

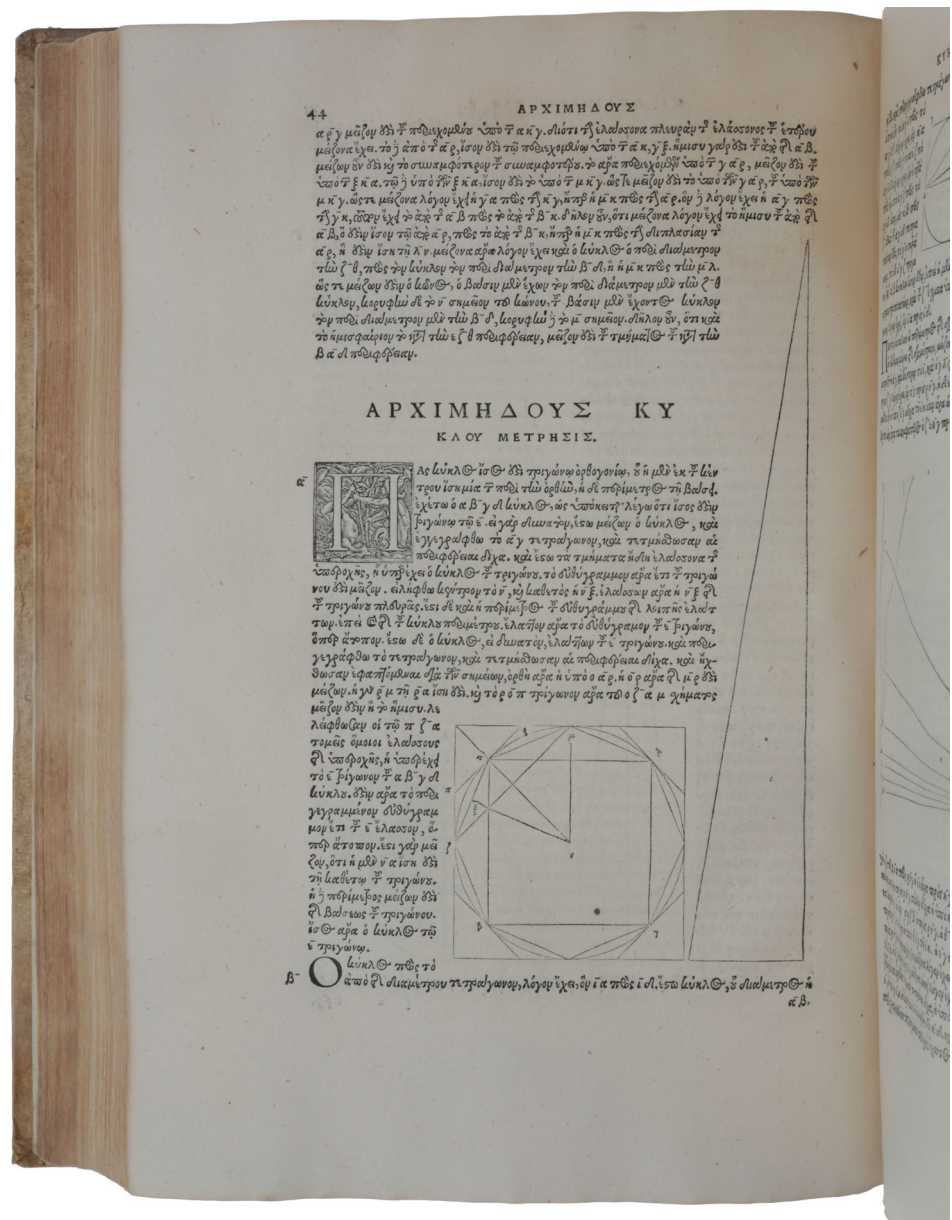
PMM 72 - 'GIVE ME A PLACE TO STAND, AND I WILL MOVE THE EARTH'

ARCHIMEDES. *Opera, quae quidem extant, omnia ... nuncque primum & Graece Latine in lucem edita ... adiecta quoque sunt Eutocii Ascalonitae in eosdem Archimedis libros commentaria item Graece & Latine, nunquam antea excusa.* Basle: Joannes Hervagius, 1544.

\$150,000

First edition of one of the key scientific books of the Renaissance, representing a decisive step forward in the history of mathematics. This book constitutes "the first printing of the original Greek text of seven Archimedean mathematical texts, accompanied by Jacopo de Cremona's Latin translation from a manuscript corrected by Regiomontanus, and the commentaries (in both Greek and Latin) of the sixth-century mathematician Eutocius of Ascalon" (Norman).

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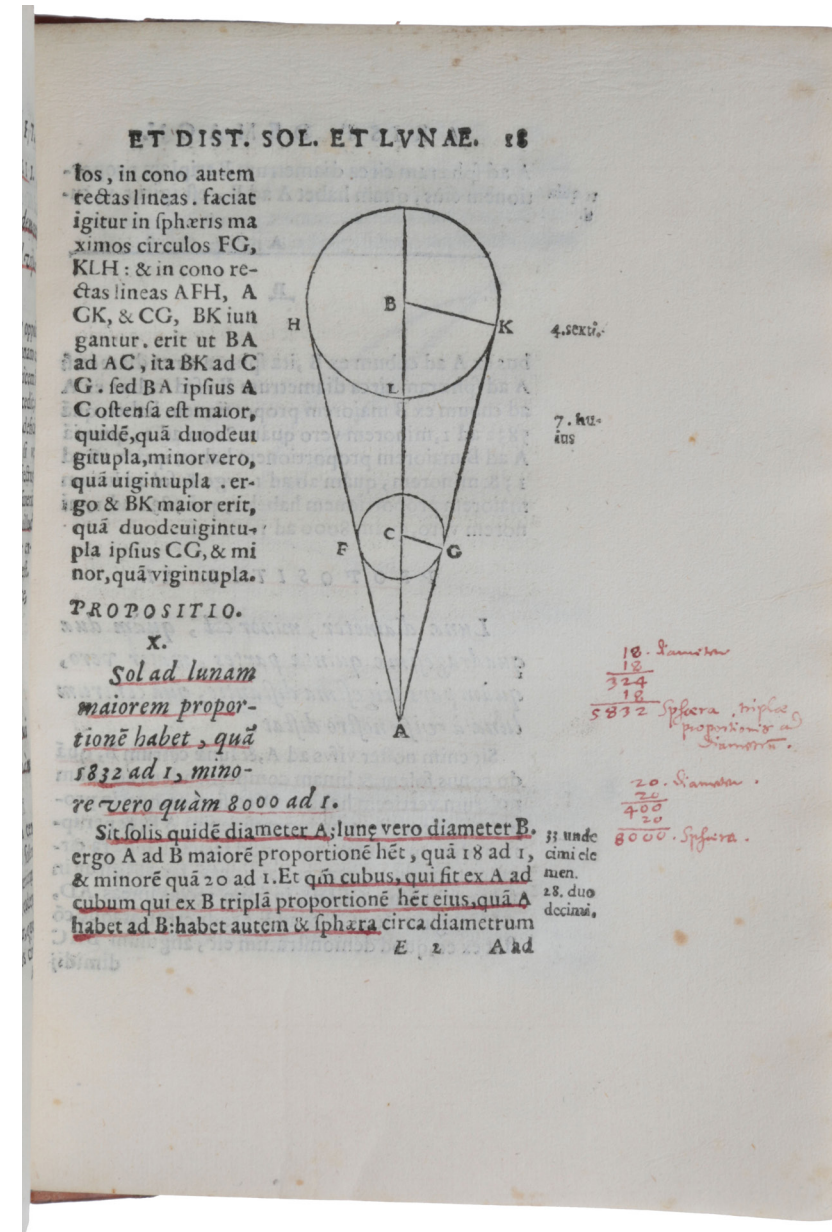


THE FIRST TO PROPOSE A HELIOCENTRIC THEORY

ARISTARCHUS OF SAMOS. *De magnitudinibus et distantiiis solis, et lunae, liber cum Pappi Alexandrini explicationibus quibusdam. À Federico Commandino Urbinate in Latinum conversus, ac commentarijs illustrates.* Pesaro: Camillus Franceschinus, 1572.

\$38,500

First separate edition of Aristarchus' only surviving work, in which Aristarchus (310-230 BCE) demonstrated an ingenious method for calculating the sizes and distances of the Sun and the Moon. "Aristarchus is celebrated as being the first man to have propounded a heliocentric theory, eighteen centuries before Copernicus" (DSB). An interesting copy with numerous early detailed annotations.



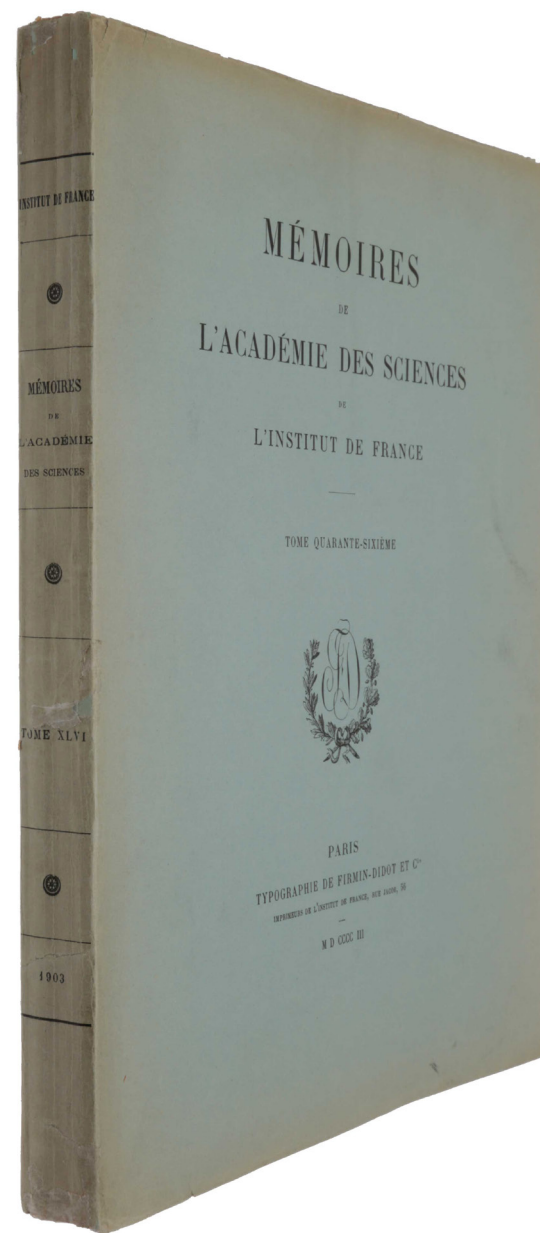
PMM 393 - DISCOVERY OF RADIOACTIVITY THE RARE OFFPRINT

BECQUEREL, Antoine Henri. *Recherches sur une Propriété nouvelle de la Matière. Activité radiante spontanée ou Radioactivité de la Matière.* Offprint from: *Mémoires de l'Académie des Sciences de l'Institut de France*, Tome 46. Paris: Firmin-Didot et Cie., 1903.

\$9,500

First edition, **very rare offprint**, of Becquerel's definitive account of his discovery of and investigations into radioactivity, including his identification of electrons in radiations of radium, and his account of the evidence of radioactive transformation. "In 1903, Becquerel published the above massive volume of some three hundred and sixty pages, 'Researches into a New Property of Matter, or Radioactivity in Matter', which is his definitive work, containing a chronological narrative of his investigations, his mature conclusions and a bibliography of two hundred and fourteen treatises on radio-activity, dating from his own first paper in 1896" (PMM).

<https://www.sophiararebooks.com/6153>



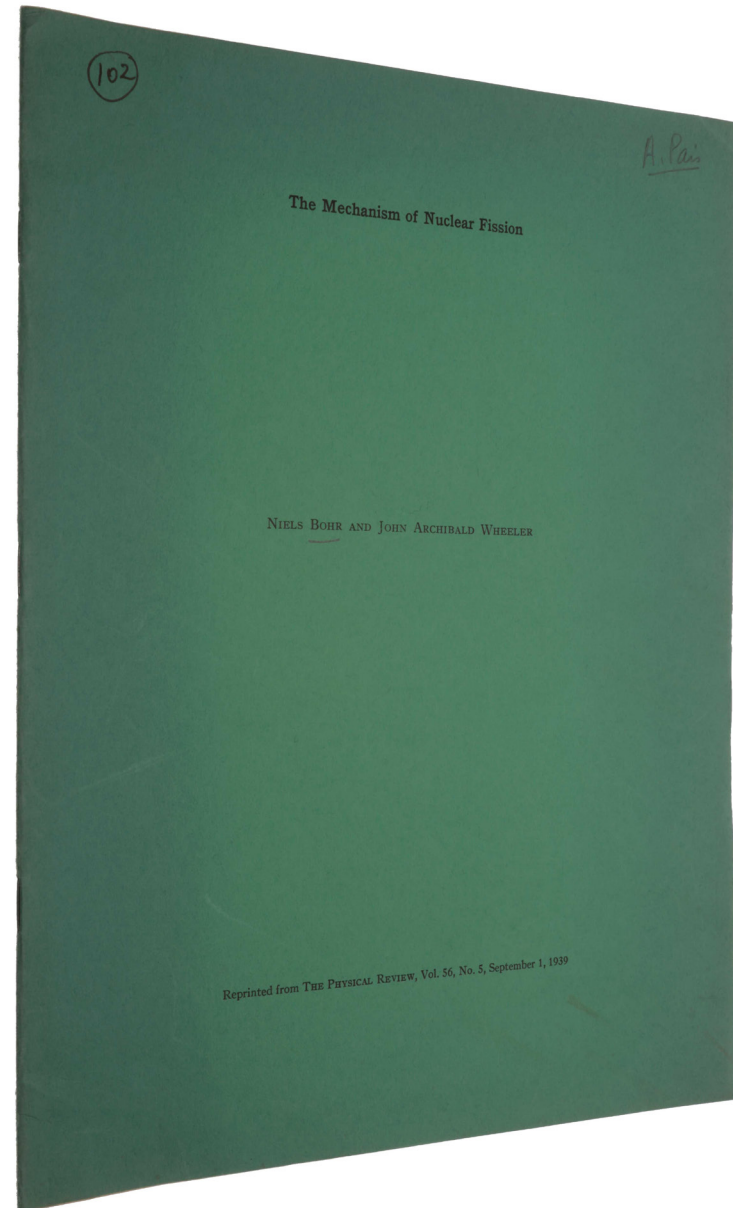
THE STANDARD THEORY OF THE MECHANISM OF NUCLEAR FISSION

BOHR, Niels & WHEELER, John Archibald. *The mechanism of nuclear fission. Offprint from Physical Review, Vol. 56, No. 5, September 1, 1939.* American Physical Society: Lancaster, PA, 1939.

\$8,000

First edition, extremely rare offprint, of this seminal paper, which presents the first comprehensive theory of nuclear fission, discovered just six months earlier by Otto Hahn and Fritz Strassmann. This theory was **essential for the development of the atomic bomb**. “The theory of Bohr and Wheeler was accepted, and continued to remain ever since, as *the* standard description of the mechanism of nuclear fission” (Mehra & Rechenberg, *The Historical Development of Quantum Theory*).

<https://www.sophiararebooks.com/6154>



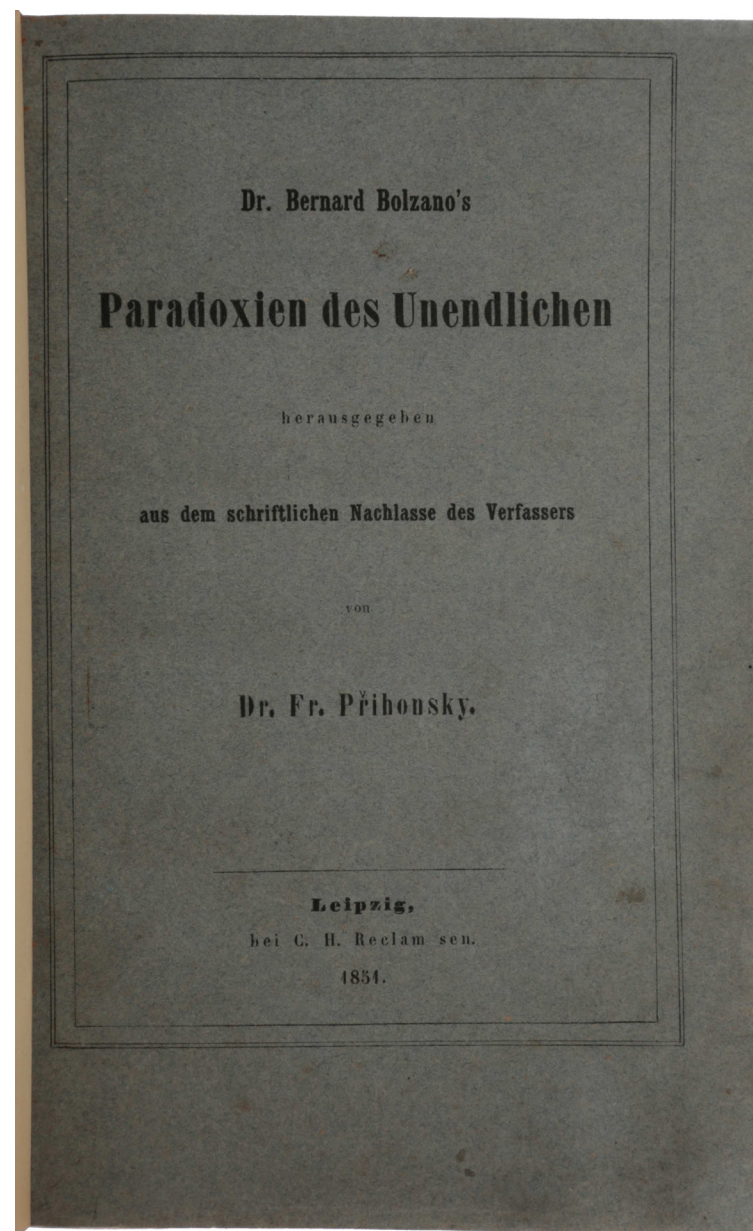
THE BIRTH OF SET THEORY

BOLZANO, Bernard. *Paradoxien des Unendlichen*, herausgeben aus dem schriftlichen Nachlasse des Verfassers von Dr. Fr. Prihonsky. Leipzig: bei C.H. Reclam sen., 1851.

\$17,500

First edition, very rare, of what “may be considered as the first book on set theory, and certainly Cantor praises the work highly in his own, much more developed, contributions to the topic. In 1909, Charles Peirce wrote that Bolzano’s *Paradoxien des Unendlichen* conferred ‘a singular benefit upon humanity’” (MacTutor). Bolzano “distinguishes between denumerable and non-denumerable infinite classes, the first being capable of being placed in one-to-one correspondence with the integers, and indicates that the set of real numbers is indeed non-denumerable” (Parkinson, *Breakthroughs*).

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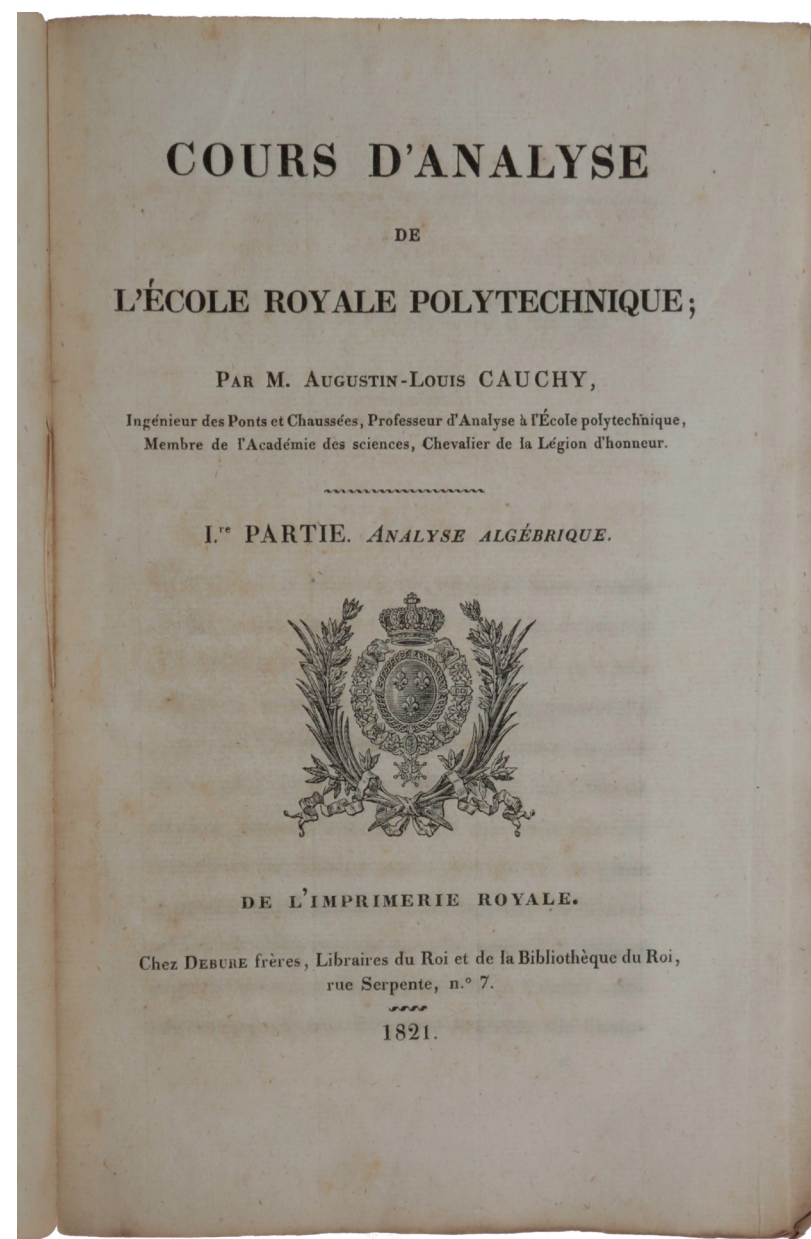
ONE OF THE MOST INFLUENTIAL MATHEMATICS BOOKS EVER WRITTEN

CAUCHY, Augustin-Louis. *Cours d'analyse de l'École Polytechnique; I.re Partie. Analyse algébrique.* Paris: De l'imprimerie Royale, chez Debure frères, 1821.

