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

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The 48th California International Antiquarian Book Fair
6-8 February 2015

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

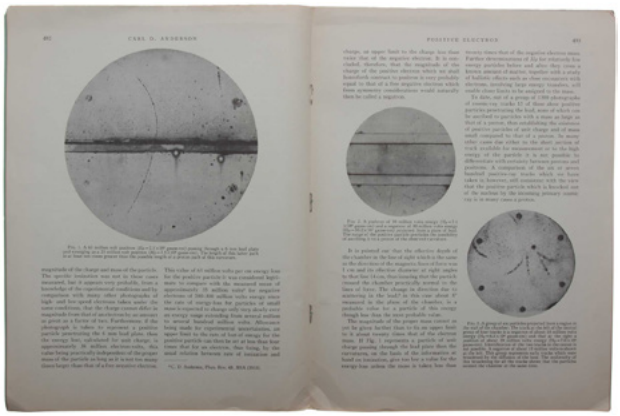
PMM 206 - Large paper copy in red morroco

Morgagni: De Sedibus, 1761.
"One of the most important works in the history of medicine" (Garrison & Morton).

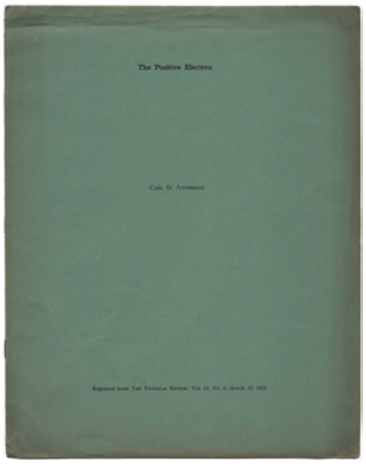
The discovery of anti-matter

1. ANDERSON, Carl David. *The Positive Electron.* Lancaster, PA and New York, NY: for the American Physical Society by the American Institute of Physics, 1933.

$10,750



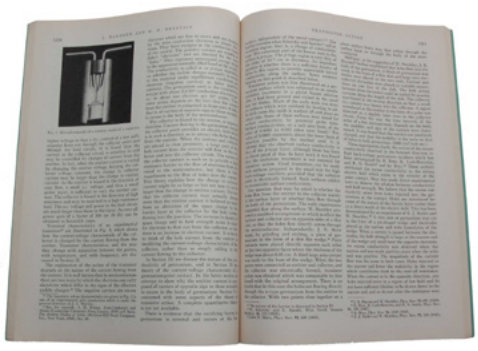
Very rare offprint of Anderson's detailed account of the discovery of the positron, an elementary particle with the same mass as the electron but carrying a positive charge. This was the first example of a particle consisting of antimatter. Its existence had been predicted by P. A. M. Dirac three years earlier in his paper 'Quantised Singularities in the Electromagnetic Field'. "The prediction and subsequent discovery of the positron rank among the great triumphs of modern physics" (Pais, *The Genius of Science*). Anderson shared the 1936 Nobel Prize in Physics "for his discovery of the positron. Extremely rare: OCLC lists no copies of this offprint and we know of only one other copy having appeared on the market.



Invention of the transistor

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

$2,100



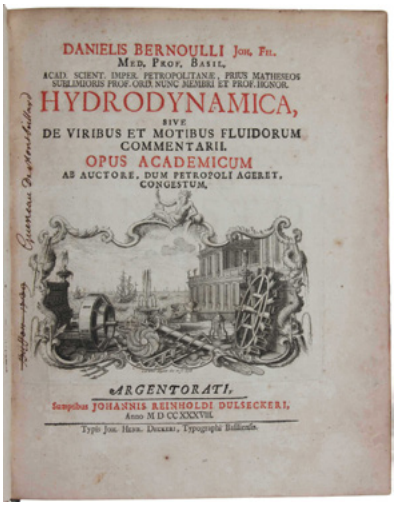
The first comprehensive report on the transistor; one of the most important inventions of the 20th Century. The invention of the transistor was first announced in three short letters by Bardeen, Brattain, Shockley, and Pearson, in *The Physical Review* (July 1948). The following year Bardeen and Brattain published the more comprehensive report 'Physical Principles Involved in Transistor Action'. This paper was simultaneously published, the same month, in *The Physical Review* and *Bell System Technical Journal*. Offered here is the *Physical Review* printing [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.

❧Origins of Cyberspace 450.

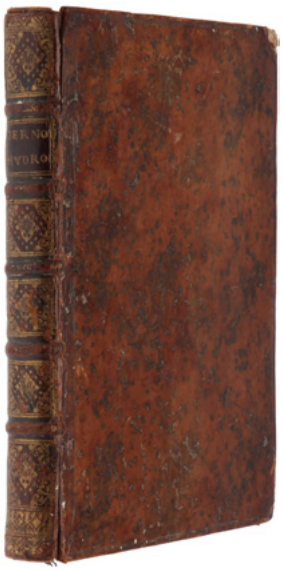
The copy of Comte de Buffon

3. BERNOULLI, Daniel. *Hydrodynamica, sive de viribus et motibus fluidorum commentarii.* Strasbourgh: Johann Reinhold Dulsseker, 1738.

$20,100


DANIELIS BERNOULLI Joh. Fil.
MED. PROF. BASIL.
ACAD. SCIENT. IMPER. PETROPOLITANÆ, PRIUS MATHESEOS SUBLIMIORIS PROF. ORD. NUNC MEMBRI ET PROF. HONOR.
HYDRODYNAMICA,
SIVE
DE VIRIBUS ET MOTIBUS FLUIDORUM COMMENTARII.
OPUS ACADEMICUM
AB AUCTORE, DUM PETROPOLI AGERET, CONGESTUM.
ARGENTORATI,
Sumptibus JOHANNIS REINHOLDI DULSECKERI,
Anno M D CC XXXVIII.

First edition with outstanding provenance, the copy of the great Comte de Buffon and later his collaborator Philippe Guéneau de Montbeillard. A beautiful and very large copy, in unrestored contemporary calf, of Bernoulli's epochal work on fluid dynamics and kinetic gas theory. "Bernoulli's *Hydrodynamica* [was] one of the major works initiating the mathematical study of fluid flow… He also examines the equilibrium oscillation of an inertialess ocean, and explicitly states that the flow equations are appropriate not only for the more common applications of fluid dynamics but also for the flow of blood in veins and arteries. Bernoulli, like Galileo Galilei in 1638 and Christian Huygens, assumes conservation of mv^2 rather than conservation of momentum mv, m and v symbolizing a body's mass and velocity respectively… [The *Hydrodynamica* also] initiates the mathematical study of the kinetic theory of gases ... and analytically deduces Boyle's Law that volume and pressure of a gas are inversely related, a law originally obtained empirically" (Parkinson, *Breakthroughs*).



❧Norman 215; PMM 179n; Barchas 175; Parkinson pp 155-6; Roberts and Trent, pp 34-5.

The birth of modern atomic physics

4. BOHR, Niels Henrik David. *On the Constitution of Atoms and Molecules, I-III.* London: Taylor & Francis, 1913.

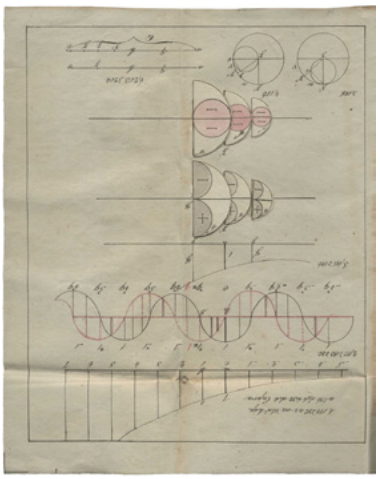
$54,500

Extremely rare author's presentation offprints of his great trilogy, which constitutes the birth of modern atomic physics. "Bohr's three-part paper postulated the existence of stationary states of an atomic system whose behavior could be described using classical mechanics, while the transition of the system from one stationary state to another would represent a non-classical process accompanied by emission or absorption of one quantum of homogeneous radiation, the frequency of which was related to its energy by Planck's equation" (Norman). In the beginning of 1913 Bohr heard about Rydberg's remarkable discovery in spectroscopy. Rydberg's formula could represent the frequencies of the lines of the hydrogen spectrum in the simplest form in terms of two integers. As soon as Bohr saw this formula, he immediately recognized that it gave him the missing clue to the correct way to introduce Planck's law of quantum of action into the description of the atomic systems. The rest of the academic year was spent reconstructing the whole theory upon the new foundation and expounding it in a large treatise, which was immediately published as these three papers in the 'Philosophical Magazine'. It was in these papers that Bohr first gave his postulates of the orbital structure of the electrons and their quantized radiation. Bohr's atomic theory inaugurated two of the most adventurous decades in the history of science. In 1922 Bohr was awarded the Nobel Prize "for his services in the investigation of the structure of atoms and of the radiation emanating from them."

Farkas Bolyai's last great work

5. BOLYAI, Farkas. *A' Marosvasarhelyt 1829-be nyomtatott Arithemetika Elejének részint röviditett, reszint bovitett, általán jobbitott, 's tisztáltabb kiadása.* Marosvasarhely: Kali Simon, 1843.

$19,850



First edition, an exceptionally fine copy in the original boards, of Bolyai's work on the foundations of mathematics. This work enlarges and extends Bolyai's investigations into the principles of mathematics. Farkas Bolyai (1775-1856) was a close friend of Gauss and regarded by the latter as the only man who fully understood Gauss' metaphysics of mathematics. "He can be taken as a precursor of Gottlob Frege, Pasch, and Georg Cantor; but, as with many pioneers, he did not enjoy the credit that accrued to those that followed him" (DSB). He had worked on the parallel postulate and the possibilities of a non-Euclidean geometry from his earliest days as a mathematician in Göttingen, and had corresponded with Gauss on the subject, even sending him a manuscript entitled *Theoria parallelarum*, but it was his son János who was to achieve the breakthrough.

Bose-Einstein statistics

6. BOSE, Satyendra Nath. *Plancks Gesetz und Lichtquantenhypothese.* Berlin: Springer, 1924.

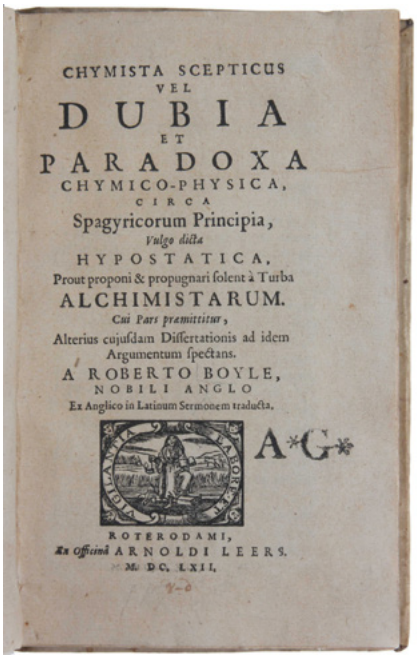
$5,100

First edition, in original printed wrappers, of one of the most important papers in the history of quantum physics, the invention of 'Bose-Einstein statistics' (Einstein's contribution came later – see below). "The paper by Bose is the fourth and last of the revolutionary papers of the old quantum theory (the other three being by, respectively, Planck [1900], Einstein [1905], and Bohr [1913])" (Pais, *Subtle is the Lord*, p. 425). "With their work Bose and Einstein established the field of quantum statistics one year before the appearance of quantum mechanics" (Brandt, *The Harvest of a Century*, p. 139). Bose sent Einstein the manuscript of the paper in July 1924; Einstein arranged for its publication, adding a note that stated: "In my opinion Bose's derivation of the Planck formula signifies an important advance. The method used also yields the quantum theory of the ideal gas as I will work out in detail elsewhere." This Einstein did in July 1924. Bose-Einstein statistics apply to particles which have integer values of spin, now known as bosons.

'One of the great books in the history of thought' (Fulton)

7. BOYLE, Robert. *Chymista scepticus vel dubia et paradoxa chymico-physica, circa spagyricorum principa, vulgo dicta hypostatica, Prout proponi & propugnari solent à Turba Alchimistarum. Cui pars premittitur, alterius cujusdem dissertationis ad idem argumentum spectans.* Rotterdam: A. Leers, 1662.

$17,000


CHYMISTA SCEPTICUS
VEL
DUBIA
ET
PARADOXA
CHYMICO-PHYSICA,
CIRCA
Spagyricorum Principia,
Vulgo dicta
HYPOSTATICA,
Prout proponi & propugnari solent à Turba
ALCHIMISTARUM.
Cui Pars præmittitur,
Alterius cujusdam Dissertationis ad idem
Argumentum spectans.
A ROBERTO BOYLE,
NOBILI ANGLO
Ex Anglico in Latinum Sermonem traducta.
A*G*
ROTERODAMI,
Ex Officinâ ARNOLDI LEERS.
M. DC. LXII.

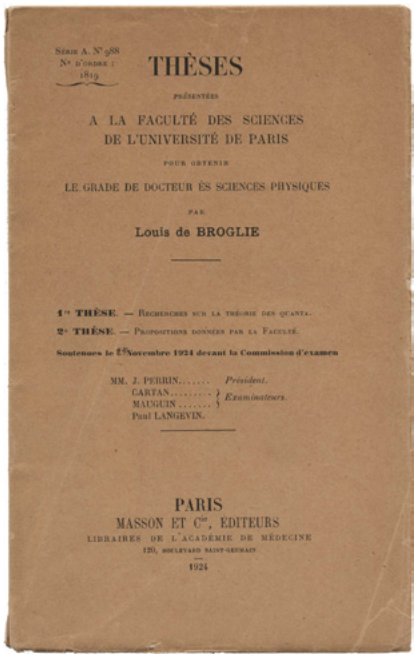
First Latin edition, one of two issues, each published one year after the first English edition (the other was published at London, no priority established), of this milestone in the history of chemistry. "His most important work [where he] set down his corpuscular theory of the constitution of matter, which finally freed chemistry from the restrictions of the Greek concept of the four elements, and was the forerunner of Dalton's atomic theory" (Sparrow). "Boyle's most celebrated book is his *Sceptical Chymist* … It contains the germs of many ideas elaborated by Boyle in his later publications" (Partington II, p. 496). This Latin edition is the second edition overall; both issues are very rare: we have been unable to locate any copy of either issue in auction records. OCLC lists six copies of the Rotterdam issue and four of the London issue in the US. The first English edition, though not as rare as this Latin edition, commands a high price – the last complete copy at auction sold for $170,750 in 2001.

❧Dibner 39; Grolier/Horblit 14; Norman 299; PMM 141; Sparrow 27 (all for the first English edition); Fulton 27.

'Lifted a corner of the great veil' (Einstein)

8. BROGLIE, Louis Victor Pierre Raymond De. *Recherches sur la théorie des quanta.* Paris: Masson et Cie., 1924.

$22,150


THÈSES
PRÉSENTÉES
A LA FACULTÉ DES SCIENCES
DE L'UNIVERSITÉ DE PARIS
POUR OBTENIR
LE GRADE DE DOCTEUR ÈS SCIENCES PHYSIQUES
PAR
Louis de BROGLIE
1re THÈSE. — Recherches sur la théorie des quanta.
2e THÈSE. — Propositions données par la Faculté.
Soutenues le 25 Novembre 1924 devant la Commission d'examen
MM. J. PERRIN..... *Président.*
CARTAN..... } *Examinateurs.*
MAUGUIN..... }
Paul LANGEVIN.
PARIS
MASSON ET Cie, EDITEURS
LIBRAIRES DE L'ACADÉMIE DE MÉDECINE
120, BOULEVARD SAINT-GERMAIN
1924

First edition, rare, of de Broglie's revolutionary doctoral thesis on the quantum theory, which, Einstein said, "lifted a corner of the great veil" (Isaacson, *Einstein: His Life and Universe*, p. 327). In this work he developed the startling and revolutionary idea that material particles such as electrons have a wave as well as a corpuscular nature, analogous to the dual behavior of light demonstrated by Einstein and others in the first two decades of the century. De Broglie was awarded the 1929 Nobel Prize in physics "for his discovery of the wave nature of electrons." De Broglie's book *Ondes et mouvements* (1926), selected by Carter and Muir for the *Printing and the Mind of Man* exhibition and catalogue (1967), was an expansion of ideas first published in his thesis. Unlike his book, de Broglie's thesis was issued in a very small edition. Three years after the publication of De Broglie's thesis, the diffraction of electrons from the surface of a solid crystal was experimentally observed by C. J. Davisson & L. H. Germer. They showed that an electron beam was scattered from the surface of a crystal of nickel at the precise angles predicted for the diffraction of X-rays according to Bragg's formula, with a wavelength predicted by De Broglie. These experiments proved that De Broglie's matter waves have observable physical effects. ❧Norman 347.

