Rare and important books & manuscripts in science, by Christian Westergaard, M.Sc.

SOPHIA ∑ RARE BOOKS

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Booth A-22

Paris International Antiquarian Book Fair
10-13 April 2014

SOPHIA ∑ RARE BOOKS

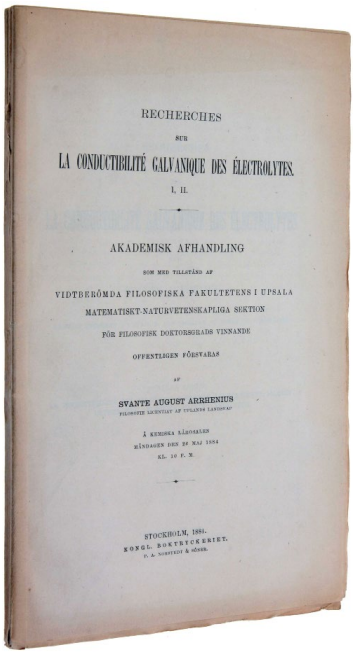
(The descriptions in this list are abbreviated; full descriptions are available)

His dissertation for which he was awarded the Nobel Prize

1. ARRHENIUS Svante August. *Recherches sur la Conductibilité Galvanique des Électrolytes. I: La conductibilté des solutions aqueuses extrêmement diluées déterminée au moyen du dépolarisateur. II: Théorie chimique des électrolytes.* Stockholm: P.A. Norstedt, 1884.

€2,400

The rare offprint issue of Arrhenius's landmark discovery of the theory of electrolytic disassociation. Arrhenius was awarded the 1903 Nobel Prize in chemistry "in recognition of the extraordinary services he has rendered to the advancement of chemistry by his electrolytic theory of dissociation." By 1880, "it was known that solutions of certain compounds conduct electricity and that chemical reactions could occur when a current was passed. It was thought that the current decomposed the substance. In 1883 Arrhenius proposed a theory that substances were partly converted into an active form when dissolved. The active part was responsible for conductivity. In the case of acids and bases, he correlated the strength with the degree of decomposition on solution. This work was published as *Reserches sur la conductibilite galvanique des electrolytes* (1884; Researches on the Electrical Conductivity of Electrolytes) and submitted as his doctoral dissertation... Arrhenius sent his work to several leading physical chemists, including Jacobus van't Hoff. Friedrich Ostwald, and Rudolf Clausius, who were immediately impressed" (Biographical Encyclopedia of Scientists). Arrhenius soon gained high international acclaim, ultimately being awarded the 1903 Nobel Prize in chemistry for his work.

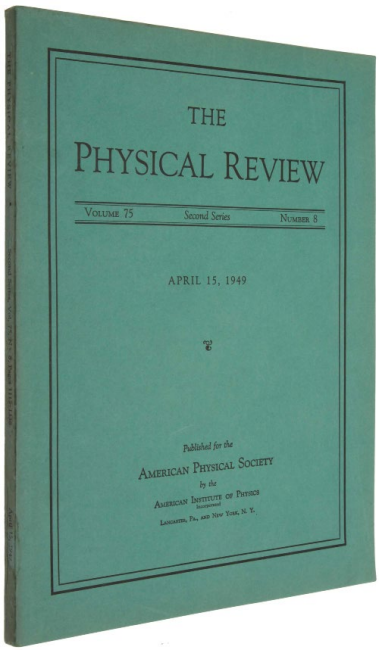

RECHERCHES
SUR
LA CONDUCTIBILITÉ GALVANIQUE DES ÉLECTROLYTES.
I, II.
AKADEMISK AFHANDLING
VIDTBERÖMDA FILOSOFISKA FAKULTETENS I UPSALA
MATEMATISKT-NATURVETENSKAPLIGA SEKTION
SVANTE AUGUST ARRHENIUS
STOCKHOLM, 1884.

A fine copy in unrestored original wrappers. A journal version was published in the Proceedings of the Swedish Academy of Science, this spererate offprint this however much scarcer, and especially in such fine condition.

Invention of the transistor - 1956 Nobel Prize in Physics

2. BARDEEN, John & Walter BRATTAIN. *Physical Principles Involved in Transistor Action.* Lancaster: American Physical Society, 1949.

€1,850


THE
PHYSICAL REVIEW
VOLUME 75 Second Series NUMBER 8
APRIL 15, 1949
Published for the
AMERICAN PHYSICAL SOCIETY

The first comprehensive report on the transistor; one of the most important inventions of the 20th century. The invention of the transistor was first announced in three short letters by Bardeen, Brattain, Shockley, and Pearson, in T*he Physical Review* (July 1948). The following year Bardeen and Brattain published the more comprehensive report 'Physical Principles Involved in Transistor Action'. This paper was simultaneously published, the same month, in *The Physical Review* [as offered here] and *Bell System Technical Journal* [no priority established]. In 1956 Bardeen and Brattain shared the Nobel Prize in Physics with William Shockley "for their researches on semiconductors and their discovery of the transistor effect". In 1972 Bardeen again received the Nobel Prize in Physics for his part in the development of the theory of superconductivity (BCS-theory), and thus became the only person, until this day, to receive the Nobel Prize more than once in the same field.

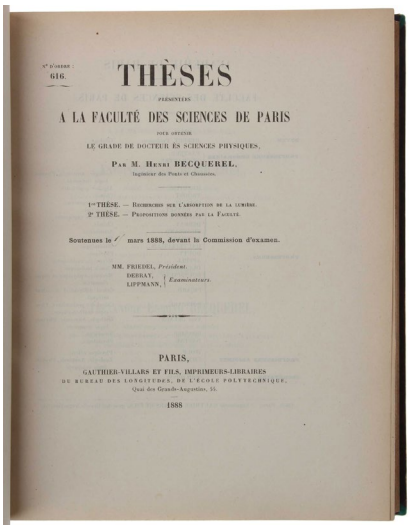
Original and unrestored printed wrappers. No stamps or other markings. Rare in such good condition. We know of no offprint of this paper.
Hook & Norman: Origins of Cyberspace, no. 450.

His doctorial thesis

3. BECQUEREL, Antoine Henri. *Recherches sur l'absorption de la lumiere. Thèses presentees a la faculté des sciences de Paris pour obtenir le grade de docteur ès sciences physiques.* Paris: Gauthier-Villars, 1888.

€3,200

Becquerel's doctoral thesis on the absorption of light in crystals. "On March 15, 1888 he submitted his thesis 'Recherches sur l'absorption de la lumière' (Research on the absorption of light). Antoine Henri had been interested in the absorption of light by crystals since 1886 and showed the importance of crystal symmetry in the absorption spectra of polarized light. He noticed that tetravalent uranium compounds were not phosphorescent, whereas uranyl salts exhibited a bright luminescence under the same conditions of excitation. Interestingly enough this was the second experiment performed by a Becquerel on uranium. Like his father, Antoine Henri was fascinated by the phenomenon of phosphorescence, and at the time nobody suspected the secret hidden in the mysterious element. This strange coincidence might be regarded as a premonitory sign of destiny or as the first step towards a major discovery." (Adloff: *100 Years after the Discovery of Radiochemistry,* p.5). Six other doctoral thesis bound in (of which Deslandres' is another important work).


N° D'ORDRE : 616.

THÈSES

PRÉSENTÉES

A LA FACULTÉ DES SCIENCES DE PARIS

POUR OBTENIR

LE GRADE DE DOCTEUR ÈS SCIENCES PHYSIQUES,

PAR M. HENRI BECQUEREL,

Ingénieur des Ponts et Chaussées.

1re THÈSE. — RECHERCHES SUR L'ABSORPTION DE LA LUMIÈRE.

2e THÈSE. — PROPOSITIONS DONNÉES PAR LA FACULTÉ.

Soutenues le mars 1888, devant la Commission d'examen.

MM. FRIEDEL, *Président.*
DEBRAY,
LIPPMANN, } *Examinateurs.*

PARIS,
GAUTHIER-VILLARS ET FILS, IMPRIMEURS-LIBRAIRES
DU BUREAU DES LONGITUDES, DE L'ÉCOLE POLYTECHNIQUE,
Quai des Grands-Augustins, 55.

1888

Provenance: probably compiled by the terrestrial physicist and oceanographer Alphonse Berget, with his bookplate to the front paste down and his initials in gilting to the spine.

Bound in one fine red morocco with green vellum corners from about 1900 with gilt spine lettering listing the seven authors. Very fine and clean throughout.

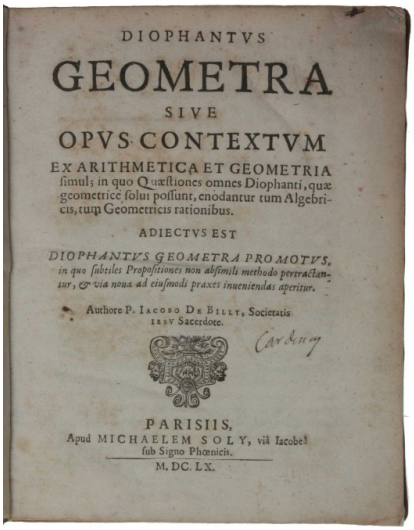
❧*Norman 156.*

Fermat and Diophantine equations

4. BILLY, Jacques de. *Diophantus geometra siue Opus contextum ex arithmetica et geometria simul: in quo quæstiones omnes Diophanti, quæ geometrice solui possunt, enodantur tum algebricis, tum geometricis rationibus. Adiectus est Diophantus geometra promotus, in quo subtiles propositiones non absimili methodo pertractantur, & via noua ad eiusmodi praxes inueniendas aperitur.* Paris: Michel Soly, 1660.

€12,000

Rare first edition of this work on the indeterminate problems of Diophantus' Arithmetica. Billy corresponded actively with Fermat on number theory, and it is mainly through his collection of letters from Fermat, published as 'Doctrinae Analyticae Inventum Novum' in the 1670 edition of Bachet's Diophantus, that we know of Fermat's methods for solving Diophantine equations. This work, published a decade before the 'Inventum Novum', also deals with Diophantine problems, in which both arithmetical and geometrical solutions are given. The second part is devoted to 59 algebraic problems that are not found in Diophantus. "Billy corresponded with Fermat and produced a number of results in number theory which have been named after him. Billy had collected many problems from Fermat's letters and, after the death of his father, Fermat's son appended de Billy's collection under the title 'Doctrinae analyticae inventum novum' (New discovery in the art of analysis) as an annex to his edition of the Arithmetica of Diophantus (1670)" (DSB). *Provenance*: ownership inscription on title of [Géraud de] Cordemoy. "Geraud de Cordemoy (1626-1684) was one of the more important Cartesian philosophers during the decades immediately following the death of Descartes. ... His two most important works are *Le Discernement du corps et de l'âme* (1666) and his *Discours physique de la parole* (1668)" (SEP)."


DIOPHANTVS

GEOMETRA

SIVE

OPVS CONTEXTVM

EX ARITHMETICA ET GEOMETRIA simul; in quo Quæstiones omnes Diophanti, quæ geometrice solui possunt, enodantur tum Algebricis, tum Geometricis rationibus.

ADIECTVS EST

DIOPHANTVS GEOMETRA PROMOTVS, in quo subtiles Propositiones non absimili methodo pertractantur, & via noua ad eiusmodi praxes inueniendas aperitur.

Authore P. Iacobo De Billy, Societatis IESV Sacerdote.

