animale, 8° *Paris*, 1823.	———————
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CIVIALE (LE *Docteur*) Rapport fait à l'Académie Royale des Sciences, par MM. le Chevalier Chaussieu et le Baron Percy sur le Nouveau Moyen du Docteur Civiale pour détruire la pierre dans la Vessie sans l'opération de la taille. 8° *Paris*, 1824.	D. Civiale, May 27, 1824.
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CONWELL, (W. E. E.) M. D. *de Londonderry, (Irlande).* Recherches sur les Propriétés médicinales et l'emploi en Médecine de l'Huile de Croton Tiglium, et quelques Propositions sur les Maladies de l'Inde. 4° *Paris*, 1824.	Dr. W. E. E. Conwell, Apr. 29, 1824.
DANIELL, (JOHN FRED.) F. R. S. Meteorological Essays and Observations. 8° *London*, 1823.	J. F. Daniell, Esq. Nov. 20, 1823.

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DELEUZE, (M.) History and Description of the Royal Museum of Natural History, published by Order of the Administration of that Establishment, translated from the French of M. Deleuze, Part II. 8° *Paris*, 1823.	Mr. Royer, Nov. 20, 1823.
DESMOULINS, (M. A.) M. D. Sur l'État Anatomique de la Peau et du Tissu cellulaire sous-cutané dans la Fièvre Jaune. 8°	M. Desmoulins, June 17, 1824.
——— Mémoire sur le défaut d'unité de composition du Système nerveux, et sur la concordance de ce défaut d' unité avec l'inégalité des Facultés des Animaux. 8°.	———
——— Mémoire sur la distribution géographique des Animaux vertèbres, moins les oiseaux, lu à la première Classe de l'Institut, le 25 Fevrier, 1822. 4°.	———
——— Exposition des motifs d'un nouveau système d'Hygiène deduit des lois de la physiologie, et appliqué au perfectionnement physique et moral de l'homme. 4° *Paris*, 1818.	———
——— Mémoire sur le Rapport qu'a l'étendue des Surfaces de la Rétine et du Nerf optique des oiseaux avec l'énergie et la portée de leur vue. Présentée à l'Académie des Sciences de l'Institut le 23 Dec. 1822. 8°.	———
———Mémoire sur le Rapport qui unit le développement du Nerf Pneumo-Gastrique à celui des Parois du quatrième ventricule, et sur la composition de la Moelle Épinière. Lu à l'Institut le 4 Août, 1823. 8°.	———
——— Sur la Patrie du Chameau à une bosse, et sur l'époque de son Introduction en Afrique. Mémoire lu à l'Académie des Inscriptions et Belles-Lettres de l'Institut le 28 Juin, 1823. 4°.	———
——— De l'État du Système Nerveux sous ses rapports de volume et de masse dans le marasme non sénile, et de l'influence de cet état sur les fonctions nerveuses. Lu à l'Académ. Royale des Sciences, 29 Mai, 1820. 4°.	———
DOUGLAS, (*Col. Sir* HOWARD *Bart.*) Observations on the Motives, Errors and Tendency of M. Carnot's Principles of Defence, showing the defects of his new System of Fortification, and of the alterations he has proposed, with a view to improve the defences of existing Places. 8 *London*, 1819.	Col. Sir Howard Douglas, Bart. Nov. 20, 1823.
DUPIN (CHARLES) Applications de Géométrie et de Mécanique à la Marine, aux Ponts et Chausées, &c. et pour faire suite aux développements de Géometrie. 4° *Paris*, 1824.	M. Dupin, May 6, 1824.
EMILIANI (LUIGI), M. D. Risposta al Tema proposto con Programma 22 Luglio, 1821, dalla Società Italiana delle Scienze residente in Modena. Memoria coronata dalla Società medesima. 4° *Modena*, 1823.	Dr. L. Emiliani, March 25, 1824.