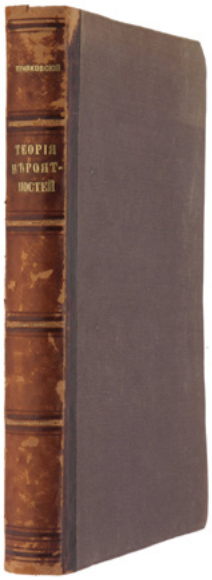
Initiated the Russian school of probability

9. BUNYAKOVSKY, Viktor. *Osnovania mathematicheskoi teorii veroiatnostei. [Foundations of the mathematical theory of probability].* Saint Petersburg: Academy of Sciences, 1846.

$9,650


ОСНОВАНІЯ
МАТЕМАТИЧЕСКОЙ ТЕОРІИ
ВѢРОЯТНОСТЕЙ.
САНКТПЕТЕРБУРГЪ.

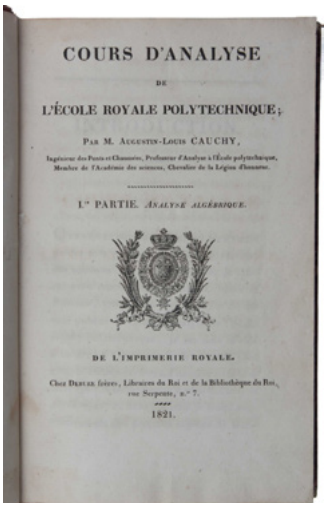
Rare first edition of the earliest textbook on probability in the Russian language. This book initiated the Russian school of probability, which eventually, through the work of Chebyshev, Lyapunov, Markov, Kolmogorov, and others, established the Russian tradition of probability as a standard part of the study of mathematics. "The prime impetus for the initial development in the 1820s of probability theory in the Russian Empire (putting aside the eighteenth-century contributions of Leonhard Euler and Daniel Bernoulli) was the need for a proper basis for actuarial and demographic work, and for the statistical treatment of observations generally. Pierre Simon Laplace's classic work on probability (*Théorie analytique des probabilités*, 1812), which initiated the Paris school of probabilistic investigations, not only laid foundations for the subject, but also contained applications to real-world situations. Its ideology was brought to the Russian Empire, partly in response to the statistical needs mentioned above, by Viktor Yakovlevich Bunyakovsky (1804-89) Bunyakovsky's prime achievement was the first treatise on probability in the Russian language (Bunyakovsky 1846). Its aim was the simplification and classification of existing theory; its lasting achievement was the creation of a Russian probabilistic terminology." (E. Seneta in *Companion Encyclopedia of the history & philosophy of the mathematical science*, pp. 1325-6).


ТЕОРІЯ ВѢРОЯТ-НОСТЕЙ

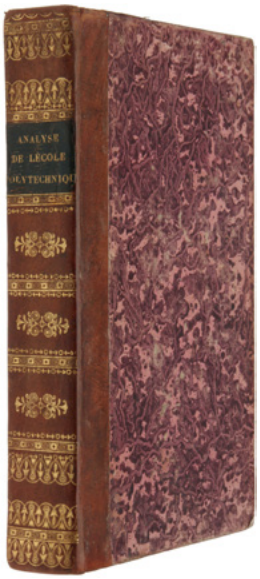
One of the most influential mathematics books ever written

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

$7,100


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.

An exceptionally fine copy of the first edition of Cauchy's great textbook, one of the most influential mathematics books ever written, in which "Cauchy gave the foundation of the calculus as we now generally accept it". (D.J. Struik). "In 1821, Augustin-Louis Cauchy (1787-1857) published a textbook, the *Cours d'analyse*, to accompany his course on 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, p. vii).

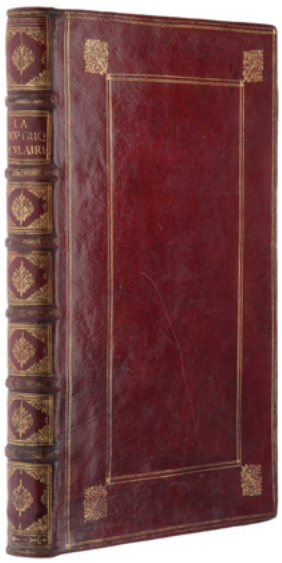

ANALYSE
DE L'ÉCOLE
POLYTECHNIQ

❧*Landmark Writtings in Western Mathematics* 25; *En Francais dans le texte* 231.

'The most exhaustive treatise on lens making in the seventeenth century'

11. CHERUBIN d'Orléans, Capuchin. *La dioptrique oculaire, ou la théorique, la positive, et la mechanique de l'oculaire dioptrique en toutes ses espèces.* Paris: Thomas Jolly and Simon Benard, 1671.

$43,650

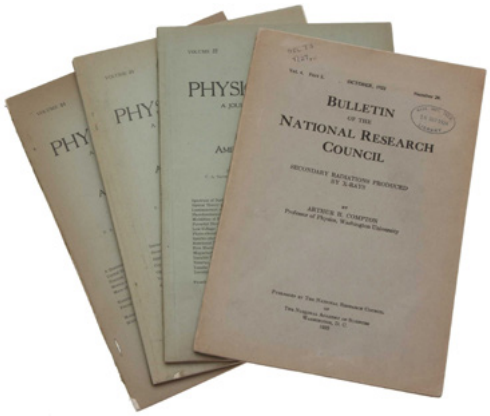


Exceptional copy in contemporary red morocco of "the most exhaustive treatise on lens making in the seventeenth century. It is a six-hundred folio page long, comprehensive, cogently-argued treatise on telescope making. It contains an impressive amount of theoretical and practical, first-hand information on all of its facets — from explanations of the telescope's working principles, to descriptions of lens grinding and polishing, to rules for the right distances between lenses, to methods to find the right apertures, to descriptions of the shapes and articulations of the wooden parts and bolts and screws needed to properly point a telescope to the skies, to the construction of tubes, and so on and so forth." (Albert et al, *The origins of the telescope*, pp. 289-291). "The French Capuchin friar Cherubin d'Orleans (1613-97), real name Michel Lassere, published a large volume in 1671 on optics, in which, among other subjects, he describes his invention of a rhombic pantograph apparatus attached to a telescope and drawing board, by which accurate drawings of distant objects could be made" (Whittaker, *Mapping and naming the moon*, p. 76).

The Compton effect

12. COMPTON, Arthur Holly. *A Quantum Theory of the Scattering of X-rays by Light Elements.* Lancaster, PA & Corning, NY: American Physical Society, [1923].

$6,250

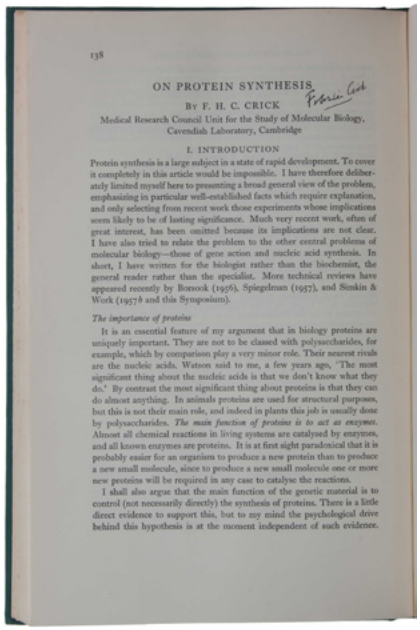


First edition of the 'Compton effect', which demonstrated the existence of quanta of electromagnetic radiation, later called photons. Compton's paper is here accompanied by the initial announcement made six months earlier, and by the two papers which document the experimental basis for his discovery. "This discovery 'created a sensation among the physicists of the time'. There were the inevitable controversies surrounding a discovery of such major proportions. Nevertheless, the photon idea was rapidly accepted. Sommerfeld incorporated the Compton effect in his new edition of *Atombau und Spektrallinien* with the comment, 'It is probably the most important discovery which could have been made in the current state of physics'" (Pais, *Subtle is the Lord*, p. 414). "Arthur Holly Compton will always be remembered as one of the world's great physicists. His discovery of the Compton effect, so vital in the development of quantum physics, has ensured him a secure place among the great scientists" (*DSB*). The explanation and measurement of the Compton effect earned Compton a share of the Nobel Prize in physics in 1927. Rare in unrestored original printed wrappers.

The Central Dogma of molecular biology

13. CRICK, Francis H. C. *On protein synthesis.* Cambridge: University Press, 1958.

$6,250



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ON PROTEIN SYNTHESIS

By F. H. C. CRICK

Medical Research Council Unit for the Study of Molecular Biology, Cavendish Laboratory, Cambridge

I. INTRODUCTION

Protein synthesis is a large subject in a state of rapid development. To cover it completely in this article would be impossible. I have therefore deliberately limited myself here to presenting a broad general view of the problem, emphasizing in particular well-established facts which require explanation, and only selecting from recent work those experiments whose implications seem likely to be of lasting significance. Much very recent work, often of great interest, has been omitted because its implications are not clear. I have also tried to relate the problem to the other central problems of molecular biology—those of gene action and nucleic acid synthesis. In short, I have written for the biologist rather than the biochemist, the general reader rather than the specialist. More technical reviews have appeared recently by Borsook (1956), Spiegelman (1957), and Simkin & Work (1957*b* and this Symposium).

The importance of proteins

It is an essential feature of my argument that in biology proteins are uniquely important. They are not to be classed with polysaccharides, for example, which by comparison play a very minor role. Their nearest rivals are the nucleic acids. Watson said to me, a few years ago, 'The most significant thing about the nucleic acids is that we don't know what they do.' By contrast the most significant thing about proteins is that they can do almost anything. In animals proteins are used for structural purposes, but this is not their main role, and indeed in plants this job is usually done by polysaccharides. *The main function of proteins is to act as enzymes.* Almost all chemical reactions in living systems are catalysed by enzymes, and all known enzymes are proteins. It is at first sight paradoxical that it is probably easier for an organism to produce a new protein than to produce a new small molecule, since to produce a new small molecule one or more new proteins will be required in any case to catalyse the reactions.

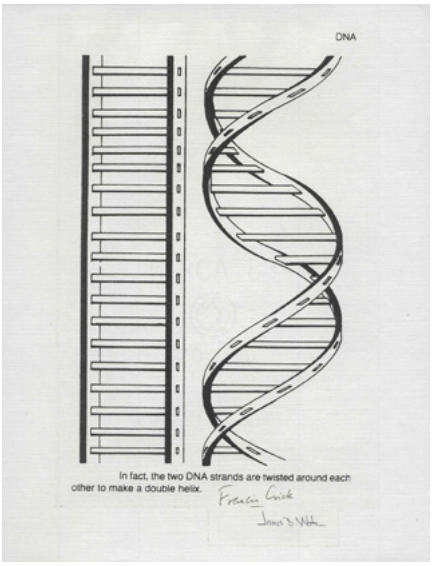
I shall also argue that the main function of the genetic material is to control (not necessarily directly) the synthesis of proteins. There is a little direct evidence to support this, but to my mind the psychological drive behind this hypothesis is at the moment independent of such evidence.

First edition of this seminal paper, **signed by Francis Crick**, which "permanently altered the logic of biology" (Judson, *The Eighth Day of Creation*, p. 333). It was in this paper that Crick first stated the "Central Dogma" and the "Sequence Hypothesis" of molecular biology. Judson likens the iconic significance of the central dogma in molecular biology to that of Einstein's equation $e = mc^2$ in relativity. "If there is one statement from the new science [of molecular biology] that deserves the general currency of that equation of Einstein, it is this assertion of Crick's. Most immediately and narrowly, the central dogma defined the difference between the functions of nucleic acids and proteins … More widely, the central dogma was the restatement of the reason why characteristics acquired by an organism in its life but not from its genes cannot be inherited by its offspring. "Once information has passed into protein it cannot get out again"." (Judson, p. 336).

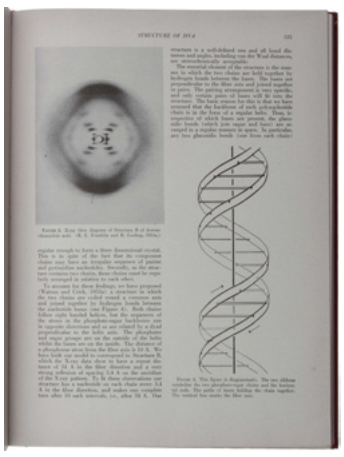
With a signed original print of the DNA double-helix

14. CRICK, Francis. & WATSON, James. *The Structure of DNA*. New York: The Biological Laboratory, Cold Spring Harbor, 1953.

$8,500



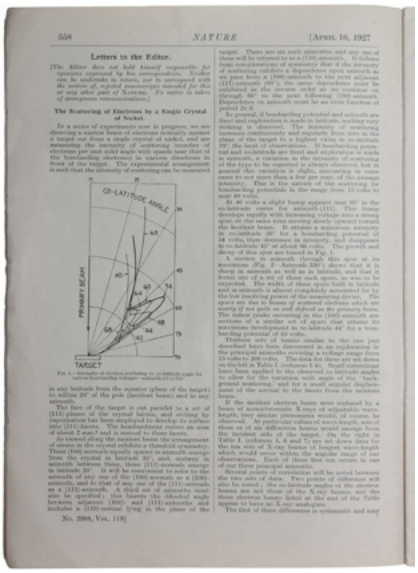
First edition, the copy of geneticist L. C. Dunn, of the first full account of the structure of DNA and its implications. This volume contains Watson's and Crick's paper 'The Structure of DNA', which had been presented by Watson at the 18th Cold Spring Harbor Symposium (Viruses) in June 1953 – the first talk by either Watson or Crick on their discovery and the first chance for many scientists to learn about their pioneering work. The paper is beautifully illustrated with Odile Crick's elegant diagram and Rosalind Franklin's and Raymond Gosling's famous 'Photo 51' – the crucial piece of X-ray crystallographic evidence that allowed Watson and Crick to complete their model. The text of the paper effectively combines the two previous Nature papers on the structure of DNA and the implications of that structure (neither of which contains both illustrations, for example). Here, in the Cold Spring Harbor presentation, serious questions about the mechanism of replication were posed, setting up the next phase of work on 'the central dogma', i.e. DNA to RNA to protein. Offered here together with an original print, depicting the double-helix structure of DNA, signed by Watson and Crick.



The wave theory of matter confirmed

15. DAVISSON, Clinton. & GERMER, Lester. *The Scattering of Electrons by a Single Crystal of Nickel.* London: Macmillan, 1927.

$3,150


558 NATURE [APRIL 16, 1927

Letters to the Editor.

The Scattering of Electrons by a Single Crystal of Nickel.