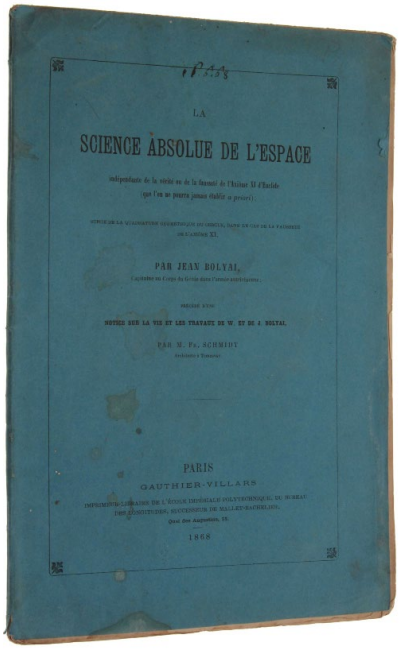
PARISIIS,
Apud MICHAELEM SOLY, viâ Iacobeâ sub Signo Phœnicis.
M. DC. LX.

A fine copy in contempoary vellum.

Inscribed offprint of the first vernacular edition of Bolyai's exteremely rare 'Appendix'

5. BOLYAI, János. *La science absolue de l'espace indépendante de la vérité ou de la fausseté de l'axiôme XI d'Euclide (que l'on ne pourra jamais établir a priori); suivi de la quadrature géométrique du cercle, dans le cas de la fausseté de l'Axiôme XI… Précédé d'une Notice sur la Vie et les Travaux de W. et de J. Bolyai par M. Fr. Schmidt.* Paris: Gauthier-Villars, 1868.

€3,500


LA
SCIENCE ABSOLUE DE L'ESPACE
PAR JEAN BOLYAI,
PARIS
GAUTHIER-VILLARS
1868

First separate edition, presentation copy from the translator, of the first vernacular translation of the famous *Appendix* by Janos Bolyai, one of the most important works in the history of mathematics. This *Appendix*, together with the independent work of Nikolai Lobachevsky, constitute the founding works of non-Euclidean geometry.

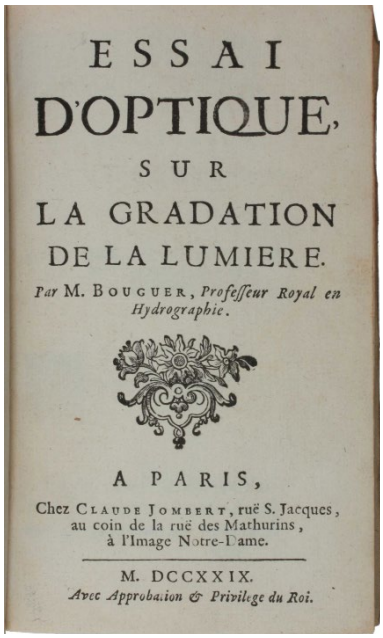
Provenance: Inscribed on the title page by the translator Jules Hoüel (1823-86) to mathematician Giusto Bellavitis (1803-80) - known for his geometrical calculus which influenced Grassmann's *Ausdehnungslehre* (another milestone in the history of geometry), for his contributions to algebraic geometry, and for his work in the history of mathematics (he vindicated Pietro Cataldi by attributing to him the invention of continued fractions).

A beutiful copy preserved in the original wrappers, unrestored, and in fine condition. Scarce, and in particular inscrbed as here by the translator to another mathematician of importance.
Dibner 116; Evans 13; Horblit 69b; Norman 259; (refering to the first edition).

The founding work of photometry

6. BOUGUER, Pierre. *Essai d'optique sur la gradation de la lumiere.* Paris: Claude Jombert, 1729.

€3,250

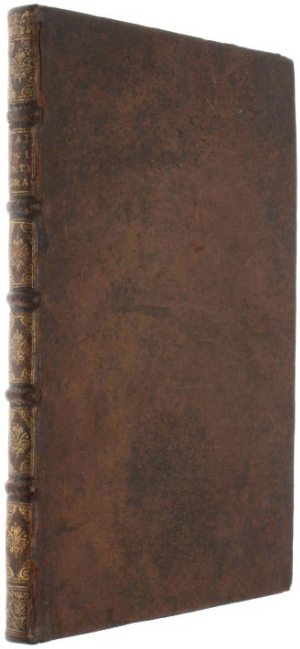

ESSAI
D'OPTIQUE,
SUR
LA GRADATION
DE LA LUMIERE.
Par M. BOUGUER, Profeſſeur Royal en Hydrographie.
A PARIS,
Chez CLAUDE JOMBERT, ruë S. Jacques, au coin de la ruë des Mathurins, à l'Image Notre-Dame.
M. DCCXXIX.
Avec Approbation & Privilege du Roi.

First edition of the founding work of photometry. "Bouguer is regarded as the founder of photometry, the branch of optics concerned with measuring the intensity of light. His two most important contributions to the subject are contained in his *Essai* [the offered book], the first part of which states his method of comparing the relative brightness of two lights by using the eye as a null indicator (i.e., to establish the equality of brightness of two adjacent surfaces) and applying the laws of inverse squares. The second part contains the first statement of what is often called Bouguer's law: that in a medium of uniform transparency, the light remaining in a collimated beam is an exponential function of the length of its path in the medium. This law was restated thirty-one years later in Lambert's *Photometria* and is thus sometimes referred to as Lambert's law" (DSB).

Contemporary mottled calf, richly gilt spine, all edges and boarders gilt, head of spine with some chipping, hinges slightly worn, engraved book plate to front paste down. A fine copy. Norman 283.

The first book on the integral calculus

7. CARRÉ, Louis. *Methode pour la mesure des surfaces, la dimension des solides, leurs centres de pesanteur, de percussion et d'oscillation, par l'application du calcul intégral.* Paris: Jean Boudot, 1700.



€4,500

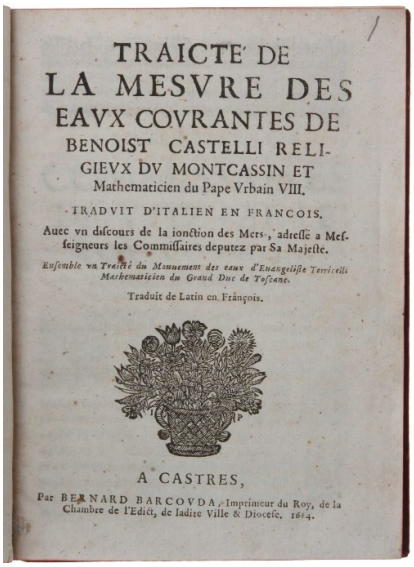
A fine copy of the first text-book on the integral calculus. "It was through his wide network of acquaintances in various European countries that Leibniz put into effect all his strategies for the spread of his analysis. The presence first of Jacob Hermann, the favourite pupil of Jacob Bernoulli, and then of Nicolaus I Bernoulli, the nephew of the Bernoulli brothers, as professors of mathematics in Padua was one outlet... In France it was through the Oratorian circle of Nicolas Malebranche (1638–1715) that Johann Bernoulli introduced in 1691 the Leibnizian calculus. His lessons to the Marquis de l'Hôpital led to the draft of the first treatise of differential calculus (1696), and it was under the influence of Malebranche that some years later appeared the first works on the integral calculus by Louis Carré in 1700 and Charles René Reyneau in 1708. The spread and acceptance of the Leibnizian calculus was transferred in this way to the wide public, through the manuals and textbooks written for students at universities or ecclesiastical colleges." (Landmark Writings in Western Mathematics, p.56).

Contemporary marbled calf, spine gilt in compartments, gilt edges. A fine copy.

Containing one of the two only scientific publications by Fermat during his lifetime

8. CASTELLI, Benedetto [FERMAT] *[Della misura dell'acque correnti]. Traicté de la mesure des eaux courantes… traduit de'italien en françois. Auec un discours de la ionction des mers… Ensemble un traicté du mouuement des eaux d'Euangeliste Torricelli… Traduit du latin en françois [by Pierre Saporta].* Castres: F. Barcouda, 1664.

€25,000


TRAICTE' DE
LA MESVRE DES
EAVX COVRANTES DE
BENOIST CASTELLI RELI-
GIEVX DV MONTCASSIN ET
Mathematicien du Pape Vrbain VIII.
TRADVIT D'ITALIEN EN FRANCOIS.
Auec vn discours de la ionction des Mers, adressé a Mes-
seigneurs les Commissaires deputez par Sa Majesté.
Ensemble vn Traicté du Mouuement des eaux d'Euangeliste Torricelli
Mathematicien du Grand Duc de Toscane.
Traduit de Latin en François.
A CASTRES,
Par BERNARD BARCOVDA, Imprimeur du Roy, de la
Chambre de l'Edict, de ladite Ville & Diocese. 1664.

Rare first edition in French of two works which founded the modern science of hydraulics, and including an original contribution by Fermat which appears here for the first time. Only one other scientific work of Fermat was published in his lifetime. The second work has a preface by the translator Saporta addressed to Fermat. Fermat had prompted Saporta to undertake the translation as a sequel to that of Castelli. The last four pages of the book contain the 'Observation sur Synesius'. The ailing Synesius (378-430 AD) wrote in 402 to his friend and teacher Hypatia asking for an instrument he called a hydroscopium or baryllion, and provided detailed instructions as to its construction. When the works of Synesius were published by the Jesuit theologian Denis Petau (1583-1652) in 1640, Petau confessed that he was unable to understand Synesius's letter. Castelli asked Fermat for his opinion, and the latter's response was published as the 'Observation sur Synesius'. The only other scientific work of Fermat to be published in his lifetime was *De linearum curvarum*, which appeared as an appendix to Lalouvere's *Veterum geometrica promota* (1660).

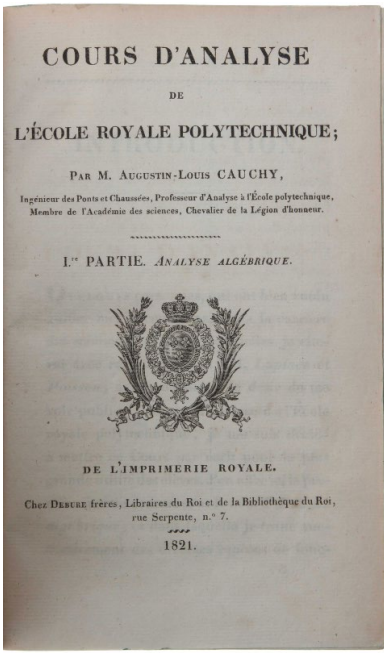
Provenance: from the Macclesfield library. Mid-18th-century sprinkled calf, gilt spine, red morocco label, red edges.

A foundation work of modern calculus

9. CAUCHY, Augustin-Louis. *Cours d'analyse de l'Ecole Polytechnique Royale 1.re Partie. Analyse algébrique. [all published].* Paris: de Bure, 1821.

€3,800

Rare first edition of his great textbook in which "Cauchy gave the foundation of the calculus as we now generally accept it". (D.J. Struik). In this work "Cauchy laid out a theory of limits, and upon its basis he constructed the basic theory of real-variable functions and of the convergence of infinite series; and also the calculus, in the approach that eventually was to dominate all others." (Grattan-Guinness). Cauchy wrote five textbooks and more than 800 papers and is, therefore, next to Euler, the most productive mathematician who ever lived. "In his greatest contribution to mathematics, Cauchy provided a first phase of satisfactory foundations for mathematical analysis. He presented some of these foundations in his classic 'Cours d'analyse de l'École Royale Polytechnique' (1821) [the offered book] by refining the notions of limit, continuity, function, and convergence. In this and later works he established the limit concept as the cornerstone for the calculus." (Calinger, *Classics of Mathematics* 102).


COURS D'ANALYSE

DE

L'ÉCOLE ROYALE POLYTECHNIQUE;

PAR M. AUGUSTIN-LOUIS CAUCHY,

Ingénieur des Ponts et Chaussées, Professeur d'Analyse à l'École polytechnique, Membre de l'Académie des sciences, Chevalier de la Légion d'honneur.

I.re PARTIE. *ANALYSE ALGÉBRIQUE.*

DE L'IMPRIMERIE ROYALE.

