

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



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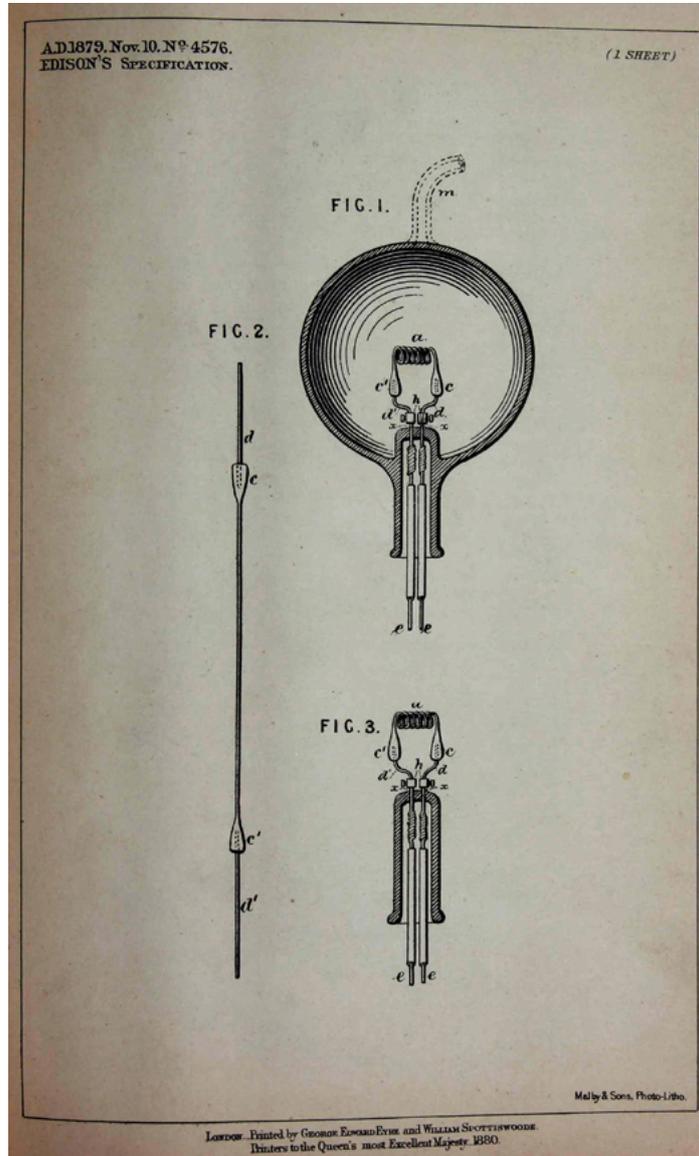
### **Booth 319**

Boston International Antiquarian Book Fair  
14-16 November 2014

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



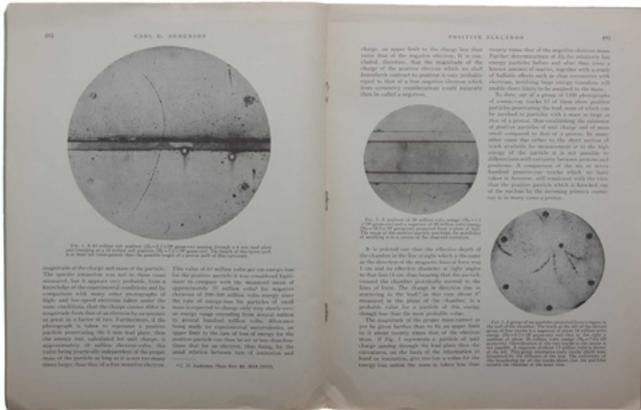
*“I use a block of glass onto which are sealed two platinum wires. These wires serve to convey the current to the electric lamp within a bulb, which is blown over the lamp and united to the glass block ... The burner consists of a filament or thread of carbon, preferably coiled, with the ends secured to the platinum wires”*