CO-LATITUDE, ANGLE

PRIMARY BEAM

TARGET

A fine copy, in original wrappers, of the first announcement of the discovery of electron diffraction in crystals, i.e., the famous Davisson–Germer experiment which confirmed de Broglie's hypothesis of the wave-particle duality of matter. "This idea was tested and confirmed by Davisson and Germer in 1927. They directed a beam of electrons on to a crystal of metal, and found that instead of bouncing off, as particles would, the beam was diffracted; just as the X-rays had been in the experiments of von Laue and Braggs [1912]...Thus the duality of both light and matter had been established, and physicists had to come to terms with fundamental particles which defied simple theories and demanded two sets of 'complementary' descriptions, each applicable under certain circumstances, but incompatible with one another." (*Printing and the Mind of Man*).

❧PMM 417 (note); *A Century of Nature, Twenty-One Discoveries that Changed Science and the World*, 28; Parkinson, *Breakthroughs*, p. 505; Brandt, *Harvest of a Century*, p. 13

Exceptionally large copy in the original Dutch vellum

16. 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.

$158,850


DISCOURS
DE LA METHODE
Pour bien conduire sa raison, & chercher la verité dans les sciences.
PLUS
LA DIOPTRIQVE.
LES METEORES.
ET
LA GEOMETRIE.
Qui sont des essais de cete METHODE.
A LEYDE
De l'Imprimerie de IAN MAIRE.
CIↃ IↃ C XXXVII.
Avec Privilege.

A very fine and exceptionally large copy, entirely unrestored, in its original Dutch vellum binding - the birth of analytical or co-ordinate geometry, designated by John Stuart Mill as "the greatest single step ever made in the progress of the exact sciences". "It is no exaggeration to say that Descartes was the first of modern philosophers and one of the first modern scientists; in both branches of learning his influence has been vast. ... The revolution he caused can be most easily found in his reassertion of the principle (lost in the middle ages) that knowledge, if it is to have any value, must be intelligence and not erudition. His application of modern algebraic arithmetic to ancient geometry created the analytical geometry which is the basis of the post-Euclidean development of that science. His statement of the elementary laws of matter and movement in the physical universe, the theory of vortices, and many other speculations threw light on every branch of science from optics to biology. ... All this found its starting point in the 'Discourse on the Method for Proper Reasoning and Investigating Truth in the Sciences'. Descartes's purpose is to find the simple indestructible proposition which gives to the universe and thought their order and system. Three points are made: the truth of thought, when thought is true to itself (thus cogito, ergo, sum), the inevitable elevation of its partial state in our finite consciousness to its full state in the infinite existence of God, and the ultimate reduction of the material universe to extension and local movement." (*PMM*). ❧PMM 129; Grolier/Horblit 24; Dibner 81; Evans 5; Sparrow 54.

The best edition of Decartes' Geometry - used by Newton

17. DESCARTES, René. *Geometria, à Renato Des Cartes anno 1637 Gallicè edita ; postea autem unà cum Notis Florimondi de Beavne, In Curia Blesensi Consiliarii Regii, Gallicè conscriptis in Latinam linguam versa, & commentariis illustrata ; operâ atque studio Francisci à Schooten, ...* Amsterdam: Elzevir, 1659-1661.

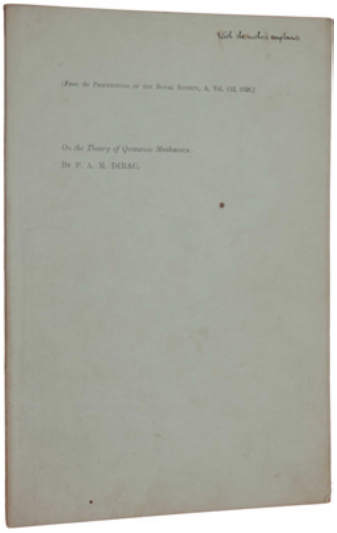
$8,500

A fine copy of van Schooten's important second edition of the *Geometria*, Descartes's *magnum opus* (*DSB*), and one of the key texts in the history of mathematics. Descartes' "application of modern algebraic arithmetic to ancient geometry created the analytical geometry which was the basis of the post-Euclidean development of that science" (*PMM*). It "rendered possible the later achievements of seventeenth-century mathematical physics" (M. B. Hall, *Nature and nature's laws* (1970), p. 91). "The mathematical community learned about the wealth of Descartes's new ideas through the works of van Schooten ... In the second edition the commentaries were enlarged, and van Schooten included the work by his students van Heuraet, Hudde, Huygens and de Witt. This edition served as the basic textbook for the generation that, in the last quarter of the century, took the lead in introducing differential and integral calculus" (Jahnke). Newton, in particular learnt his Descartes from this edition: "There can be no doubt that Newton read the *Géométrie* in Schooten's second Latin edition" (Whiteside, *Papers* I, p. 7, n17). Newton's own heavily annotated copy of this edition is held in Cambridge University Library (NQ.16.203).

Fermi-Dirac statistics - inscribed offprint

18. DIRAC, Paul Adrien Maurice. *On the theory of quantum mechanics.* [London: Harrison & Sons for the Royal Society, 1926].

$20,100



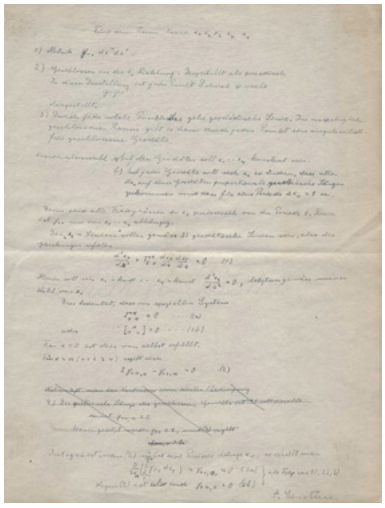
First edition, offprint with **presentation inscription in Dirac's hand**, of Dirac's paper, which "is justly seen as a major contribution to quantum theory" (Kragh, *Dirac: A Scientific Biography*, p. 36). It introduced his quantum mechanical derivation of what is now called Fermi-Dirac statistics, which describes a distribution of particles (now known as fermions, a name coined by Dirac in 1945) in certain systems containing many identical particles that obey the Pauli exclusion principle—meaning that no two of the particles can occupy the same quantum state simultaneously. This paper "will be remembered as the first in which quantum mechanics is brought to bear on statistical mechanics. Recall that the earliest work on quantum statistics, by Bose and by Einstein, predates quantum mechanics. Also, Fermi's introduction of the exclusion principle in statistical problems, though published after the arrival of quantum mechanics, is still executed in the context of the "old" quantum theory. All these contributions were given their quantum mechanical underpinnings by Dirac, who was, in fact, the first to give the correct justification of Planck's law, which started it all" (Pais, Paul Dirac: *The Man and his Work*, p. 6). Dirac's paper may also be considered the birth of quantum electrodynamics. He applied Schrödinger's wave mechanics to develop a theory of time-dependent perturbations and applied it to the emission and absorption of radiation. "Radiation theory was the subject of the last section of the important paper "On the theory of quantum mechanics." There Dirac considered a system of atoms subjected to an external perturbation that could vary arbitrarily with the time. Of course,the particular perturbation he had in mind was an incident electromagnetic field but, characteristically, he stated the problem in the most general way possible (Kragh, pp. 120-1).

No copy of this offprint on OCLC.

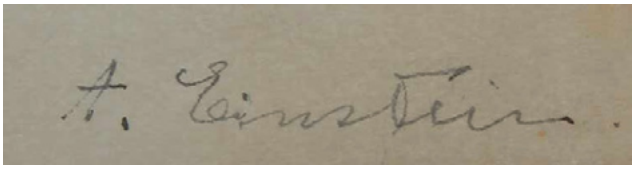
Five-dimensional unified field theory

19. EINSTEIN, Albert. *L Autograph manuscript signed 'A. Einstein'.*

$42,500



An important working manuscript apparently representing Einstein's notes for a paper entitled "On a Generalization of Kaluza's Theory of Electricity," which he wrote jointly with Peter Bergmann, and which was published in the *Annals of Mathematics*, vol. 39, no. 3, July 1938, pp. 683-701. Bergmann (1915-2002) collaborated with Einstein, as his research assistant, at the Institute for Advanced Study between 1936 and 1941. Although the manuscript differs in many details from the published article (written in English), there are enough correspondences in wording, and also with respect to the equations in the section of the article headed 'The Space Structure,' to suggest very strongly a link between it and the 1938 paper. In sum, the manuscript details part of Einstein's attempt to construct a unified theory of electromagnetism, gravitation and quantum mechanics based on a curved five-dimensional spacetime with five spacetime coordinates x_1, x_2, x_3, x_4, x_0 and four spatial coordinates, one of which, x_0, is periodic. Through every point it is assumed that there passes a closed geodesic given by x_1, x_2, x_3, x_4 constant. This particular approach is sometimes referred to as 'Projective Relativity' and is a type of unified theory pioneered by T. Kaluza and later by O. Klein in the 1920s. Kaluza and Klein's ideas play a key part of modern superstring theory and are currently being extensively pursued by theoretical physicists.

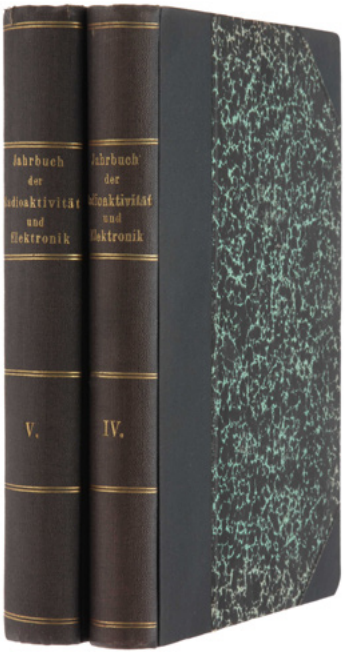


$E = mc^2$ and the equivalence principle

20. EINSTEIN, Albert. *Über das Relativitätprinzip und die aus demselben gezogenen Folgerungen. [with:] Berichtigungen zu der arbeit "Über das Relativitätprinzip...".* Leipzig: S. Hirzel, 1907/1908.

$2,850

First edition of one of Einstein's most important works. "On p. 443 are probably the first explicit statements both of the equivalence of inertial and gravitational mass and of the equation for mass in terms of energy [$E = mc^2$], now regarded as the theoretical basis for the release of atomic energy" (Weil). "Of greatest importance is the last part of the paper, which generalizes the principle of relativity from uniformly moving systems to uniformly 'accelerated' systems … He introduces the principle of equivalence which claims that the problem of a uniform and stationary gravitational field on the one hand, and the system moving with a constant acceleration without any gravitation on the other hand, are physically indistinguishable situations. This principle put him in a position to find out what effect gravitation has on an arbitrary physical phenomenon, because all he had to do was to observe that phenomenon from an accelerated reference system. He thus obtains the speeding up of clocks in a field of increased gravitational potential, which must lead to a universal red shift of the spectral lines coming from the Sun, and likewise to a bending of light rays near to the limb of the Sun. Furthermore, the hypothesis at once makes it clear why the inertial mass and gravitational mass must be, under all circumstances, strictly proportional to one another … Hence, the principle of the energy value of inertial mass must be extended to the gravitational mass" (Lanczos, *The Einstein Decade*, p. 153).

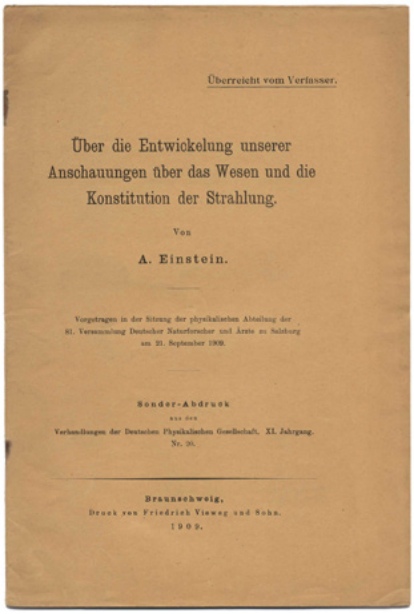


❧Weil *21; Boni 20; Plotnick 77; Stanitz 94.

Wave-particle duality

21. EINSTEIN, Albert. *Über die Entwickelung unserer Anschauungen über das Wesen und die Konstitution der Strahlung.* Braunschweig: Friedrich Vieweg und Sohn, 1909.

$19,850


Überreicht vom Verfasser.

Über die Entwickelung unserer Anschauungen über das Wesen und die Konstitution der Strahlung.

Von

A. Einstein.

Vorgetragen in der Sitzung der physikalischen Abteilung der 81. Versammlung Deutscher Naturforscher und Ärzte zu Salzburg am 21. September 1909.

Sonder-Abdruck aus den Verhandlungen der Deutschen Physikalischen Gesellschaft. XI. Jahrgang. Nr. 20.

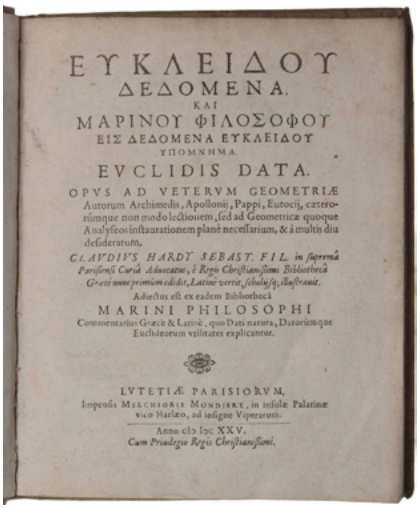
Braunschweig. Druck von Friedrich Vieweg und Sohn. 1909.

The true first printing (see below), extremely rare author's offprint issue, of this paper which Wolfgang Pauli said "can be considered as one of the landmarks in the development of theoretical physics" (Schilpp, p. 154). This paper marks the introduction of the modern 'photon' concept (although the term itself was introduced much later, in a 1926 paper by Gilbert N. Lewis). It contains "the first well-conceived promulgation of the wave-particle duality of light [which] had implications as profound as Einstein's earlier theoretical breakthroughs" (Isaacson, p. 157). Einstein here anticipated the principle of complementarity, one of the fundamental principles of quantum mechanics. His own proposal for a solution of the wave-particle paradox - that Maxwell's equations for electromagnetic fields be modified to allow wave solutions that are bound to singularities of the field - was never developed, although it may have influenced Louis de Broglie's pilot wave hypothesis for quantum mechanics, developed in his famous thesis *Recherches sur la théorie des quanta* (1924). The present paper was also published in *Physikalische Zeitschrift*, Vol. 10 (1909), but the *Verhandlungen* printing has priority: it was published on 30 October 1909, the *Physikalische Zeitschrift* printing appeared on 10 November. OCLC lists just two copies of this offprint. ❧Weil 30

Editio princeps of Euclid's Data

22. EUCLID / Ed. HARDY, Claude. *[In Greek:] Deodomena kai Marinou Philosophou eis dedomena Eukleidou Hypomnema. Euclidis Data Opus ad veterum Geometriae Autorum Archimedis, Apollonii, Pappi, Eutocii... Marini Philosophi Commentarius Graece & Latine, quo Dati natura, Datorumque Euclideorum utilitates explicantur.* Paris: Melchior Mondiere, 1625.

$10,750


ΕΥΚΛΕΙΔΟΥ
ΔΕΔΟΜΕΝΑ.
ΚΑΙ
ΜΑΡΙΝΟΥ ΦΙΛΟΣΟΦΟΥ
ΕΙΣ ΔΕΔΟΜΕΝΑ ΕΥΚΛΕΙΔΟΥ
ΥΠΟΜΝΗΜΑ.

EVCLIDIS DATA.