\$7,500

First edition, **unopened in original wrappers**, of this classic in the history of mathematics, which gives the first rigorous definitions of the notions of limit, continuity and convergence of infinite series, as well as the first comprehensive theory of functions of a complex variable. "In 1821, Augustin-Louis Cauchy (1787-1857) published a textbook, the *Cours d'analyse*, to accompany his course in analysis at the École Polytechnique. It is one of the most influential mathematics books ever written. Not only did Cauchy provide a workable definition of limits and a means to make them the basis of a rigorous theory of calculus, but he also revitalized the idea that all mathematics could be set on such rigorous foundations. Today the quality of a work of mathematics is judged in part on the quality of its rigor; this standard is largely due to the transformation brought about by Cauchy and the *Cours d'analyse*" (Bradley & Sandifer).

<https://www.sophiararebooks.com/6088>



A LANDMARK IN THE HISTORY OF PSYCHIATRY

CHIARUGI, Vincenzo. *Della pazzia in genere, e in spezie tratto medico-analitico con una centuria di osservazioni.* Florence: Luigi Carlieri, 1793-1794.

\$95,000

First edition, **an exceptionally fine copy**, of perhaps the greatest rarity in the history of psychiatric literature. "Chiarugi's reformed system of treatment of the mentally ill was given full expression in his *Della pazzia*, in which he classified insanity into melancholia, mania and dementia, and gave a system of diagnosis and treatment for each. The work also presents Chiarugi's observations on hundreds of cases (many supported by autopsies), and contains the first illustration of the straitjacket." (Norman).



<https://www.sophiararebooks.com/6048>

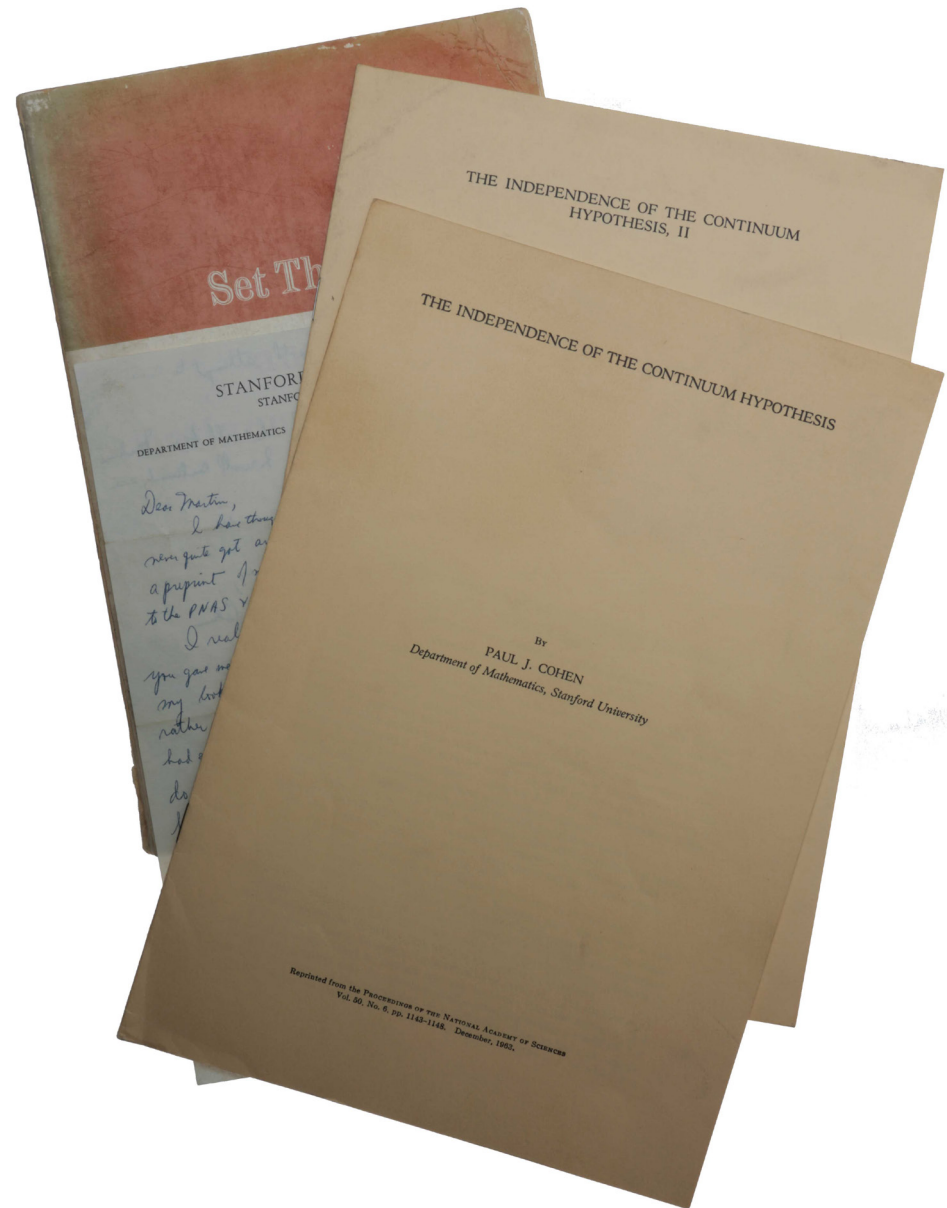
“THE GREATEST ADVANCE IN THE FOUNDATIONS OF SET THEORY SINCE ITS AXIOMATIZATION” (KURT GÖDEL)

COHEN, Paul. *The Independence of the Continuum Hypothesis*. Offprint from: *Proceedings of the National Academy of Sciences*, Vol. 50, No. 6, December 1963. [With:] *The Independence of the Continuum Hypothesis II*. Offprint from: *Proceedings of the National Academy of Sciences*, Vol. 51, No. 1, January 1964. [With:] Autograph letter signed from Cohen to Martin Davis, Stanford, CA, November 27, 1963. [With:] *Set Theory and the Continuum Hypothesis*. New York: W. A. Benjamin, 1966.

\$50,000

First edition, extremely rare offprints, of Cohen's proof that the continuum hypothesis and the axiom of choice cannot be proved from the generally accepted Zermelo-Fraenkel axioms of set theory; the method of 'forcing' which Cohen devised for the purposes of his proof revolutionized the subsequent development of set theory. Kurt Gödel wrote in 1964 that this work "no doubt is the greatest advance in the foundations of set theory since its axiomatization" Accompanied by an ALS to Martin Davis, in which Cohen writes that Davis was "directly responsible for my looking once more at set theory".

<https://www.sophiararebooks.com/6158>



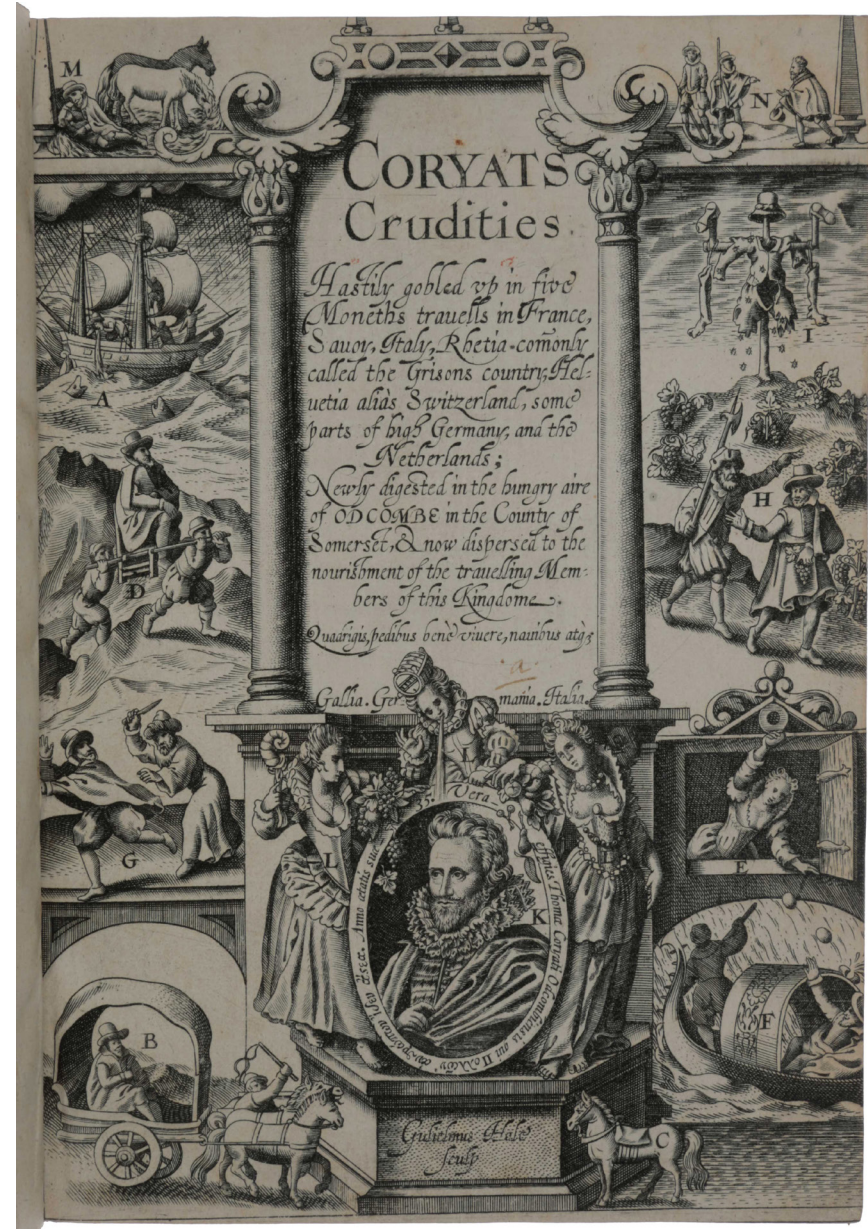
INTRODUCED THE USE OF THE FORK TO ENGLAND

CORYAT (or CORYATE), Thomas. [Engraved title:] *Coryats crudities: hastily gobbled up in five moneths travells in France, Savoy, Italy, Rhetia commonly called the Grisons country, Helvetia alias Switzerland, some parts of high Germany, and the Netherlands; newly digested in the hungry aire of Odcombe in the county of Somerset, & now dispersed to the nourishment of the travelling members of this kingdome.* [Letterpress title:] *Three crude veines are presented in this booke following (besides the foresaid crudities) no lesse flowing in the body of the booke, then the crudities themselves, two of rhetoricke and one of poesie.* London: Printed by W[illiam]. S[tansby]. For the author, 1611.

\$12,000

First edition of the European adventures of Thomas Coryate, wit and eccentric, and one of the most widely travelled Englishmen of his time. "There probably has never been another such combination of learning and unconscious buffoonery as is here set forth. Coryate was a serious and pedantic traveller who (as he states in his title) in five months toilsome travel wandered, mostly on foot, over a large part (by his own reckoning 1,975 miles) of Western Europe." (Craik).

<https://www.sophiararebooks.com/6029>

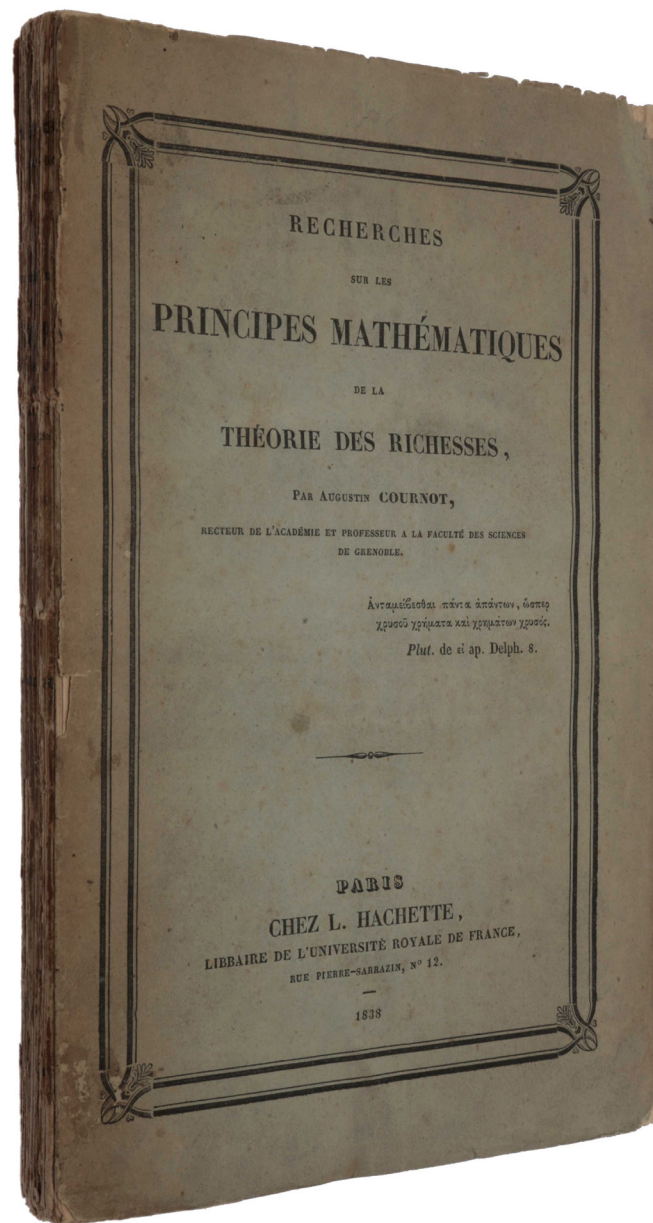


“THE TRUE FOUNDER OF MATHEMATICAL ECONOMICS” (DSB)

COURNOT, Antoine Augustin. *Recherches sur les Principes Mathématiques de la Théorie des Richesses*. Paris: Chez L. Hachette, 1838.

\$28,000

First edition, **uncut in original printed wrappers** and extremely rare thus, of Cournot's masterpiece which inaugurated mathematical economics. “Although neglected in his time, the impact of Cournot's work on modern economics can hardly be overstated” (*The History of Economic Thought*). “With the publication in 1838 of his *Recherches sur les principes mathématiques de la théorie des richesses*, he was a third of a century ahead of Walras and Jevons and must be considered the true founder of mathematical economics” (DSB).



<https://www.sophiararebooks.com/6159>

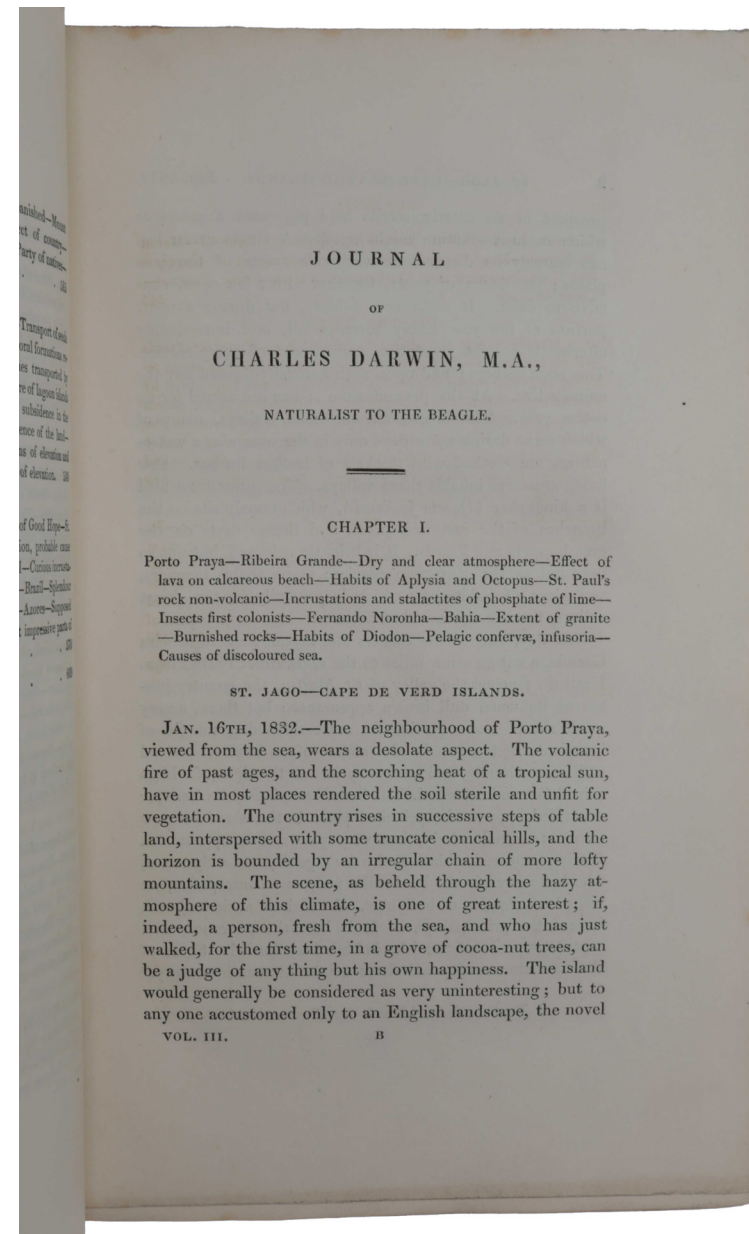
THE VOYAGE OF THE BEAGLE

DARWIN, Charles and Robert FITZROY. *Narrative of the Surveying Voyages of His Majesty's Ships Adventure and Beagle, between the Years 1826 and 1836, describing their Examination of the Southern Shores of South America, and the Beagle's Circumnavigation of the Globe.* London: Henry Colburn, 1839.

\$85,000

First edition, first issue, in original publisher's bindings. "The voyage of the *Beagle* has been by far the most important event in my life, and has determined my whole career" (Darwin, *Life and Letters*). "The five years of the voyage were the most important event in Darwin's intellectual life and in the history of biological science" (DSB). The third volume is the first issue of his first published book. It is "is undoubtedly the most often read and stands second only to *On the Origin of Species* as the most often printed" (Freeman).

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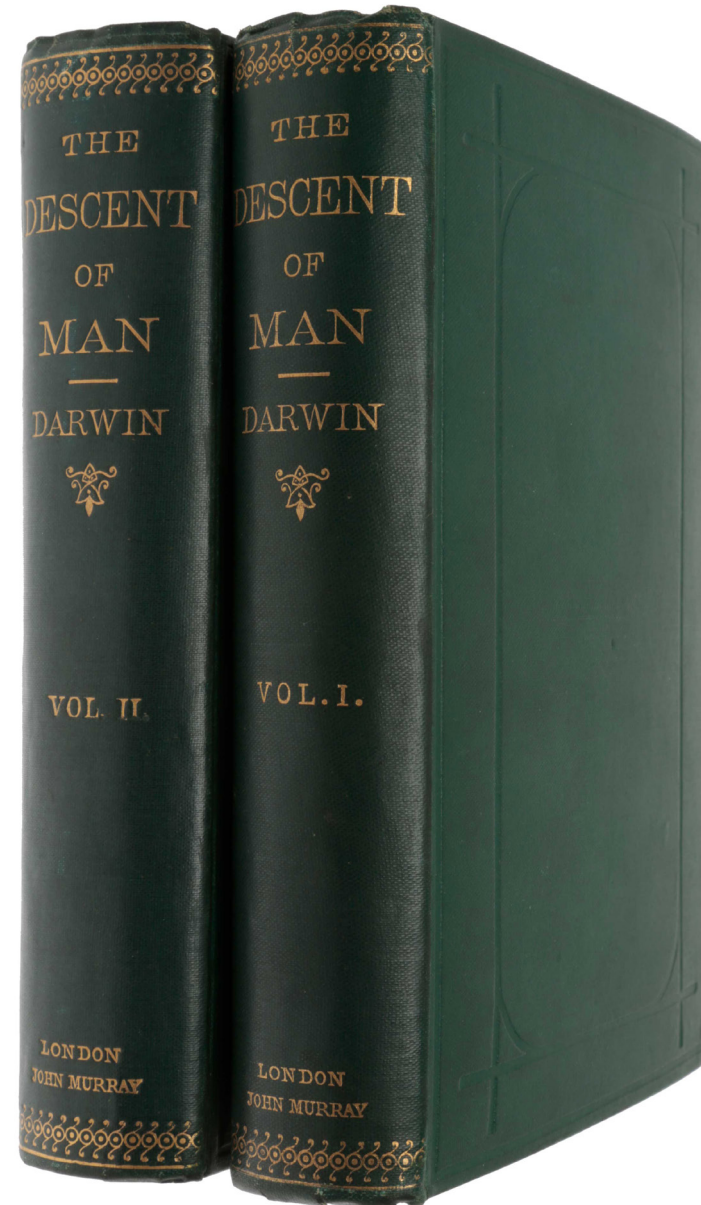


THE FIRST APPEARANCE OF THE WORD 'EVOLUTION' IN DARWIN'S WORKS

DARWIN, Charles. *The Descent of Man, and Selection in Relation to Sex*. London: John Murray, 1871.

\$5,000

First edition, second issue, **presentation copy from the printer** William Clowes the younger. The word 'evolution' appears here for the first time in any of Darwin's works, on page 2 of the first volume, 'that is to say before its appearance in the sixth edition of the *Origin of species* in the following year' (Freeman).