*- Thomas Edison*

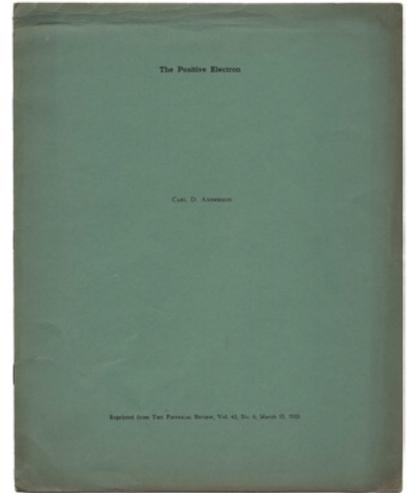
## *The discovery of anti-matter*

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.

**\$11,850**



The 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 subse-



quent 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.

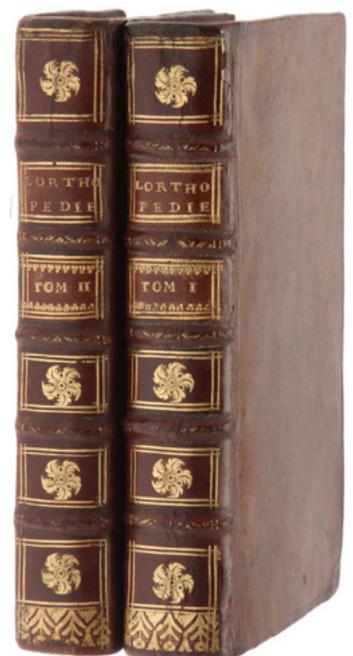
## *The first book on orthopedics*

2. **ANDRY, Nicolas.** *L'orthopédie ou l'art de prevenir et de corriger dans les enfans, les difformités du corps.* Paris: Chez la veuve Alix; Lambert & Durand, 1741.

**\$16,000**



Rare first edition, and a very fine copy, of the "first book on orthopedics" (Garrison- Morton). A work "of supreme importance" (Bick). "Nicholas Andry coined the word 'orthopaedics' in French as *orthopédie*, derived from the Greek words *orthos* ('correct', 'straight') and *paidion* ('child'), when he published *Orthopédie* (translated as *Orthopaedia: or the Art of Correcting and Preventing Deformities in Children*) in 1741. Though as the name implies it was initially developed with attention to children, the correction of spinal and bony deformities in all stages of life eventually became the cornerstone of orthopedic practice." (Wikipedia). Andry's "book was the first monograph on the subject, and the emblematic engraving it contains of a tree with a crooked trunk tied to a straight post has been adopted as a symbol of orthopedics" (Grolier/Medicine).

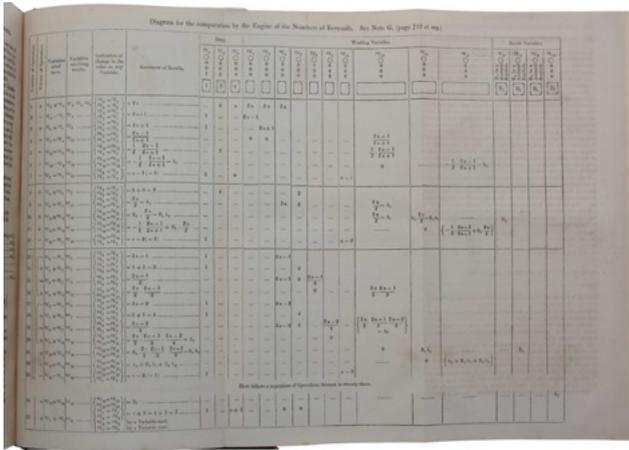


☛Grolier/Medicine 42; Lilly, *Notable Medical Books* 113; Norman 55; *Heirs of Hippocrates* 697; Garrison-Morton 4301.

## Ada Lovelace on Babbage's analytical engine

**3. BABBAGE, Charles. & LOVELACE, Ada.** *Sketch of the Analytical Engine invented by Charles Babbage [by L.F. Menabrea, translated, and appended with additional notes, by Augusta Ada, Countess of Lovelace]*. London: Richard & John Taylor, 1843.