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EDWARDS (H. MILNE) M. D. Mémoire sur la Structure Élémentaire des principaux Tissus organiques des Animaux. 4° *à Paris*, 1823.	Dr. H. Milne Edwards, Jan. 15, 1824.
EDWARDS (W. F.) M. D. De l'Influence des Agens Physiques sur la vie. 8° *Paris*, 1824. *v.* BRECHET.	Dr. W. F. Edwards, April 8, 1824.
THE EUROPEAN MAGAZINE AND LONDON REVIEW. June–October, 1823. 8° *London*, 1823.	The Proprietors.
FLORA BATAVA. No. 63–65. 4°	H. M. The King of the Netherlands.
FORSTER (THOMAS) M. D. Somatopsychonoologia, showing that the proofs of Body Life and Mind considered as distinct essences cannot be deduced from Physiology, but depend on a distinct sort of Evidence, being an Examination of the Controversy concerning Life, carried on by MM. Laurence, Abernethy, Rennell, and others, by Philostratus. 8° *London*, 1823.	Dr. Thomas Forster, March 11, 1824.
HALL (*Capt.* BASIL, *R. N.*) Extracts from a Journal written on the Coasts of Chili, Peru, and Mexico, in the years 1820, 1821, and 1822. 2nd Edition, 2 Vols. 12° *Edinburgh*, 1824.	Captain B. Hall, June 17, 1824.
HARDING (CAROLUS LUDOVICUS) Atlas Novus Cœlestis XXVII. Tabulis, continens Stellas inter Polum Borealem et trigesimum gradum Declinationis Australis adhuc observatas. 27 sheets. *Gottingæ*, 1822.	M. C. L. Harding, May 6, 1824.
HOME (*Sir* EVERARD, *Bart.*) Lectures on Comparative Anatomy, in which are explained the preparations in the Hunterian Collection, illustrated by Engravings, to which is subjoined Synopsis Systematis Regni Animalis nunc primum ex ovi modificationibus præpositi. Vol. III. and IV. 4° *London*, 1823.	Sir E. Home, Bart. Nov. 20, 1823.
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HUBERUS (DANIEL) Nova Theoria de Parallelarum Rectarum proprietatibus. 12° *Basiliæ*, 1823.	Mr. Huber, Jan. 29, 1824.
——— Eröffnungs-Rede de siebenten Jahres-Versammlung der Allgem. Schweizerischen Gesellschaft für gesammte Naturwissenschaften gehalten in Basel den 23 heumonats 1821. 12° *Basel*, 1821.	———
HUMBOLDT (*Baron* DE) Selections from the Works of the Baron de Humboldt relating to the Climate, Inhabitants, Productions, and Mines of Mexico, with Notes by John Taylor, Esq *Tr. Geol. Soc. London*, 1824.	John Taylor, Esq. April 29, 1824.
JOMARD (*M.*) Voyage à l'Oasis de Syouah, redigé et publié d'après les matériaux recueillis par M. le Chev. Drovetti, Consul Général de France en Égypte, et par M. Frédéric Caillaud de Nantes pendant leurs voyages dans cette Oasis en 1819 et en 1820. 2 et 3 Livraisons. fol. *Paris*, 1823.	M. Jomard, Nov. 20, 1823.
——— Recueil d'Observations et de Mémoires sur l'Égypte Ancienne et Moderne, ou Description historique et pittoresque de plusieurs des principaux monumens de cette contrée, accompagnée de Recherches sur les Connaissances des anciens Égyptiens et de Remarques sur la Géographie, l'Archæologie, et les Beaux-Arts. Tome 3e. 8°. *Paris, no date.*	———

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IRBY (*the Hon.* CHARLES LEONARD) and JAMES MANGLES (*Commanders in the Royal Navy.*) Travels in Egypt and Nubia, Syria and Asia Minor during the years 1817 and 1818. 8° *London*, 1823.	Captains Irby and Mangles, Dec. 18, 1823.
KIRCKHOFF (LE *Chev.* J. ROM. LOUIS DE) Hygiène Militaire à l'Usage des Armées de Terre. 8° *à Anvers*, 1823.	Le Chev. Kirckhoff, Nov. 20, 1823.
LANCASTRIÆ DUCATUS. Pars prima. Calendarium Inquisitionum post mortem, &c. temporibus Regum Edw. I. Edw. III. Rich. II. Hen. V. Hen. VI. Edw. IV. Hen. VII. Hen. VIII. Edw. VI. Regin Mar. Phil. et Mar. Eliz. Jac. I. Car. I. Pars Secunda. A Calendar to the pleadings, &c. in the Reigns of Hen. VII. Hen. VIII. Edw. VI. Queen Mary and Phil. and Mary, printed by Command of H. M. King George IV. in pursuance of an Address to the House of Commons of Great Britain. fol. 1823.	The Commissioners of Public Records, Nov. 20, 1823.
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ERRATUM.

The references to the Figures in Mr. IVORY's Paper having been accidentally omitted, are to be thus supplied;

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