Chez DEBURE frères, Libraires du Roi et de la Bibliothèque du Roi, rue Serpente, n.° 7.

1821.

Rare: Just two copies recorded in ABPC the past 50 years (Sotheby's 1963 & 1978); "By the end of the nineteenth century, the editors of Cauchy's collected works had difficulty in tracing a copy of Cauchy 1821 in France!" (Laugwitz in *Encyclopedia of the History and Philosophy of the Mathematical Sciences*, p. 319).

Contempoaray half vellum, a very good copy of this rare work.

❧*Landmark Writings in Western Mathematics, no. 25; Honeyman 636.*

The first new theoretical physics book to appear in France since 1671

10. CHÂTELET, Émilie, Marquise Du. *Institutions de Physique.* Paris: Prault, 1740.

€3,500

A fine copy of "the first new theoretical physics book to appear in France since 1671. [Du Chatelet] was troubled, as were most French scientists, by the lack of a physical explanation for Newton's mathematical physics, and various metaphysical concepts are introduced. The allegorical frontispiece shows muses of the sciences at the bottom and a female figure climbing to a naked figure, perhaps representing Truth. The figures at the top probably represent Descartes, Newton, and Leibniz." (Smeltzer). Madame Châtelet (1706-1749), an intimate friend of Voltaire, is best known in the history of science for her translation of Newton's *Principia* into French.

Contemporary French calf, fully complete with engraved frontispiece, and 11 engraved folding plates.

❧*Ronald Smeltzer, Extraordinary Women in Science & Medicine, no. 7.*

By one of the best makers of terrestrial globes

11. CORONELLI, Vincenzo. *Epitome Cosmographica, o compendiosa introduttione All'Astronomia, Geografia, & Idrografia, Per L'Uso, Dilucidatione, e Fabbrica delle Sfere, Globi, Planisferi, Astrolabi, et Tavole Geografiche....* Colonia [i.e. Venice]: Ad istanza di Andrea Poletti, 1693.

€16,500

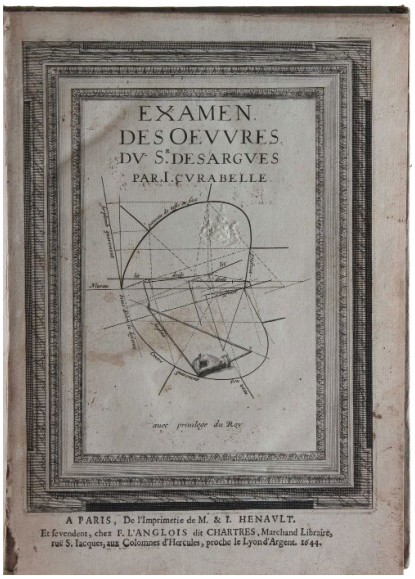
First and only edition of this sumptuously illustrated work, a singular source for the documentation of several of the most elaborate large-scale globes, inventions used to make celestial and terrestrial maps, and astronomical mechanisms, some now lost, constructed during the latter decades of the seventeenth century. The work contains 4 large fold-out celestial maps in circular format engraved in a spectacular baroque style. These celestial maps are especially noteworthy because they were based upon the most recent astronomical observations and were copied into the eighteenth century. Also included are two large terrestrial maps – the western and eastern hemispheres. Of the 37 double-page plates, many illustrate globes, spheres, astronomical diagrams and instruments.

Engraved frontispiece, 37 double-page plates, one with 6 volvelles. Contemporary mottled calf, spine richly gilt in compartments with red lettering-piece (boards a little scuffed, top of front joint starting). Bookplate of Bibliothecae Nobilis Collegii Ptolemaei on front pastedown. A fine copy.

On the work of Desargues

12. CURABELLE, Jacques. *Examen des oeuvres de Sr. Desargues; Foiblesse pitoyable du Sr. Desargues employée contre l'examen fait de ses oeuvres.* Paris: de l'imprimerie de M. & I. Henault, et se vendent, chez F. l'Anglois dit Chartres, 1644.

€13,000



First edition, complete with its very rare supplement, of this polemic against Girard Desargues (1591-1661). Important for containing literal extracts from Desargues' *Brouillon Projet*, the work also contains the first printed reference to 'La Pasqualle', the mystic hexagram, published in 1640 by the sixteen year-old Pascal in a broadside of which only one copy survives.

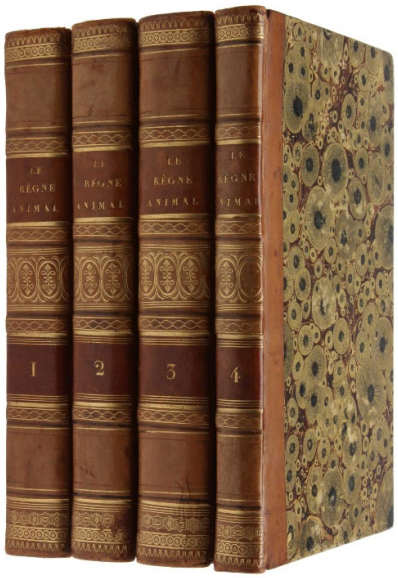
With 16 engravings printed in the text (several full-page),with an engraving printed on one page, 18th century vallum-backed blue paper boards, lower inner corner of the first eight pages with some damage (but not affecting the printing area). ❧ *Macclesfield 581 (this copy); Arnaud de Vitry 165.*

An exceptionally fine set

13. CUVIER, Georges L.C.F.D. *Le Règne Animal Distribué D'Après Son Organisation, Pour Servir De Base À L'Histoire Naturelle Des Animaux Et D'Introduction À L'Anatomie Comparée.* Paris: Deterville, 1817.

€5,400

"The most influential exposition of typological approach to animal classification, representing the greatest body of zoological facts that had yet been assembled; it served as the standard zoological manual for most Europe during the first half of the nineteenth century." (Norman). "Using the taxonomic system that he had introduced in 1812 in his memoire 'Sur un nouveau rapprochement à établir entre led classes quicomposent le règne animal,' Cuvier divided the animal kingdom into four main types or *embrachements*: Vertebrata, Mollusca, Articulata and Radiata, each with its own subgroups. This represented an attempt at a 'natutal' classification system, based upon the assumption that the characteristic interrelationship between an animal's function and structure placed it within an exclusive group (i.e., that species were 'real'), as opposed to the more artificial systems of the past, which had been based upon single features of species. Cuvier's view of animal organization led him to an early recognition of balance of nature, both with respect to the functional balance of parts in the individual and the interdependence of groups in the 'network of nature.'" (Norman).



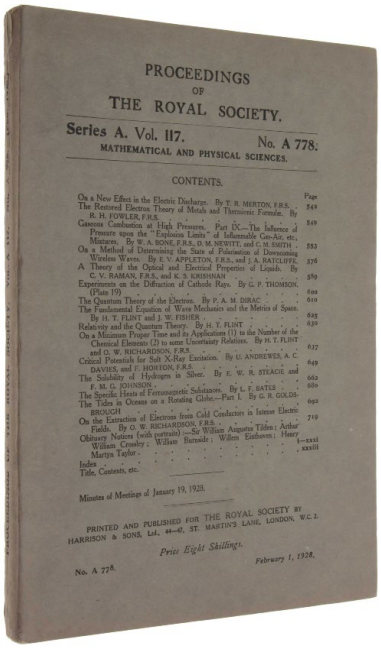
A beautiful set of in fine contemporary French half calf, richly gilt spines and green vellum corners.

❧*PMM 276; Dibner 195; Sparrow, Milestone 42; Norman 567.*

The Dirac equation

14. DIRAC, Paul Adrien Maurice. *The Quantum Theory of the Electron.* London: Harrison, 1928.

€4,500


PROCEEDINGS
OF
THE ROYAL SOCIETY.
Series A. Vol. 117. No. A 778.
MATHEMATICAL AND PHYSICAL SCIENCES.
CONTENTS.
Minutes of Meetings of January 19, 1928.
PRINTED AND PUBLISHED FOR THE ROYAL SOCIETY BY HARRISON & SONS, Ltd., 46–47, ST. MARTIN'S LANE, LONDON, W.C.2.
Price Eight Shillings.
No. A 778. February 1, 1928.

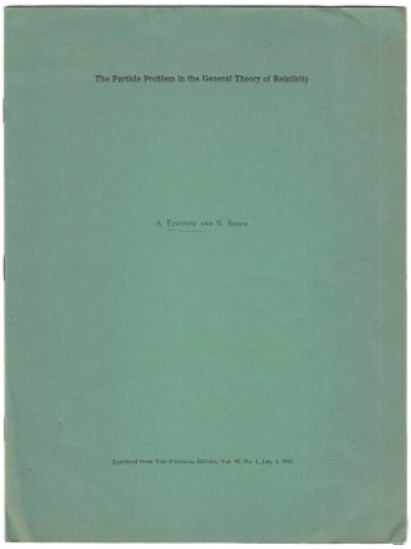
A fine copy in original wrappers of the discovery of the 'Dirac equation'. "The relativistic wave equation of the electron ranks among the highest achievements of twentieth-century science" (Pais, Inward Bound, p. 290). "What is widely regarded as Dirac's greatest contribution to physics came in 1928, when he found an equation which incorporates both quantum physics and the requirements of the special theory of relativity to give a complete description of the electron. One of the most remarkable features of this equation was that it had two sets of solutions, corresponding to positive energy electrons and negative energy electrons; the 'negative energy electrons' are now called positrons. Dirac had predicted the existence of antimatter, although even Dirac was not entirely clear what the equations meant until the positron was discovered by Carl Anderson in 1932. Because they incorporated relativistic effects, Dirac's wave equations had accurately predicted the electron's motion, spin, and magnetic and other properties. Moreover, these equations laid the foundations for the theory of quantum electrodynamics, which incorporates both quantum and relativity theory in its descriptions of the interactions of charged particles with the electromagnetic field" (Britannica).

❧*Brandt, Harvest of a Century, Episode 43.*

First announcement of the concept of 'wormhole'

15. EINSTEIN, Albert; ROSEN, Nathan *The Particle Problem in the General Theory of Relativity.*. Lancaster PA: Lancaster Press, 1935.

€2,200



Rare offprint of the famous 'Einstein-Rosen bridge' paper in which the authors introduced the concept of a wormhole. "In the last decades of his life, Albert Einstein tried endlessly to unify electromagnetism with his own theory of gravity, general relativity. These efforts are mostly now regarded as quixotic, but a short proposal written in 1935 with a colleague has survived in unlikely fashion as the source of science-fiction ideas for speeding across the universe by means of "wormholes" through spacetime. From the modern perspective, the paper also illustrates how general relativity posed mathematical and conceptual difficulties that foxed even its creator.

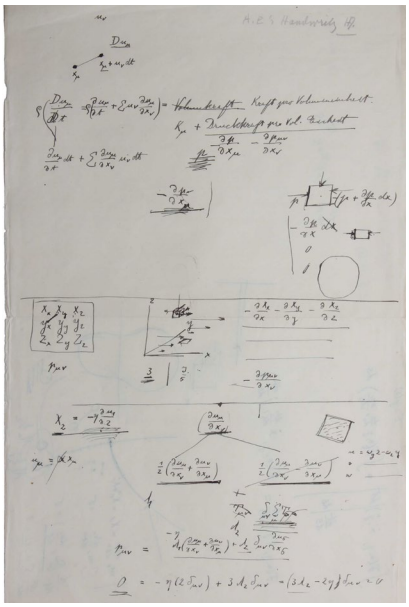
A fine copy of the rare offprint issue preserved in the original printed wrappers.

Autograph scientific notes on general relativity theory

16. EINSTEIN, Albert. *One leaf, written on both sides by Einstein. With certification in pencil in the hand of Helen Dukas, Einstein's longtime secretary: "A. E.'s handwriting. HD." From the library of historian of physics Jagdish Mehra (1931-2008).* [Zürich or Berlin: ca. 1912-1916].