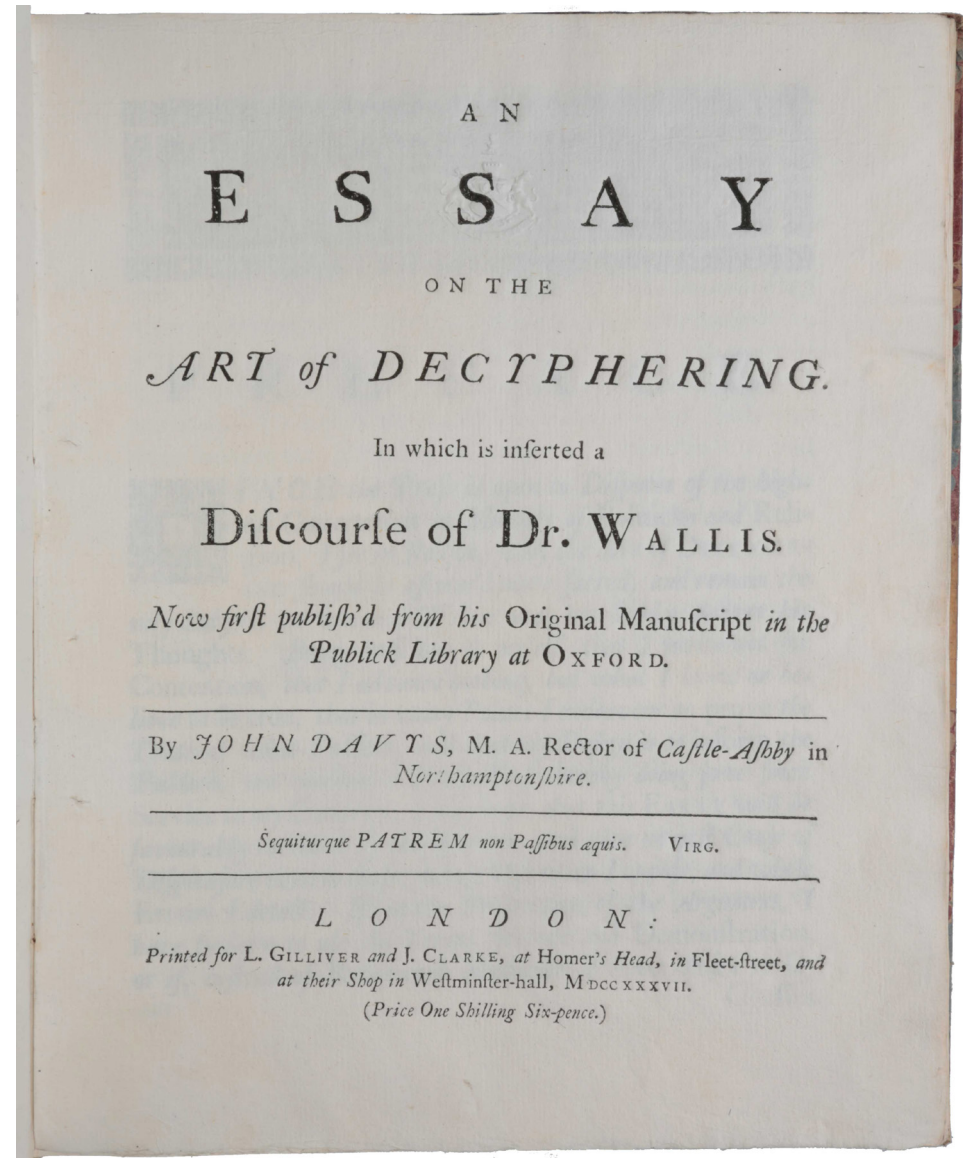
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JOHN WALLIS THE CRYPTOGRAPHER

DAVYS, John. *An essay on the art of decyphering. In which is inserted a discourse of Dr. Wallis. Now first publish'd from his original manuscript in the publick library at Oxford.* London: printed for L. Gilliver and J. Clarke, 1737.

\$12,500

First edition, very rare, of the only published portion of the treatise on cryptography which Wallis composed in his last years. Wallis was the most important English mathematician before Newton, and was regarded by Leibniz as the leading cryptographer in Europe. "At the time of his death Wallis was not only the incumbent Savilian professor of geometry and the Keeper of the Archives of the University of Oxford, but also the first holder of the post of decipherer in the office of the Secretary of State ... Wallis had in fact been employed by government officers in the breaking of codes for over sixty years since the Civil Wars" (Beeley).



<https://www.sophiararebooks.com/6162>

PMM 129 – THE INVENTION OF ANALYTIC GEOMETRY

DESCARTES, René. *Discours de la Methode pour bien conduire sa Raison, & chercher la Verité dans les Sciences. Plus la Dioptrique, les Meteores, et la Geometrie. Qui sont des essais de cete Methode.* Leiden: Jan Maire, 1637.

\$165,000

First edition, a fine and large copy in contemporary calf, of Descartes' first and most famous work. Following the main text of this volume, the *Discours* (now celebrated as one of the canonical texts of Western philosophy) are three 'Essais', the last of which, *La Géométrie*, contains the birth of analytic or co-ordinate geometry, "of epoch-making importance" (Cajori), designated by John Stuart Mill as "the greatest single step ever made in the progress of the exact sciences".

<https://www.sophiararebooks.com/6067>

DISCOURS
DE LA METHODE

Pour bien conduire la raison, & chercher
la verité dans les sciences.

PLUS

LA DIOPTRIQUE.

LES METEORES.

ET

LA GEOMETRIE.

Qui sont des essais de cete METHODE.



A LEYDE

De l'Imprimerie de IAN MAIRE.

CIO IO C XXXVII.

Avec Privilege.

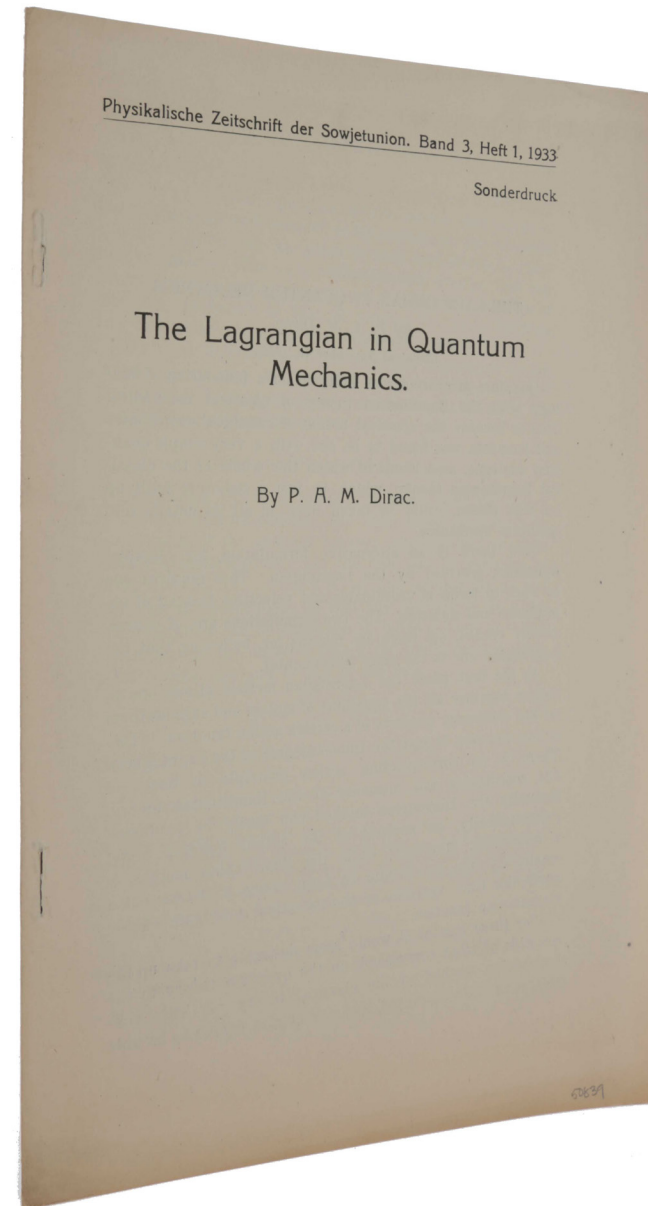
THE SPACE-TIME APPROACH TO QUANTUM FIELD THEORY

DIRAC, Paul Adrien Maurice. *The Lagrangian in quantum mechanics. Offprint from Physikalische Zeitschrift der Sowjetunion, Band 3, Heft 1.* Kharkov: Technische Verlag, 1933.

\$8,500

First edition, extremely rare offprint, of this seminal paper which, a decade later, gave birth to the path-integral formulation of quantum mechanics and Feynman integrals. "In an investigation in 1933 of the formal quantum mechanical analogue of classical Lagrangian theory, Dirac argued that the Lagrangian method was in some respects more fundamental than the standard Hamiltonian method ... years later it was studied by the young Richard Feynman, who developed it into the space-time approach to quantum field theory for which he received the Nobel Prize" (Kragh, *Dirac*).

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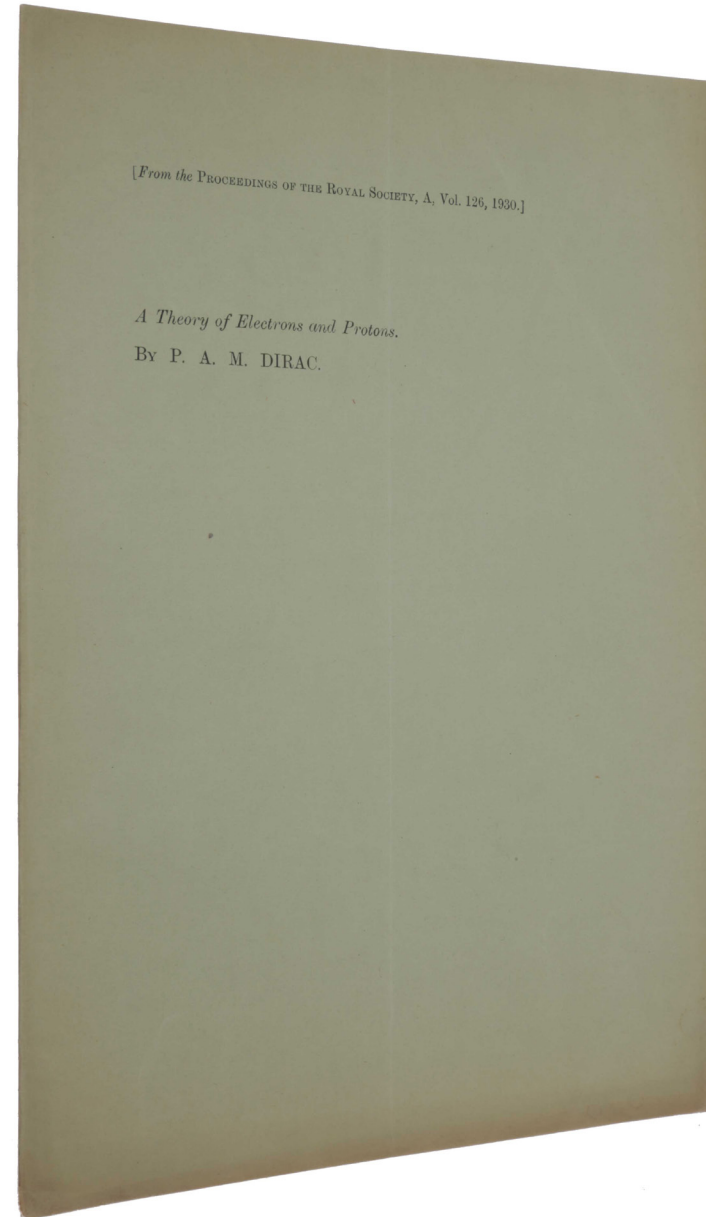
ANTIMATTER PREDICTED

DIRAC, Paul. *A Theory of Electrons and Protons.* Offprint from *Proceedings of the Royal Society, Series A, Vol. 126, No. A801.* London: Harrison & Sons for the Royal Society, 1930.

\$8,500

First edition, extremely rare offprint, of Dirac's prediction of antimatter – although he did not accept it as such until a year later – and the advent of the dynamical view of the vacuum which was fundamental to the later development of quantum field theory. “The consensus among today's scientists is that Dirac's role in foreseeing the existence of the positron is one of the greatest achievements in science” (Farmelo, *The Strangest Man*).

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UNPUBLISHED MANUSCRIPT ON UNIFIED FIELD THEORY

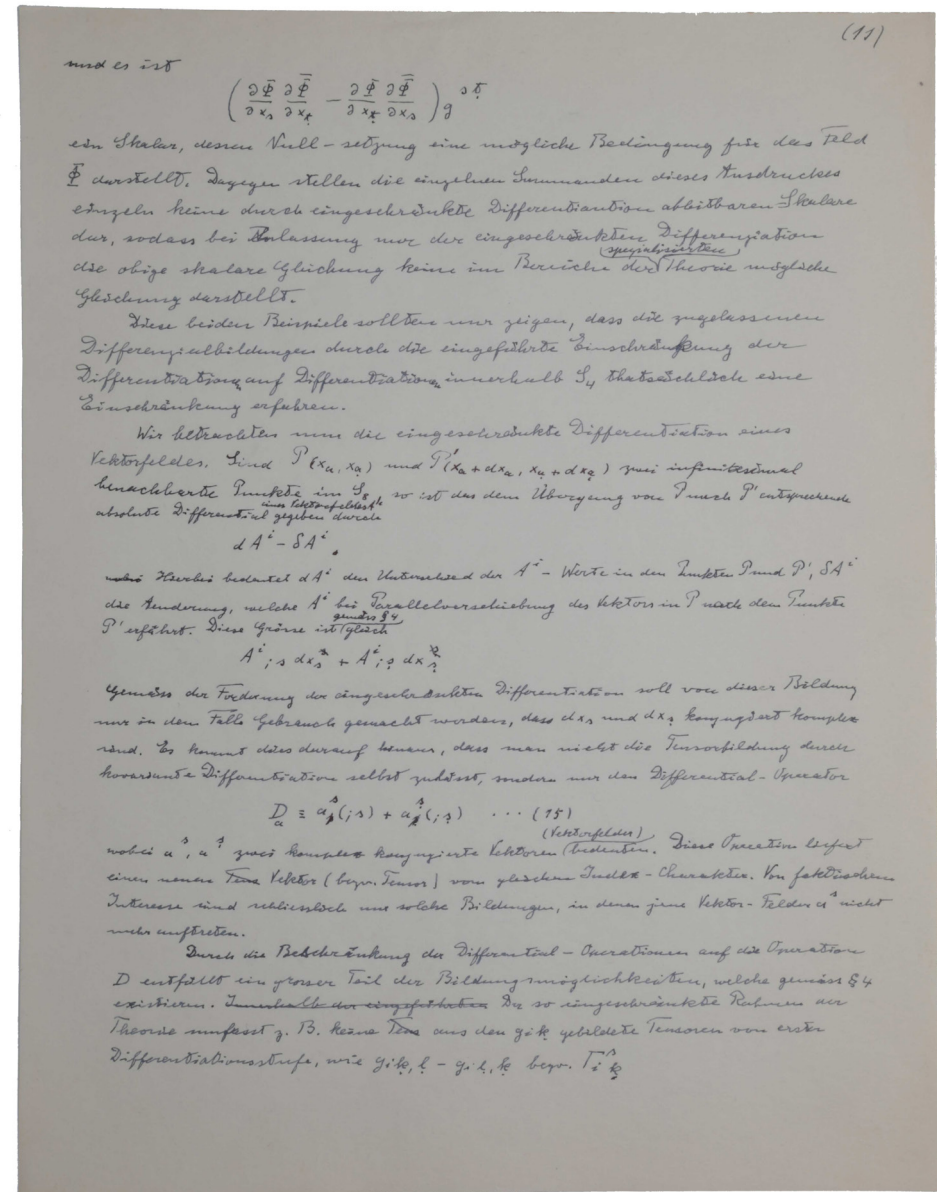
EINSTEIN, Albert. *Autograph manuscript draft of a page of a scientific paper on unified field theory, in German.* [Princeton, NJ: 1940s].

\$135,000

One page of an autograph manuscript by Einstein, apparently unpublished and unstudied. It appears to relate to Einstein's work on 'asymmetric' unified field theory, an approach to UFT which began in 1925 with his paper 'Einheitliche Feldtheorie von Gravitation und Elektrizität,' and which he took up again in 1945 in his article 'Generalization of the relativistic theory of gravitation'. This approach dominated his work from the mid 1940s until the end of his life.

The present leaf is page 11 of the same unpublished manuscript, which Christie's sold page 10 from (14th July 2021, lot 44, £106,250).

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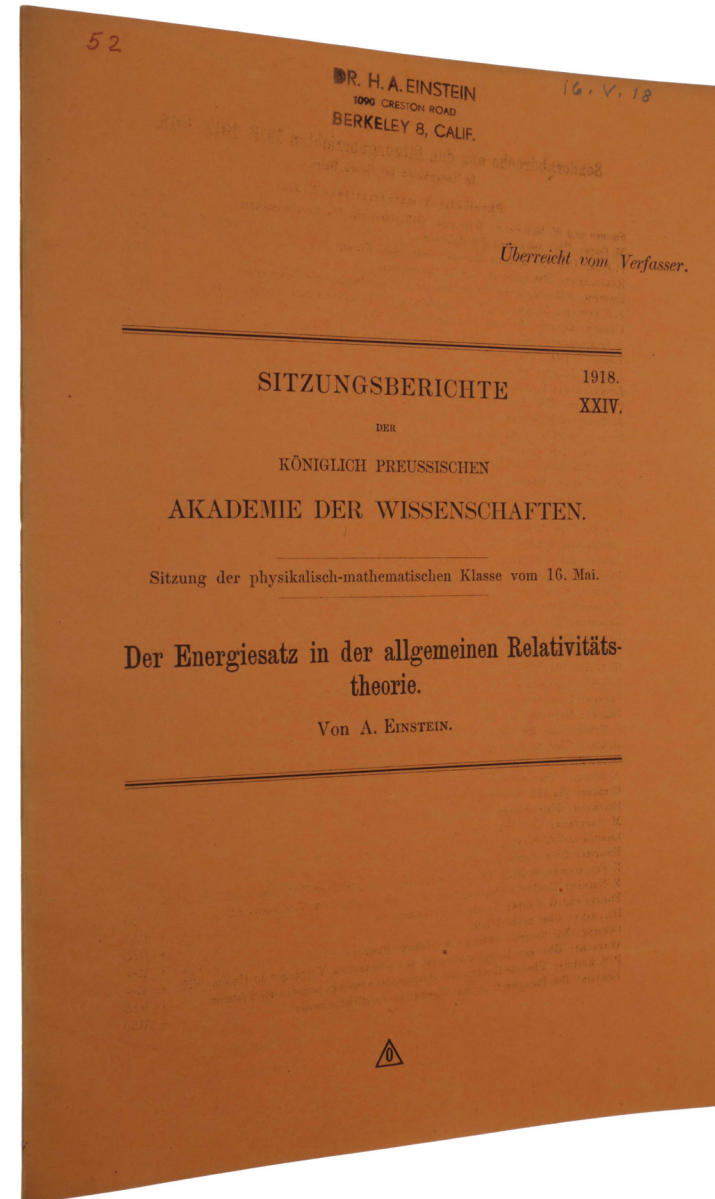
THE PROBLEM OF ENERGY IN GENERAL RELATIVITY

EINSTEIN, Albert. *Der Energiesatz in der allgemeinen Relativitätstheorie* [The Law of Energy Conservation in the General Theory of Relativity]. Offprint from: *Sitzungsberichte der Königlich preussischen Akademie der Wissenschaften* XXIV, 1918.

\$3,850

First edition, extremely rare author's presentation offprint ('Überreicht vom Verfasser'), and **the copy of Einstein's son Hans Albert**, of Einstein's discussion of the difficult problem of the energy of the gravitational field, and his justification of his introduction of a 'pseudotensor' to represent it.

<https://www.sophiararebooks.com/6163>



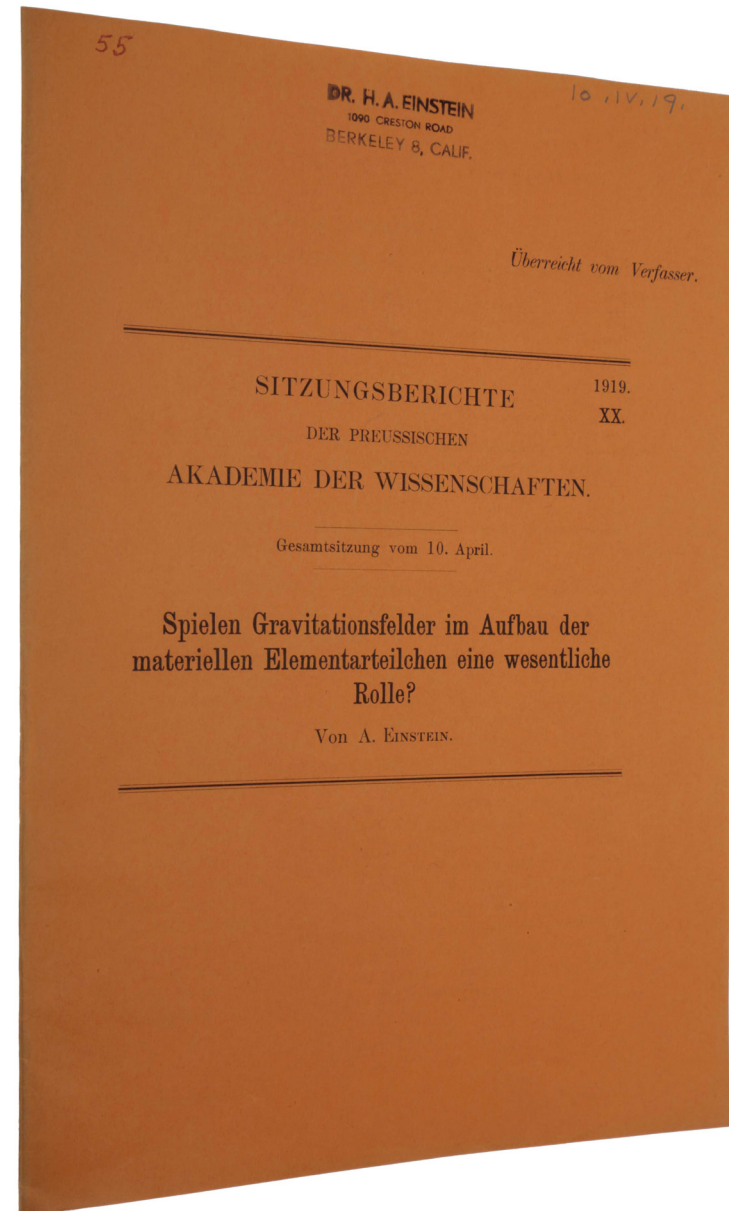
“EINSTEIN’S FIRST ATTEMPT AT A UNIFIED FIELD THEORY” (PAIS)

EINSTEIN, Albert. *Spielen Gravitationsfelder im Aufbau der materiellen Elementarteilchen eine wesentliche Rolle?* [Do Gravitational Fields Play an Essential Role in the Structure of the Elementary Particles of Matter?] Offprint from: *Sitzungsberichte der Preussischen Akademie der Wissenschaften, XX. Gesamtsitzung vom 10. April.* Berlin: Verlag der Akademie der Wissenschaften, In Kommission bei Walter de Gruyter [Reichsdruckerei], 24th April 1919.