OPVS AD VETERVM GEOMETRIÆ Autorum Archimedis, Apollonii, Pappi, Eutocii, extero-rumque non modo lectionem, sed ad Geometricæ quoque Analyseos instaurationem planè necessarium, & à multis diu desideratum,

CLAVDIVS HARDY SEBAST. FIL. in supremâ Parisiensi Curiâ Advocatus, & Regis Christianissimi Bibliothecæ Græcè nunc primùm edidit, Latinè vertit, scholijs, illustravit.

Adiectus est ex eadem Bibliotheca

MARINI PHILOSOPHI Commentarius Græcè & Latinè, quo Dati natura, Datorumque Euclideorum vtilitates explicantur.

LVTETIÆ PARISIORVM, Impensis MELCHIORIS MONDIERE, in insula Palatinæ vico Harlæo, ad insigne Viperarum.

Anno clɔ Iɔc XXV. Cum Priuilegio Regis Christianissimi.

Very rare *editio princeps* of this important text by Euclid, his only work in pure geometry, other than the *Elements*, to have survived in Greek. It is here accompanied by a commentary, or rather an introduction, by Marinus of Naples (5th century AD), the pupil and biographer of Proclus. Although the importance of the first printing of any Euclidean text goes without saying, the work is of particular interest given contemporary developments in French geometry — Descartes, Mersenne, Fermat, etc., to whose circle the translator Claude Hardy belonged. "The *Data* … is closely connected with books I-VI of the *Elements*. It is concerned with the different senses in which things are said to be given. Thus areas, straight lines, angles, and ratios are said to be "given in magnitude" when we can make others equal to them. Rectilineal figures are "given in species" or "given in form" when their angles and the ratio of their sides are given. Points, lines, and angles are "given in position" when they always occupy the same place, and so on. After the definitions there follow ninety-four propositions, in which the object is to prove that if certain elements of a figure are given, other elements are also given in one of the defined senses" (*DSB* IV.524). **OCLC lists 5 copies.**

Euler's most important philosophical work

23. EULER, Leonhard. *Lettres à une princesse d'Allemagne sur divers sujets de physique & de philosophie.* Saint-Pétersbourg: Imprimerie de l'Académie impériale des sciences, 1768-1772.

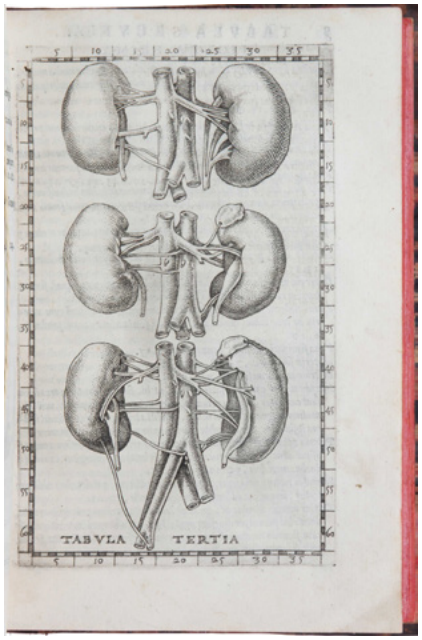
$15,850

First edition, uncut in the original wrappers, of this famous work. The "*Lettres á une Princesse d'Allemagne*, 1768-72 (mainly on cosmology and physics), in which he attacked Leibniz's monadology, had an immense success and profoundly influenced contemporary philosophy" (*PMM* 196n). "The famous *Lettres* … was an unusual success and ran to twelve editions in the original French, nine in English, six in German, four in Russian, and two in both Dutch and Swedish. There were also Italian, Spanish, and Danish editions. In physics Euler built up many artificial models and hypotheses which were short-lived. But his main concept of the unity of the forces of nature acting deterministically in some medium proved to be important for the development of physics, owing especially to *Lettres à une princesse d'Allemagne*. Thus, his views on the nature of electricity were the prototype of the theory of electric and magnetic fields of Faraday and Maxwell. His theory of ether influenced Riemann" (DSB). ❧Enestrom 343, 344, 417; Honeyman 1074; Houzeau-Lancaster 8897.

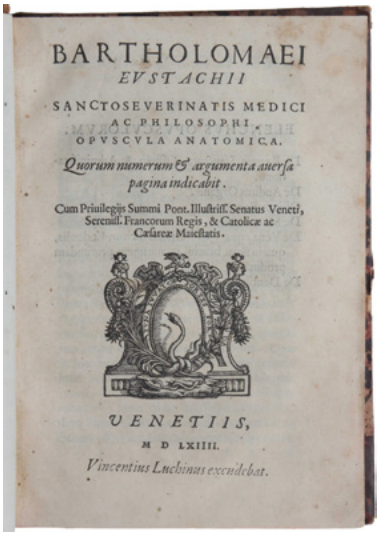
A founder of modern anatomy

24. EUSTACHIUS, Bartholomaeus. *Opuscula anatomica.* Venice: Vincentius Luchinus excudebat, 1564.

$63,500



First edition, very rare, of one of the most important of all anatomical books. It includes the first specific treatise on the kidney, the first account of the Eustachian tube in the ear, the first description of the thoracic duct, and the Eustachian valve, as well as the first systematic study of teeth. The fine etchings illustrating the edition "were the first eight in an intended series of forty-seven anatomical plates engraved by Giulio de' Musi after drawings by Eustachi and his relative, Pier Matteo Pini, an artist. These were prepared in 1552 to illustrate a projected book entitled *De dissensionibus ac controversiis anatomicis*, the text of which was lost after Eustachi's death. Had the full series of plates been published at the time of their completion, Eustachi would have ranked with Vesalius as a founder of modern anatomy" (Norman).

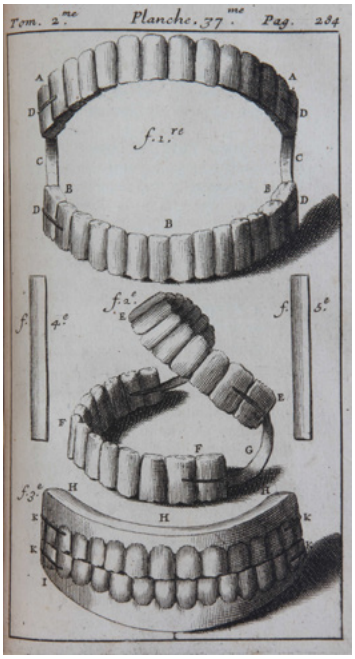


❧ Grolier, *One Hundred Books Famous in Medicine* 21; *Heirs of Hippocrates* 322; Norman 739. Garrison-Morton 801.

PMM 186 - The beginning of modern dentistry

25. FAUCHARD, Pierre. *Le chirurgien dentiste, ou traité des dents.* Paris: Jean Mariette, 1728.

$40,850



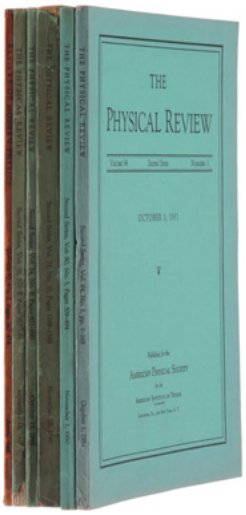
First edition, an excellent copy, with the often lacking portrait, of the first comprehensive work on dentistry, and one of the 'great books' in the history of medicine. Very rare: the last complete copy to sell at auction appears to be the Haskell Norman copy from 1998 ('title patched, library stamp removed, rebacked'). Our copy is in unrestored contemporary calf and in fine condition. "Before Fauchard's time the profession of dentistry was truly a 'mystery', for its practitioners had steadfastly refrained from publishing details of their technique and equipment. Fauchard summarized in his pages with numerous illustrations all that was best in the practice of his day and disclosed what had been hitherto jealously guarded secrets. *Le chirurgien dentiste* ... is in fact the first scientific work on its subject, and modern dentistry begins with its publication" (PMM). Fauchard (1678-1761) was the first to use the word 'dentiste' to describe his profession and his work marks the beginning of dentistry as a distinct speciality.

PMM 186; Grolier/Medicine 40; Norman 768; Lilly, *Notable Medical Books* 111; *En Francais dans le Texte* 142; *Heirs of Hippocrates* 785; Garrison-Morton 3671

Feynman path-integrals and Feynman diagrams

26. FEYNMAN, Richard P. *Seven papers constituting the development of the 'path-integral' formulation of quantum mechanics and the 'Feynman diagram' approach to quantum electrodynamics (QED) (which is based on path-integrals): I. Space-Time Approach to Non-Relativistic Quantum Mechanics; II. A Relativistic Cut-Off for Classical Electrodynamics; III. Relativistic cut-off for quantum electrodynamics; IV. The Theory of Positrons; V. Space-Time Approach to Quantum Electrodynamics; I. Mathematical Formulation of the Quantum Theory of Electromagnetic Interaction; VII. An Operator Calculus Having Applications in Quantum Electrodynamics.* Lancaster: American Physical Society, 1948-51.

$14,500



First editions, in original wrappers, of the seven papers which constitute Feynman's path-integral formulation of quantum mechanics and his 'Feynman diagram' approach to QED. Feynman "published an extended set of papers - they would stretch over three years and one hundred thousand words - that defined the start of the modern era for the next generation of physicists. After his path-integral paper came, in the *Physical Review*, 'A Relativistic Cut-Off for Classical Electrodynamics,' 'Relativistic Cut-Off for Quantum Electrodynamics,' 'The Theory of Positrons,' 'Space-Time Approach to Quantum Electrodynamics,' 'Mathematical Formulation of the Quantum Theory of Electromagnetic Interaction,' and 'An Operator Calculus Having Applications in Quantum Electrodynamics.' As they appeared, the younger theorists... devoured them... [and] felt invigorated by his images..." (Gleick, *Genius*, pp. 271-2).

Feynman offprints (QED)

27. FEYNMAN, Richard. *Mathematical Formulation of the Quantum Theory of Electromagnetic Interaction; An Operator Calculus Having Applications in Quantum Electrodynamics.* [Lancaster: American Phsyical Society], 1950;1951.

$14,150

Extremely rare offprints of Feynman's final two papers on quantum electrodynamics, in which he described the mathematical foundations of his techniques of path-integrals and Feynman diagrams. Feynman himself stated about these papers: "In these two papers, I put everything that I had done and thought should be published on the subject [i.e., quantum electrodynamics (QED)]. And that was the end of my published work in this field" (quoted in Mehra, *The Beat of a Different Drum*, p. 325). We are not aware of any other offprints of any of Feynman's papers on quantum electrodynamics having appeared on the market; no copies on OCLC. "While Feynman made many original and imaginative contributions to theoretical physics, it may well be that his place in the history of science will be largely based on his approach to renormalizing quantum electrodynamics, and especially on the tools that he invented to accomplish that goal, such as path integrals, the operator calculus, and the famous Feynman diagrams" (*Selected Papers*, p. 7). "Nobody but Dick [Feynman] could use his theory, because he was always invoking his intuition to make up the rules of the game as he went along. Until the rules were codified and made mathematically precise, I could not call it a theory" (Freeman Dyson, quoted in David Kaiser, *Pedagogy and the Practice of Science*).

Gauss' masterpiece

28. GAUSS, Carl Friedrich *Disquisitiones arithmeticae.* Leipzig: Gerh. Fleischer, 1801.

$54,500

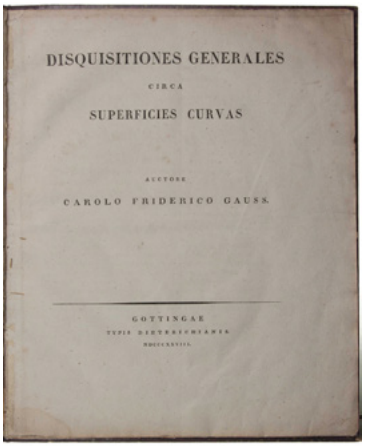
A very fine copy of Gauss' masterpiece - uncut, contemporarily bound and with numerous mathematical notes inserted. "Gauss ranks, together with Archimedes and Newton, as one of the greatest geniuses in the history of mathematics" (*Printing and the Mind of Man*). "Published when he was just twenty-four, *Disquisitiones arithmeticae* revolutionized number theory. In this book Gauss standardized the notation; he systematized the existing theory and extended it; and he classified the problems to be studied and the known methods of attack and introduced new methods… The *Disquisitiones* not only began the modern theory of numbers but determined the direction of work in the subject up to the present time. The typesetters of this work were unable to understand Gauss' new and difficult mathematics, creating numerous elaborate mistakes which Gauss was unable to correct in proof. After the book was printed Gauss insisted that, in addition to an unusually lengthy four-page errata, the worst mistakes be corrected by cancel leaves to be inserted in copies before sale [as in the offered copy]… Gauss's highly technical work was printed in a small edition, and the difficulty of understanding it was hardly alleviated by the sloppy typesetting. The few mathematicians who were able to read the *Disquisitiones* immediately hailed Gauss as their prince, but the full understanding required for further development did not occur until the publication in 1863 of Dirichlet's less austere exposition in his *Vorlesungen über Zahlentheorie.*" (Norman).

❧PMM 257; Evans 11; Horblit 38; Dibner 114.

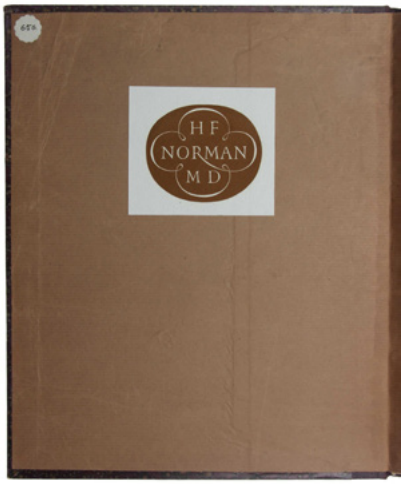
Gauss' second masterpiece

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

$13,600


DISQUISITIONES GENERALES
CIRCA
SUPERFICIES CURVAS
AUCTORE
CAROLO FRIDERICO GAUSS
GOTTINGAE

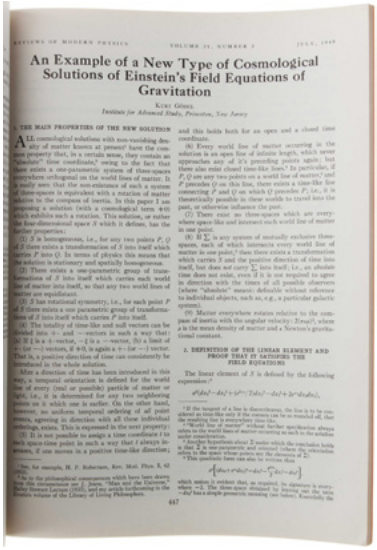
First edition, the very rare offprint, from the library of Haskell F. Norman, of the founding paper of modern differential geometry containing the seed for Riemann's work on non-Euclidean geometry. A "masterpiece of the mathematical literature" (Zeidler, p. 16). "... the crowning contribution of the 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*). "A decisive influence on the entire course of development of differential geometry was exerted by the publication of [the present] paper of Gauss… It was this paper, carefully polished and containing a wealth of new ideas, that gave this area of geometry more or less its present form and opened a large circle of new and important problems whose development provided work for geometers for many decades" (Kolmogorov & Yushkevitch, p. 7). Gauss's *Disquisitiones* was, in particular, the basis for Riemann's famous 1854 Habilitationsschrift 'Uber die Hypothesen welche die Geometrie zu Grunde liegen'. ❧Norman 880 (this copy).