€37,500

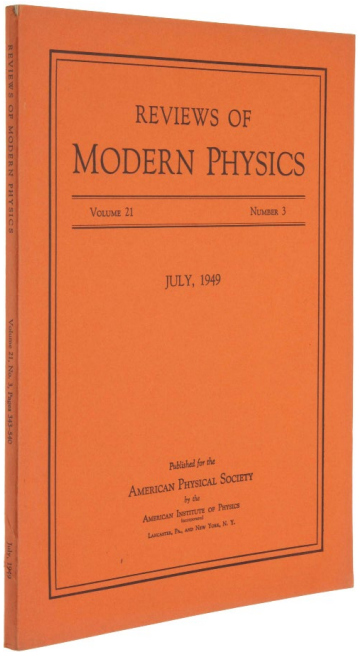
A fascinating Einstein manuscript showing the master at work. While most Einstein autograph material on the market is in the form of letters to friends or colleagues, or drafts of papers to be published, the present manuscript gives us a glimpse of Einstein doing what he did best - original research. It clearly illustrates his highly visual way of thinking - as well as mathematical formulas there are several illustrative diagrams. The present manuscript is also earlier than most such material that appears on the market, probably dating from the period 1912-1916, during which Einstein was intensely involved in the development of general relativity. The calculations employ compact four-dimensional tensor notation, which Einstein began using only by 1912. Dating the manuscript to the years just after 1912 is confirmed by the existence of thematically similar notes in *The Collected Papers*, IV, Doc. 1, (dated 1912-1914), and VI, Doc. 7, p. 58 (dated Oct. 1914-March 1915). The use of four-vector notation is most appropriate (indeed essential) in the context of general relativity. The calculations appear to discuss the motion of point particles and the ponderomotive forces arising from pressure gradients and from stresses. In the period when this manuscript was probably composed, such calculations would make most sense in the context of cosmology. Einstein completed the formal development of general relativity in autumn 1915 and was certainly thinking about cosmology in 1916. *We are grateful to Prof. P. West and Dr A. Recknagel of the Theoretical Physics Group, King's College London, and to Dr. Tilman Sauer of the Einstein Papers Project at CIT, for helping with the discription of this manuscript.*



'One of the most important papers on relativity' (Einstein)

17. GÖDEL, Kurt. *An Example of a New Type of Cosmological Solutions of Einstein's Field Equations of Gravitation.* Lancaster: American Physical Society, 1949.

€1,800



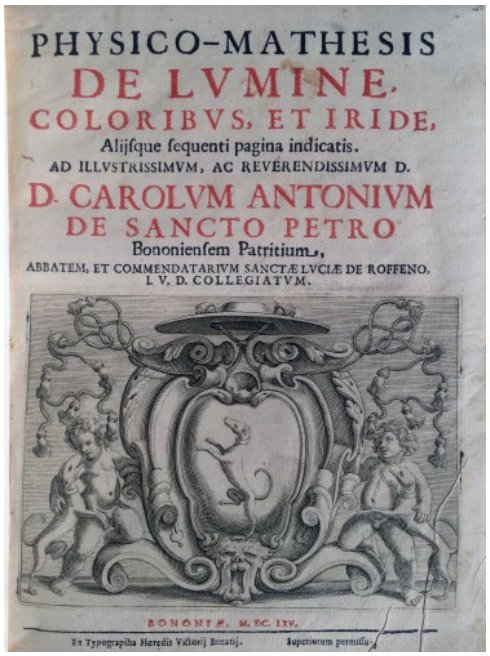
First edition of Gödel's 'time travel paper' – one of "the most important [papers] on relativity since my own original paper appeared" (Einstein to Morgenstern, 1952). "In the 1920s and 1930s, the Friedmann-Robertson-Walker cosmological models had been introduced as the simplest solutions of the equations of Einstein's general theory of relativity that were consistent with the observed red-shift of distant galaxies. These models were spatially homogenous and isotropic, and were expanding but were non-rotating. Gödel was the first to consider models that were rotating. The possible rotation of the universe has a special significance in general relativity because one of the influences that led Einstein to the theory in 1915 was Mach's principle. The exact formulation of the principle is rather obscure, but it is generally interpreted as denying the existence of absolute space. In other words, matter has inertia only relative to other matter in the universe. The principle is generally taken to imply that the local inertial frame defined by gyroscopes should be non-rotating with respect to the frame defined by distant galaxies. (Stephen Hawking in: *Gödel's Collected Works*).

A prestine copy in unrestored original prined wrappers. No stamps or other markings. Scarce in such good condition. We know of no offprint of this paper. As this issue of the Reviews of Modern Physics was dedicated to commemorating Einstein's birthday it seems unlikely that seperate offprints would have been made.

The discovery of optical diffraction

18. GRIMALDI, Francesco Maria. *Physico-Mathesis de Lumine, Coloribus, et Iride.* Bologna: Heirs of V. Benati, 1665.

€50,000


PHYSICO-MATHESIS
DE LVMINE,
COLORIBVS, ET IRIDE,
Aliiſque ſequenti pagina indicatis.
AD ILLVSTRISSIMVM, AC REVERENDISSIMVM D.
D. CAROLVM ANTONIVM
DE SANCTO PETRO
Bononienſem Patritium,
ABBATEM, ET COMMENDATARIVM SANCTÆ LVCIÆ DE ROFFENO.
I. V. D. COLLEGIATVM.
BONONIÆ, M. DC. LXV.
Ex Typographia Heredis Victorij Benatij. Superiorum permiſſu.

This is Grimaldi's only book; in it he describes the discovery of optical diffraction. This is perhaps the rarest of all great optical books, especially in such good condition, and marks the first scientific attempt to establish a comprehensive wave theory of light. The diffraction experiments which Grimaldi describes here show "that a new mode of transmission of light had been discovered and that this mode contradicts the notion of an exclusively rectilinear passage of light. Diffraction thus gave prima facie evidence for a fluid nature of light. The name 'diffraction' comes from the loss of uniformity observed in the flow of a stream of water as it 'splits apart' around a slender obstacle placed in its path." (DSB). Grimaldi repeatedly states that colors are not something different from light but are modifications of light produced by the fine structure of the bodies which reflect it, and probably consisting of an alteration in the type of motion and in the velocity of the light. The different colors are produced when the eye is stimulated by light oscillations whose velocities differ. All these views were of fundamental importance for the subsequent development of optics. Newton was aware of Grimaldi's work, though only secondhand.

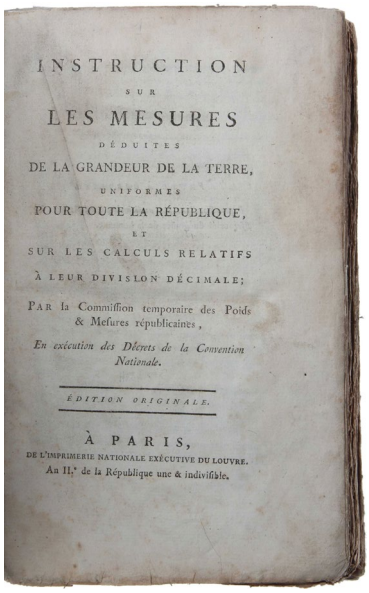
A fine copy, including the letter press title which is often lacking. Contemporary vellum.

The metric system

19. HAÜY; LAGRANGE; LAPLACE; MONGE; BORDA; LAVOISIER. *Instruction sur les mesures déduites de la grandeur de la terre, uniformes pour toute la République, et sur les calculs relatifs à leur division décimale. [Bound with 21 rare pamphlets on the metric system].*. Paris: Imprimerie Nationale exécutive du Louvre, 1793-1798.

€6,000

A large collection of official publications on the metric system – including the true first edition of the official manual with the often lacking plate. "The metric system was one of the few permanent social reforms that stemmed from the violent French Revolution. First proposed by Mouton in 1670, it is based on a decimal unit of length (meter), being one-millionth part of a quadrant of the earth through Paris. In 1790 the National Assembly appointed a commission to select a standard unit of length and the arc of a meridian between Dunkirk and Barcelona was thereafter measured. Another commission used the unit of standard length finally adopted in 1799, on which were based standards of weight and volume; the system became compulsory in France in 1801" (Dibner). "In 1793/94 (the French Revolutionary calendar year began in September), the Temporary Commission on Republican Weights and Measures published three introductory works to the metric system: the present work [offered here], which emphasized mathematics and theory; an 'abridged' introduction containing a shorter and simpler presentation of the system (see Norman 1504); and a précis of the system for distribution to the public. Instruction sur les mesures was also issued by several other French publishers in the same year; (see Norman 1500-1503). The offered copy is fully complete with the engraved plate which the Norman copy lacked, and is contemporarily bound with 21 other rare pamphlets on the metric system (please inquire for a full list with collations of the pamphlets). *Contemporary orange boards.*


INSTRUCTION
SUR
LES MESURES
DÉDUITES
DE LA GRANDEUR DE LA TERRE,
UNIFORMES
POUR TOUTE LA RÉPUBLIQUE,
ET
SUR LES CALCULS RELATIFS
À LEUR DIVISION DÉCIMALE;
PAR la Commission temporaire des Poids & Mesures républicaines,
En exécution des Décrets de la Convention Nationale.
ÉDITION ORIGINALE.
À PARIS,
DE L'IMPRIMERIE NATIONALE EXÉCUTIVE DU LOUVRE.
An II,e de la République une & indivisible.

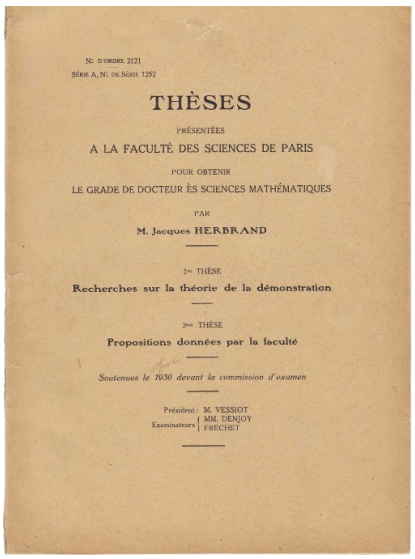
❧*Norman 1499 (that copy lacking the plate), Dibner 113 (citing a reprint).*

A seminal work in mathematical logic

20. HERBRAND, Jacques. *Thèses présentées à la Faculté des Sciences de Paris pour obtenir le grade de Docteur ès Sciences Mathématiques ... 1re thèse: Recherches sur la théorie de la démonstration. 2me thèse: Propositions données par la faculté. Soutenues le 1930 devant la commission d'examen.* Warsaw: Dziewulski, 1930.

€3,200

First edition of his doctoral dissertation - a seminal work in mathematical logic (Van Heijenoort: *From Frege to Gödel*). Herbrand "completed his doctoral dissertation in April 1929. That October he began a year of service in the French army. He then went to Germany on a Rockefeller fellowship, studying in Berlin (until May 1931) with John von Neumann, then in Hamburg (May-June) with Emil Artin, and in Göttingen (June-July) with Emmy Noether. He left Göttingen for a vacation in the Alps and a few days later was killed in a fall at the age of twenty-three... Herbrand's main contribution to logic was what is now called the Herbrand theorem, published in his doctoral dissertation: it is the most fundamental result in quantification theory... Besides yielding a very convenient proof procedure, the Herbrand theorem has many applications (a field explored by Herbrand himself) to decision and reduction problems and to proofs of consistency. Almost all methods for proving theorems by machine rest upon the Herbrand theorem" (DSB).