**\$35,000**



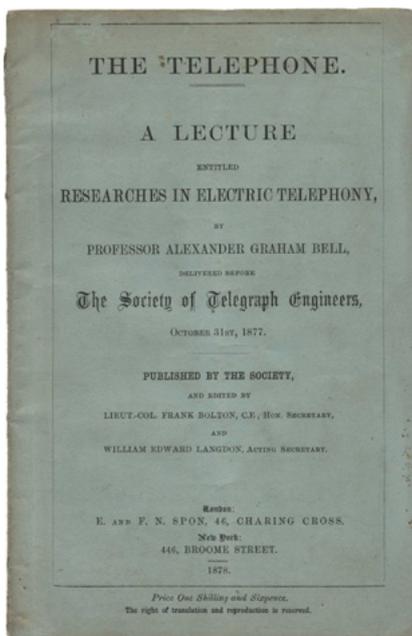
First edition of “the most important paper in the history of digital computing before modern times” (Allan George Bromley). In 1840 Babbage delivered a lecture in Turin on his Analytical Engine. The young Italian mathematician Luigi Federico Menabrea published an account of Babbage’s lecture in French in 1842 (Bibliothèque universelle de Genève). “After the appearance of Menabrea’s paper, the daughter of Lord Byron, Augusta Ada King, Countess of Lovelace, became interested in preparing an English translation. At Babbage’s suggestion, Lady Lovelace added seven explanatory notes to her translation, which run three times the length of the original. Because Babbage never published a detailed description of the Analytical Engine, Ada’s translation of Menabrea’s paper, with

its lengthy explanatory notes, represents the most complete contemporary account in English of the intended design and operation of the first programmable digital computer.’ (Bromley 1982, xv).

## Bell's telephone comes to England

**4. BELL, Alexander Graham.** *The Telephone. A Lecture entitled Researches in Electric Telephony... delivered before The Society of Telegraph Engineers, October 31st, 1877*. London: E. and F.N. Spon, 1878.

**\$5,600**



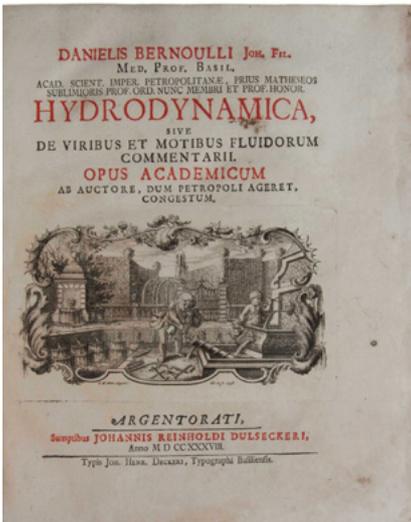
Very rare first edition of the most detailed early account of Bell’s invention of the telephone, and the first to be published in Bell’s native country. COPAC lists the copy at the University of Glasgow only. The early history of the telephone, which developed out of the electric telegraph, is complex and still a matter of dispute. The German engineer Philip Reis was the first to build a telephone but Bell was the first to make one that could reproduce intelligible speech at the receiving end. Bell’s US patent for the telephone was granted on 7 March 1876, and three days later he transmitted the first sentence “Mr. Watson, come here! I want to see you!” using a liquid transmitter and an electromagnetic receiver. This design was soon replaced by one using permanent magnets, iron diaphragms, and a call bell, for which Bell received a second patent on 30 January 1877. The telephone became commercially viable only in 1878, when the invention of the microphone by David Edward Hughes made telephony feasible for general communication. In August 1877 Bell left Boston for an extended trip to England to secure English capital for his new invention. On the evening of 31 October 1877, Bell was invited to address the Society of Telegraph Engineers (later to be re-named the Institution of Electrical Engineers) at the Institute of Civil Engineers in Westminster. The honor thrilled him to such a degree that he stayed up late that night

to tell his parents about it – by letter of course. He wrote: “The hall was crammed and numbers were turned away. I am told that all the principal scientific men of London were present”

## His most famous work

5. **BERNOULLI, Daniel.** *Hydrodynamica, sive De Viribus et Motibus Fluidorum Commentarii. Opus Academicum.* Strasbourg: Johann Reinhold Dulsseker, 1738.