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

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

$2,050


An Example of a New Type of Cosmological Solutions of Einstein's Field Equations of Gravitation

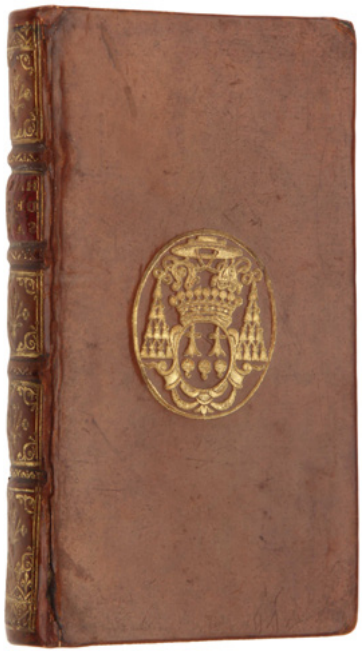
First edition, a fine copy in original wrappers, of Gödel's 'time travel paper' – one of "the most important [papers] on relativity since my own original paper appeared" (Einstein to Morgenstern, 1952). "In the 1920s and 1930s, the Friedmann-Robertson-Walker cosmological models had been introduced as 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 showed that it was possible to have solutions of the Einstein field equations in which the galaxies were rotating with respect to the local inertial frame. He therefore demonstrated that general relativity does not incorporate Mach's principle. This solution was the first to be discovered that had the curious property that it was possible to travel into the past. This leads to paradoxes such as 'What happens if you go back and kill your father when he has a baby?' It is generally agreed that this cannot happen in a solution that represents our universe, but Gödel was the first to show that it was not forbidden by the Einstein equations. His solution generated a lot of discussion of the relation between general relativity and the concept of causality" (Stephen Hawking in Gödel's *Collected Works*).

'One of Harvey's major contributions to medical science' (Keynes)

31. HARVEY, William. *Exercitationes Duae Anatomicae De Circulatione Sanguinis Ad Joannem Riolanum filium.* Rotterdam: Arnold Leers, 1649.

$22,700

First edition, one of two issues published simultaneously (see below), of this rare and important work; this is a beautiful copy with an outstanding provenance. "In 1649, after maintaining a twenty-one year silence against his detractors, Harvey published two essays addressed to Jean Riolan the younger, a Parisian professor of anatomy who had put forth a rival theory of the circulation in his *Encheiridium anatomicum* (1648). Harvey demolished Riolan's arguments point by point in the first essay, and in the second essay refuted Descartes, who had denied Harvey's claims about the movement of the heart. Keynes called this second essay "one of [Harvey's] major contributions to medical science" (Life, p. 327)" (Norman). The *Exercitationes duae* were appended to later editions of *De motu*, and, as Keynes says in his Bibliography of William Harvey, "The two treatises have for too long been considered merely an appendix to *De motu* – they are far more important than this." The only copy auctioned in the last forty years was the Haskell F. Norman copy (Christie's, June 1998, $9200), re-sold at Sotheby's PMM sale (October 1999, £6900). "The work was published simultaneously by Roger Daniels in Cambridge and by Arnold Leers in Rotterdam. Keynes states that the Rotterdam edition has traditionally been assumed to be printed after the Cambridge one, although he could find no evidence to support the claim" (Norman).

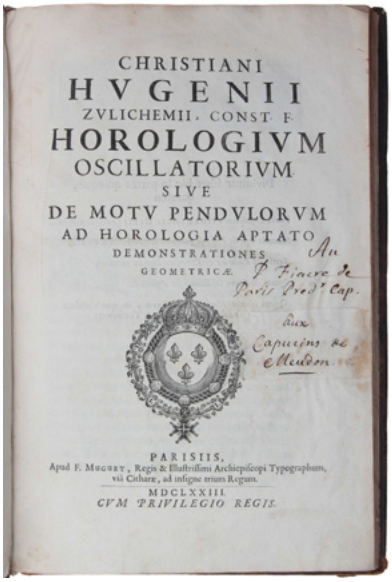


Provenance: Pierre Daniel Huet (1630-1721), French prelate, scholar and mathematician, who became Bishop of Avranches in 1691, with his armorial bookplate dated 1692 on front paste-down and his arms repeated in gilt on both covers.

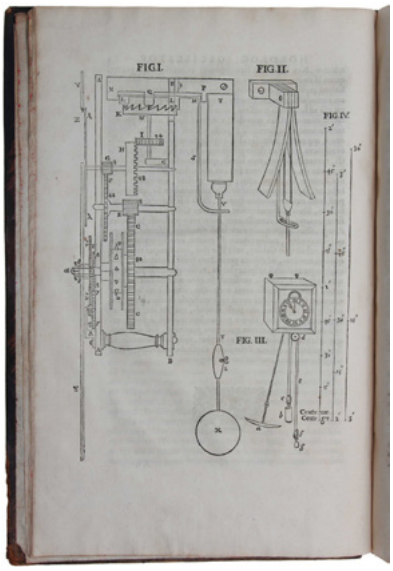
Second only to Newton's Principia

32. HUYGENS, Christiaan. *Horologium oscillatorium sive de motu pendulorum ad horologia aptato demonstrationes geometricae.* Paris: F. Muguet, 1673.

$56,750


CHRISTIANI
HVGENII
ZVLICHEMII, CONST. F.
HOROLOGIVM
OSCILLATORIVM
SIVE
DE MOTV PENDVLORVM
AD HOROLOGIA APTATO
DEMONSTRATIONES
GEOMETRICÆ
PARISIIS,
Apud F. Muguet, Regis & Illustrissimi Archiepiscopi Typographum, viâ Cithara, ad insigne trium Regum.
MDCLXXIII.
CVM PRIVILEGIO REGIS.

First edition and a very fine copy of the author's most important work, "a superb tapestry woven from the three strands of the science of Christiaan Huygens (1629–1695): mathematics, mechanics, and technology" (*Landmark Writings in Western Mathematics*, p. 34). It was the most original work of this kind since Galileo's *Discorsi*" (PMM), and a "work of the highest genius which has influenced every science through its mastery of the principles of dynamics. It is second in scientific importance perhaps only to Newton's *Principia*, which is in some respects based on it" (Charles Singer, *A Short History of Science to the Nineteenth Century*, 1941, p. 258). It is also probably the single most important book in the literature on clocks.

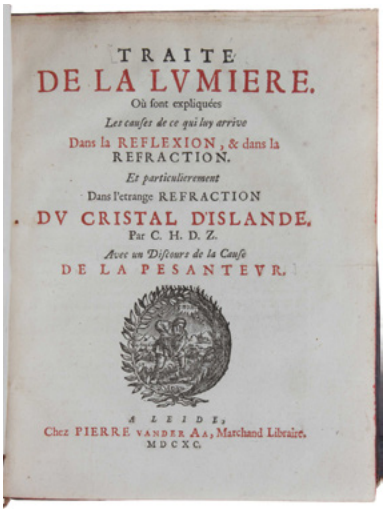


❧PMM 154; Dibner 145; Horblit 53; Evans 31; Sparrow 109; Norman 1137.

The wave theory of light

33. HUYGENS, Christiaan. *Traité de la Lumière. Où sont expliquées les Causes de ce qui luy arrive dans la Reflexion, & dans la Refraction. Et particulierement dans l'etrange Refraction du Cristal d'Islande ... Avec un Discours de la Cause de la Pesanteur.* Leyden: Pierre vander Aa, 1690.

$44,850


TRAITE
DE LA LVMIERE.
Où sont expliquées
Les causes de ce qui luy arrive
Dans la REFLEXION, & dans la
REFRACTION.
Et particulierement
Dans l'etrange REFRACTION
DV CRISTAL D'ISLANDE.
Par C. H. D. Z.
Avec un Discours de la Cause
DE LA PESANTEVR.
A LEIDE,
Chez PIERRE VANDER AA, Marchand Libraire.
M DC XC.

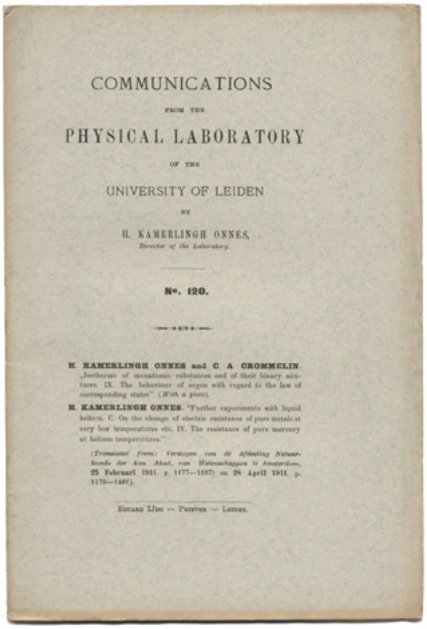
An excellent copy of Huygens' path-breaking exposition of his wave theory of light. Huygens was able to explain reflection and refraction using this theory, of which he became completely convinced in August 6, 1677, when he found that it explained the double refraction in Iceland spar. His view of light was opposed to the corpuscular theory of light advanced by Newton. Huygens' work fell into oblivion during the following century, but his theory of light was confirmed at the beginning of the 19th century by Thomas Young, who used it to explain optical interference, and by Jean-Augustin Fresnel a few years later. Modern physics has reconciled Newton's and Huygens' theories in discerning both corpuscular and wave characteristics in the properties of light. In the second part of the work, the *Discours de la cause de la pesanteur*, written in 1669, Huygens expounded his vortex theory of gravity, a purely mechanistic theory that contrasted markedly with Newton's notion of a universal attractional force intrinsic to matter.

❧Grolier/Horblit, One *Hundred Books Famous in Science* 54; Dibner, *Heralds of Science* 145; Evans, *First Editions of Epochal Achievements in the History of Science* 32; Sparrow, *Milestones of Science* 111.

The discovery of superconductivity

34. KAMMERLIGH ONNES, Heike. *Further experiments with liquid helium. C. On the change of electric resistance of pure metals at very low temperature etc. IV. The resistance of pure mercury at helium temperatures.* Leiden: Eduard Ijdo, 1911.

$5,100

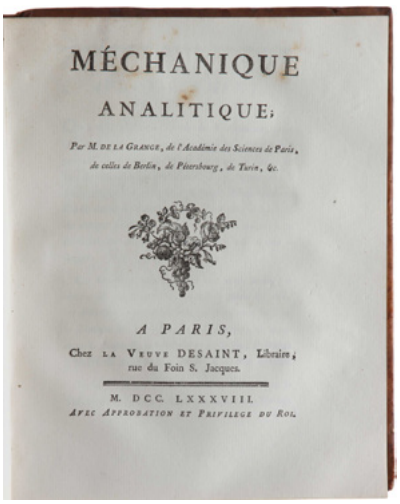

COMMUNICATIONS
FROM THE
PHYSICAL LABORATORY
OF THE
UNIVERSITY OF LEIDEN
BY
H. KAMERLINGH ONNES,
Director of the Laboratory.
N°. 120.
H. KAMERLINGH ONNES and C. A. CROMMELIN.
H. KAMERLINGH ONNES.

First printing, in original printed wrappers, of the first announcement of the discovery of superconductivity, the disappearance of electrical resistance in certain materials at very low temperatures. "Of all the discoveries in condensed matter physics during the 20th century, some might call superconductivity the "crown jewel". Others might say that honour more properly belongs to semiconductors or the elucidation of the structure of DNA, given the benefits that both have brought to humanity. Yet no-one would deny that when a team led by Heike Kammerlingh Onnes stumbled across superconductivity ... the scientific community was caught by complete surprise" (P. M. Grant, "Down the path of least resistance", *Physics World*, Vol. 24, April 2011, p, 18). In the course of the same experiment, Kammerlingh Onnes and his team also made the first observation of superfluidity, although this was not recognized until later. Very rare in original printed wrappers.

Lagrange's two greatest works

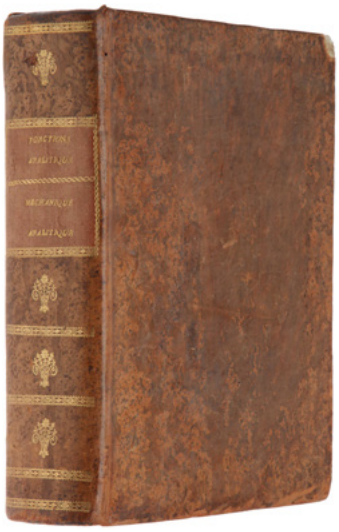
35. LAGRANGE, Joseph Louis de. *Méchanique analitique; Théorie des fonctions analytiques.* Paris; Paris: Veuve Desaint; Imprimerie de la République, 1788; 1797.

$20,100


MÉCHANIQUE
ANALITIQUE;
Par M. DE LA GRANGE, de l'Académie des Sciences de Paris, de celles de Berlin, de Pétersbourg, de Turin, &c.
A PARIS,
Chez LA VEUVE DESAINT, Libraire, rue du Foin S. Jacques.
M. DCC. LXXXVIII.
AVEC APPROBATION ET PRIVILEGE DU ROI.

First edition of Lagrange's two most important works contemporarily bound. The *Méchanique* is "perhaps the most beautiful mathematical treatise in existence. It contains the discovery of the general equations of motion, the first epochal contribution to theoretical dynamics after Newton's *Principia*" (Evans). "Lagrange's masterpiece, the *Méchanique Analitique* (Paris, 1788), laid the foundations of modern mechanics, and occupies a place in the history of the subject second only to that of Newton's *Principia*."

❧Grolier/Horblit 61; Evans 10; Dibner 112; Sparrow 120; Norman 1257.



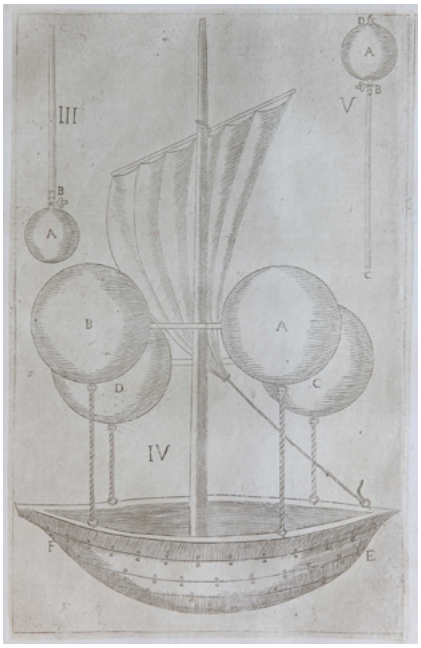
"The year 1797 … saw the appearance of the famous work of Lagrange, *Théorie des fonctions analytique*, … This book developed with care and completeness the characteristic definition and method in terms of 'fonctions dérivés,' based upon Taylor's series, which Lagrange had proposed in 1772… Lagrange's *Théorie des fonctions* was only one, but by far the most important, of many attempts made about this time to furnish the calculus with a basis which would logically modify or supplant those given in terms of limits and infinitesimals." (Cajori).

❧Norman 1258; *Landmark Writings in Western Mathematics* 16; Barchas 1198; Honeyman 1881; Stanitz 250.

The first scientific work on the mechanics of flight

36. LANA TERZI, Francesco. *Prodromo overo saggio di alcune inventioni nuove premesso all'arte maestra.* Brescia: Rizzardi, 1670.

$10,750



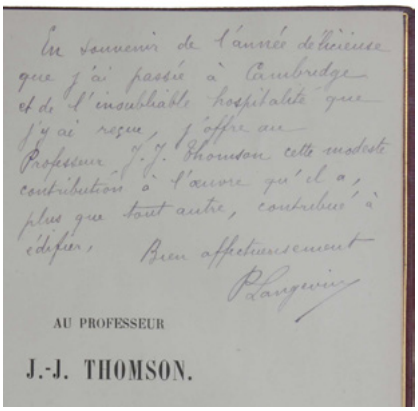
An excellent copy of the first scientific work on the mechanics of flight. "In this volume is presented the earliest concept of flight derived from demonstrable aerostatic principles." (Norman). An important work in the history of aeronautics, in the *Prodromo* Lana Terzi presented several technological innovations, of which the best known is his proposal for a 'flying boat' to be airborne by four spheres of thin copper from which air had been exhausted. Although the vehicle was never tested, and would have proved unworkable, since the copper would not have been able to withstand the atmospheric pressure, Lana Terzi's reasoning was correct. In surmising that a vessel containing a semi-vacuum would weigh less than the surrounding air and would consequently become buoyant, Lana Terzi formulated the earliest concept of flight based on aerostatic principles. "While Lana apparently originated the method of reducing air density in a vessel by heating it, the implications of this phenomenon in relation to flight were not fully understood until the advent of the Montgolfier brothers a century later" (Norman). ❧Dibner 125; Norman 127.