N: D'ORDRE 2121
SÉRIE A, N: DE SÉRIE 1252
THÈSES
PRÉSENTÉES
A LA FACULTÉ DES SCIENCES DE PARIS
POUR OBTENIR
LE GRADE DE DOCTEUR ÈS SCIENCES MATHÉMATIQUES
PAR
M. Jacques HERBRAND
1re THÈSE
Recherches sur la théorie de la démonstration
2me THÈSE
Propositions données par la faculté
Soutenues le 1930 devant la commission d'examen
Président: M. VESSIOT
Examinateurs: MM. DENJOY, FRÉCHET

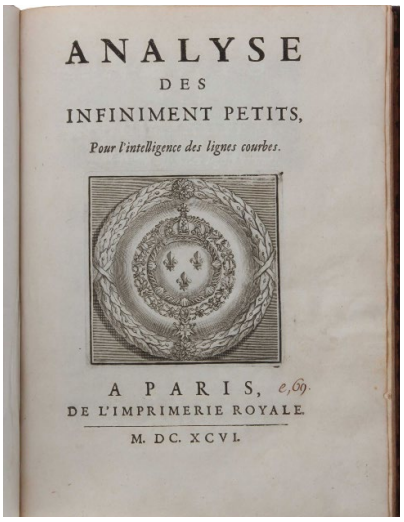
A fine copy preserved in it's original printed wrappers. Custom cloth box.

❧*See also Hook & Norman: Origins of Cyberspace, no. 865 for the important application by John A. Robinson of Herbrand's theorem. Van Heijenoort: From Frege to Gödel, pp. 525-581.*

The first book on differential calculus bound with the first book on interal calculus

21. L'HÔSPITAL, Guillaume François Antoine, Marquis de. *Analyse des infiniment petits, pour l'intelligence des lignes courbes. Paris: L'imprimerie Royale, 1696.* [Bound with:] **CARRÉ, Louis.** *Methode pour la mesure des surfaces, la dimension des solides, leurs centres de pesanteur, de percussion et d'oscillation, par l'application du calcul intégral.* Paris: L'imprimerie Royale / Jean Boudot, 1696/1700.

€17,000


ANALYSE
DES
INFINIMENT PETITS,
Pour l'intelligence des lignes courbes.
A PARIS, *e.69.*
DE L'IMPRIMERIE ROYALE.
M. DC. XCVI.

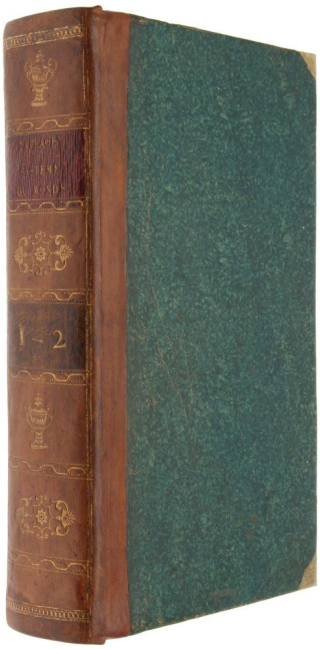
A fine sammelband comprising the first editions of the first books on the differential and integral calculus, respectively. "It was through his wide network of acquaintances in various European countries that Leibniz put into effect all his strategies for the spread of his analysis. The presence first of Jacob Hermann, the favourite pupil of Jacob Bernoulli, and then of Nicolaus I Bernoulli, the nephew of the Bernoulli brothers, as professors of mathematics in Padua was one outlet ... In France it was through the Oratorian circle of Nicolas Malebranche (1638–1715) that Johann Bernoulli introduced in 1691 the Leibnizian calculus. His lessons to the Marquis de l'Hôpital led to the draft of the first treatise of differential calculus (1696) [first offered work], and it was under the influence of Malebranche that some years later appeared the first works on the integral calculus by Louis Carré in 1700 [second offered work] and Charles René Reyneau in 1708. The spread and acceptance of the Leibnizian calculus was transferred in this way to the wide public, through the manuals and textbooks written for students at universities or ecclesiastical colleges." (*Landmark Writings in Western Mathematics*, p.56). *Two works bound in one volume, 4to, pp. [xviii], 181, [3], with 11 folding engraved plates; pp. [xii], 115, [1, blank] and 4 folding engraved plates. Old signature cut from first title and expertly repaired. Contemporary French calf, spine gilt with red lettering-piece. Fine copies.* ❧*Honeyman 2006 & 2007; Norman 1345.*

On the origin of the solar system

22. LAPLACE, Pierre Simon. *Exposition du Systême du Monde.* Paris: De l'Imprimerie du Cercle-Social, l'An IV [1796].

€4,000

A very copy, with the very rare errata leaves, of Laplace's classic work on the origin and formation of the solar system in which he first stated his celebrated 'nebular hypothesis.' "One of the most successful popularizations of science ever composed." (DSB). "An elegant, non-mathematical classic on astronomy. It is in this work that Laplace introduced one of his most notable contributions (although he himself did not take it very seriously at first), the so-called nebular hypothesis,


1 - 2

which provided a conjectural account of the origin of the solar system. This remained through the 19th century the most widely accepted view on the subject" (PMM 252). "The two-volume work consists of five books. Book I begins with what any attentive observer may see if he will open his eyes to the spectacle of the heavens on a clear night with a view of the whole horizon. Book II (...) sets out the 'real' motions of planets, satellites, and comets and gives the dimensions of the solar system. Book III is a verbal précis of the laws of motion as understood in eighteenth-century rational mechanics, with special reference to astronomy and hydrostatics. In Book IV, Laplace in effect summarized his own work in gravitational mechanics. (...) Only Book V contains material that Laplace had not written up in technical form or presupposed. It gives an overview of the history of astronomy and concludes with the speculation since called the nebular hypothesis and another on the nature of the universe in outer space". (DSB).

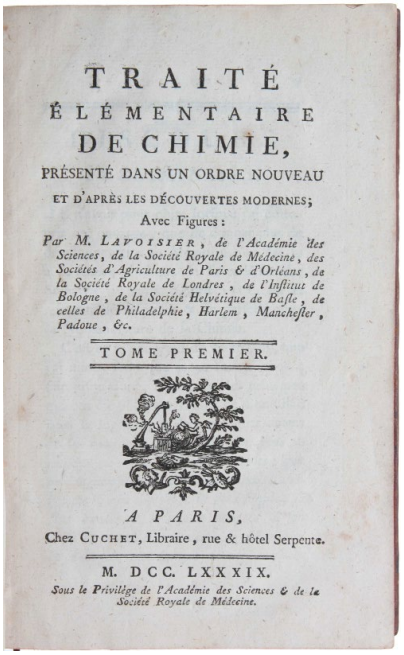
As mentioned in the 2004 Christie's sale of the library of Jean-Louis Mosès: "A pair of errata leaves was added to very few copies [not present in the Mosès-Barrillot copy]". Both of these errata leaves are present in our copy. We can find no copy in the auction records having the errata leaves. A fine copy in contempoary calf with vellum corners.

❧*Sparrow, Milestones of Science 123; Honeyman 1919.*

'Modern chemistry begins with this work' (Neville)

23. LAVOISIER, Antoine-Laurent de. *Traité élémentaire de Chimie, présenté dans un ordre nouveau, et d'après les découvertes modernes.*. Paris: Chez Cuchet, 1789.

€5,800


TRAITÉ
ÉLÉMENTAIRE
DE CHIMIE,
PRÉSENTÉ DANS UN ORDRE NOUVEAU
ET D'APRÈS LES DÉCOUVERTES MODERNES;
Avec Figures :
Par M. LAVOISIER, de l'Académie des Sciences, de la Société Royale de Médecine, des Sociétés d'Agriculture de Paris & d'Orléans, de la Société Royale de Londres, de l'Institut de Bologne, de la Société Helvétique de Basle, de celles de Philadelphie, Harlem, Manchester, Padoue, &c.
TOME PREMIER.
A PARIS,
Chez CUCHET, Libraire, rue & hôtel Serpente.
M. DCC. LXXXIX.
Sous le Privilège de l'Académie des Sciences & de la Société Royale de Médecine.

A fine copy of "one of the great milestones in the history of chemical literature. By common consent modern chemistry begins with this work" (Neville), "which finally freed the science from its phlogiston chains and formed the starting point of its modern progress. It may be said to have done almost as much for chemistry as Newton's Principia did for physics." (Zeitlinger). "Lavoisier's chemical textbook includes the unified exposition of his four most significant contributions to chemistry. These are first, the use of accurate measurements for chemical researches, such as the balance for weight distribution at every chemical change; second, researches on combustion which effectively overthrew the phlogiston theory of Stahl; third, the law of conservation of mass; and fourth, the reform of chemical nomenclature, whereby every substance was assigned a definite name based upon the elements of which it was composed." (Norman).

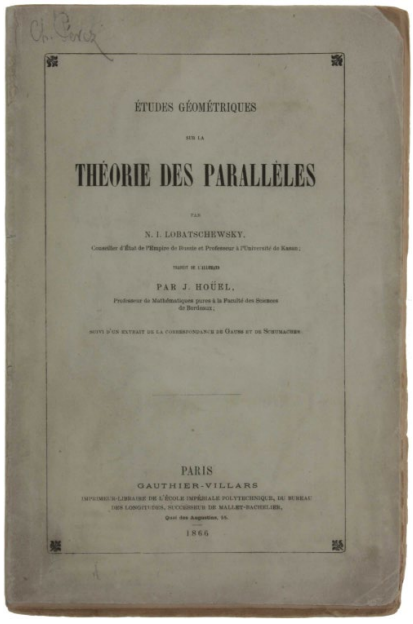
Two volumes, contemporary French calf with gilt spine, one title label missing, 2 printed folding tables and 13 engraved folding plates. Fine and clean throughout.

❧*PMM 238; Grolier/Horblit 64; Dibner 43; Evans 53; Sparrow 127.*

The first translation of Lobachewsky's 'Geometrische Untersuchungen'

24. LOBACHEWSKY, Nikolai Ivanovich. *Études géométriques sur la théorie des parallèles. Traduit de l'allemand par J. Hoüel ...; suivi d'un extrait de la correspondence de Gauss et de Schumacher.* Paris/Bordeaux: Gauthier-Villars/Gounouilhou, 1866.

€4,800


ÉTUDES GÉOMÉTRIQUES
SUR LA
THÉORIE DES PARALLÈLES
PAR
N. I. LOBATSCHEWSKY,
PAR J. HOÜEL,
PARIS
GAUTHIER-VILLARS
1866

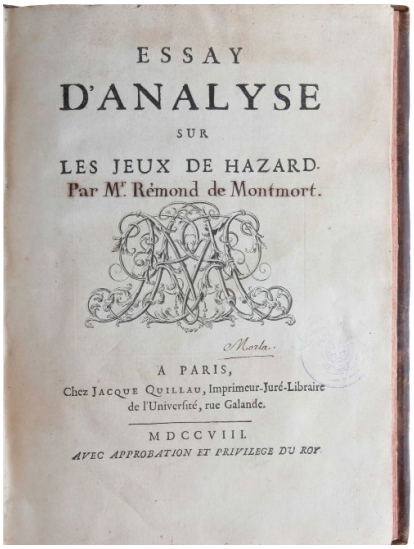
A fine copy, in wrappers, of the rare separate printing of the first translation of Lobachewsky's 'Geometrische Untersuchungen zur Theorie der Parallellinien' (Dibner 115) which was originally published in Berlin 1840. This translation by Guillaume-Jules Hoüel (1823-1886) played an important role in the acceptance of Lobachewsky's non-Euclidean geometry; "Hoüel's reputation rests primarily on the quality and quantity of his activities in mathematical exposition. His gift for languages was used to evaluate and frequently to expound or translate important foreign mathematical writings... Of great importance were his successful efforts to overcome the long-standing failure of mathematicians to appreciate the significance of non-Euclidean geometry. Led by his own research to doubt the necessity of the parallel postulate and by Richard Baltzer to the writings of Lobachevski, Hoüel published in 1866 a translation of one of the latter's essays along with excerpts from the Gauss-Schumacher correspondence. By 1870 he had published translations of the classic writings in this area of János Bolyai, Beltrami, Helmholtz, and Riemann as well as his own proof of the impossibility of proving the parallel postulate" (DSB).