**\$16,850**



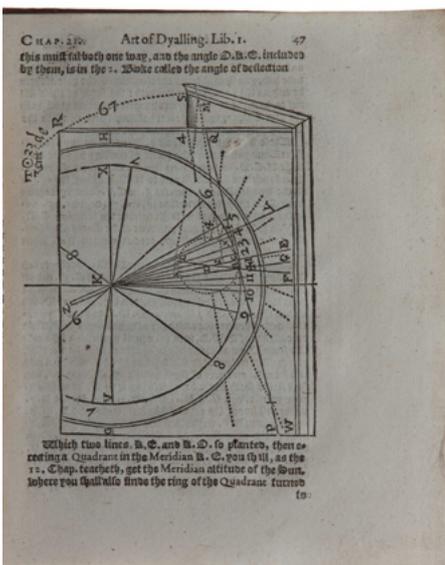
A beautiful and very large copy of Bernoulli's epochal work on fluid dynamics and kinetic gas theory. "Bernoulli's *Hydrodynamica* [was] one of the major works initiating the mathematical study of fluid flow... He also examines the equilibrium oscillation of an interialess ocean, and explicitly states 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.

## An early English Copernican

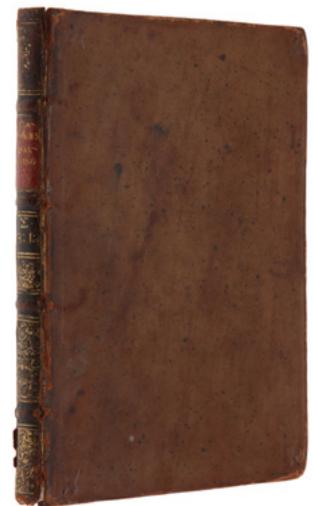
6. **BLAGRAVE, John.** *The Art of Dyalling in two Parts. The first shewing plainly, and in a maner mechanichally to make dyals to all plaines, either Horizontall, Murall, declining, reclining or inclining, with the theoricke of the Arte. The second how to performe the selfe same, in a more artificall kinde, and without use of Arithmeticke, together with concaue and conuex Dyals, and the inserting of the 12 signes, and the howres of any other country in any dyall, with many other things to the same Art appertaining.* London: Printed by N[icholas] O[kes] for Simon Waterson, 1609.

**\$21,250**



First edition, very rare, of one of the earliest English books on dialing, the last of four books published by the famous English mathematician during his lifetime. Blagrave was one of the earliest English converts to Copernicanism. It is unusual to find such early English scientific books in fine condition and in a contemporary binding as here. Only four other complete copies have appeared at auction in the last 50 years, all except the Horblit copy being in later bindings.

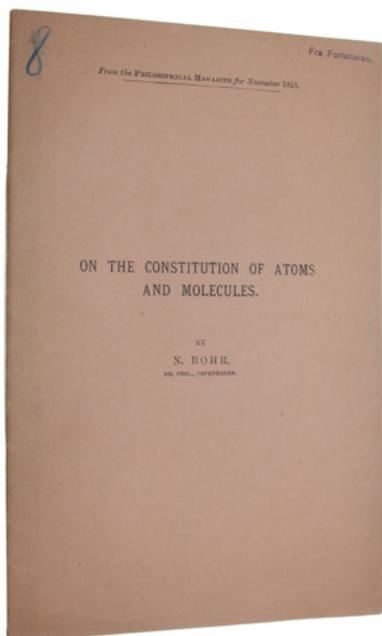
☛Horblit sales catalogue, Sotheby's 1974, lot 126; Frank Streeter, Christie's 2007, lot 42. Not in Macclefield or Honeyman.