The dedication copy presented to J. J. Thomson

37. LANGEVIN, Paul. *Thèses présentées à la Faculté des Sciences de l'Université de Paris… Recherches sur les gaz ionisés….* Paris: Gauthier-Villars, 1902.

$6,800

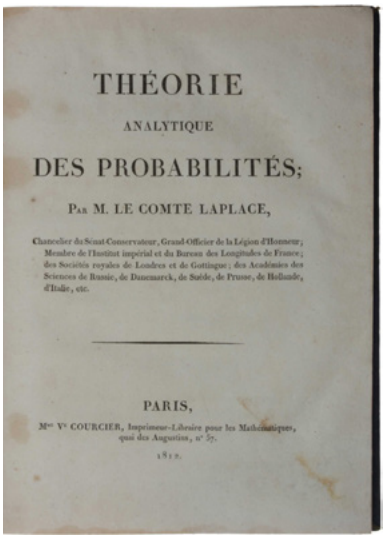
First edition, the dedication copy, warmly inscribed to Nobel laureate J. J. Thomson (1856-1940), of Langevin's doctoral thesis. Langevin spent the year 1897-8 working with Thomson at the Cavendish Laboratory in Cambridge, during a period of high excitement when Thomson had just identified the electron and studies of the newly discovered X-rays and radioactivity were being carried out in his laboratory. The study of ionization in gases was then at the heart of physics, having led to the discovery of the electron and the elucidation of properties of X-rays, the state of the art being later summarized in Thomson's classic book *Conduction of electricity through gases* (1903). Under Thomson's direction, Langevin worked on ionization by X-rays, in the process discovering, independently of Sagnac, that X-rays liberate secondary electrons from metals. Based on work carried out with Thomson, Langevin's thesis was completed on his return to Paris under the supervision of Pierre Curie. "The thesis, a notable one, … dealt mainly with the recombination and mobilities of ions, their coefficients and the relations between them. It is a standard work on this subject. In it he also devised and applied new and elegant methods of measuring these quantities which were an advance on all their predecessors and have not since been improved upon to any appreciable extent" (*Nature*, Vol. 146 (1940), p. 750, recording the award of the Royal Society's Copley Medal to Langevin).



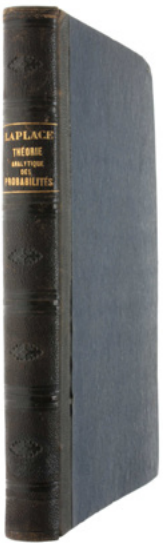
'The most influential book on probability and statistics ever written' (Hald)

38. LAPLACE, Pierre Simon. *Théorie Analytique des Probabilités.* Paris: Courcier, 1812.

$25,500


THÉORIE
ANALYTIQUE
DES PROBABILITÉS;
PAR M. LE COMTE LAPLACE,
PARIS,

"In the *Théorie* Laplace gave a new level of mathematical foundation and development both to probability theory and to mathematical statistics. … [It] emerged from a long series of slow processes and once established, loomed over the landscape for a century or more." (Stephen Stigler: *Landmark Writings in Western Mathematics*, p.329-30). "Laplace's great treatise on probability appeared in 1812, with later editions in 1814 and 1820. Its picture of probability theory was entirely different from the picture in 1750. On the philosophical side was Laplace's interpretation of probability as rational belief, with inverse probability as its underpinning. On the mathematical side was the method of generating functions, the central limit theorem, and Laplace's technique for evaluating posterior probabilities. On the applied side, games of chance were still in evidence, but they were dominated by problems of data analysis and Bayesian methods for combining probabilities of judgments, which replaced the earlier non-Bayesian methods of Hooper and Bernoulli." (Grattan-Guinness: *History and Philosophy of the Mathematical Sciences*, p.1301). "It was the first full–scale study completely devoted to a new specialty, … [and came] to have the same sort of relation to the later development of probability that, for example, Newton's *Principia Mathematica* had to the later science of mechanics." (DSB).

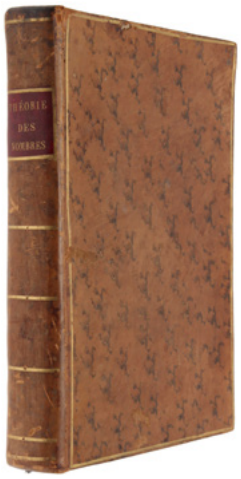


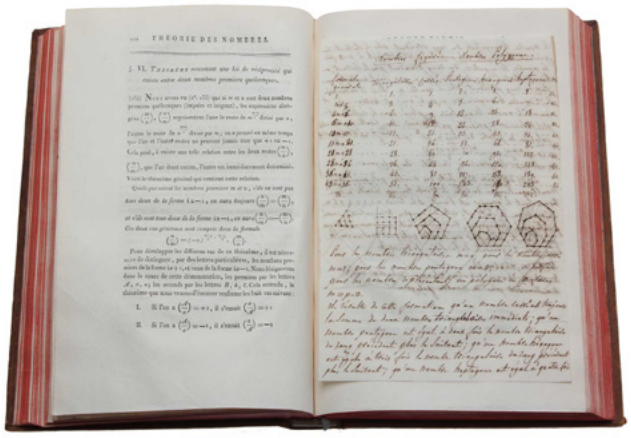
❧Evans 12; *Landmark Writings in Western Mathematics* 24.

The most important book on number theory (before Gauss)

39. LEGENDRE, Adrien Marie. *Essai sur la théorie des nombres.* Paris: Duprat, 1797-1798.

$4,000





A fine copy of the first book entirely dedicated to number theory. The work contains Legendre's discovery of the law of quadratic reciprocity, which Gauss referred to as the 'golden theorem' and for which he published six proofs, the first in his *Disquisitiones arithmeticae* (1801). "The theory of numbers in the eighteenth century remained a series of disconnected results. The most important works in the subject were Euler's *Anleitung zur Algebra* (1770) and Legendre's *Essai sur la théorie des nombres* (1798)." (Kline). "Legendre was one of the most prominent mathematicians of Europe in the 19th Century… His texts were very influential. In 1798 he published his *Theory of Numbers*, the first book devoted exclusively to number theory. It underwent several editions, but was soon to be superseded by Gauss' *Disquisitiones arithmeticae*." (Kleiner).

❧Norman 1325; Parkinson *Breakthroughs* 231.

Established obstetrics as a science

40. MAURICEAU, François. *Des maladies des femmes grosses et accouchées. Avec la bonne et veritable méthode de les bien aider en leurs accouchemens naturels, & les moyens de remedier à tous ceux qui sont contre-nature, & aux indspositions des enfans nouveau-nés.* Paris: Chez Jean Henault, Jean d'Houry, Robert de Ninville, Jean Baptiste Coignard, 1668.

$9,000

First edition, the copy of Maurice Villaret, of the book which "established obstetrics as a science" (G&M). This was the outstanding textbook of the time, the first important textbook of obstetrics for nearly sixty years (since that of Jacques Guillemeau in 1609), and the first important obstetrical text to be published in five vernacular languages as well as Latin. "Perhaps the first obstetric text in the modern sense, Mauriceau's Maladies des femmes grosses et accouchees established obstetrics as a science and as a separate medical specialty. Through its various translations, it exercised a dominant influence on seventeenth-century obstetrical practice" (Grolier/Medicine).

❧Grolier, *One Hundred Books Famous in Medicine* 33; Lilly, *Notable Medical Books* 85; Norman 1461; Garrison-Morton 6147.

First illustrated Spanish Anatomy

41. MONTAÑA DE MONSERATTE, Bernadino. *Libro de la anathomia del ho[m]bre.* Valladolid: Sebastian Martinez, 1551.

$81,750

First edition, and a very fine copy, of the first separate, and first illustrated, anatomical work in the vernacular printed in Spain. "While Valverde di Hamusco's *Historia de la composicion del cuerpo humano* (1556) is often credited with introducing into Spain the Vesalian anatomical iconography coupled with a vernacular text, this honor actually belongs to Montaña de Monserrate's *Anathomia*… [It] represents the first separate anatomical work in the vernacular printed in Spain, as Lobera de Avila's unillustrated *Libro de Anatomia* was only a section of the more general *Remedio de cuerpos humanos* (1542?). Montaña's text, like that of another Vesalian propagandist, Thomas Geminus, was largely derived from the popular Anatomy of the medieval surgeon Henri de Mondeville, and was thus more likely than that of Valverde to have been immediately accessible to Spain's barber-surgeons" (Norman).

❧Norman 739. Garrison-Morton 801.

PMM 206 - Large paper copy in red morroco

42. MORGAGNI, Giovanni Battista. *De Sedibus, et Causis Morborum per anatomen Indagatis libri quinque. Dissectiones, et Animadversiones, nunc primum editas, complectuntur propemodum innumeras, medicis, chirurgis, anatomicis profuturas.* Venice: Remondini, 1761.

$32,000

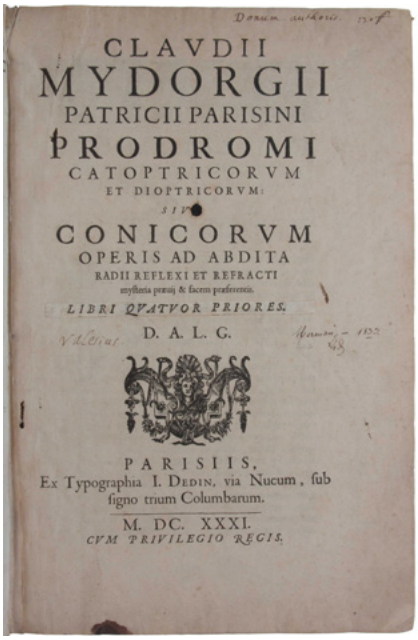
First edition, first issue. A magnificent large paper copy, bound in contemporary red morocco, of "one of the most important [works] in the history of medicine." "After Antonio Benivieni [1443-1502], Giovanni Battista Morgagni is considered the founder of pathological anatomy. His 'De sedibus' [the offered work], regarded as one of the most important books in the history of medicine, established a new era in medical research" (Norman). "Morgagni's contribution to the understanding of disease may well rank with the contributions of Vesalius in anatomy and Harvey in physiology." (*Heirs of Hippocrates*). "On the basis of direct examination and records of some 700 post mortem dissections, he advanced the procedure of basing diagnosis, prognosis and treatment on a detailed and comprehensive knowledge of the anatomical conditions of common diseases. In the above volumes, some of the cases are given with a precision and details hardly surpassed in medical history. His proposal was a shift of emphasis from the traditional 'nature' of a disease to its anatomical 'seat'. It combined the approach of anatomist and pathologist, making their special knowledge available to the diagnostician" (Dibner).

❧PMM 206; Evans, *First Editions of Epochal Achievements in the History of Science* 98; Dibner, *Heralds of Science* 125; Grolier, *One Hundred Books Famous in Medicine* 46; Lilly, *Notable Medical Books* 125.

Author's presentation copy

43. MYDORGE, Claude. *Prodromi catoptricorum et dioptricorum, sive conicorum operis ad abdita radii reflexi et refracti mysteria praevii & facem praeferentis. Libri quatuor priores [Liber primus et secundus]. D. A. L. G.* Paris: Jean Dedin, 1631-39.

$14,200


CLAVDII
MYDORGII
PATRICII PARISINI
PRODROMI
CATOPTRICORVM
ET DIOPTRICORVM:
SIVE
CONICORVM
OPERIS AD ABDITA
RADII REFLEXI ET REFRACTI
mysteria praevij & facem praeferentis.
LIBRI QVATVOR PRIORES.
D. A. L. G.
PARISIIS,
Ex Typographia I. Dedin, via Nucum, sub
signo trium Columbarum.
M. DC. XXXI.
CVM PRIVILEGIO REGIS.

Extremely rare first edition, author's presentation copy, of all four books of this important work on conic sections, intended to provide the geometrical basis for the study of optics. "Mydorge's work on conic sections contains hundreds of problems published for the first time, as well as a multitude of ingenious and original methods that later geometers frequently used, usually without citing their source" (DSB). Books I and II (pp. 1-134) were first published separately in 1631; a second edition appeared in 1639 with two additional books. The present copy has the first edition of the first two books, with the 1631 title page, bound up with the last two books from the second edition. A printed paper slip *Libri quatuor priores* has been pasted over *Liber primus et secundus* on the title to accommodate the added books, and a large section of text has also been pasted over the original on page 67 corresponding to changes in book I made between the 1631 and 1639 editions. The 1631 edition is very much rarer than the 1639: OCLC lists only five copies of the former – Danish Royal Library (but this copy is actually of the 1641 edition), Columbia, NYPL, Zürich, BNF – but 24 of the latter. It is likely that the 1631 edition was printed in very small numbers and was mostly, if not entirely, intended for presentation: the copies at Columbia, Zürich and BNF all have authorial corrections. The only other copy of the 1631 edition to have appeared at auction was Michel Chasles' copy, last sold in 1972.

Autograph notebook by the founder of modern medicine

44. PASTEUR, Louis. Autograph manuscript lecture notes by Pasteur entitled *École normale 1844-1845. Notes du Cours de Géologie. Prof. M. Delafosse. 1er Cahier*. Paris: 1845. Twenty leaves, including 14 autograph diagrams.

$24,000

Fascinating, extensive, autograph manuscript by Pasteur as a 22- or 23-year old student at the École Normale. Scientific manuscripts from this early period of Pasteur's career are very rare on the market. These notes prefigure Pasteur's later working methods, notably his systematic and exhaustive methods of analysis – he makes numerous critical references to all the important French geologists, including the lecturer Gabriel Delafosse himself. Even more significantly, they also prefigure some of his later research interests – it was probably Delafosse (1796-1878), who, as Pasteur mentions in the manuscript, also taught mineralogy, who awakened Pasteur's interest in crystallography. Delafosse was the first to propose that the crystal structure of minerals was due to the symmetrical arrangement of its molecules in space, and it was with Delafosse and two of his colleagues at the École Normale that, in late 1847, Pasteur carried out his first series of investigations on dimorphism (Debré, *Louis Pasteur*, p. 41).

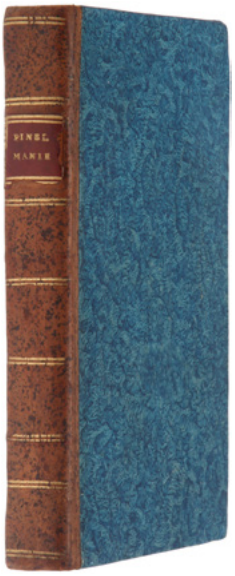
❧ Offered together with a full transcription and English translation.

Textual foundation of psychiatry

45. PINEL, Phlippe. *Traité médico-philosophique sur l'aliénation mentale mentale, ou la manie.* Paris: Chez Richard, Caille et Ravier, An IX [1800-01].

$4,300

First edition, a fine copy, of "one of the foremost medical classics, giving as it did a great impetus to humanitarian treatment of the insane" (Garrison). Philippe Pinel's *Traité médico-philosophique sur l'aliénation mentale mentale, ou la manie*, which presented the textual foundation of psychiatry, stands as the first great publication of the nineteenth century in clinical medicine, and at the same time as one of the paradigmatic expressions of the medical and scientific revolution that was taking place in the late eighteenth and early nineteenth centuries. "In his *Traité*, Pinel departed from past interpretations of mental illness, which placed it within a supernatural or spiritual, rather than a somatic, realm, and accepted the mentally ill as legitimate patients in the domain of medicine. According to Pinel, the manifestations of insanity, including disturbed reason, inappropriate thought, bizarre behavior, and exaggerated passions, represented phenomena of natural history and its pathology that could be studied like those of any other medical or surgical condition" (Grolier/Medicine).