❧*In Sotheran's catalogue no. 770 from 1918 this separate printing is noted to be "scarce".*

The very rare and little known first issue

25. MONTMORT, Pierre Rémond de *Essay d'Analyse sur les Jeux de Hazard..* Paris: J. Quilau, 1708.

€6,500


ESSAY
D'ANALYSE
SUR
LES JEUX DE HAZARD.
Par Mr. Rémond de Montmort.
A PARIS,
Chez JACQUE QUILLAU, Imprimeur-Juré-Libraire de l'Université, rue Galande.
M DCC VIII.
AVEC APPROBATION ET PRIVILEGE DU ROY.

Rare first edition, first issue (i.e., without plates and with significant textual differences in comparison with the second issue also from 1708 which has plates). Based on the problem's set forth by Huygens in his famous treatise *De Ratiociniis in Ludo Aleae* (1657), it spawned the publication of De Moivre's two important works *De Mesura Sortis* (1711) and *Doctrine of Chances* (1718) as well as Bernoulli's celebrated *Ars Conjectandi* (1713). "In 1708 [Montmort] published his work on Chances, where with the courage of Columbus he revealed a new world to mathematicians." (Todhunter). "The greatest value of Montmort's book lay perhaps not in its solutions but in its systematic setting out of problems about games, which are shown to have important mathematical properties worthy of further work. The book aroused Nikolaus I Bernoulli's interest in particular and the 1713 edition includes the mathematical correspondence of the two men. This correspondence in turn provided an incentive for Nikolaus to publish the Ars conjectandi of his uncle Jakob I Bernoulli, thereby providing mathematics with a first step beyond mere combinatorial problems in probability. The work of De Moivre is, to say the least, a continuation of the inquiries of Montmort. Montmort put the case more strongly—he accused De Moivre of stealing his ideas without acknowledgment. De Moivre's De mensura sortis appeared in 1711 and Montmort attacked it scathingly in the 1713 edition of his own Essay." *Contemporary calf, some light wear to joints and spine. Engraved vignette on title, author's name added in fine manuscript (the work was published anonymously), old library stamp partially removed from title, several headpieces showing gambling scenes, and two engraved figures in text of the backgammon board. Light browning to some gatherings.* ❧ *For detailed accounts of the work see: David's Games, Gods and Gambling, Chap. 14; Todhunter, History of the Theory of Probability, Chap. 7. Sotheran's 3059 (described as 'rare').*

Anamorphoses and the theory of perspective

26. NICERON, Jean Francois. *La perspective curieuse ou magie artificiele des effets merveilleux. De l'optique, par la vision directe. La catoptrique, par la reflexion des miroirs plats, cylindriques & coniques. La dioptrique, par la refraction des crystaux... Oeuvre tres-utile aux peintres, architectes, graveurs, sculpteurs...* Paris: Pierre Billaine, 1638.

€5,000


LA PERSPECTIVE CVRIEVSE

First edition, with a fine provenance, of Niceron's important treatise on perspective and anamorphic projection, which gains added significance in the history of science for containing "perhaps the first published reference to Descartes' derivation of the law of refraction" (DSB). "The classic phase of anamorphosis, during which it came to relate vitally to a series of scientific and theological concerns, occurred in France and Rome in the 1630s and 1640s. The theorist at the centre of the Paris-Rome developments was Jean-François Niceron" (Kemp).

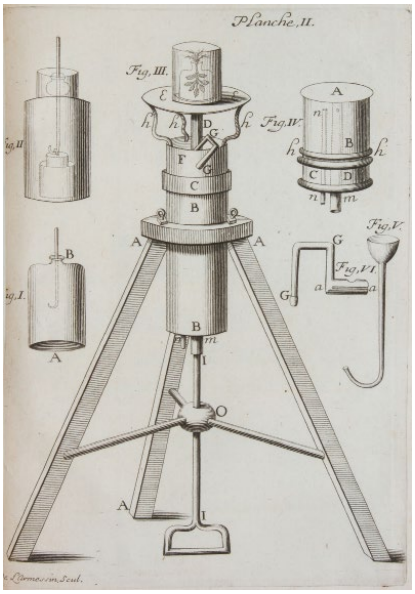
Provenance: Gilles Allou (1670-1751), French painter (signature on front fly-leaf). Allou was elected to the Académie Royale de Peinture et de Sculpture in 1711. One of his works is *L'Optique, or Portrait of Madame Allou drawing an Anamorphic.*

Folio, with engraved frontispiece and 25 engraved plates on 26 leaves (plate 19 double-page). Contemporary limp vellum.

One of the most important documents in the early history of the air-pump

27. PAPIN, Denis. *Nouvelles experiences du vuide. Avec la description des machines qui servent a les faire.* Paris: J. Cusson, Fils, 1674.

€18,500



First edition, very rare and a fine copy, of one of the most important documents in the early history of the air-pump, and the primary source (besides letters published half a century later in Christiaan Huygens' Oeuvres) for information on Huygens' improvements on Boyles' first air-pump. "Among further improvements in the air-pump during the latter part of the seventeenth century were the two way tap, introduced by Papin; and the double cylindered pump, probably introduced by Papin and perfected by Hauksbee, through whom the air-pump assumed what long remained its standard form" (Wolf, *A History of Science, Technology, and Philosophy*, Vol. I, p. 107).

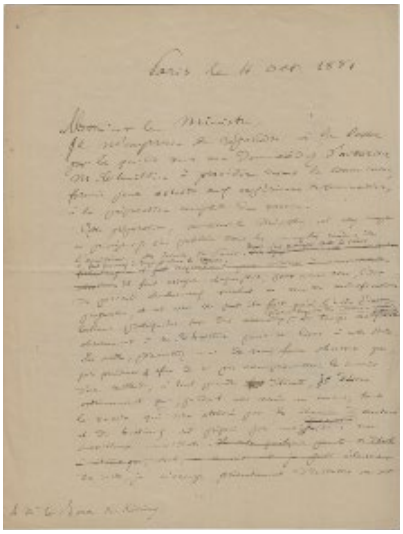
The work is contained in a sammelband from the Macclesfield Library, bound in mid-eighteenth-century polished mottled calf, with six other works.

❧*Poggendorff II 355. Ernst Weil stated (his Cat. 27, item 162) that this book is to be "always regarded as one of the Classics in Science; it is without doubt one of the rarest of all of them." OCLC lists Brandeis and Harvard only in US.*

Pasteur on his anthrax vaccine

28. PASTEUR, Louis. *Signed autograph manuscript, being the original draft version with corrections, of a letter by Pasteur to the Hungarian ambassador in Paris on the methods of inoculation using his anthrax vaccine, but also documenting Pasteur's determination to maintain the technical monopoly of his Institut over the production and mass distribution of the vaccine.* Paris: 4 October, 1881.

€15,000

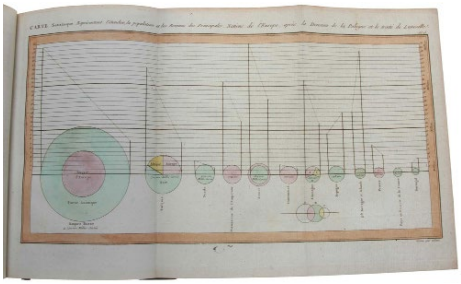


In the 1870s, anthrax was a major epidemic that plagued farmers throughout Europe. According to Pasteur, estimates of the annual loss to French agriculture from anthrax ranged from 20 to 30 million francs. In addition, the disease was also often fatal to humans. In 1876, Robert Koch had shown that anthrax was caused by a rod-shaped bacterium. By that time Pasteur was 54 years old and already internationally famous for his work on fermentation, silkworm diseases and spontaneous generation. After hearing about Koch's work he began intensively experimenting with *B. anthracis*, with his goal nothing less than harnessing and controlling its killing power. Pasteur had created a successful vaccine against chicken cholera by exposing the cultures to the air for long periods – this was the world's first artificially produced vaccine (Jenner's smallpox vaccine had been based on naturally-occurring cowpox).
❧*Cassier quotes a copy of the present letter in the archives of the Institut Pasteur. That is presumably the copy sent to Baron de Kemeny, the offered letter, which has several corrections and deletions, being the draft version retained by Pasteur for his own records.*

The important first French edition

29. PLAYFAIR, William. *Elemens de statistique, ou l'on demontre, d'aprees un principe entierement neuf, les ressources de chaque Royaume, Etat et Republique de l'Europe; suivis d'un etat sommaire des principales Puissances et Colonies de l'Indostan. Translated from the English by Denis Francois Donnant.* Paris: Chez Batilliot jeune et Genets jeune, 1802.

€4,000



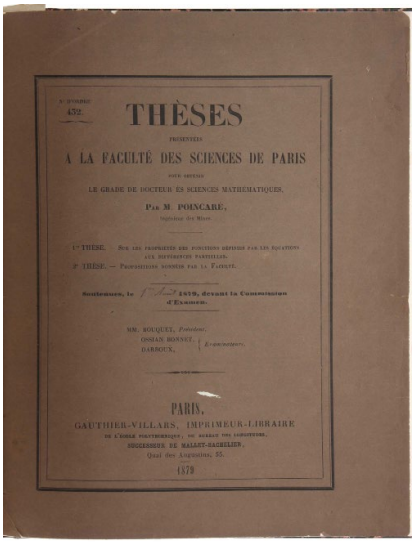
A fine copy of the important first French edition of *The Statistical Breviary*. Playfair, the founder of graphical methods of statistics, published this work originally in English in 1801. It is considered his most theoretical book about graphics in which he "broke free of analogies to the physical world and drew graphics as designs-in-themselves" (Tufte), and contains what is generally credited as the first pie chart. Donnant, the translator of this French edition, did not merely produce a translation but also added several original contributions to this edition, for example 'A Statistical Account of the United States of America', which Playfair in turn translated into English and published in 1805. In 'The Statistical Breviary: shewing, on a Principle Entirely New, the Resources of every State and Kingdom in Europe' [Playfair] first introduced the circle diagram and pie chart that used area to represent the relative sizes of geographical regions. Playfair 'offers a creative combination of different visual forms: circles (used to show the area of nations), a pie chart (to show the divisions of the Turkish Empire), and lines (to show both population and taxes)". (Tufte Sale, this French edition).

2 large folding letterpress tables plus 5 hand-colored folding engraved charts, bound in a fine contemporary half gilt with richly gilt spine (small piece chipped away at the at the lower part of the front hinge, otherwise remarkably good), a fine a fresh copy. Rare.

One of his most celebrated contributions to mathematics

30. POINCARÉ, Jules Henri. *Thèses présentées a la Faculté des sciences de Paris pour obtenir le grade de docteur des sciences mathématiques. 1re These. Sur les propriétés des fonctions définies par les équations aux différences partielles. 2e These. Propositions données par la Faculté. Soutenues le 1er aout 1879, devant la commission d'examen.* Paris: Gauthier-Villars, 1879.

€1,250


THÈSES

PRÉSENTÉES

A LA FACULTÉ DES SCIENCES DE PARIS

POUR OBTENIR

LE GRADE DE DOCTEUR ES SCIENCES MATHÉMATIQUES.

Par M. POINCARÉ,

Ingénieur des Mines.

1re THÈSE. — Sur les propriétés des fonctions définies par les équations aux différences partielles.

2e THÈSE. — Propositions données par la Faculté.

Soutenues, le 1879, devant la Commission d'Examen.