\$3,250

First edition, extremely rare author’s presentation offprint (‘Überreicht vom Verfasser’), and **the copy of Einstein’s son Hans Albert**, of “Einstein’s first attempt at a unified field theory” (Pais, *Subtle is the Lord*). Once Einstein completed work on the general theory of relativity at the end of 1915, “his attention shifted to the search for a unified theory of the electromagnetic and gravitational fields, out of which he hoped to be able to explain the structure of matter. Quantum effects were to be derived from such a theory, rather than postulated *ad hoc*. This remained his approach for the rest of his life” (Cao, *Conceptual foundations of quantum field theory*).

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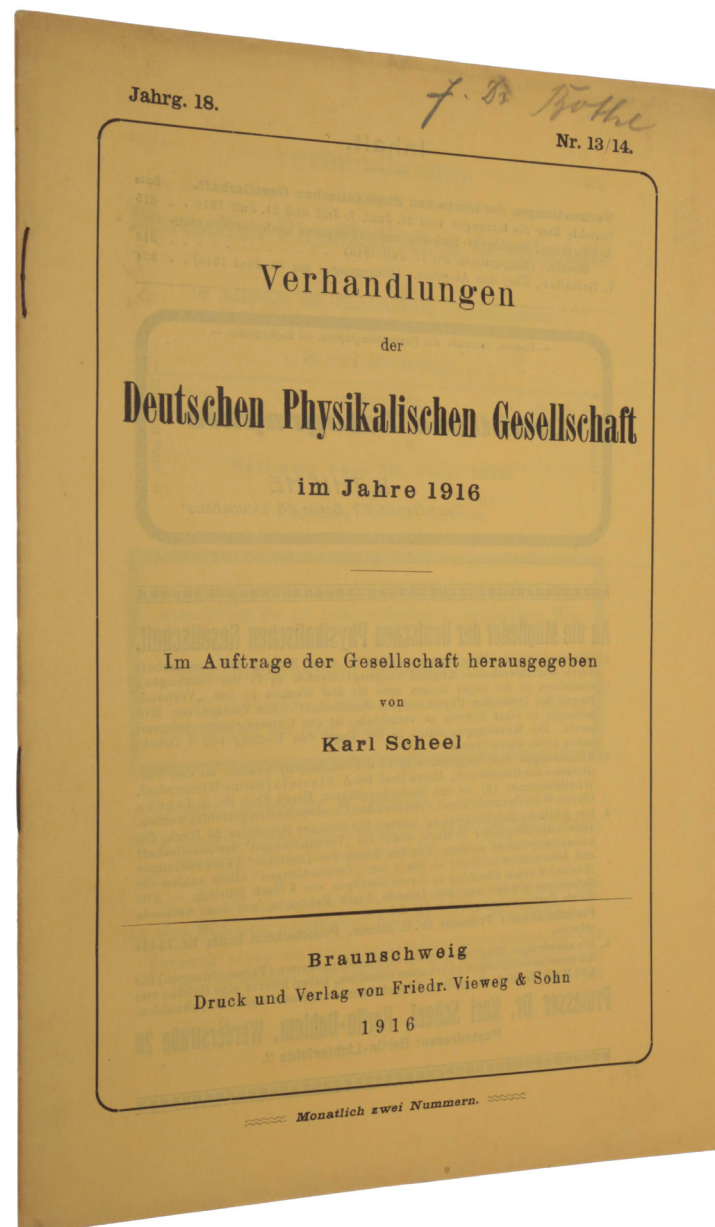
DISCOVERY OF STIMULATED EMISSION OF RADIATION - INSCRIBED BY EINSTEIN TO A FELLOW NOBEL LAUREATE

EINSTEIN, Albert. *‘Strahlungs-Emission und Absorption nach der Quantentheorie’*, pp. 318-323 in: *Verhandlungen der Deutsche Physikalische Gesellschaft, Jahrg. 18, Nr. 13/14, 30 July 1916.* Braunschweig: Druck und Verlag von Friedr. Vieweg and Son, 1916.

\$25,000

First edition, complete journal issue in original printed wrappers, **inscribed by Einstein to fellow Nobel Laureate Walther Bothe.** “This work represents a major step forward in quantum theory” (Calaprice, p. 297). It introduced the concept of stimulated emission of radiation, the theoretical basis for the laser; it also contained a new derivation of Planck’s radiation law which provided, as a by-product, a justification of the frequency rule forming the basis of Bohr’s theory of atomic spectra.

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‘THE GREATEST BLUNDER OF MY LIFE’

[EINSTEIN, Albert.] *A group of photographs documenting Einstein's visit to the Caltech in the first quarter of 1931, and featuring his wife, Elsa, his 'calculator' Walther Mayer, and other scientists including Robert Millikan and Albert Michelson.* [1930-1931].

\$55,000

An important group of photographs documenting Einstein's visit to Caltech. The main purpose of the visit was to discuss Edwin Hubble's observations, made in 1929 with the 100-inch telescope at the Mount Wilson Observatory, which showed that light from distant nebulae (galaxies) was red-shifted, indicating that the universe was expanding. Einstein had believed that the universe is static, and had introduced his 'cosmological constant' into his equations of general relativity to allow for a static solution. When Einstein met Hubble at the Mount Wilson Observatory in January and February 1931, he was visibly moved with Hubble's discovery and reportedly said, with tears in his eyes that "It was the most beautiful and satisfying interpretation of astronomical science." In light of the new evidence, Einstein published a paper two months later renouncing the concept of a cosmological constant, whose invention Einstein denounced as "the greatest blunder of my life."



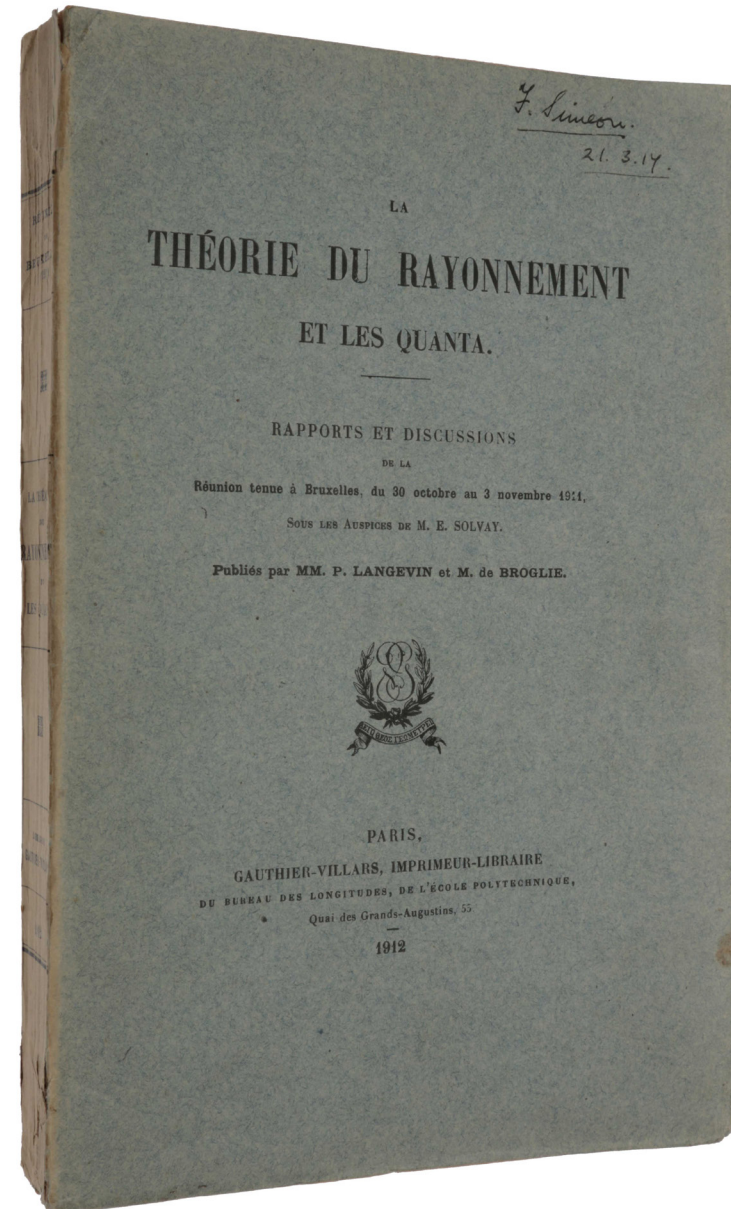
THE FIRST SOLVAY CONGRESS RECONCILING CLASSICAL PHYSICS WITH QUANTUM THEORY

[EINSTEIN, LORENTZ, PLANCK, et al.] *La théorie du rayonnement et les quanta: rapports et discussions de la réunion tenue à Bruxelles, du 30 octobre au 3 novembre 1911 sous les auspices de M. E. Solvay; Publiés par MM. Langevin et M. de Broglie.* Paris: Gauthier-Villars, 1912.

\$3,000

First edition, rare in the original printed wrappers, of the proceedings of the First Solvay Congress, widely considered a turning point in the history of modern physics, which was devoted to the problem of reconciling classical physics with quantum theory. “The breakthrough was, in fact, achieved in 1911; the climate of thought had become completely transformed. The quantum concept was no longer the view of outsiders but became a matter of significance recognized by many leading scientists ... The Solvay Congress in Brussels played a crucial role in this development” (Hermann, *The Genesis of Quantum Theory*).

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THE FIRST EDITION OF EUCLID IN ARABIC

A TSAR OF RUSSIA'S COPY

EUCLID. *Euclidis Elementorum geometricorum libri tredecim ex traditione doctissimi Nasiridini Tusini nunc primum Arabicè impressi.* Rome: in Typographia Medicea, 1594.

\$88,500

First edition of Euclid in Arabic, “possibly the most remarkable of all printed editions of Euclid” (Thomas-Stanford). Euclid’s *Elements*, the “oldest mathematical textbook still in common use today” (PMM), “has exercised an influence upon the human mind greater than that of any other work except the Bible” (DSB). This edition includes an attempted proof of the “parallel postulate” which “became the starting point for the work of Saccheri and ultimately for the discovery of non-Euclidean geometry” (Katz, *History of Mathematics*).



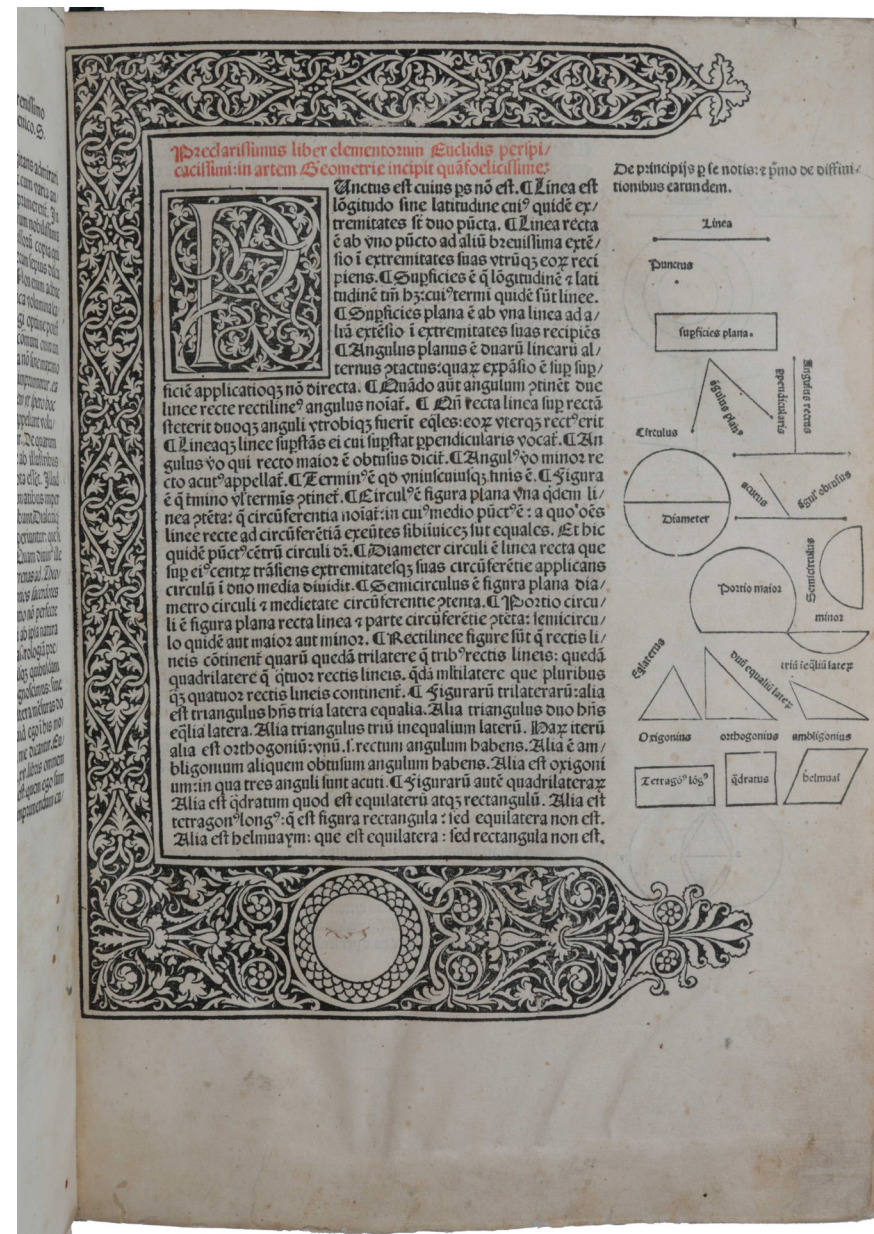
PMM 25 - THE OLDEST TEXTBOOK IN THE HISTORY OF SCIENCE

EUCLID. *Elementa geometriæ*. [Translated from the Arabic by Adelard of Bath (c. 1080-c. 1152). Edited by Giovanni Campano da Novara (1220-96).] Venice: Erhard Ratdolt, 25th May 1482.

\$375,000

First edition of the “oldest mathematical textbook still in common use today” (PMM), This book “has exercised an influence upon the human mind greater than that of any other work except the Bible” (DSB). Ratdolt’s edition is one of the most beautifully printed of early scientific books, and is the first dated book with diagrams (Stillwell).

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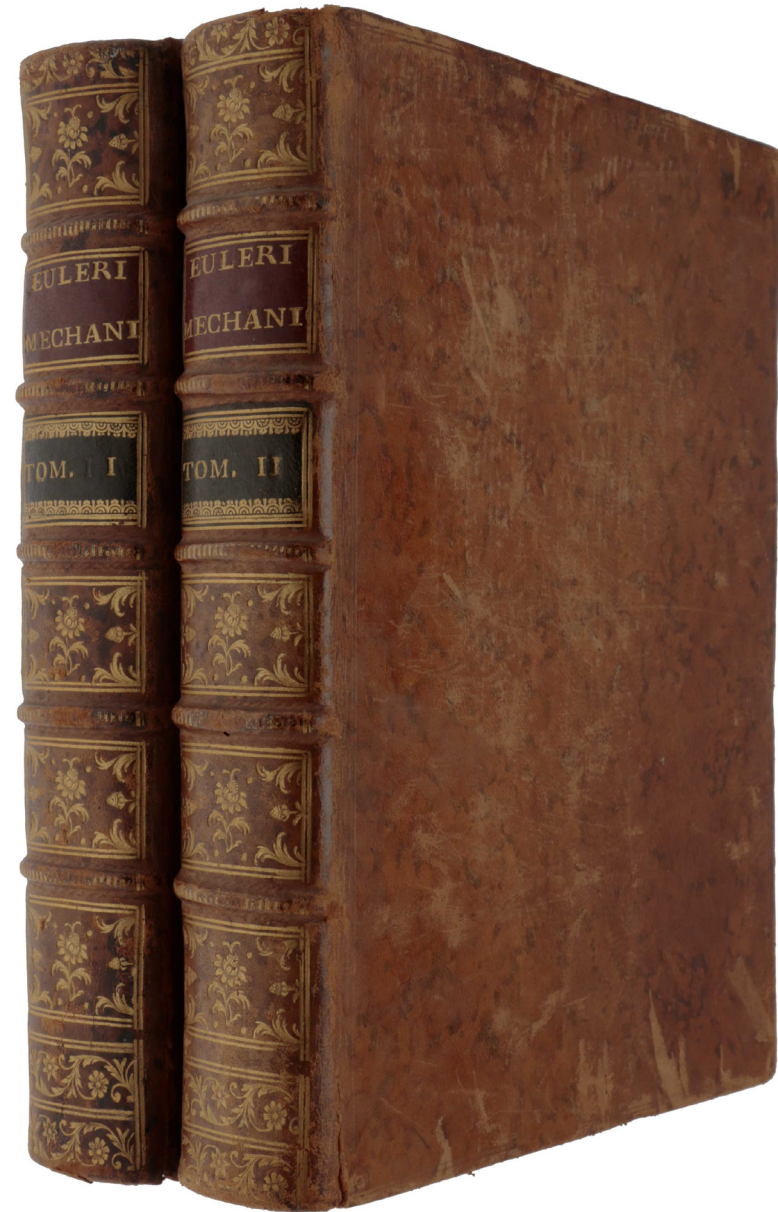
THE BIRTH OF ANALYTICAL MECHANICS

EULER, Leonhard. *Mechanica sive motus scientia analytice exposita*. St. Petersburg: Academy of Sciences, 1736.

\$7,500

First edition of “Euler’s famous work on mechanics in which he introduced the use of analytical methods instead of the geometrical methods of Newton and his followers” (Timoshenko). Lagrange in his own *Mécanique analytique* acknowledged Euler’s mechanics to be “the first great work where Analysis has been applied to the science of motion.”

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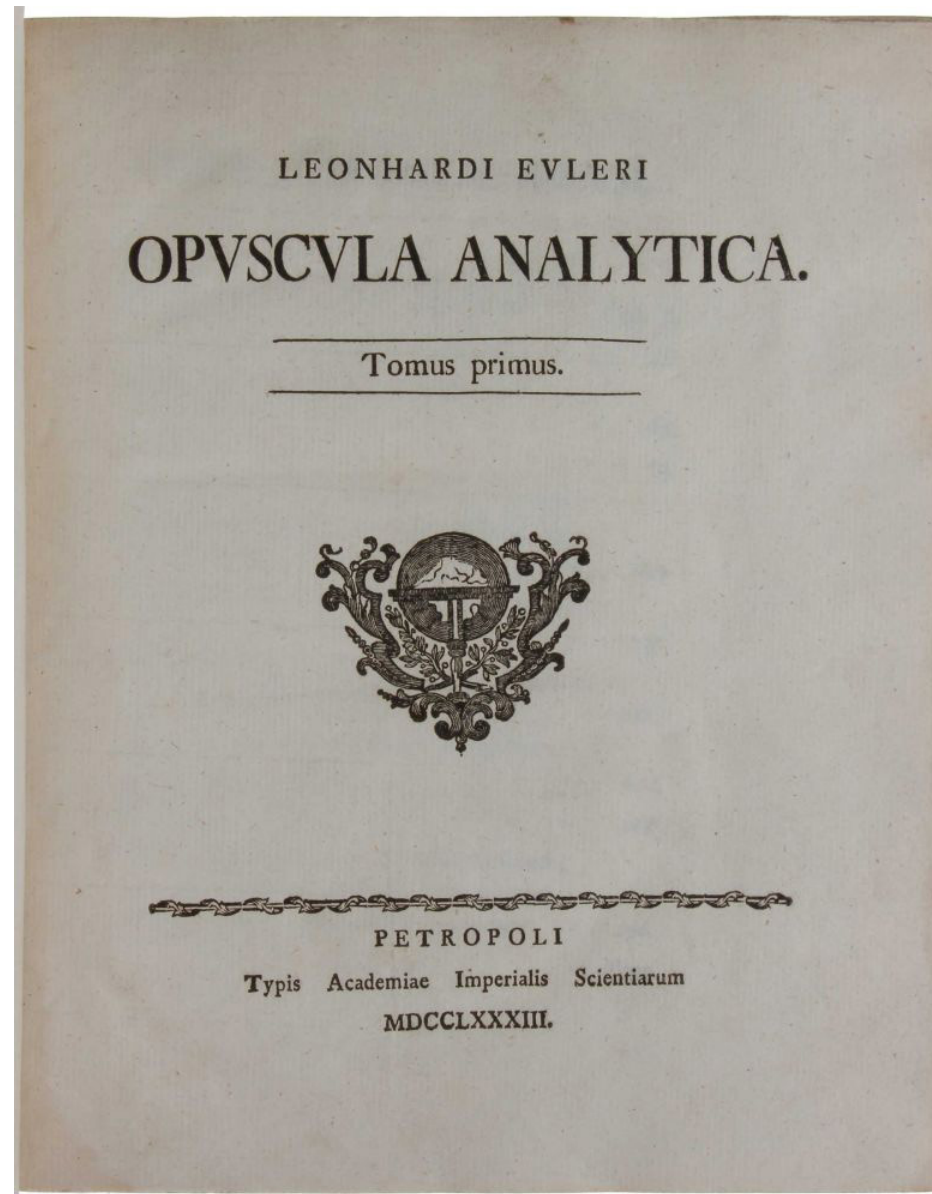
THE LAW OF QUADRATIC RECIPROCITY

EULER, Leonhard. *Opuscula Analytica*. St. Petersburg: Academia Imperialis Scientiarum, 1783-85.