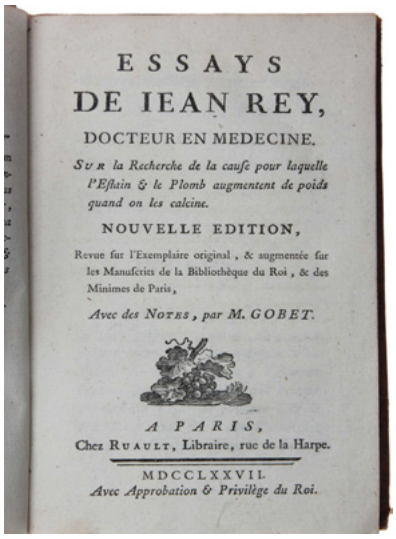


❧Grolier/Medicine 54; Lilly, *Notable Medical Books* 155; Norman 1701; *Heirs of Hippocrates* 1070; Garrison-Morton 4922.

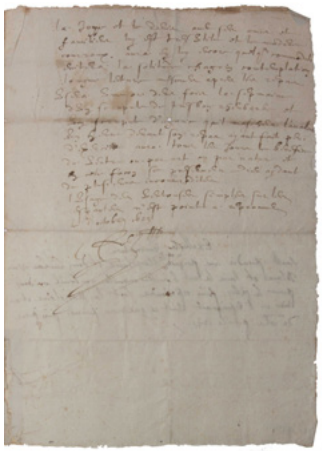
Anticipated Lavoisier - one of the rarest autographs in the history of science

46. REY, Jean. *Autograph document signed, in Latin and French, 1 October 1623. 2½ pages. Offered here with the first obtainable edition of Rey's only published work.*

$20,450


ESSAYS
DE IEAN REY,
DOCTEUR EN MEDECINE.
Sur la Recherche de la cauſe pour laquelle l'Eſtain & le Plomb augmentent de poids quand on les calcine.
NOUVELLE EDITION,
Revue ſur l'Exemplaire original, & augmentée ſur les Manuſcrits de la Bibliothèque du Roi, & des Minimes de Paris,
Avec des Notes, par M. GOBET.
A PARIS,
Chez RUAULT, Libraire, rue de la Harpe.
MDCCLXXVII.
Avec Approbation & Privilège du Roi.

One of the rarest autographs in the history of science. 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 a few 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, p. xl) that he at first believed Rey's work to be a forgery; he later spoke of the work with admiration. In 1777 a second edition of Rey's *Essays*, edited by Nicolas Gobet, was published in Paris [i.e., the edition being offered together with the autograph document]; this edition - the earliest obtainable has also become rare (see Duveen). Of this edition Neville writes: "A milestone work in the history of chemistry, describing for the first time that metals gain in weight on calcination (by combining with the then-unknown oxygen of the air)."



Pioneering work on neurophysiology – extremely rare

47. ROLANDO, Luigi. *Saggio sopra la vera struttura del cervello dell' uomo e degl' animali e sopra le funzioni del sistema nervosa.* Sassari: Nella Stamperìa da S.S.R.M. Privilegiata, 1809.

$39,750

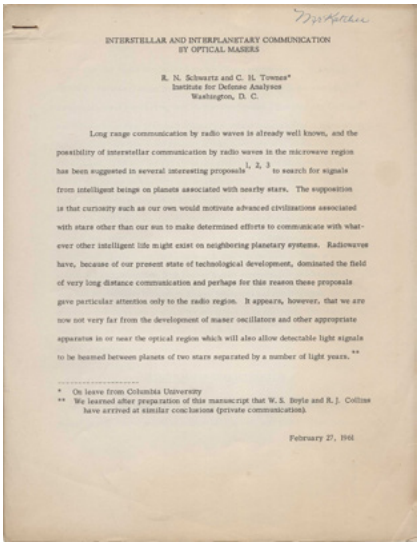
First edition, extremely rare, of this pioneering work on neurophysiology, anticipating many of the discoveries made by Flourens fifteen years later. OCLC locates four copies in America. "Rolando was the first to demonstrate that the cerebellum was not the 'seat of life.' In his publication of 1809 he maintained that the cerebellum was responsible for movements … Rolando was a brilliant and diligent observer. He was the first to describe the *substantia gelatinosa* (which today bears his name) in the posterior horn. And his experiments in decerebrated animals convinced him that the hemispheres are responsible for higher functions such as the will and judgement … Finally, Rolando was the first to detect consistency in the arrangement of the cortical gyri. Even up to the 1860s these seemed to many a mere chaos. To Rolando these convolutions could be "reduced to regular and specific shapes and positions." He found the central gyri to be constant features and described the *fissure centralis*, a structure that has become firmly linked with Rolando's name up to the present day" (Sammet, p. 405)."[Rolando's] findings, and his theory that the cerebellum functioned as a whole, were described in a book that he engraved, printed and bound himself in 1809. His *Saggio*, however, had a very limited printing and was not widely disseminated. The limited availability of Rolando's findings proved to be significant because his experiments remained largely unknown to the wider scientific community for a number of years" (Finger, *Origins of Neuroscience*, p. 212).

❧Garrison-Morton 1388.

SETI - the search for extraterrestrial intelligence

48. SCHWARTZ, Robert N. & TOWNES, Charles H. *Interstellar and Interplanetary Communication by Optical Masers.* 1961.

$2,750



INTERSTELLAR AND INTERPLANETARY COMMUNICATION
BY OPTICAL MASERS

R. N. Schwartz and C. H. Townes*
Institute for Defense Analyses
Washington, D. C.

Long range communication by radio waves is already well known, and the possibility of interstellar communication by radio waves in the microwave region has been suggested in several interesting proposals.[1, 2, 3] to search for signals from intelligent beings on planets associated with nearby stars. The supposition is that curiosity such as our own would motivate advanced civilizations associated with stars other than our sun to make determined efforts to communicate with whatever other intelligent life might exist on neighboring planetary systems. Radiowaves have, because of our present state of technological development, dominated the field of very long distance communication and perhaps for this reason these proposals gave particular attention only to the radio region. It appears, however, that we are now not very far from the development of maser oscillators and other appropriate apparatus in or near the optical region which will also allow detectable light signals to be beamed between planets of two stars separated by a number of light years.**

* On leave from Columbia University
** We learned after preparation of this manuscript that W. S. Boyle and R. J. Collins have arrived at similar conclusions (private communication).

February 27, 1961

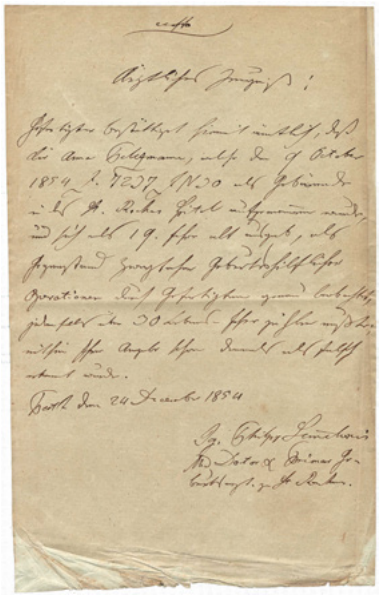
Very rare pre-publication draft of "the classic paper published in *Nature* that started it all" (coseti.org). The present copy is an offset, stapled affair sent to the editor of *Physics Today*; it has the annotation 'Mr. Katcher' in a secretarial hand at top, that being David Katcher, the founding editor-in-chief. This is a pre-printed version, and is dated more than a month before the article's publication, and is dated February 27, 1961. "While most SETI [search for extraterrestrial intelligence] sky searches have studied the radio spectrum, some SETI researchers have considered the possibility that alien civilizations might be using powerful lasers for interstellar communications at optical wavelengths. The idea was first suggested by R. N. Schwartz and Charles Hard Townes, one of the inventors of the laser, in a 1961 paper published in the journal *Nature* titled 'Interstellar and Interplanetary Communication by Optical Masers'." (Wikipedia).

Charles Hard Townes (July 28, 1915 – January 27, 2015) was an American Nobel Prize-winning physicist and educator. Townes was known for his work on the theory and application of the maser, on which he got the fundamental patent, and other work in quantum electronics connected with both maser and laser devices. He shared the Nobel Prize in Physics in 1964 with Nikolay Basov and Alexander Prokhorov "for fundamental work in the field of quantum electronics, which has led to the construction of oscillators and amplifiers based on the maser-laser principle".

One of a handful of autograph manuscripts

49. SEMMELWEIS, Ignaz Philipp. *Extremely rare autograph document in Semmelweis' hand, from his time at the St. Rochus Hospital in Pest were he eliminated childbed fever, medical testimony regarding a female patient, signed and dated 24. December 1854.*

$43,150



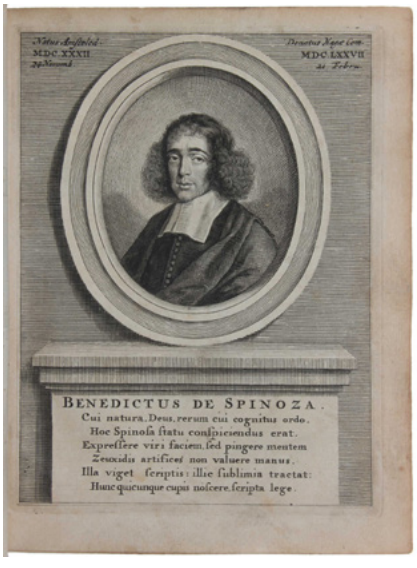
Extraordinarily rare autograph manuscript. Despite the wide interest there has been for more than a century in Semmelweis' work and personality, there are still today extremely few examples of autograph material by him. In their 1968 article on Semmelweis manuscripts, Antall, Harko, and Vida note: "He left only few manuscripts; the first drafts of his published works are irretrievably lost. In 1940 György Korbuly summarized the number of the discovered Semmelweis manuscripts and he stated in his article: 'if we inquire, how many manuscripts of Semmelweis we know today, the reply is expressively depressing. We know today only 5 original letters of him'". (*Semmelweis Ignac összegyütött keziratai*, Budapest 1968). The authors continue to mention that since 1940 some new Semmelweis manuscripts had come to light in London and Budapest, but that still in 1966 when Ákos Palla described a newly discovered document he estimated a total number of documents known worldwide to be 20-30. We cannot locate any other autograph material in the auction records. This large and impressive document (380 x 240 mm) is a medical testimony written by Semmelweis when he was primary obstetrician at the St. Rochus Hospital in Pest. The patient, Anna Petermann, claimed when she was hospitalized for birth on 9 October 1854, that she was 19 years of age. Due to two obstetric surgeries, however, Semmelwies realized that the patient must be at least thirty. The document is signed with a large and bold signature by Semmelweis "Ig. Philipp Semmelweis, Med Doctor & Primar-Geburtsarzt zu St. Rochus" and dated "Pest den 24 December 1854".

With the extremely rare portrait

50. [SPINOZA, Benedictus de]. B. d. S. *Opera Posthuma. Quorum series post Praefationem exhibetur.* [Amsterdam: Jan Riewertz, 1677.

$73,750

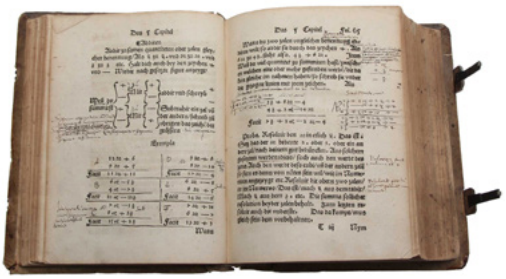
First edition, **complete with the portrait of Spinoza**, of Spinoza's *Opera Posthuma*, which "have served, then and since, with the *Tractatus Theologico-Politicus*, to immortalize his name" (*PMM*). The first work in the volume is the first printing of "Spinoza's one indisputable masterpiece, the *Ethics*" (Bennett, *A Study of Spinoza's Ethics*, p. 7). Although ordinary copies of this work are quite common on the market, copies with the portrait are exceptionally rare: the portrait "is found in only a very small number of copies" (Wolf). We can locate only one such copy at auction, the Helmut N. Friedlaender copy (Christie's, New York, 23 April 2001, Lot 181, $64,625). The 'Opera portrait,' as it is generally known, is considered by most Spinoza specialists to be the most secure expression of Spinoza's appearance we have. It is very rare, partly because the portrait was executed by the technique of etching, and consequently could be printed in only a limited number of copies, but principally because the *Opera Posthuma*, and its Dutch translation *Nagelate Schriften*, were prohibited almost immediately after their publication by the Court of Holland and the States of Holland - anyone who sold or owned a copy could be severely punished. By including the portrait (on which the name of the author is mentioned) in the anonymously published book, the possession of it became even more dangerous. For this reason the portrait is seldom found in the existing copies of Spinoza's magnum opus. The library of the Society Het Spinozahuis at Rijnsburg, which possesses three copies of the *Opera Posthuma* and two copies of the *Nagelate Schriften*, has no copy of either with the portrait. ❧Norman 1988 (lacking the portrait); *PMM* 153n.



With numerous contemporary annotations

51. STIFEL, Michael. *Die Coss Christoffs Rodolff; mit schönen Exempeln der Coss durch Michael Stifel gebessert und sehr gemehrt.* Königsberg: Alexandrum Behm von Lutomysl, 1553.

$25,500



A magnificent copy, in contemporary blind stamped pigskin and heavily annotated, of the first edition of Stifel's *Coss*. "This work did for Germany what Cardan's and Tartaglia's did for Italy" (Smith). This is the first edition by Stifel of Rudolff's *Behend vnnd Hubsch Rechnung durch die kunstreichen regeln Algebre so gemeincklich die Coss genennt warden* (Strasbourg, 1525), the first German book on algebra, usually referred to simply as the *Coss*. Rudolff's book having become unavailable, Stifel took on the task of producing a new version, not only reproducing Rudolff's text in its entirety, but adding commentary and additions of his own, which more than doubled the length of the book (Rudolff's 208 pages grew to 494 in Stifel's edition). Stifel's work served for at least the next 150 years as the principal text from which many mathematicians learned their algebra, including Frans van Schooten (1615-1660) (*DSB*) and, as late as the eighteenth century, Leonhard Euler (1707-1783); in fact, it formed the basis of Euler's own algebra textbook, *Vollständige anleitung zur Algebra* (1770). "[Stifel] was, in fact, the greatest German algebraist of the sixteenth century" (DSB).

❧Smith, Rara Arithmetica, pp. 258-260; Honeyman 2916.

Most influential Renaissance work on astrolabes

52. STOEFFLER, Johannes. *Elucidatio fabricae usuque astrolabii.* Oppenheim: Jakob Köbel, 1513 [colophon: 1512].

$22,700

First edition, an exceptionally fine copy, complete with all the extensions and moveable parts, of the most influential Renaissance work on astrolabes, and also the first German work on astrolabes. "Johann Stoeffler was a leading authority on the methods of defining latitude and longitude in vogue in the beginning of the new era; cf. his *Elucidatio fabricae ususque astrolabii*, Oppenheim, 1513 (colophon 1512)" (Winsor, *Narrative and Critical History of America*, Vol. II, p. 99). "Stoeffler recognized that, in mapping, computation of the distance between two places whose latitude and longitude were known failed to take into account the convergence of the meridians" (Stillwell). The astrolabe was an inclinometer, a device invented in c. 150 BC by the Ancient Greeks. It had a variety of uses such as locating and predicting the positions of the sun, moon, planets, and stars, determining local time given local latitude and vice-versa, and in surveying and triangulation. Used in Europe from the Middle Ages onwards, Stoeffler's work was a comprehensive manual of the instrument. The first part concerns the construction of the astrolabe. The full-page woodcut illustrations are extended by paper strips to almost double the page size and clearly show the various stages in the construction process. The second part explains the use of the astrolabe with equally remarkable woodcut illustrations. Stoeffler ends his work with a discussion of perspective and measurement.