MM. BOUQUET, *Président.*
OSSIAN BONNET, *Examinateurs.*
DARBOUX,

PARIS,
GAUTHIER-VILLARS, IMPRIMEUR-LIBRAIRE
DE L'ÉCOLE POLYTECHNIQUE, DU BUREAU DES LONGITUDES,
SUCCESSEUR DE MALLET-BACHELIER,
Quai des Augustins, 55.
1879

A fine copy, with the original printed wrappers, of Poincaré's thesis for his doctorate in science from the University of Paris. "Poincaré's doctoral thesis [was] on differential equations (not on methods of solution, but on existence theorems), which led to one of his most celebrated contributions to mathematics-the properties of automorphic functions" (Boyer & Merzbach, *History of Mathematics*, p. 675). "The theory of differential equations and its applications to dynamics was clearly at the center of Poincaré's mathematical thought; from his first (1878) to his last (1912) paper, he attacked the theory from all possible angles and very seldom let a year pass without publishing a paper on the subject" (DSB).

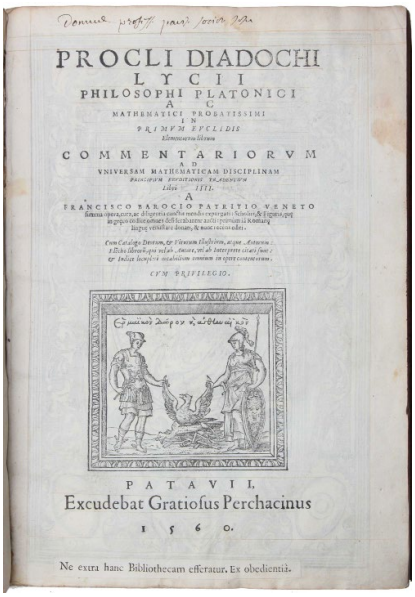
Bound in a fine recent half cloth binding over marbled boards, gilt morocco title label to spine, original brown printed wrappers with bound (small hole to the front wrapper, paper flaw?).

The copy of Pierre Daniel Huet

31. PROCLUS DIADOCHUS *Procli... in primum Euclidis Elementorum librum commentariorum... libri IIII. A Francisco Barocio... expurgati: scholiis, & figuris, que in greco codice omnes desiderabantur aucti, etc.*. Padua: Gratiosus Perchacino, 1560.

€25,000

A magnificent copy, with a very distinguished provenance, of the first Latin edition of Proclus' commentary on the first book of Euclid's *Elements*, edited by Federico Barozzi. The text appeared previously in the Greek Euclid of 1533 (Basel), but lacked illustrations [which are included in this edition], and contained other deficiencies, remarked upon by Barozzi in the preface to the present edition. Proclus' commentary can be regarded as the first work on non-Euclidean geometry (Sommerville). It gives a penetrating discussion of Euclid's fifth postulate, also known as the 'parallel postulate'. He criticizes Ptolemy's proof of the fifth postulate, and points out with the example of the straight line asymptote to a hyperbola that it is possible for two lines to get closer and closer together without ever meeting. He goes on to show that the parallel postulate is equivalent to what later became known as Playfair's axion (introduced in John Playfair's 1795 commentary on Euclid), that 'Through a given point, only one line can be drawn parallel to a given line'.


PROCLI DIADOCHI
LYCII
PHILOSOPHI PLATONICI
A C
MATHEMATICI PROBATISSIMI
IN
PRIMVM EVCLIDIS
Elementorum librum
COMMENTARIORVM
AD
VNIVERSAM MATHEMATICAM DISCIPLINAM
A
FRANCISCO BAROCIO PATRITIO VENETO
CVM PRIVILEGIO.
PATAVII,
Excudebat Gratiosus Perchacinus
1560.
Ne extra hanc Bibliothecam efferatur. Ex obedientia.

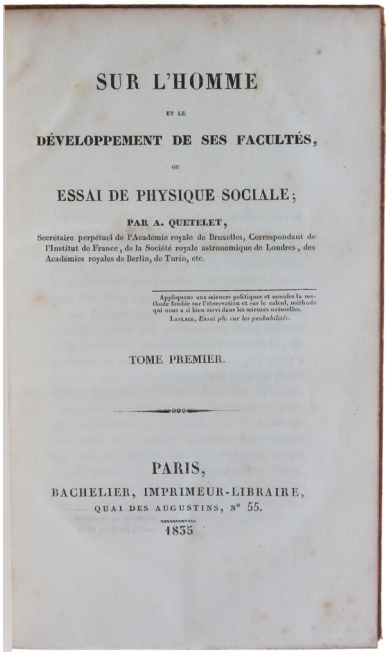
Provenance: Pierre Daniel Huet, Bishop of Avranches with bookplate commemorating his legacy in 1692 to; Jesuit College at Paris, with printed pressmark label XLVII.C, and with label on title-page 'Ne extra hanc bibliothecam efferatur. Ex obedientia.'; Michel Chasles (bookplate), bought at his sale Paris, 7 July 1881 by; P. Laffite. Contemporary Parisian limp vellum binding, gilt oval centre-piece, gilt fillets on covers with fleurons at corners, flat spine in six compartments, decorated with small gilt leaf tool, all edges gilt.

'A new era in statistics' (Stigler)

32. QUETELET, Lambert Adolphe Jacques. *Sur l'homme et le developpement de ses facultes ou Essai de physique sociale.* Paris: Bachelier, 1835.

€5,000

First edition, and a fine copy, of Quetelet's principal work in which he presented his conception of the *homme moyen* ("average man") as the central value about which measurements of a human trait are grouped according to the normal distribution (this was the first time the normal distribution had been used other than as an error law). "With Quetelet's work of 1835 a new era in statistics began. It presented a new technique of statistics, or, rather, the first technique at all. The material was thoughtfully elaborated, arranged according to certain pre-established principles, and made comparable. There were not very many statistical figures in the book, but each figure reported made sense. For every number, Quetelet tried to find the determining influences, its natural causes, and the perturbations caused by man. The work gave a description of the average man as both a static and dynamic phenomenon. This work was a tremendous achievement, but Quetelet had aimed at a much higher goal: social physics, as the subtitle of the work said; the same title under which, since 1825, Comte had taught what he later called sociology. Terms and analogies borrowed from mechanics played a great part in Quetelet's theoretical explanation. To find the laws that govern the social body, one has to do what one does in physics: to observe a large number of cases and then take averages. Quetelet's average man became a slogan in nineteenth-century discussions on social science" (DSB).


SUR L'HOMME
ET LE
DÉVELOPPEMENT DE SES FACULTÉS,
OU
ESSAI DE PHYSIQUE SOCIALE;
PAR A. QUETELET,
Secrétaire perpétuel de l'Académie royale de Bruxelles, Correspondant de l'Institut de France, de la Société royale astronomique de Londres, des Académies royales de Berlin, de Turin, etc.
Appliquons aux sciences politiques et morales la méthode fondée sur l'observation et sur le calcul, méthode qui nous a si bien servi dans les sciences naturelles.
LAPLACE, *Essai ph. sur les probabilités*.
TOME PREMIER.
PARIS,
BACHELIER, IMPRIMEUR-LIBRAIRE,
QUAI DES AUGUSTINS, N° 55.
1835

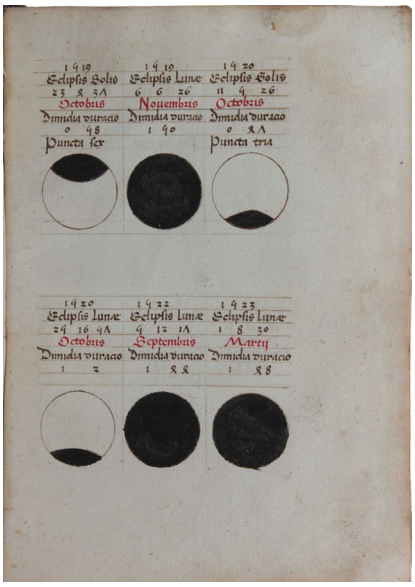
Bound in two contemporary purple calf, some wear to spines, light spotting (this work is normally quite foxed). Rare, and especially in such good condition.

❧*Stigler, The History of Statistics, Chapter 5.*

Possibly preceding the printed text

33. RENAISSANCE ASTRONOMY MANUSCRIPT *A Unique Compendium of Astronomical Texts, including significant portions of Regiomontanus' 'Kalendarium' (1476) together with other prognostic texts. The various texts have original composition dates that range from the 12th through the 15th century. The Regiomantanus text contains small, but significant, differences from the printed version - suggesting that the MS precedes the printed text. To the best of our research, the choice and ordering of these texts do not conform with any other known astronomical manuscript.* [Northern Italy, c. 1475].

€110,000



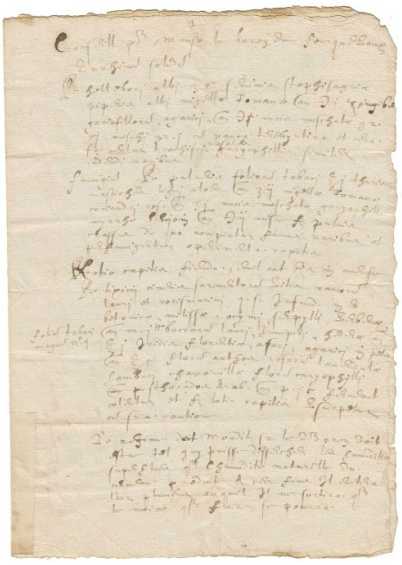
Provenance: Joseff Gregri Da Bologna (early inscription to back cover); Samuel Verplanck Hoffman (armorial bookplate); Sir Thomas Phillips, MS.16242 (inscription to front pastedown). All evidences point to Northern Italy as the place of the manuscript's composition: the humanistic script, the provenance, the orthography (with an Italianate use of "c" rather than "t" before "i" in several places), and the inclusion of distinctively North Italian feast days in its calendar (which are not contained in Regiomontanus' printed calendar) – very probably originating from Verona or Bologna. The contemporary inscription on the rear cover would indicate that the manuscript was used within the context of the university of Bologna (an active center of astronomy in the later half of the 15th century), and it has been suggested that the manuscript is perhaps related to the circle of Paulerinus (1413-71), a master of the University at Bologna (composer of the encyclopedic Liber viginti arcium, a text that has survived in only one known manuscript exemplar).

❧*Sir Thomas Phillipps, MS.16242.*

One of the Rarest Autographs in the History of Science

34. REY, Jean. *Autograph document signed, in Latin and French. N.p., 1 October 1623. 2-1/2 pages.*

€16,000



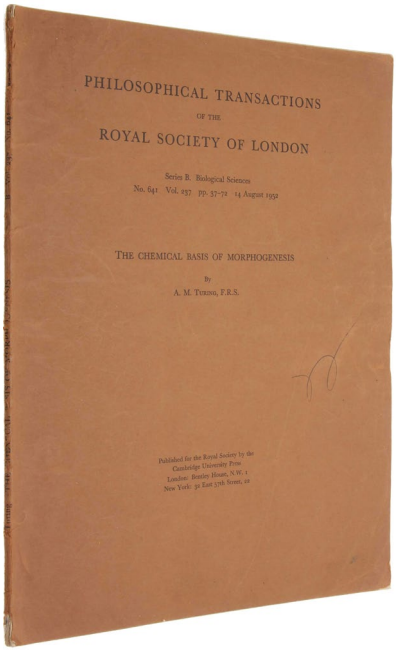
Rey, Jean (ca. 1583- ca. 1645). Pour Monsieur le baron de Fourquevaux. The Only Autograph in Private Hands from the hand of French physician and chemist Jean Rey, author of *Essays de Jean Rey Sur la recherche de la cause pour laquelle l'estain & le plomb augmentent de poids quand on les calcine* (1630). This extraordinarily rare book, of which only seven copies are known, was Rey's only publication; it anticipated by more than one hundred years Lavoisier's discovery that the calcination of metals involves combination with air - a discovery fundamental to the overthrow of the phlogiston theory and the foundation of modern chemistry. Lavoisier published his discovery in 1774; the following year, chemist Pierre Bayen alerted Lavoisier to the existence of Rey's *Essays*. Lavoisier was so impressed with "the apparent modernity of Rey's ideas" (McKie) that he at first believed Rey's work to be a forgery; he later spoke of the work with admiration. Douglas McKie, in the historical introduction to his facsimile edition of Rey's Essays (1951), relates what little is known of Rey's life, describing in detail the scant documentary evidence that remains, and reproducing examples of Rey's handwriting. The University of Montpellier, where Rey studied medicine from 1605 to 1609, preserves a signed 6-line inscription in Latin written by Rey when he matriculated at the University (1605), as well as four other documents bearing Rey's signature: two consilia (1608 and 1609), Rey's licence en medicine (1609) and a document Rey signed upon receiving his doctorate (1609). Apart from these, the only other signed autograph document of Rey's is the one we are offering here," containing his signed prescriptions and dietary for a distinguished patient living near Toulouse, Baron de Fourquevaux. Our 2½ page autograph document was at one time owned by Dr. Pierre Lemay, who published a study of Rey.