\$8,500

First edition of this collection of 28 previously unpublished papers by Euler, of which the most important is 'Observationes circa divisionem quadratorum per numeros primos', which gives the first clear statement of the 'law of quadratic reciprocity', called the 'golden theorem' by Gauss who gave its first proof in his *Disquisitiones Arithmeticae* (1801).

<https://www.sophiararebooks.com/6037>



THE ORIGINS OF WAVE-PARTICLE DUALITY

EULER, Leonhard. *Opuscula Varii Argumenti [Tomus I]; Conjectura Physica circa Propagationem soni ac luminis [Tomus II]; Opusculorum Tomus III continens Novam theoriam magnetis.* Berlin: Haude & Spener, 1746; 1750; 1751.

\$6,500

First edition, uncut in the original boards, of this collection of thirteen tracts, all but one published here for the first time. The most important is the first printing of Euler's major treatise on light, *Nova theoria lucis et colorum*. According to Casper Hakfoort the wave-particle duality debate in optics really began with Euler's publication of this work. The twelve further tracts cover topics in astronomy, magnetism, electricity, light, sound and mathematics.

<https://www.sophiararebooks.com/4420>



THE FOUNDATION WORK OF THEORETICAL HYDROMECHANICS

EULER, Leonhard. *Scientia navalis seu tractatus de construendis ac dirigendis navibus.* St. Petersburg: Typis Academiae Scientiarum, 1749.

\$5,000

First edition of the work, which enunciated for the first time the principles of hydrostatics, with outstanding provenance: the copy of the great explorer and mathematician Charles Marie de La Condamine (1701–1774). A very good and entirely unrestored copy, in contemporary binding, of Euler's first large work on fluid mechanics. "Together, these [two volumes] are second among the great treatises on rational mechanics by which Euler created the field as we now know it... [in this work Euler] builds a 'mansion of analysis' that includes all the elementary parts of hydrostatics as we know them today." (Eneström).

<https://www.sophiararebooks.com/6036>

SCIENTIA
NAVALIS
SEV
TRACTATUS
DE
CONSTRVENDIS AC DIRIGENDIS
NAVIBVS
PARS PRIOR
COMPLECTENS
THEORIAM VNIVERSAM
DE SITV AC MOTV
CORPORVM AQVAE INNATANTIVM.
AVCTORE
LEONHARDO EVLERO
PROF. HONORARIO ACADEMIAE IMPER. SCIENT. ET
DIRECTORE ACAD. REG. SCIENT. BORVSSICAE.
INSTAR SVPPLEMENTI AD TOM. I. NOVORVM
COMMENTAR ACAD. SCIENT. IMPER.
PETROPOLI
TYPIS ACADEMIAE SCIENTIARVM
clb lcccxlx.

THE TWO-BODY PROBLEM

EULER, Leonhard. *Theoria motuum planetarum et cometarum. Continens methodum facilem ex aliquot observationibus orbitas cum planetarum tum cometarum determinandi. Una cum calculo, quo cometae, qui annis 1680 et 1681. Itemque ejus, qui nuper est visus, motus verus investigatur.* Berlin: Ambrosius Haude, 1744.

\$4,000

First edition of Euler's first treatise on astronomy, "a fundamental work on calculation of orbits" (DSB). Stimulated by the appearance of two great comets in 1742 and 1744, Euler developed new methods to determine the (elliptic) orbits of planets and the (elliptic and parabolic) orbits of comets. His first major contribution in the present work was to the 'two-body problem,' the problem of determining the motion of two spherical bodies under their mutual gravitational attraction (such as the Sun and a planet). The second major contribution of the present work was the introduction of new techniques of perturbation theory – the method of successive approximations that Euler used to determine parabolic orbits is still known as 'Euler's method.'

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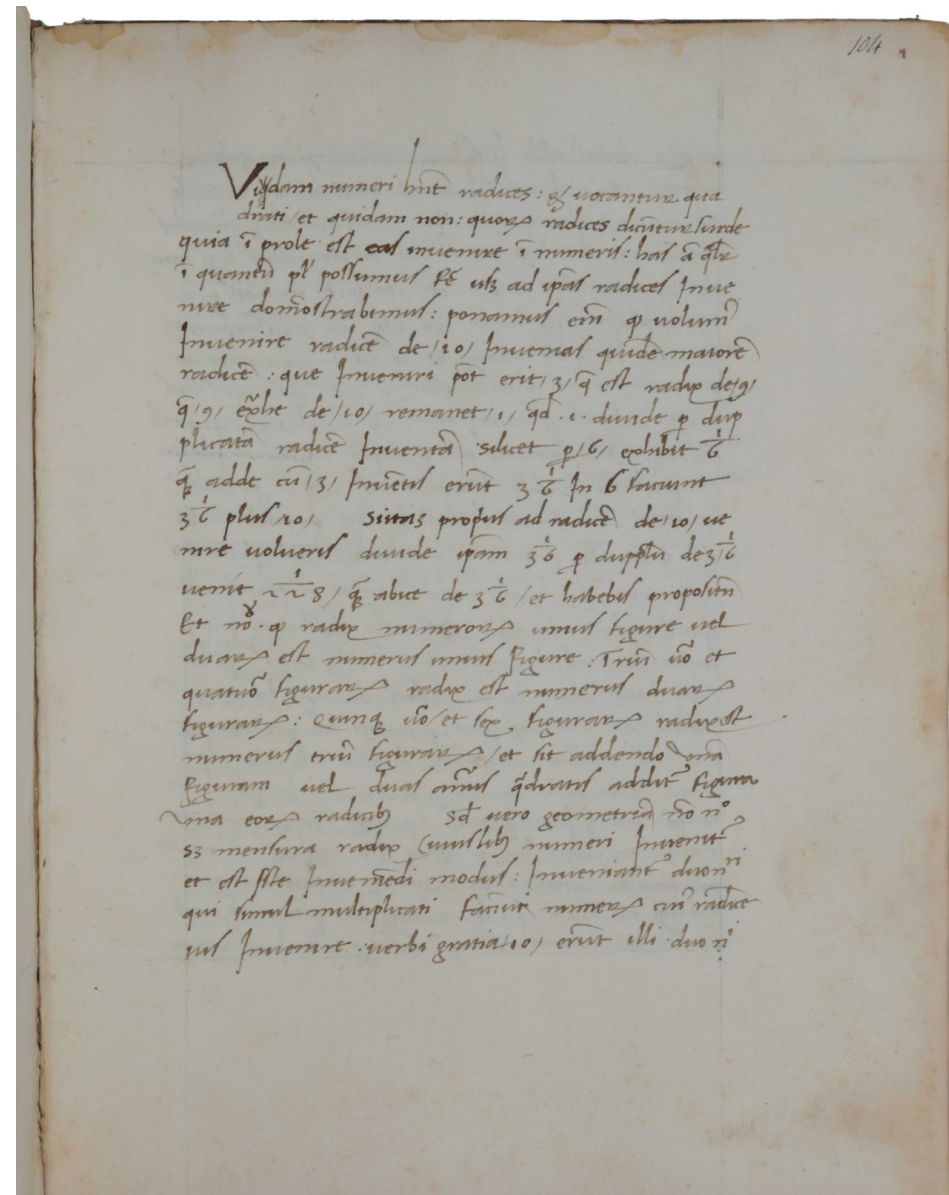
FIBONACCI'S *LIBER ABBACI*

FIBONACCI, Leonardo; BOETHIUS, Anicius; GROSSE-TESTE, Robert; [DE PULCHRO RIVO, Johannes]. A sammelband of five mathematical texts, in Latin, illustrated manuscript on paper. Comprising: Boethius, *De Institutione Arithmetica*; Grosseteste, *Computus*; [Anon.] Tables for the comparison of Christian and Arabic years, tables of conjunction and opposition with explanatory notes; De Pulchro Rivo, *Computus Manualis*; Fibonacci, *Liber Abbaci*, chapters 14 & 15. [Italy: late 15th century].

\$650,000

An extraordinary and highly important 15th-century illustrated sammelband of mediaeval mathematical texts, including the two final and most advanced chapters of the *Liber Abbaci* of Leonardo of Pisa, also known as Fibonacci (c.1170-c.1250), "the first great mathematician of the Christian West" (DSB). This manuscript was owned and bound by one of the most important 19th-century historians of mathematics, Prince Baldassare Boncompagni, who published the first modern critical edition of Fibonacci's work (1857-62). *Liber Abbaci* was largely responsible for disseminating knowledge of the system of Hindu-Arabi numerals in Europe.

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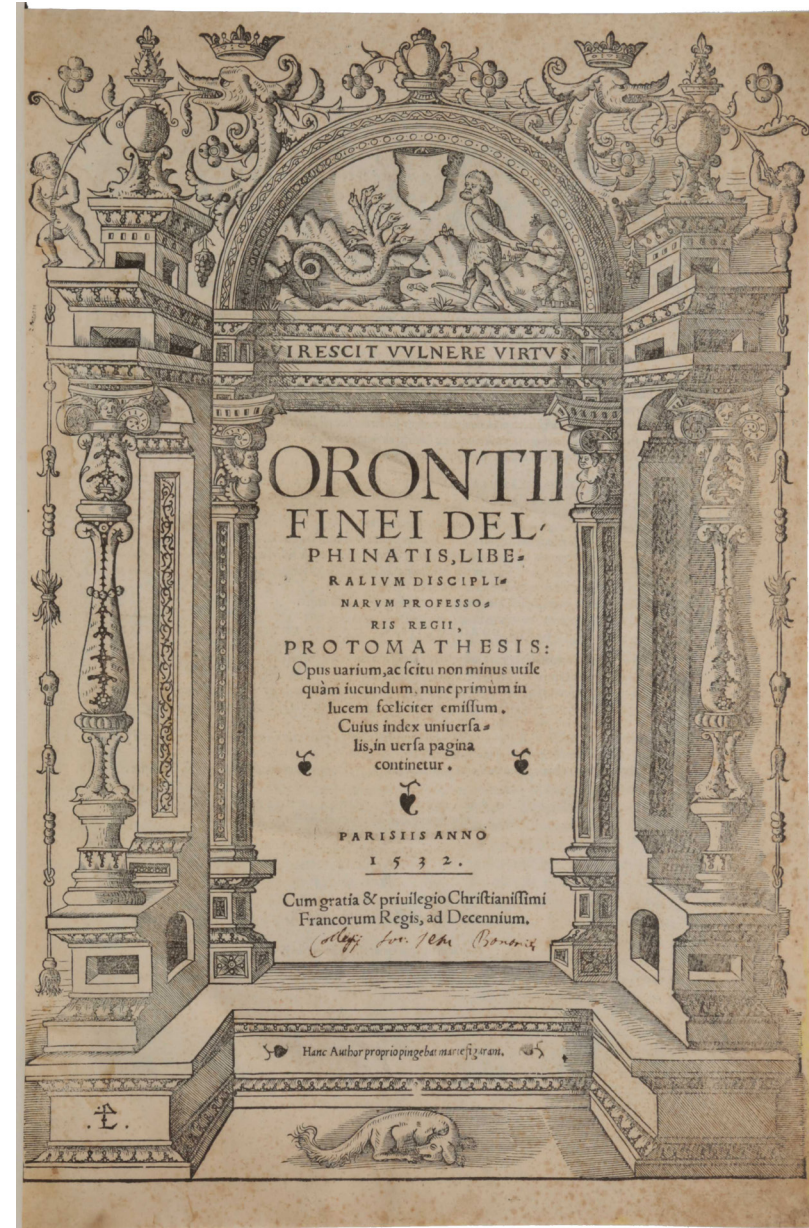


A MASTERPIECE OF ILLUSTRATED BOOK PRODUCTION - THE RICCATI COPY

FINÉ, Oronce. *Protomathesis ... [De arithmetica practica libri IIII; De geometria libri II; De cosmographia, libri V; De solaribus horologiis, et quadrantibus libri IV].* Paris: Gérard Morrhy and Jean Pierre, 1532.

\$45,000

First edition, the Riccati family copy, of Finé's masterpiece of illustrated book production; it is especially remarkable for the fact that the author designed its illustrations himself. Although Finé had published a few works before 1532, and edited others, "it was only with the publication of the *Protomathesis* that he revealed himself as the inventor of a new kind of scientific book" (Pantin). The first two parts of the *Protomathesis* deal with arithmetic and geometry, the third with cosmography, and the fourth with gnomonics.



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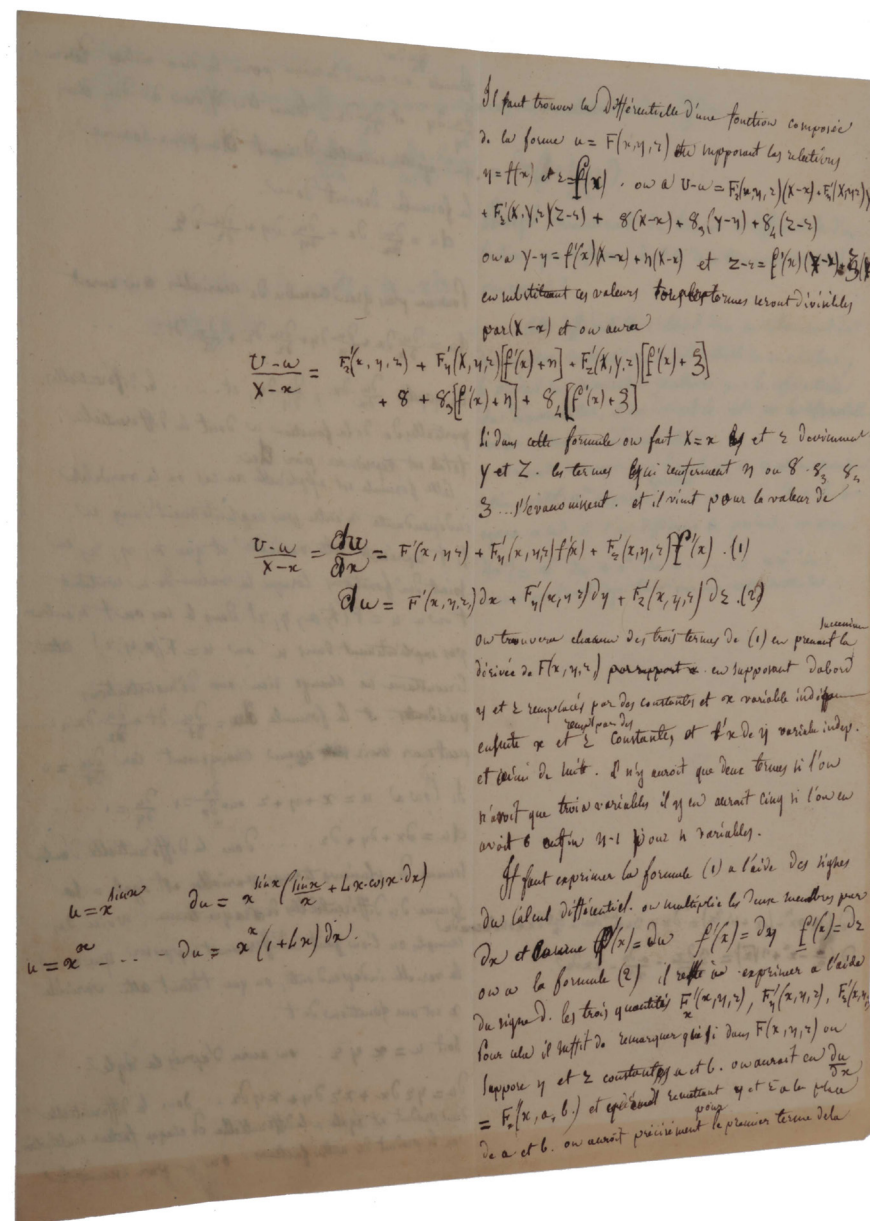
AUTOGRAPH MATHEMATICAL MANUSCRIPT BY FOURIER

FOURIER, Jean-Baptiste-Joseph. *Autograph mathematical manuscript, unsigned, with several corrections and erasures: "It is necessary to find the differential of a function".* [Paris: , 1796-1798].

\$7,500

Extremely rare autograph mathematical manuscript by Fourier, prepared for students on his lecture course on differential calculus at the Ecole Polytechnique, where he taught from its creation in 1795 until he was posted to Egypt by Napoleon in 1798. Fourier is famous today for his mathematical study of heat diffusion, which began a decade later (he is also sometimes credited with the discovery of the 'greenhouse effect'). "This work marks an epoch in the history of both pure and applied mathematics. It is the source of all modern methods in mathematical physics ... The gem of Fourier's great book is 'Fourier series'" (Cajori, *A History of Mathematics*, p. 270). Fourier's scientific manuscripts are extremely rare in private hands.

<https://www.sophiararebooks.com/6169>



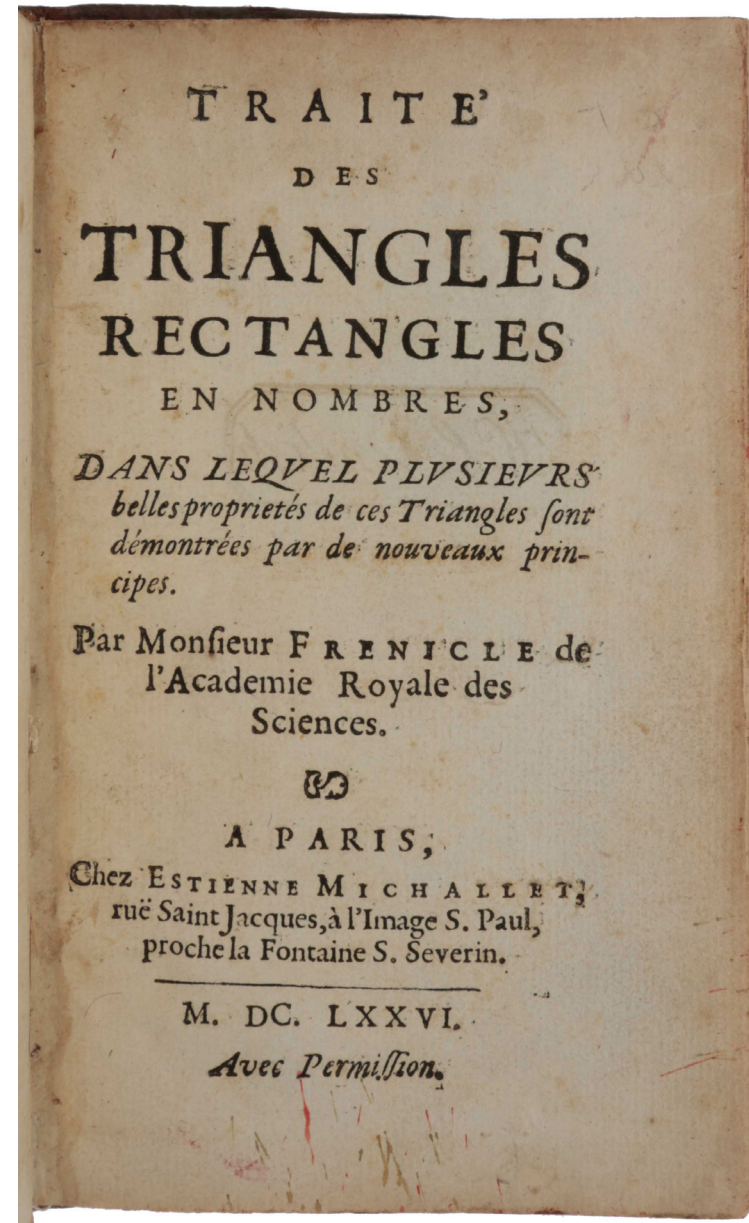
THE FIRST CASE OF FERMAT'S LAST THEOREM TO BE PROVED

FRENICLE DE BESSY, Bernard. *Traité des triangles rectangles en nombres, dans lequel plusieurs belles propriétés de ces triangles sont démontrées par de nouveaux principes.* Paris: Estienne Michallet, 1676.

\$9,500

First edition, very rare, **Henry Cavendish's copy**, of this early treatise on number theory, containing a number of results Frenicle had probably obtained by correspondence with Fermat. These include the proof of the first case of Fermat's last theorem to be published, the proof being by the 'method of descent' which Fermat invented.

<https://www.sophiararebooks.com/6170>



CONTEMPORARY PORTRAIT OF GALVANI

[GALVANI, Luigi] GANDOLFI, Luigi. *Portrait of Galvani, done in Bologna, signed by the Italian artist Mauro Gandolfi. 55 mm (diameter), pen and grey ink, watercolor on vellum, in its original wooden frame and glass with decorated brass ring.*

\$5,000

Very rare and beautiful contemporary portrait of Luigi Galvani (1737 – 1798), who inaugurated the modern epoch in electricity with his celebrated description of the production of “current electricity” by contact between two different metals and the legs of a frog. The portrait was painted, and is signed on the verso, by the Italian artist Mauro Gandolfi (1764 – 1834). He studied at the Accademia Clementina di belle arti where he won several prizes, becoming professor at the Academy in 1794. His best known paintings are two altarpieces painted in 1791 for the church of San Domenico in Ferrara. After 1796 he concentrated mainly on watercolours.