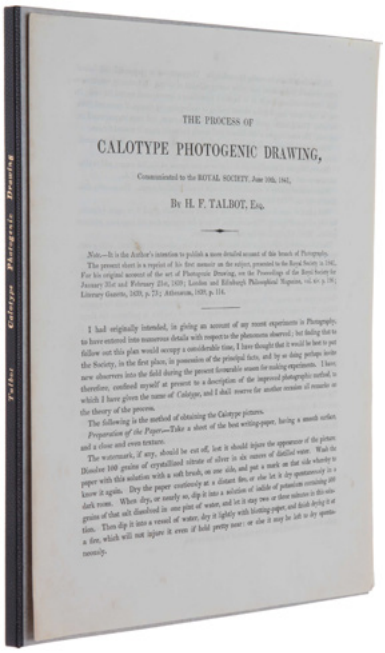
❧Houzeau & Lancaster 3256; Wellcome 6099; Zinner 991.

First announcement of the Calotype process

53. TALBOT, William Henry Fox. *The Process of Calotype Photogenic Drawing, Communicated to the Royal Society, June 10th, 1841.* London: J.L. Cox & Sons, 1841.

$17,000

Extremely rare privately printed memoir in which the author first announced his invention of the Calotype (or Talbotype) process - the precursor to most photographic processes of the 19th and 20th centuries. We can find just two copies of this paper having been auctioned in the past fifty years (both in the André Jammes Collection, Sotheby's 2002)



THE PROCESS OF

CALOTYPE PHOTOGENIC DRAWING,

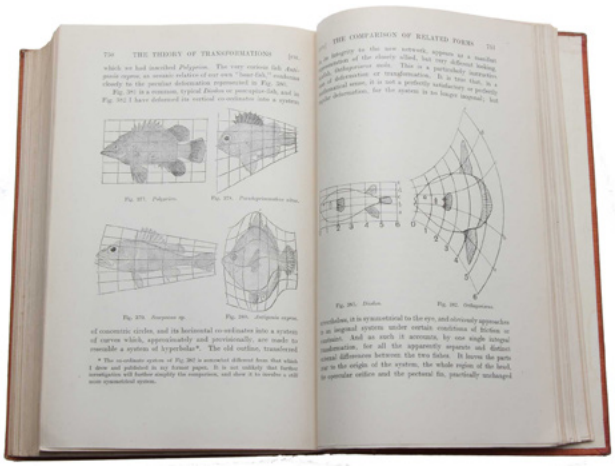
By H. F. TALBOT, Esq.

"Nicephore Niépce produced the first photo-engraving in 1822, using bitumen of Judea on glass, and the first photographic image from nature in 1826 or 1827, on a pewter plate, but was reluctant to divulge the secret of his process and never published it. During the same period Louis Daguerre experimented with fixing images, first on paper and then on metal plates, joining forces with Niépce in 1829, and producing the first successful daguerrotype in 1837. Meanwhile, across the Channel, the mathematician and chemist William Henry Fox Talbot had been inspired by unsuccessful attempts to sketch landscapes using the camera obscura to seek a method of imprinting natural images on chemically sensitized paper. After several unsatisfactory experiments using paper coated with successive coats of silver nitrate and sodium chloride, fixed with a strong solution of salt water, and set within a camera obscura, Talbot finally succeeded, in 1835, in obtaining a few tiny negatives, having resolved the problem of underexposure by outfitting several very small cameras with fixed-focus microscope lenses of short focal length. One of these 1-inch square negatives, showing the window of the library of his home at Lacock Abbey, survives at the Science Museum in London.

The mathematics of biological form

54. THOMPSON, Sir D'Arcy Wentworth. *On Growth and Form.* Cambridge: University Press, 1917.

$1,350



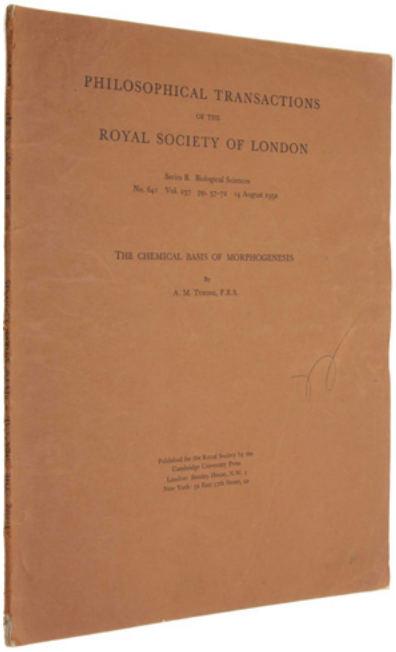
Rare first edition of D'Arcy Thompson's masterpiece which has been described as "the finest work of literature in all the annals of science that have been recorded in the English tongue" (Peter Medawar). The book pioneered the scientific explanation of morphogenesis, the process by which patterns are formed in plants and animals. The central theme of *On Growth and Form* is that biologists of its author's day overemphasized evolution as the fundamental determinant of the form and structure of living organisms, and underemphasized the roles of physical laws and mechanics. He advocated structuralism as an alternative to survival of the fittest in governing the form of species. On the concept of allometry, the study of the relationship of body size and shape, Thompson wrote: "An organism is so complex a thing, and growth so complex a phenomenon, that for growth to be so uniform and constant in all the parts as to keep the whole shape unchanged would indeed be an unlikely and an unusual circumstance. Rates vary, proportions change, and the whole configuration alters accordingly." Thompson pointed out - in example after example - correlations between biological forms and mechanical phenomena. He showed the similarity in the forms of jellyfish and the forms of drops of liquid falling into viscous fluid, and between the internal supporting structures in the hollow bones of birds and well-known engineering truss designs. His observations of phyllotaxis (numerical relationships between spiral structures in plants) and the Fibonacci sequence has become a textbook staple. Perhaps the most famous part of the work is chapter XVII, The Comparison of Related Forms, where Thompson explored the degree to which differences in the forms of related animals could be described by means of relatively simple mathematical transformations.

His last major work

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

$34,000

First edition, very rare 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..."



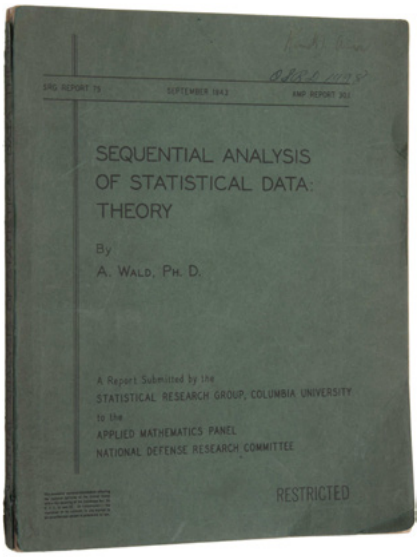
❧Philip K. Maini, in *Alan Turing: his work and impact*, p. 684

A milestone in modern statistics

56. WALD, Abraham. & H.A. Freeman. *Sequential Analysis of Statistical Data: Theory.* Washington: National Defense Research Committee, 1943-1944.

$10,800

Extremely rare first printing, the copy of Nobel laureate Kenneth Arrow, of the classified report in which Wald's ground-breaking work on sequential tests of statistical hypotheses was first announced. Before Wald, the traditional style of statistical decision was to posit a hypothesis, make a predetermined number of measurements, then make a decision whether to accept or reject the hypothesis. Wald realized that this procedure is quite wasteful, and that many measurements could be saved if given the option to decide at every step whether to continue or stop the measurement process. "According to Wald, the resulting 'sequential probability ratio test' frequently results in a savings of about 50 percent in the number of observations over the most efficient test procedure based on a fixed number of observations" (Gass, *An Annotated Timeline of Operations Research*, p. 65). In these papers Wald, known now as 'the father of sequential analysis and decision theory,' first presents the theoretical foundations of the theory of sequential analysis. The ideas he put forth revolutionized the art of statistical testing and were later developed in the hands of computer scientists into a field known as on-line algorithms (Blom, *Problems and Snapshots*, p. 203).



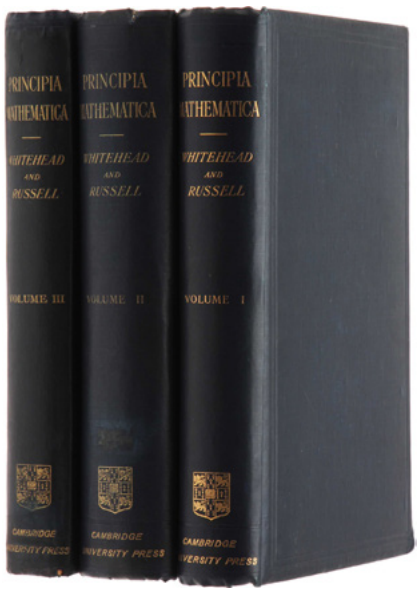
❧Kotz & Johnson, *Breakthroughs in Statistics*, pp. 229-298..

One of the greatest rarities of modern mathematics

57. WHITEHEAD, Alfred North & RUSSELL, Bertrand. *Principia mathematica.* Cambridge: at the University Press, 1910-12-13.

$136,000

First edition of all three volumes of this monumental work. Complete sets of the first edition, which, like ours, are not ex-library, are very rare on the market – only two such copies have sold at auction in the past 25 years. Probably named after Isaac Newton's great work, *Principia Mathematica* was Whitehead and Russell's detailed account of their 'logicist' thesis that mathematics could be derived solely from logical concepts and by logical methods…[It] has had an influence, direct and indirect, of near Newtonian proportions upon the spheres of its chief influence: mathematical logic, set theory, the foundations of mathematics, linguistic analysis and analytical philosophy" (Grattan-Guinness, p. 89). "Whether they know it or not, all modern logicians are the heirs of Whitehead and Russell" (Palgrave, p. 20). "After the failure of Frege's *Grundgesetze*, due to Russell's paradox, it was the *Principia Mathematica* of Whitehead and Russell which first successfully developed mathematics within a logical framework" (ibid., p. 21). The first volume of *Principia Mathematica* was published in December 1910 in an edition of 750 copies, priced 25 shillings; volumes II and III had a print run of only 500 copies, and were priced at 30 shillings and 21 shillings, respectively. A fourth volume, dealing with applications to geometry, was written by Whitehead alone, but was not published.



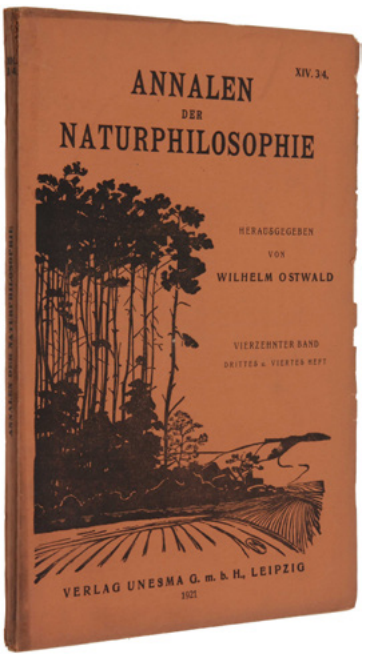
❧*Landmark Writings in Western Mathematics* 16; *The Collection of the Garden Ltd.* 219; Norman 1868.

'An important event in the philosophical world' (Russell)

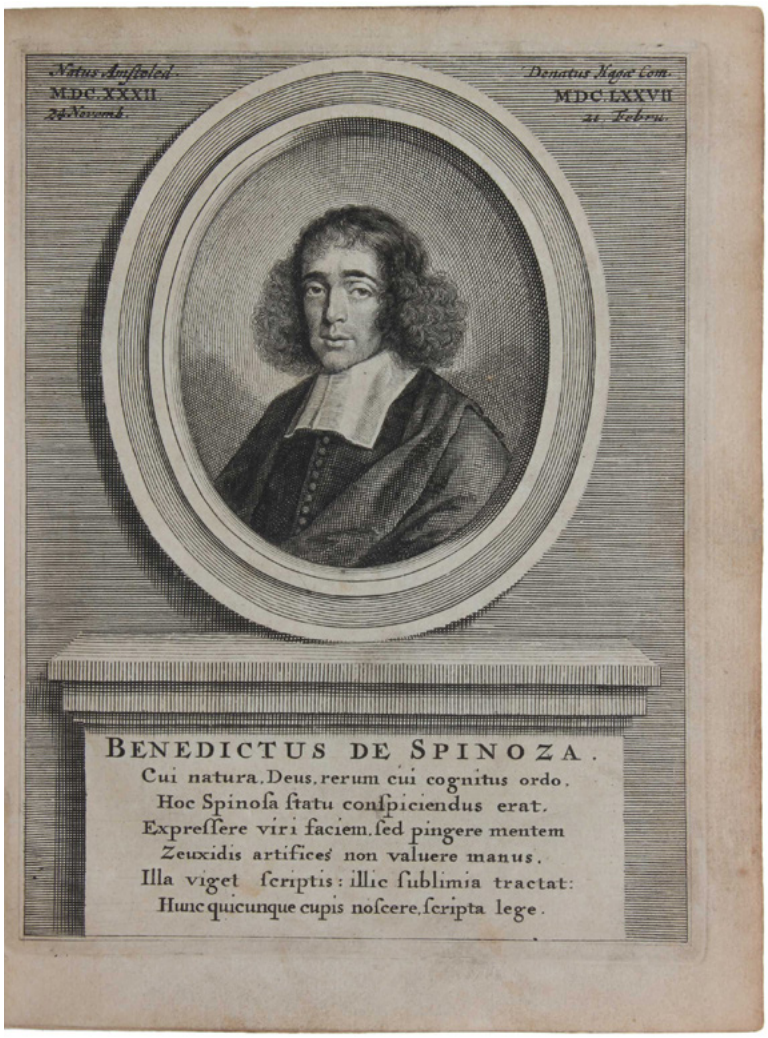
58. WITTGENSTEIN, Ludwig. *Logisch-philosophische abhandlung.* Leipzig: Verlag Unesma, 1921.

$86,250

Exceedingly rare first edition, and a remarkably fine copy, of the book later published as the *Tractatus Logico-Philosophicus* (1922) – arguably the most important philosophical work of the twentieth century, and the only book by Wittgenstein published in his lifetime. "The *Tractatus* is a comprehensive work of extreme originality" (*Encyclopedia of Philosophy*, Vol. 8, p. 329). Only two copies have appeared at auction since 1975.



Following engineering studies at Linz, Berlin and Manchester, "Wittgenstein's interest began to shift to pure mathematics and then to the philosophical foundations of mathematics. He chanced upon Bertrand Russell's *Principles of Mathematics* and was greatly excited by it. He decided to give up engineering and to study with Russell at Cambridge. At the beginning of 1912 he was admitted to Trinity College, where he remained for the three terms of 1912 and the first two terms of 1913. Under Russell's supervision he applied himself intensively to logical studies and made astonishing progress. Soon he was engaged in the research that culminated in the logical ideas of the Tractatus (ibid., p. 327). Bertrand Russell described Wittgenstein as "the most perfect example I have ever known of genius as traditionally conceived: Passionate, profound, intense, and dominating" (McGuiness, *Wittgenstein: A Life*, p. 118). Very rare in such fine and unretored condition.



"Spinoza's one indisputable masterpiece, the Ethics"
- Exceptionally rare copy with the Opera portrait -

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