Very rare offprint of one of his most famous papers

35. TURING, Alan Mathison. *The Chemical Basis of Morphogenesis.* London: Cambridge University Press, 1952.

€30,000

First edition, offprint issue, and the copy of Robin Gandy, of Turing's last major published work which has been 'hugely influential' (Maini), and 'in every respect ahead of its time' (Copeland). Taking his cue from the zoologist D'Arcy Thompson, who held that the forms of living things are to be explained in terms of the operation of physical forces and mathematical laws, Turing presents here the first mathematical theory of embryology. Offprints of Turing's papers are extremely rare in institutional holdings, and even more so in commerce. We have located only the copy in the Turing Archive at King's College, Cambridge and that in the Max Newman collection (now at Bletchley Park). The latter copy is the only other copy we are aware of having appeared in commerce. "Alan Turing's paper, 'The chemical basis of morphogenesis,' has been hugely influential in a number of areas. In this paper, Turing proposed that biological pattern formation arises in response to a chemical pre-pattern which, in turn, is set up by a process now known as diffusion-driven instability. The genius of this work was that he considered a system which was stable in the absence of diffusion and then showed that the addition of diffusion, which is naturally stabilizing, actually caused an instability. Thus, it was the integration of the parts that was as crucial to the understanding of embryological development as the parts themselves – patterns emerged or self-organized as a result of the individual parts interacting. To see how far ahead of his time he was, one has to note that it is only now in the post-genomic era of systems biology that the majority of the scientific community has arrived at the conclusion he came to 60 years ago..." (Philip K. Maini, in *Alan Turing: his work and impact*, p. 684).

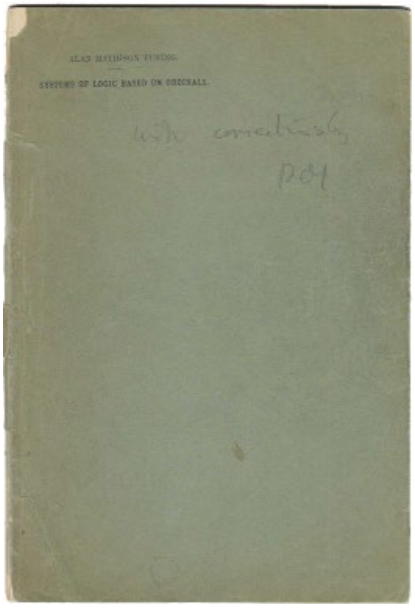

PHILOSOPHICAL TRANSACTIONS
OF THE
ROYAL SOCIETY OF LONDON
Series B. Biological Sciences
No. 641 Vol. 237 pp. 37–72 14 August 1952
THE CHEMICAL BASIS OF MORPHOGENESIS
By
A. M. Turing, F.R.S.
Published for the Royal Society by the
Cambridge University Press
London: Bentley House, N.W. 1
New York: 32 East 57th Street, 22

A fine and unrestored copy preserved in the original printed wrappers.

Offprint of his PhD thesis - the copy of Robin Gandy

36. TURING, Alan Mathison. *Systems of Logic Based on Ordinals.* London: C.F. Hodgson & Son, 1939.

€28,000


ALAN MATHISON TURING.
SYSTEMS OF LOGIC BASED ON ORDINALS.
With corrections
PCI

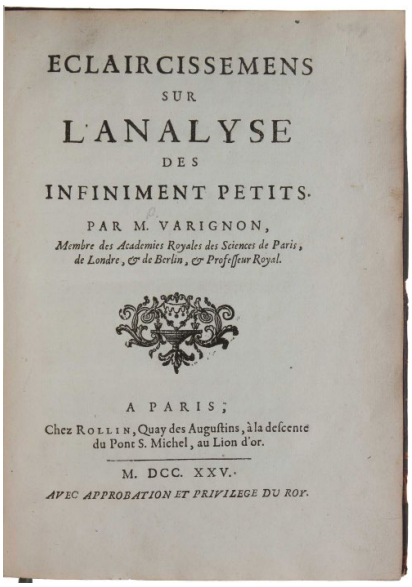
First edition, the incredibly rare offprint issue, and the copy of Robin Gandy, of Turing's PhD thesis, "one of the key documents in the history of mathematics and computer science" (Appel), and perhaps Turing's most formidable paper. "*Systems of logic based on ordinals* is a profound work of first rank importance. Among its achievements are the exploration of a means of circumventing Gödel's incompleteness theorems; the introduction of the concept of an 'oracle machine,' thereby opening the field of relative computability; and, in the wake of the demolition of the Hilbert programme (by Gödel, Turing and Church), an analysis of the place of intuition in mathematics and logic" (Copeland). "Turing's 1938 Princeton PhD thesis, *Systems of logic* based on ordinals, which includes his notion of an oracle machine, has had a lasting influence on computer science and mathematics... A work of philosophy as well as mathematics, Turing's thesis envisions a practical goal – a logical system to formalize mathematical proofs so that they can be checked mechanically. If every step of a theorem could be verified mechanically, the burden on intuition would be limited to the axioms... Turing's vision of 'constructive systems of logic for practical use' has become reality: in the twenty-first century, automated 'formal methods' are now routine" (Appel). Offprints of Turing's papers are extremely rare in institutional holdings, and even more so in commerce. We have located only three copies: one in the Alan Turing Archive at King's College Cambridge (AMT/B/15), one at St. Andrew's, and one in the Max Newman collection at Bletchley Park. *Original printed wrappers (rear wrapper lacking), front wrapper with pencil annotation in Gandy's hand.*

An important work in the development of the calculus

37. VARIGNON, Pierre. *Eclaircissemens sur l'analyse des infiniment petits..* Paris: Rollin, 1725.

€2,800

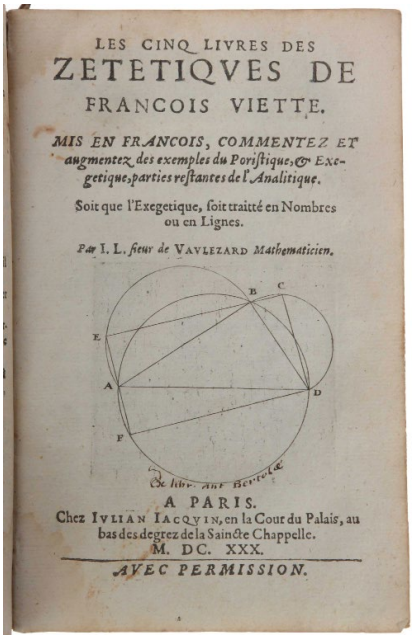
First edition. "Fully occupied by his teaching duties and his responsibilities as an academician, Varignon had no leisure to prepare works for publication. From the papers he left at his death, most of which are now lost, his disciples assembled several posthumous works: *Nouvelle mécanique, Eclaircissements sur l'analyse des infiniment petits* (1725) and *Elémens de mathématiques* (1731). His intense pedagogical activity, extending over more than thirty years, constituted his chief contribution to the progress of science and was the source of his fame. By inaugurating a chair devoted specifically to mathematics at the Collège Mazarin, he joined the handful of men who were then teaching advanced mathematics. In working with the model of falling bodies, Varignon encountered difficulties in obtaining acceleration as a second derivative. This problem had the advantage, however, of obliging him to reassess calculus. His acceptance of the new procedures occurred between 1692 and 1695, and he was among those who gave the most favorable reception to the publication of L'Hospital's Analyse des infiniment petits. The *Eclaircissemens* is composed of critical notes that Varignon, as professor, considered necessary in presenting L'Hospital's pioneering work to young mathematicians - further evidence of his constructive role in the movement to transform the operations used in mathematics. But Varignon accomplished even more : in 1700-1701 he refuted Rolle's arguments against the new calculus, challenged the cabal that had formed within the Academy, and obliged Leibniz to furnish a more precise account of his ideas. Leibniz, to be sure, did not give him all the aid desired. Nevertheless, he encouraged Varignon to cease debating principles and to start developing mechanical applications of the new mathematics". (DSB).


ECLAIRCISSEMENS
SUR
L'ANALYSE
DES
INFINIMENT PETITS.
PAR M. VARIGNON,
Membre des Academies Royales des Sciences de Paris, de Londre, & de Berlin, & Professeur Royal.
A PARIS;
Chez ROLLIN, Quay des Augustins, à la descente du Pont S. Michel, au Lion d'or.
M. DCC. XXV.
AVEC APPROBATION ET PRIVILEGE DU ROY.

First French edition of the 'In artem analyticum isagoge'

38. VIÈTE, François [& VAULEZARD, J. L. (translator)]. *Introduction en l'art analytic. ou Nouuelle algebre de François Viete. [bound with:] Les cinq livres des Zetetiques de Francois Viette. [with:] Examen de la Traduction faicte par Anthoine Vasset, des cinq Livres des Zetetiques de M. Viette..* Paris: J. Jacquin, 1629/1630.

€35,000


LES CINQ LIVRES DES
ZETETIQVES DE
FRANCOIS VIETTE.
MIS EN FRANCOIS, COMMENTEZ ET augmentez des exemples du Poristique, & Exegetique, parties restantes de l'Analitique.
Soit que l'Exegetique, soit traitté en Nombres ou en Lignes.
Par I. L. *sieur de* VAVLEZARD *Mathematicien.*
A PARIS.
Chez IVLIAN IACQVIN, en la Cour du Palais, au bas des degrez de la Saincte Chappelle.
M. DC. XXX.
AVEC PERMISSION.

Very rare first edition of the first French translation and exposition of Viète's *In artem analyticum isagoge* (Tours, 1591), the earliest work on symbolic algebra, here bound with a first edition of Vaulezard's translation of Viète's *Zeteticorum libri quinque* (Tours, 1593), which gives examples of the application of his 'analytic art' to problems from Diophantus' *Arithmetica*. The third work is a scathing criticism of a slightly later translation of the *Isagoge* by Antoine Vasset, a response to criticisms Vasset had made of Vaulezard's translation in his own work. "The most important of Viète's many works on algebra... [*In artem analyticem isagoge*] also introduced the use of letters both for known quantities, which were denoted by the consonants *B, C, D*, and so on, and for unknown quantities, which were denoted by the vowels. Furthermore, in using *A* to denote the unknown quantity *x*, Viète sometimes employed *A* quadratus, *A* cubus ... to represent x^2, x^3 , ... This innovation, considered one of the most significant advances in the history of mathematics, prepared the way for the development of algebra" (DSB).

The first edition of *In artem analyticem isagoge* is among the rarest of the important works in the history of mathematics. The present works are almost as rare on the market, and are in fact even rarer than the *Isagoge* in institutional collections.

Fine copy in contemporary vellum.