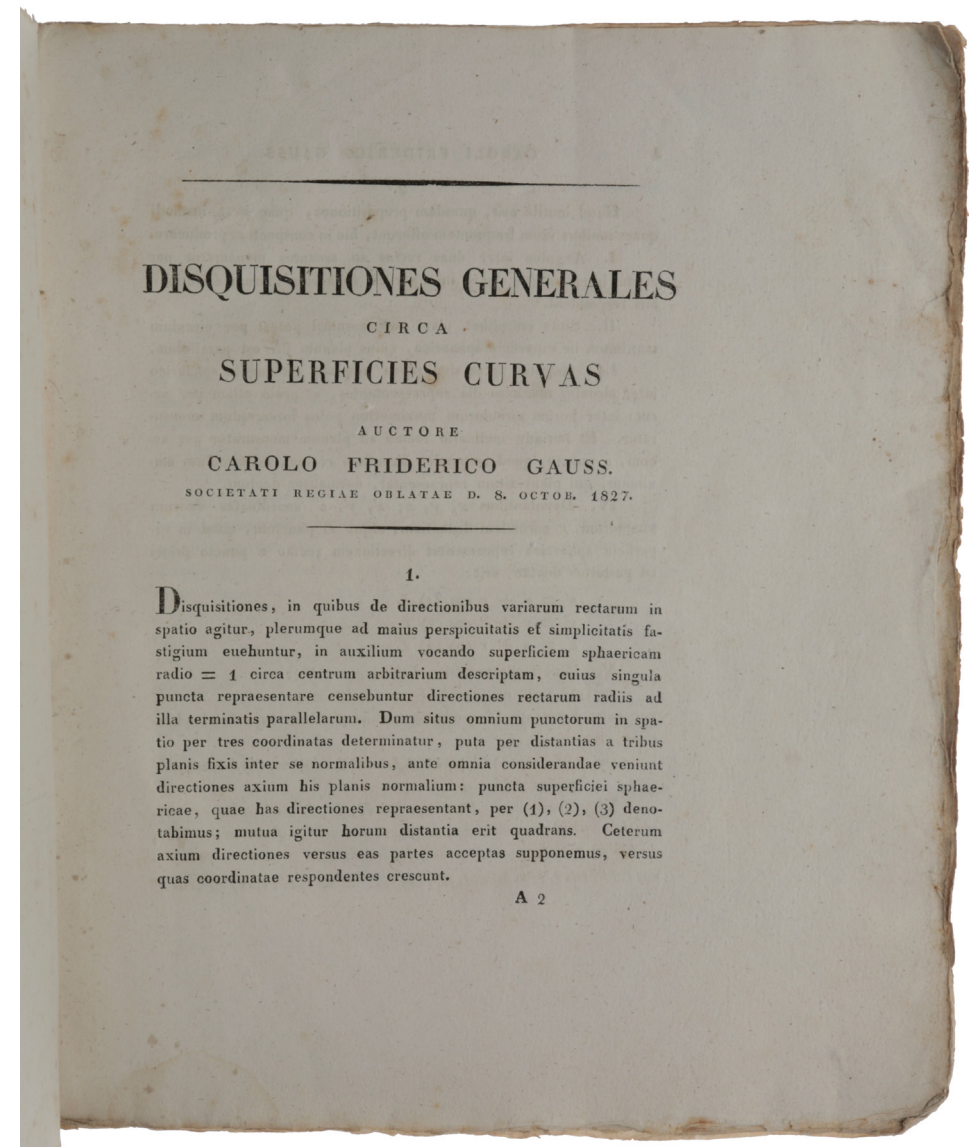
<https://www.sophiararebooks.com/6133>

GAUSS'S SECOND MASTERPIECE

GAUSS, Carl Friedrich. *Disquisitiones generales circa superficies curvas.* Göttingen: Dieterich, 1828.

\$14,500

First edition, the very rare separately-paginated offprint, of this “masterpiece of the mathematical literature” (Zeidler). This is an exceptionally fine copy, uncut in its original plain wrappers. “The crowning contribution of the period, and his last great breakthrough in a major new direction of mathematical research, was *Disquisitiones generales circa superficies curvas* (1828), which grew out of his geodesic meditations of three decades and was the seed of more than a century of work on differential geometry” (DSB).



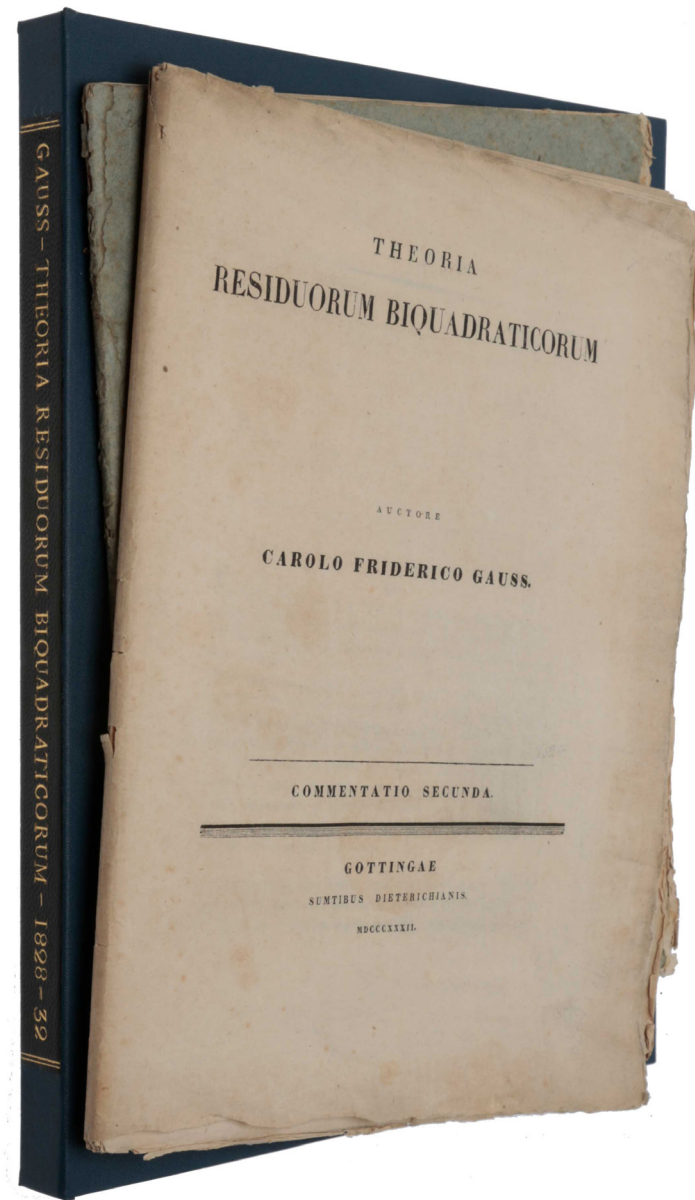
<https://www.sophiararebooks.com/6070>

GAUSS ON THE THEORY OF COMPLEX NUMBERS

GAUSS, Carl Friedrich. *Theoria residuorum biquadraticorum. Commentatio prima [- secunda]*. Göttingen: Dieterich, 1828 [- 1832].

\$12,500

First edition, very rare separately-paginated offprints, and an exceptional copy in original state, of these two important papers, in which Gauss coined the term 'complex number' and introduced the complex plane now often referred to as the 'Gaussian plane'. "The foundations of the theory of algebraic integers were laid by Gauss in his important work *Theoria residuorum biquadraticorum, Commentatio II*, which appeared in 1832, in which he considered the numbers $a + bi$ ($i = \sqrt{-1}$)" (Klein, *Vorlesungen über die Entwicklung der Mathematik im 19. Jahrhundert*).



<https://www.sophiararebooks.com/6172>

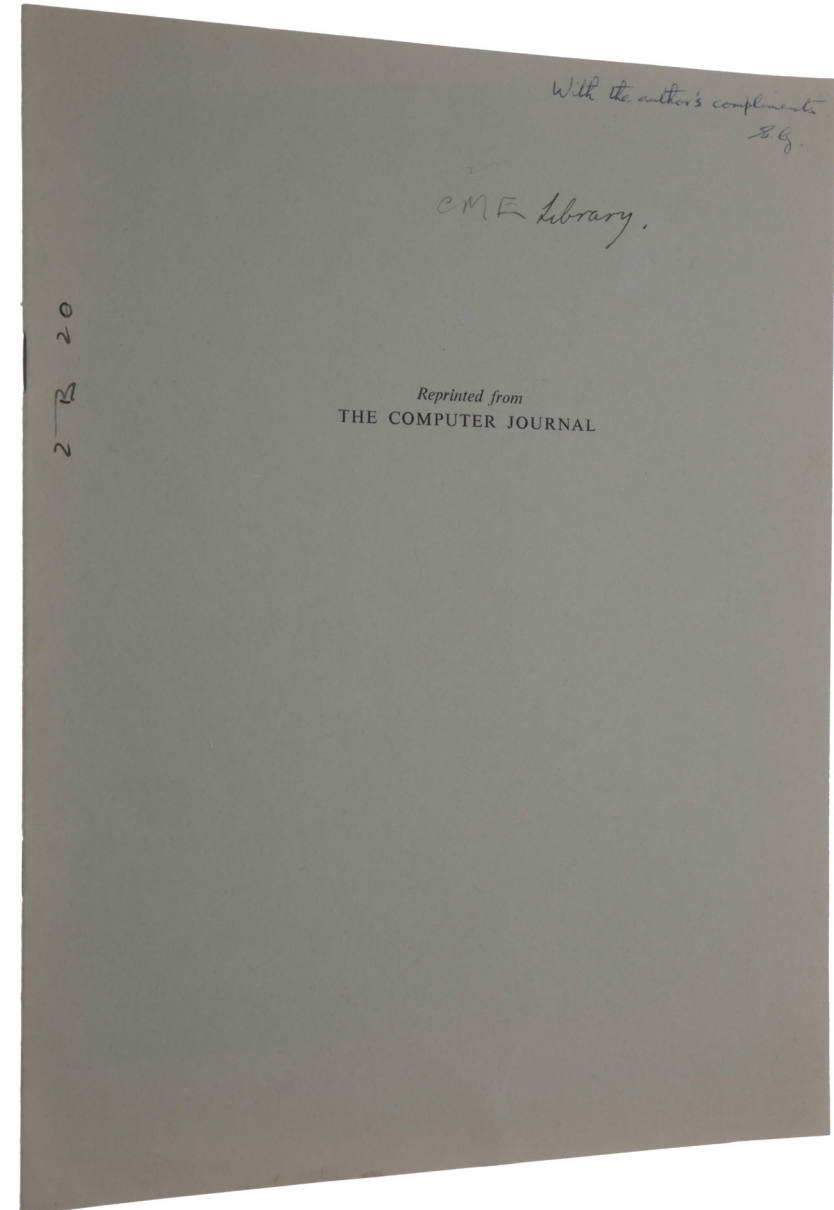
THE BIRTH OF PARALLEL COMPUTING

GILL, Stanley. *Parallel Programming*. Offprint from: *The Computer Journal*, Vol. 1, No. 1, April 1958. London: The British Computer Society Ltd., [1958].

\$8,000

First edition, exceptionally rare separately-paginated offprint, **inscribed by Gill**, of “the first paper on parallel programming ... Subsequent papers on the subject did not appear for another seven years ... A decade later, interest in parallel programming had increased dramatically” (Dauben). Today, “parallel computing has become the dominant paradigm in computer architecture, mainly in the form of multi-core processors” (Wikipedia).

<https://www.sophiararebooks.com/6173>



THE DISCOVERY OF RADIOTHORIUM INSCRIBED AND ANNOTATED BY HAHN

HAHN, Otto. *Über ein neues, die Emanation des Thoriums gebendes radioaktives Element. Offprint from: Jahrbuch der Radioaktivität und Elektronik, Bd. 2, Heft 3.* Leipzig: S. Hirzel, 1905.

\$9,500

First edition, extremely rare separately-paginated offprint, **inscribed by Hahn to Sir William Ramsay and with Hahn's autograph corrections**, of his *Habilitation*, announcing his discovery of the new element 'radiothorium'. It was the success of this dissertation which convinced Hahn to pursue a career in academic research, which culminated in his discovery in 1938 of nuclear fission, for which he was awarded the Nobel Prize in Chemistry 1944.

<https://www.sophiararebooks.com/6178>

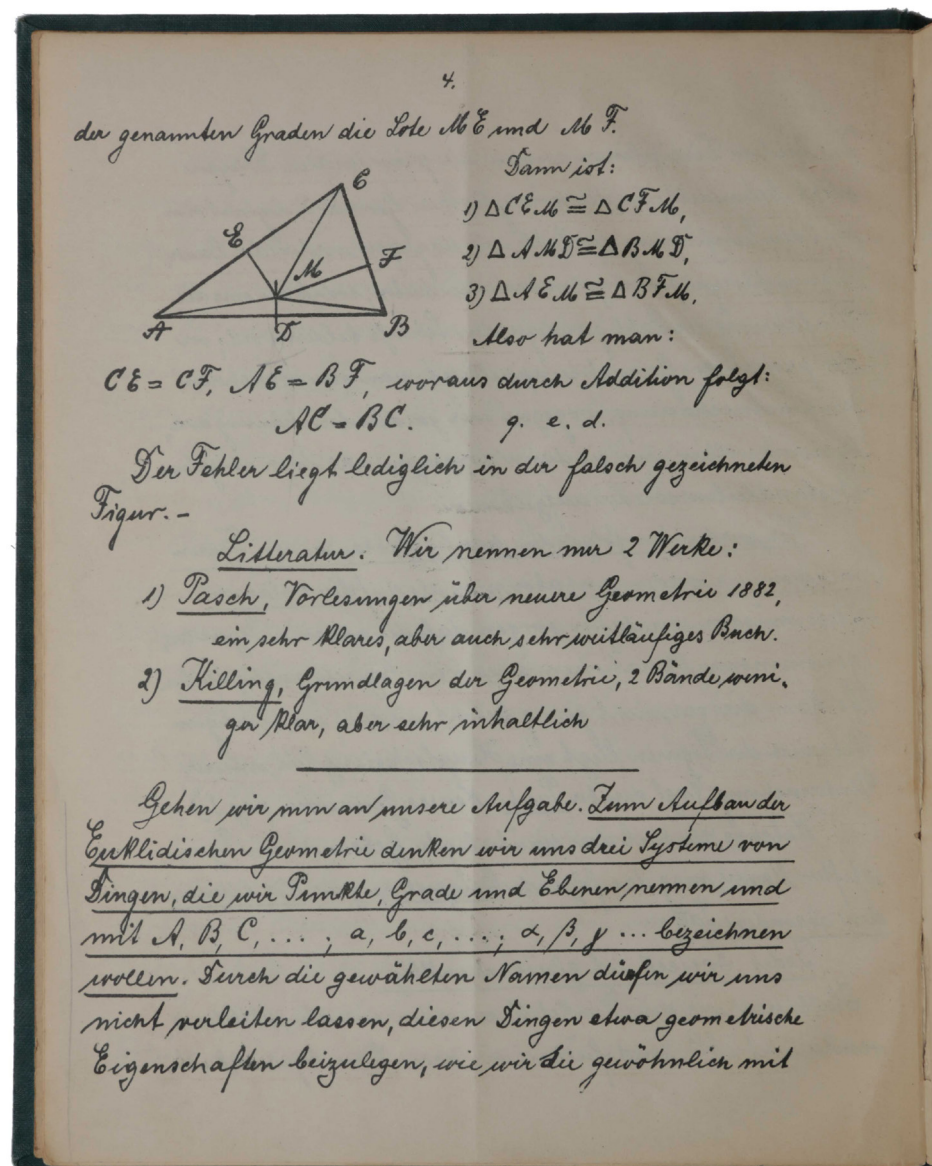


PRE-PUBLICATION PRINTING OF HILBERT'S LECTURES ON THE FOUNDATIONS OF GEOMETRY

HILBERT, David. *Elemente der Euklidischen Geometrie.* Göttingen, Wintersemester 1898/99. Mechanically reproduced manuscript in a professional copyist's hand. Göttingen: 1899.

\$12,500

First printing, extremely rare (one of 70 copies), of Hilbert's classic lectures on the foundations of geometry, delivered during the 1898-99 winter semester at Göttingen. It precedes the revised and expanded published version, retitled "Grundlagen der Geometrie," that was included in the Festschrift zur Feier der Enthüllung des Gauss-Weber-Denkmal in Göttingen (1899).



PMM 252 - CELESTIAL MECHANICS

LAPLACE, Pierre-Simon, Marquis de. *Traité de mécanique céleste*. Paris: Crapelet for Duprat, An VII [1799] [Vols. I-II]; Crapelet for Duprat, An XI-1802 [Vol. III]; Courcier, An XIII-1805 [Vol. IV]; Bachelier, 1825 [Vol. V]. Paris: Crapelet, Courcier, Bachelier, [1799-1825].

\$20,000

First edition, a fine set in original wrappers, of this monumental work. The *Mécanique céleste* is the foundation of modern theoretical astronomy, termed ‘the eighteenth-century *Almagest*’ and ‘a sequel to Newton’s *Principia*’ by Grolier/Horblit. Here, Laplace, rightly called the ‘Newton of France’ (*En Français dans le Texte*), codified and developed the theories and achievements of Newton, Euler, d’Alembert, and Lagrange, producing “a locus classicus for celestial mechanics on a scale unmatched since Newton, and also a valuable source for a cluster of important mathematical theories and methods” (Grattan-Guinness).



<https://www.sophiararebooks.com/6040>

THE FOUNDATION OF ALL SUBSEQUENT ADVANCES IN SURGERY

LISTER, Joseph. 'On the Antiseptic Principle in the Practice of Surgery,' pp. 353-356 in: *The Lancet*, Vol II, Number XII (September 21, 1867) & pp. 668-669 in: *ibid.*, Number XXII (November 30, 1867). London: George Fall, 1867.

\$4,500

First appearance, contained in two complete journal issues in the original printed wrappers, of Lister's paper, which along with his 'On a New Method of Treating Compound Fracture, Abscess, etc', published in *The Lancet* a few months earlier, "represent two of the most epoch-making contributions to surgery" (Garrison-Morton-Norman). RBH lists no other copy in original printed wrappers since 1988.



<https://www.sophiararebooks.com/6182>

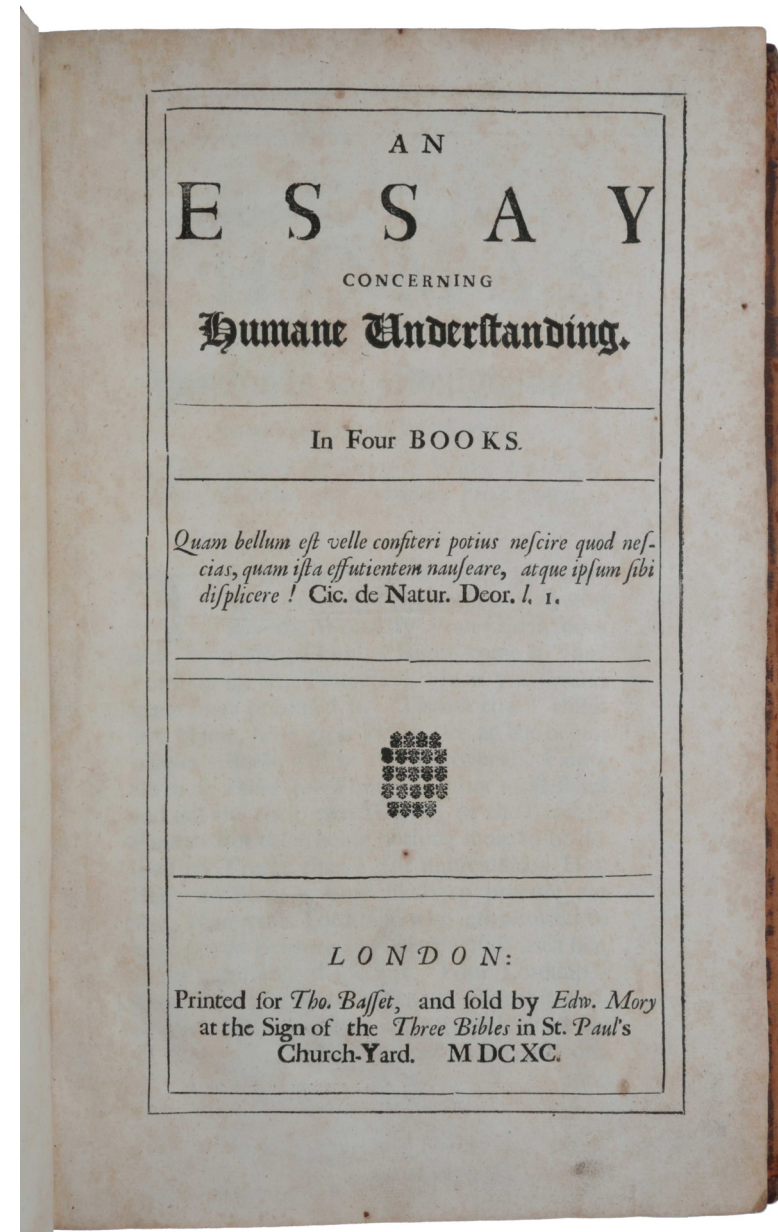
PMM 164 - THE MOST INFLUENTIAL WORK OF EUROPEAN PHILOSOPHY FOR A CENTURY

LOCKE, John. *An Essay Concerning Humane Understanding.*
London: printed [by Elizabeth Holt] for Tho. Basset, and sold by
Edw. Mory, 1690.

\$45,000

First edition, second issue, of Locke's great dissertation on 'the adequacy of human knowledge when confronted with God and the universe' (PMM). A fine copy, in contemporary calf, from the collection of Locke scholar Peter Laslett, Trinity College Cambridge. This is Locke's greatest work, a critical assessment of the origins, nature, and limits of human reason, which was to remain the single most influential work in European philosophy for at least one hundred years and influence the two other great British empiricists David Hume and George Berkeley. "Few books in the literature of philosophy have so widely represented the spirit of the age and country in which they have appeared, or have so influenced opinion afterwards" (Fraser).

<https://www.sophiararebooks.com/6126>



AN EXCEPTIONAL COLLECTION OF WORKS BY LORENTZ - THE GREATEST INFLUENCE ON EINSTEIN

LORENTZ, Hendrik Antoon. *Unique and extensive collection of scientific publications by the Dutch Nobel laureate from his own private library. Comprising some 220 publications by Lorentz, mostly offprints, 53 books relating to his work, and 8 further books from his library. [1718-1939].*

\$135,000

An unparalleled collection of works by Lorentz, representing a major portion of the scientific production of one of the most important physicists of his time. “The Nobel Prize in Physics 1902 was awarded jointly to Hendrik Antoon Lorentz and Pieter Zeeman ‘in recognition of the extraordinary service they rendered by their researches into the influence of magnetism upon radiation phenomena” (nobel.org). “Einstein said Lorentz had been the greatest influence in his life” (DSB).



<https://www.sophiararebooks.com/6041>

THE FIRST PAPER ON FRACTALS

MANDELBROT, Benoit B. 'How Long is the Coast of Britain? Statistical Self-Similarity and Fractional Dimension,' pp. 636-638 in: *Science, New Series*, Vol. 56, No. 3775, May 5, 1967. [With:] **RICHARDSON, Lewis Fry.** 'The problem of contiguity: An appendix to Statistics of Deadly Quarrels,' pp. 139-187 in: *General Systems: Yearbook of the Society for the Advancement of General Systems Theory*. Ann Arbor, MI: The Society, 1961. Washington, DC: American Association for the Advancement of Science, 1967.

\$2,000

First edition, journal issue in original printed wrappers, of Mandelbrot's first paper on fractals (a term he coined in 1975). "Today Mandelbrot's paper on the coast of Britain is famous in the history of mathematics" (historyofscience.com). "Mandelbrot had come across the coastline question in an obscure posthumous article by an English scientist, Lewis F. Richardson, who groped with a surprising number of the issues that later became part of chaos [theory]" (Gleick, *Chaos*, p. 94). Mandelbrot and Richardson argued that the coastline should be regarded as having a fractional dimension between 1 and 2.

<https://www.sophiararebooks.com/5675>

Reports

How Long Is the Coast of Britain?

Statistical Self-Similarity and Fractional Dimension

Abstract. Geographical curves are so involved in their detail that their lengths are often infinite or, rather, undefinable. However, many are statistically "self-similar," meaning that each portion can be considered a reduced-scale image of the whole. In that case, the degree of complication can be described by a quantity D that has many properties of a "dimension," though it is fractional; that is, it exceeds the value unity associated with the ordinary, rectifiable, curves.

Seacoast shapes are examples of highly involved curves such that each of their portion can—in a statistical sense—be considered a reduced-scale image of the whole. This property will be referred to as "statistical self-similarity." To speak of a length for such figures is usually meaningless. Similarly (1), "the left bank of the Vistula, when measured with increased precision, would furnish lengths ten, hundred or even thousand times as great as the length read off the school map." More generally, geographical curves can be

considered as superpositions of features of widely scattered characteristic size; as ever finer features are taken account of, the measured total length increases, and there is usually no clearcut gap between the realm of geography and details with which geography need not be concerned.

Quantities other than length are thus needed to discriminate between various degrees of complication for a geographical curve. When a curve is self-similar, it is characterized by an exponent of similarity, D , which possesses

many properties of a dimension, though it is usually a fraction greater than the dimension 1 commonly attributed to curves. We shall reexamine in this light some empirical observations by Richardson (2). I propose to interpret them as implying, for example, that the dimension of the west coast of Great Britain is $D = 1.25$. Thus, the so far esoteric concept of "random figure of fractional dimension" is shown to have simple and concrete applications and great usefulness.

Self-similarity methods are a potent tool in the study of chance phenomena, including geostatistics, as well as economics (3) and physics (4). In fact, many noises have dimensions D contained between 0 and 1, so that the scientist ought to consider dimension as a continuous quantity ranging from 0 to infinity.

Returning to the claim made in the first paragraph, let us review the methods used when attempting to measure the length of a seacoast. Since a geographer is unconcerned with minute details, he may choose a positive scale G as a lower limit to the length of geographically meaningful features. Then, to evaluate the length of a coast between two of its points A and B , he may draw the shortest inland curve joining A and B while staying within a distance G of the sea. Alternatively, he may draw the shortest line made of straight segments of length at most G , whose vertices are points of the coast which include A and B . There are many other possible definitions. In practice, of course, one must be content with approximations to shortest paths. We shall suppose that measurements are made by walking a pair of dividers along a map so as to count the number of equal sides of length G of an open polygon whose corners lie on the curve. If G is small enough, it does not matter whether one starts from A or B . Thus, one obtains an estimate of the length to be called $L(G)$.

Unfortunately, geographers will disagree about the value of G , while $L(G)$ depends greatly upon G . Consequently, it is necessary to know $L(G)$ for several values of G . Better still, it would be nice to have an analytic formula linking $L(G)$ with G . Such a formula, of an entirely empirical character, was proposed by Lewis F. Richardson (2) but unfortunately it attracted no attention. The formula is $L(G) = M G^{1-D}$, where M is a positive constant and D is a constant at least equal to unity. This

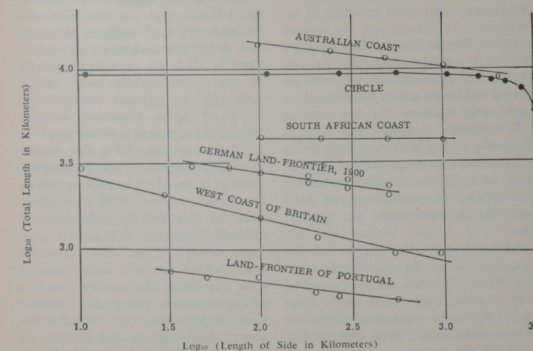


Fig. 1. Richardson's data concerning measurements of geographical curves by way of polygons which have equal sides and have their corners on the curve. For the circle, the total length tends to a limit as the side goes to zero. In all other cases, it increases as the side becomes shorter, the slope of the doubly logarithmic graph being in absolute value equal to $D-1$. (Reproduced from 2, Fig. 17, by permission.)

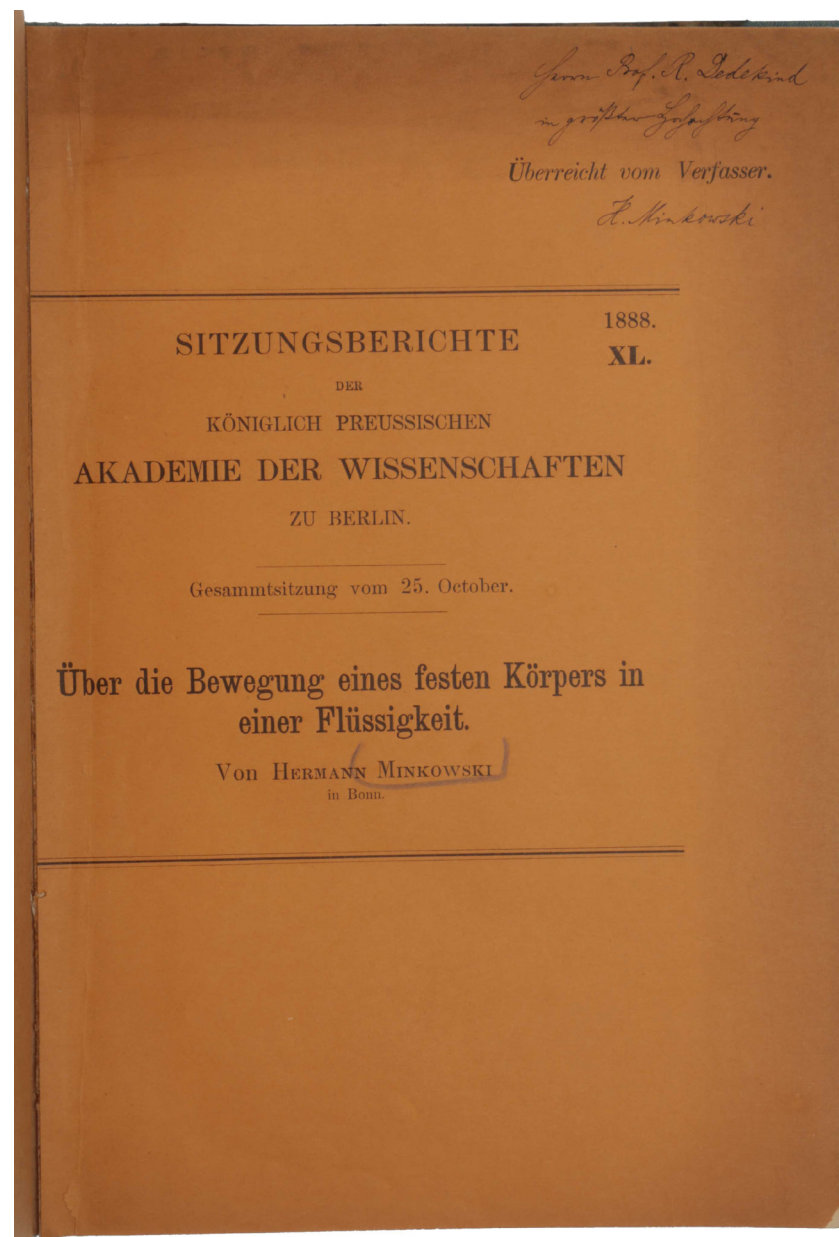
INSCRIBED BY MINKOWSKI TO DEDEKIND

MINKOWSKI, Hermann. [DEDEKIND, Richard]. *Zur Geometrie der Zahlen*. Offprint from: *Verhandlungen des III. Internationalen Mathematiker-Kongresses, Heidelberg 1904*. [Bound with:] *Raum und Zeit*. Vortrag, gehalten auf der 80. Naturforscher-Versammlung zu Köln am 21 September 1908. Bound with six other offprints, one of which is signed by Minkowski and three are inscribed by him to Dedekind. Leipzig & Berlin: Teubner, 1909.

\$1,500

Sammelband containing eight offprints by Minkowski (1864-1909), with extraordinary provenance. One of the offprints is **signed by Minkowski** and three are **inscribed by him to Richard Dedekind**. The volume thus links two of the most important mathematicians of the later 19th and early 20th centuries. Minkowski is perhaps best known today for his introduction of the concept of four-dimensional 'spacetime', represented in the present volume by an offprint of his lecture 'Raum und Zeit' [no. 8 in the list of contents below]. But the first paper in this volume, published 20 years earlier, demonstrates that Minkowski became interested in physics early in his career.

<https://www.sophiararebooks.com/6192>



THE MOST EXTENSIVE EDITION OF MÜNSTER'S COSMOGRAPHY

MÜNSTER, Sebastian. *Cosmographia, das ist: Beschreibung der gantzen Welt: darinnen aller Monarchien Keyserthumben Königreichen Fürstenthumben Graff- und Herrschafften Länderen Stätten und Gemeinden; wie auch aller geistlichen Stifften Bisthumben Abteyen Klöstern Ursprung Regiment Reichthumb Gewalt und Macht Verenderung Auff- und Abnehmen zu Fried- und Kriegszeiten sampt aller ubrigen Beschaffenheit...* Basel: [Sebastian Henricpetri], 1628.

\$28,500

A fine copy, untouched in a contemporary binding, of the last German edition of the *Cosmography*, “the first modern” work of geography (Hodgen, p. 506). This, the most extensive of all the editions of Münster’s great work, contains 68 maps and plans published here for the first time.

<https://www.sophiararebooks.com/6042>



OPTICKS AND THE DISCOVERY OF CALCULUS

[NEWTON, Sir Isaac.] *Opticks: or, A Treatise of the Reflexions, Refractions, Inflexions and Colours of Light. Also Two Treatises of the Species and Magnitude of Curvilinear Figures.* London: Printed for Sam. Smith and Benj. Walford, Printers to the Royal Society, at the Prince's Arms in St. Paul's Church-Yard, 1704.

\$185,000

First edition, first issue, and a **very fine copy** in its unrestored original binding. Of Newton's three greatest contributions to science – his theory of gravity, his theories of light and colour, and the invention of calculus – the first was published for the first time in the *Principia* (1687), and the other two in the present work. “Newton's *Opticks* did for light what his *Principia* had done for gravitation, namely, placed it on a scientific basis” (Babson). “One of the supreme productions of the human mind” (Andrade).

<https://www.sophiararebooks.com/6071>

OPTICKS:
OR, A
TREATISE
OF THE
REFLEXIONS, REFRACTIONS,
INFLEXIONS and COLOURS
OF
LIGHT.
ALSO
Two TREATISES
OF THE
SPECIES and MAGNITUDE
OF
Curvilinear Figures.

LONDON,
Printed for SAM. SMITH, and BENJ. WALFORD.
Printers to the Royal Society, at the Prince's Arms in
St. Paul's Church-yard. MDCCIV.

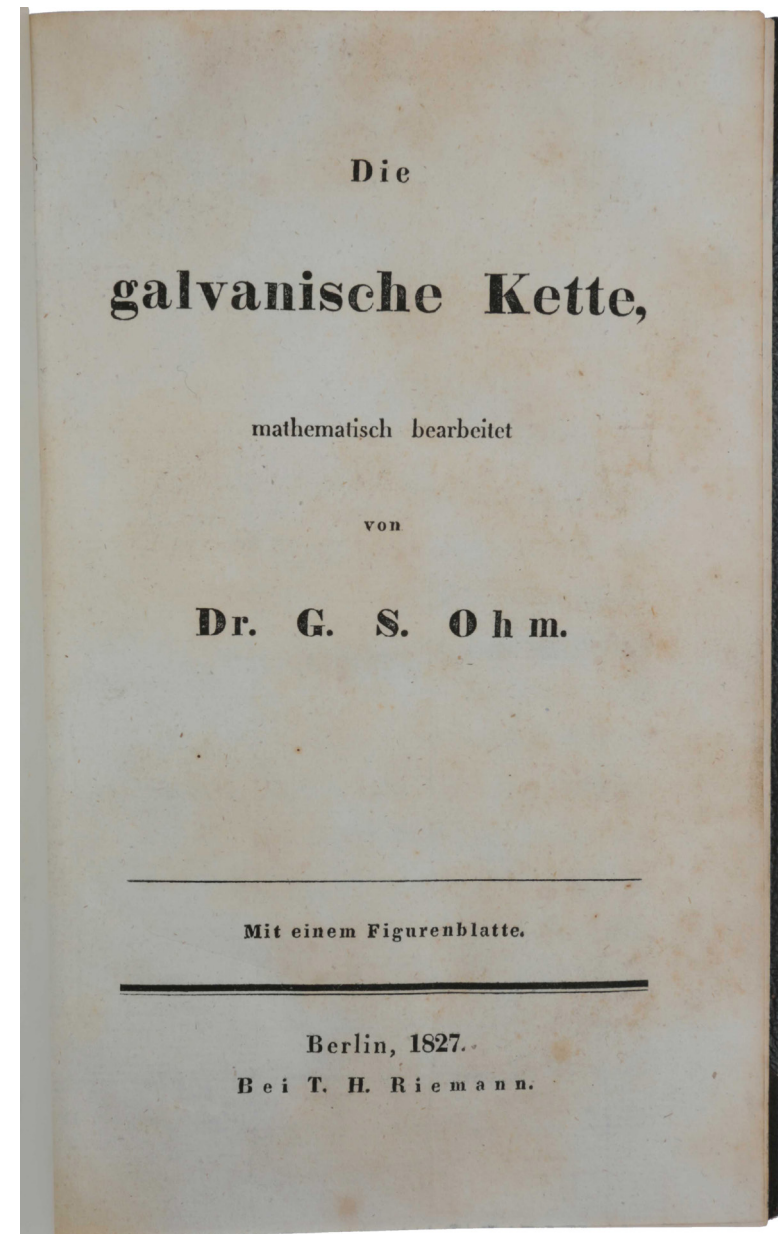
PMM 289 - MEASURING ELECTRICITY

OHM, Georg Simon. *Die galvanische Kette, mathematisch bearbeitet.* Berlin: J.G.F. Kniestadt for T.H. Riemann, 1827.

\$25,000

First edition of “Ohm’s great work” (DSB), containing the fully-developed presentation of his theory of electricity, including Ohm’s Law. “Ohm’s great contribution – ‘The Galvanic Chain Mathematically Calculated’ – was to measure the rate of current flow and the effects of resistance on the current. ‘Ohm’s law’ – that the resistance of a given conductor is a constant independent of the voltage applied or the current flowing was arrived at theoretically by analogy with Fourier’s heat measurements” (PMM).

<https://www.sophiararebooks.com/6043>



THE FIRST MODERN WORLD ATLAS

ORTELIUS, Abraham. *Theatrum orbis terrarum*. [With:] *Parergon* [And:] *Nomenclator Ptolemaicus*. Antwerp: Officina Plantiniana, 1591-92.

\$325,000

Fourth Latin edition, and a copy **hand-coloured and heightened in gold**. Ortelius's atlas "set a standard by which subsequent collections would be judged and compared" (Short). Several editions were printed at the Plantiniana at the end of the 16th century and from 1585 Ortelius began to include historical maps in a section called *Parergon*. The maps and plates in the *Parergon* may be considered "the most outstanding engravings depicting the wide-spread interest in classical geography in the 16th century" (Van der Krogt). The present 1592 edition, contains 108 maps as well as the 26 maps and views of the *Parergon*, as well as an index called *Nomenclator Ptolemaicus* that lists all the names mentioned in Ptolemy's *Geographia*. New to this edition are the maps of Flanders and Brabant. "This is the first edition of the *Theatrum* with a clear division into three parts: (1) the Atlas itself, (2) the *Parergon*, and (3) the *Nomenclator*."



THE MOST INFLUENTIAL WORK IN THE HISTORY OF CAPITALISM

PACIOLI, Luca [Lucas de Burgo S. Sepulchri]. *Summa de arithmetica geometria proportioni et proportionalita.* Toscolano: Paganino de' Paganini, 20 December, 1523.

\$185,000

Second edition, very rare, and a copy with distinguished provenance, of the first mathematical encyclopaedia of the Renaissance, “the first great general work on mathematics printed” (*Rara arithmetica*), and the first printing of any of the works of Fibonacci and Piero della Francesca. It contains Pacioli's original treatise *Particularis de Computis et Scripturis*, the first printed text to set out the method of double-entry bookkeeping, which has been called “the most influential work in the history of capitalism”. *Provenance*: Giulio Lorenzo de Ceci, of Pescia (in Tuscany) (inscription dated 13 July 1546 on front free endpaper); Baron Horace de Landau (1824-1903), banker and bibliophile (bookplate on front paste-down).

<https://www.sophiararebooks.com/5912>



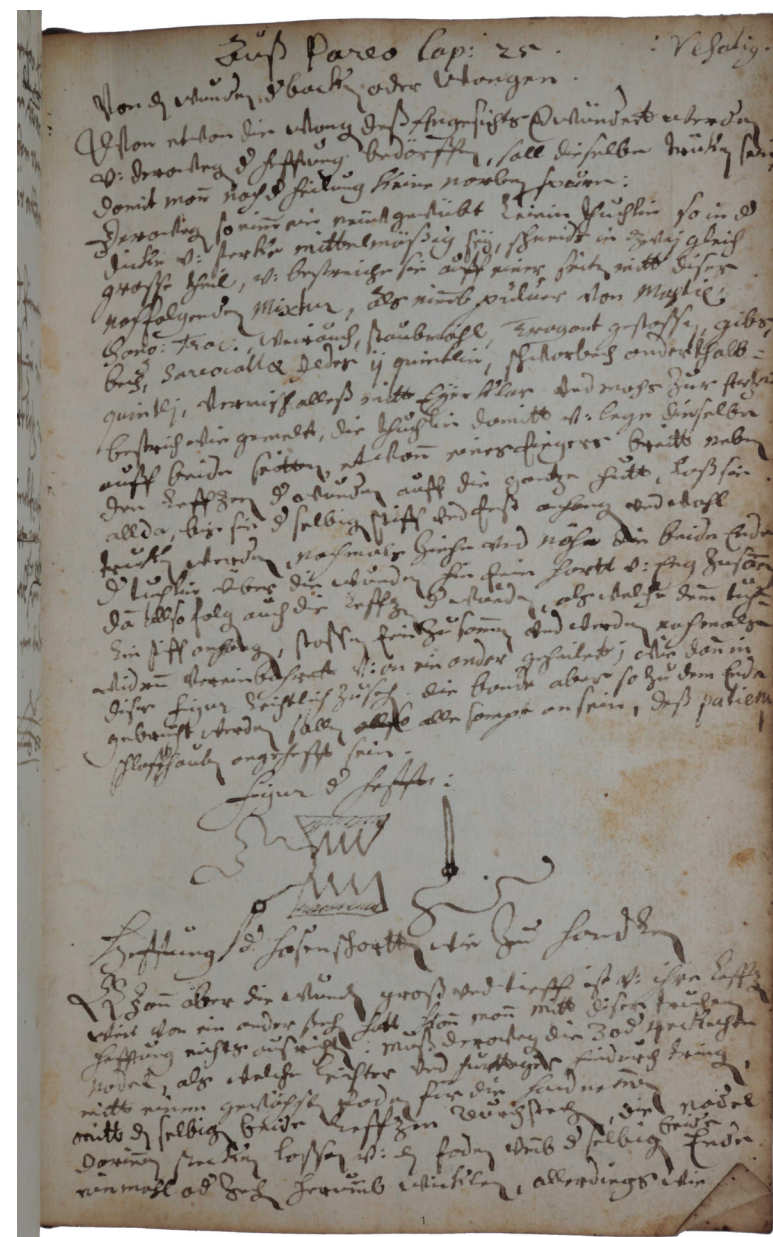
AN EXTRAORDINARY COPY WITH CONTEMPORARY MANUSCRIPT LEAVES

PARACELSUS, Theophrastus. *Wundt und Leibartznei, zu allen Wunden, Verletzungen, Schäden und Brüchen, wes iedem Wundartzt der Theoric und Practick zuwissen von nöten, die gantze Chirurgie belangend.* Frankfurt: Christian Egenolff, [1549].

\$18,500

First edition, very rare, and an extraordinary copy with inserted contemporary manuscript leaves, of this adaptation of Paracelsus' *Der Grossen Wundartzney* (1536). The extensive contemporary manuscript notes are without doubt those of a practising physician or medical student using the Paracelsian methods. On the front free endpaper are several alchemical symbols relating to compounds of arsenic. The inserted manuscript text leaves list the inorganic and organic materia used in Paracelsus' treatment of disease. Most important are the Three Alchemical Primes: sulphur, mercury, and salt. Other chemical compounds listed are vitriol – the general chemical name encompassing a class of chemical compounds comprising sulfates of certain metals, originally, iron or copper – as well as borax, alum, cinnabar, aqua regia, ammonia, etc. Alchemical marginalia appear throughout.

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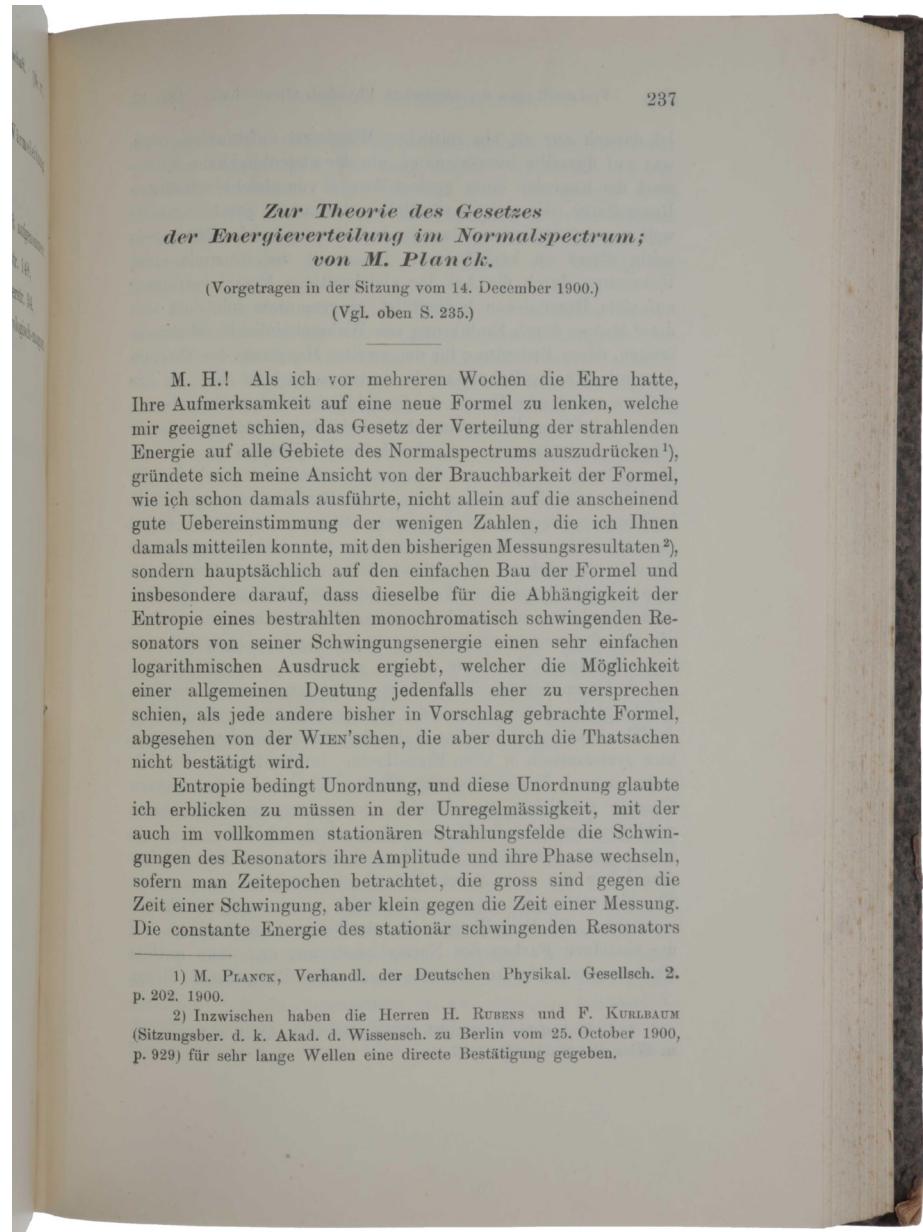
THE BIRTH OF QUANTUM THEORY

PLANCK, Max. *Zur Theorie des Gesetzes der Energieverteilung im Normalspectrum*, pp. 237-45 in: *Verhandlungen der Deutschen Physikalischen Gesellschaft im Jahre 1900. Jahrg. 2.* Leipzig: Johann Ambrosius Barth, 1900.

\$25,000

First edition, contained in a complete volume of *Verhandlungen der Deutschen Physikalischen Gesellschaft*, of the first appearance of Planck's revolutionary quantum theory, arguably the most important development in twentieth-century physics. Planck was awarded the Nobel Prize in Physics 1918 "in recognition of the services he rendered to the advancement of Physics by his discovery of energy quanta." A fine unmarked copy in contemporary unrestored binding.

<https://www.sophiararebooks.com/5850>



FIRST RUSCELLI EDITION OF PTOLEMY'S GEOGRAPHY

PTOLEMAEUS, Claudius. *La Geografia di Claudio Tolomeo Alessandrino Nuovamente tradotta di Greco in Italiano...* Venice: Vincenzo Valgrisi, 1561.

\$8,500

First edition of one of the most important and influential editions of Ptolemy's *Geography*, edited and translated from Greek into Italian by the great scholar Girolamo Ruscelli, with his numerous remarks and extensive addenda. "A new and important edition" (Sabin). In this edition, the maps are enlarged copies of Gastaldi's maps in the 1548 Ptolemy. Ruscelli has reinserted the map of the old world by Ptolemy (excluded from the Gastaldi edition), drawn the world map on a new projection, and added three new maps. Two important innovations were introduced through this edition into the literature of atlases. The map of the world is divided into two hemispheres, the right representing the Old World and the left the New; and also, the map of the Arctic Regions, copied from the 1558 Zeno chart, here is included for the first time in a Ptolemy.



THE INVENTION OF INFORMATION THEORY

SHANNON, Claude Elwood. 'A Mathematical Theory of Communication,' pp. 379-423 in *Bell System Technical Journal*, Vol. 27, No. 3, July, 1948 and pp. 623-656 in *ibid.*, No. 4, October, 1948. New York: American Telephone and Telegraph Company, 1948.

\$9,500

First edition, journal issue, **in original printed wrappers**, of "the most famous work in the history of communication theory" (*Origins of Cyberspace*, 880), and rare in such fine condition. "Probably no single work in this century has more profoundly altered man's understanding of communication than C. E. Shannon's article, 'A mathematical theory of communication,' first published in 1948" (Slepian). "Th[is] paper gave rise to 'information theory,' which includes metaphorical applications in very different disciplines, ranging from biology to linguistics via thermodynamics or quantum physics on the one hand, and a technical discipline of mathematical essence, based on crucial concepts like that of channel capacity, on the other" (DSB).

<https://www.sophiararebooks.com/6187>

The Bell System Technical Journal

Vol. XXVII

July, 1948

No. 3

A Mathematical Theory of Communication

By C. E. SHANNON

INTRODUCTION

THE recent development of various methods of modulation such as PCM and PPM which exchange bandwidth for signal-to-noise ratio has intensified the interest in a general theory of communication. A basis for such a theory is contained in the important papers of Nyquist¹ and Hartley² on this subject. In the present paper we will extend the theory to include a number of new factors, in particular the effect of noise in the channel, and the savings possible due to the statistical structure of the original message and due to the nature of the final destination of the information.

The fundamental problem of communication is that of reproducing at one point either exactly or approximately a message selected at another point. Frequently the messages have *meaning*; that is they refer to or are correlated according to some system with certain physical or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem. The significant aspect is that the actual message is one *selected from a set* of possible messages. The system must be designed to operate for each possible selection, not just the one which will actually be chosen since this is unknown at the time of design.

If the number of messages in the set is finite then this number or any monotonic function of this number can be regarded as a measure of the information produced when one message is chosen from the set, all choices being equally likely. As was pointed out by Hartley the most natural choice is the logarithmic function. Although this definition must be generalized considerably when we consider the influence of the statistics of the message and when we have a continuous range of messages, we will in all cases use an essentially logarithmic measure.

The logarithmic measure is more convenient for various reasons:

1. It is practically more useful. Parameters of engineering importance

¹ Nyquist, H., "Certain Factors Affecting Telegraph Speed," *Bell System Technical Journal*, April 1924, p. 324; "Certain Topics in Telegraph Transmission Theory," *A. I. E. E. Trans.*, v. 47, April 1928, p. 617.

² Hartley, R. V. L., "Transmission of Information," *Bell System Technical Journal*, July 1928, p. 535.

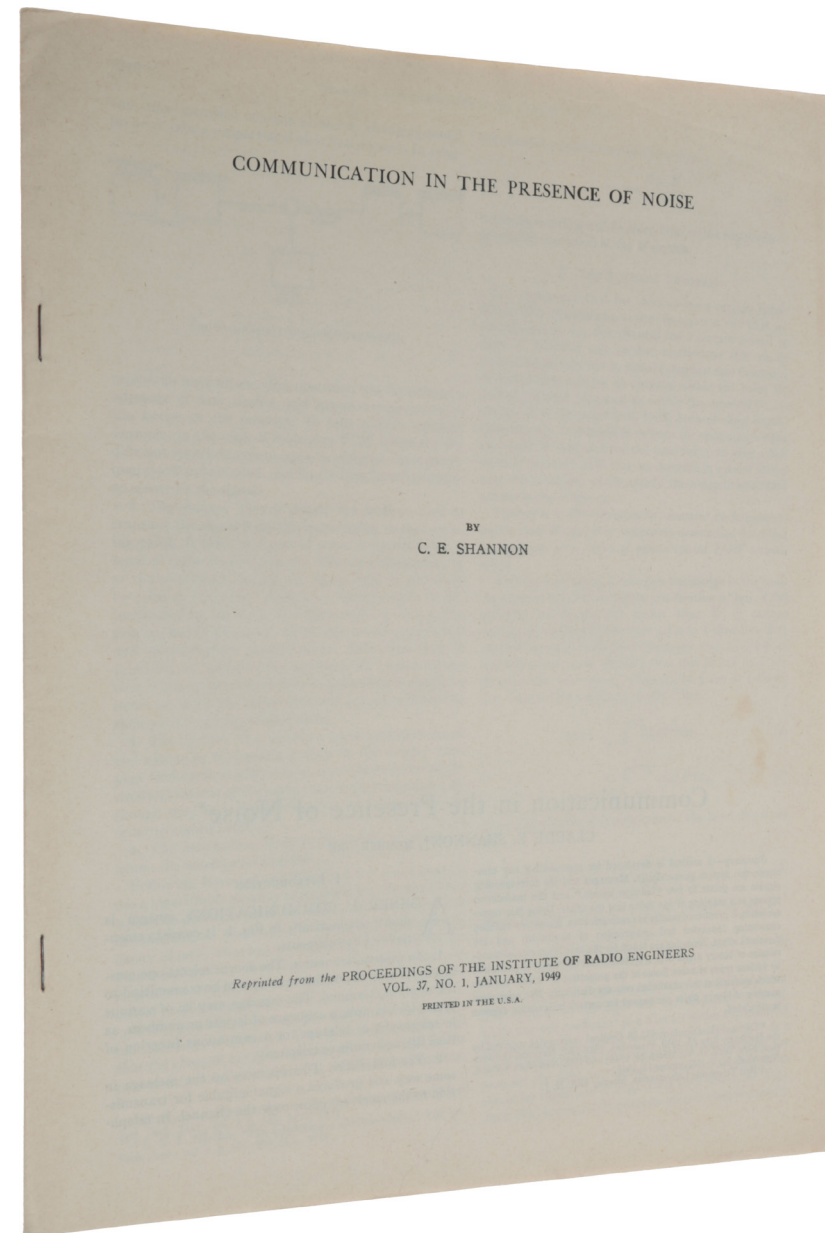
PAVED THE WAY FOR DEVELOPMENTS IN INFORMATION THEORY

SHANNON, Claude Elwood. *Communication in the Presence of Noise*. Offprint from *Proceedings of the Institute of Radio Engineers*, Vol. 37, January 1949. [New York: The Institute of Radio Engineers, Inc.], 1949.

\$15,000

First edition, **Shannon's own copy** of the extremely rare offprint. "In 1948, C. E. Shannon published his classic paper 'A Mathematical Theory of Communication' in the *Bell System Technical Journal*. That paper founded the discipline of information theory ... Several months later, he published a second paper, 'Communication in the Presence of Noise,' in the *Proceedings of the Institute of Radio Engineers*. This second paper is ... intimately connected to the earlier classic paper ... it can be thought of as an elaboration and extension of the earlier paper, adopting an 'engineering' rather than strict mathematical point of view. Yet, this [second] paper comprises ideas, notions, and insights that were not reported in the first paper. In retrospect, many of the concepts treated in this [second paper] proved to be fundamental, and they paved the way for future developments in information theory.

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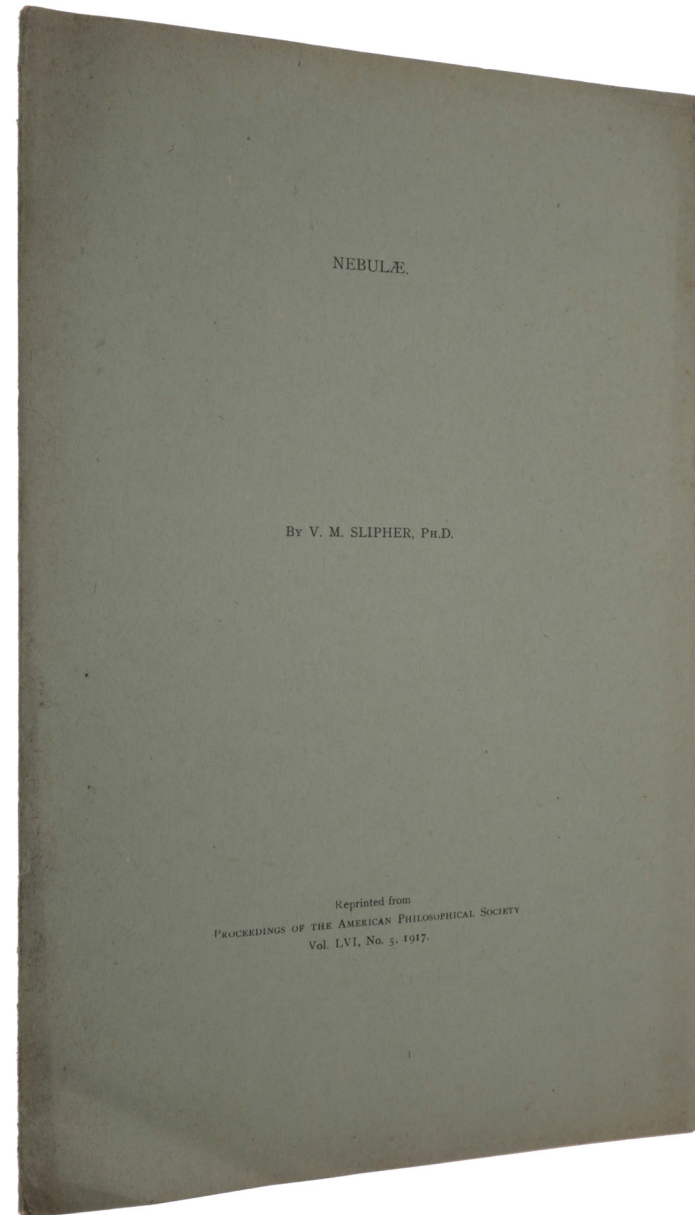
THE FIRST OBSERVATIONAL EVIDENCE FOR THE EXPANDING UNIVERSE

SLIPHER, Vesto Melvin. *Nebulae. Offprint from: Proceedings of the American Philosophical Society, vol. LVI, no. 5, 1917.* [Philadelphia, PA: American Philosophical Society], 1917.

\$4,000

First edition, extremely rare separately-paginated offprint, of the paper which “provided the first evidence supporting the expanding-universe theory” (Britannica). In this profoundly significant paper, Slipher reports his finding that, of 25 spiral ‘nebulae’ examined, 21 are receding from us at high velocities, thus anticipating Hubble in his two most important discoveries: that the universe is expanding, and that the nebulae are separate galaxies outside our own, implying that the universe is vastly larger than our own Milky Way galaxy.

<https://www.sophiararebooks.com/6189>



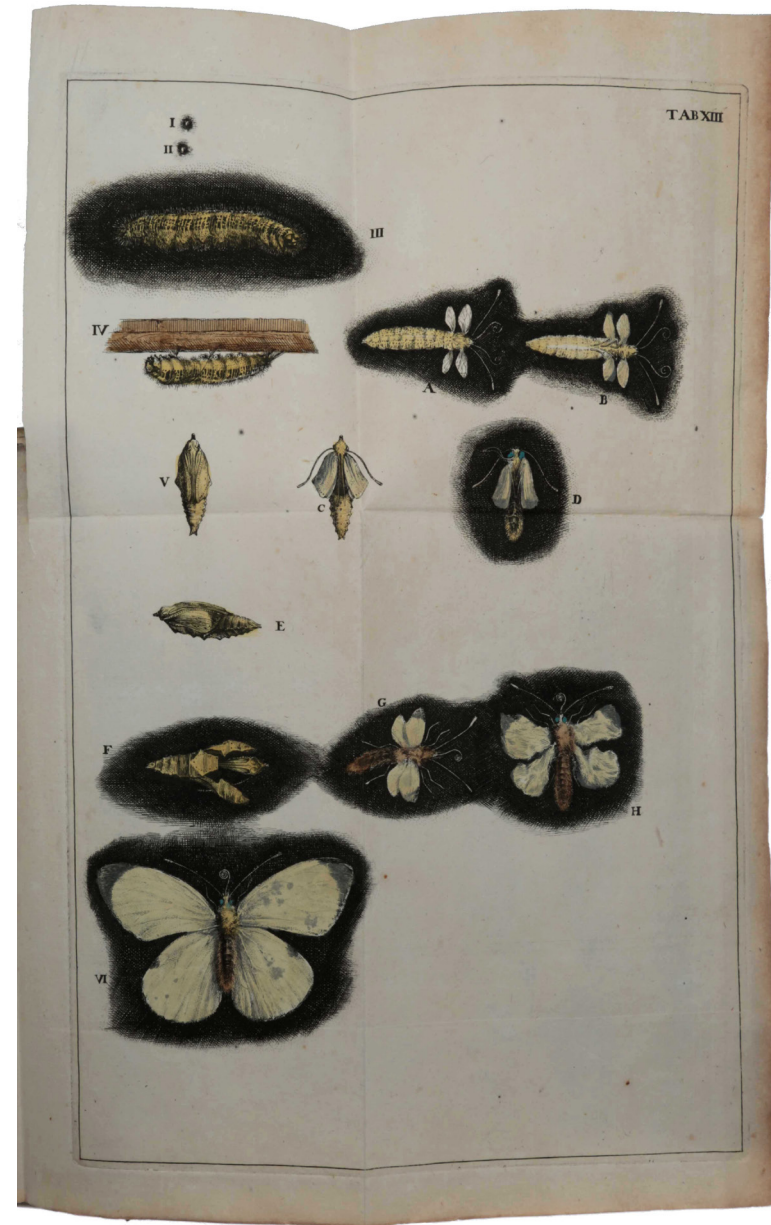
WITH ALL PLATES IN FINE CONTEMPORARY HAND-COLORING

SWAMMERDAM, Jan. *Historia insectorum generalis; ofte, algemeene verhandeling der bloedeloose dierkens*. Utrecht: Merinardus van Dreunen, 1669.

\$25,000

First edition, an exceptional copy with all plates in fine contemporary hand coloring, of Swammerdam's important entomological work in which he "sketched the general outlines of an entirely new theory of the generation of all insects. He vehemently attacked axioms that were three centuries old: (1) insects lack internal anatomy; (2) they originate by spontaneous generation; (3) they then develop by metamorphosis. Swammerdam self-confidently declared that he, 'by means of experience' ('door middel van de ondervindingen'), had solved the mystery that for two thousand years had puzzled the most brilliant minds." (*The Early Enlightenment in the Dutch Republic, 1650-1750*, p. 94).

<https://www.sophiararebooks.com/6136>



THE WORLD'S FIRST COMPUTER PROGRAMMING MANUAL

TURING, Alan Mathison. *Programmers' Handbook for Manchester Electronic Computer Mark II [i.e., the Ferranti Mark I], [late 1950 or early 1951]. With errata sheets dated March 13, March 28, and July 9, 1951. [With:] Mimeographed letter from Turing stating that copies of library subroutines may be sent to holders of the Handbook. [And with:] Four examples of such subroutines. 1951.*

\$50,000

First edition, extremely rare, of “the world’s first computer programming manual” (Jack Copeland & Jason Long), written by Turing for the Ferranti Mark I, the first commercially available electronic digital computer (The first US commercial machine, the Eckert-Mauchly UNIVAC, appeared a few months later). Its extraordinary rarity is perhaps explained by the fact that the only two units of the Mark I were ever sold. There were at least two later editions, to which Turing made no significant further contribution.

<https://www.sophiararebooks.com/6191>