## The birth of modern atomic physics

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

**\$56,250**



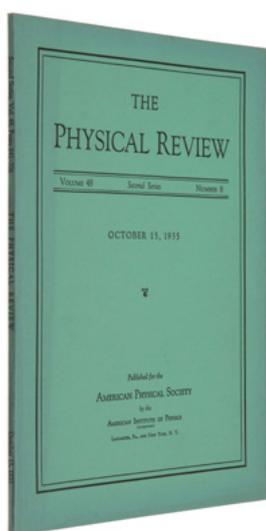
Extremely rare author's presentation offprints of his great trilogy, which constitutes the birth of modern atomic physics. "Bohr's three-part paper postulated the existence of stationary states of an atomic system whose behavior could be described using classical mechanics, while the transition of the 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."

## Bohr versus Einstein

8. **BOHR, Niels.** *Can quantum-mechanical description of physical reality be considered complete?.* Lancaster, PA & New York: American Physical Society, 1935.

**\$3,200**

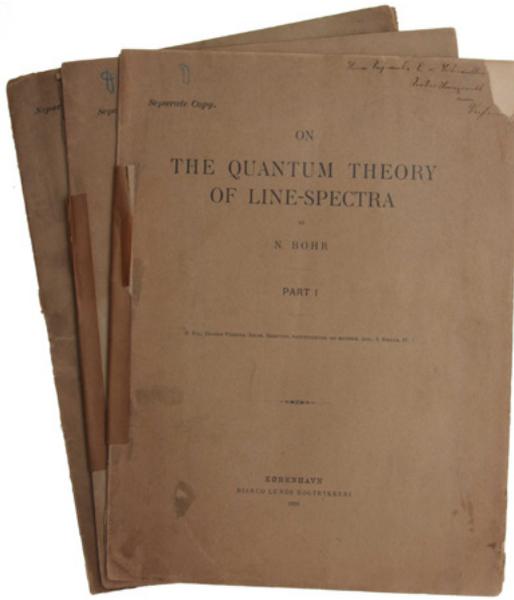
A very fine copy, in the original wrappers, of Bohr's response to the famous 'EPR paradox', which he resolved by introducing the notion of 'quantum entanglement'. Bohr's paper also marks the conclusion of the Bohr-Einstein debate on the foundations of quantum mechanics that had begun at the Solvay Conference in 1927. "In the May 15, 1935 issue of *Physical Review* Einstein co-authored a paper with his postdoctoral research associates Boris Podolsky and Nathan Rosen entitled 'Can Quantum Mechanical Description of Physical Reality Be Considered Complete?'. Generally referred to as 'EPR' this paper quickly became a centerpiece in the debate over the interpretation of the quantum theory, a debate that continues today" (*Stanford Encyclopedia of Philosophy*). The thought experiment proposed by Einstein, Podolsky and Rosen involves two particles that interact with each other and are then separated so that they presumably interact no longer. Then, the position of one of the systems is measured, and due to the known relationship between the measured value of the first particle and the value of the second particle, the observer is aware of the position of the second particle. A measurement is then made of the momentum of the second particle. This seems to violate the uncertainty principle, since both the position and momentum of the second particle would be known with certainty. When the EPR paper reached Copenhagen, "its effect on Bohr was remarkable (Leon Rosenfeld). Bohr's response "was longer than the original paper. In it Bohr backed away somewhat from what had been an aspect of the uncertainty principle: that the mechanical disturbance caused by the act of observation was the cause of the uncertainty. [Bohr] pointed out that the two particles were part of one whole phenomenon. Because they have interacted, the two particles are therefore 'entangled'. They are part of one whole system that has one wave function" (Isaacson).



## The correspondence principle

9. BOHR, Niels. *On the Quantum Theory of Line-Spectra, I-III*. Copenhagen: Bianco Lunos, 1918-1922.

\$23,000



A rare complete set of his major work in the scarce presentation-offprint issue; with 'Separate Copy' printed on the front wrappers. Inscribed by Bohr to Austrian physicist Egon von Schweidler (1873-1948) on the front wrapper of the first part. It was in this fundamental paper that Bohr first gave a clear formulation of, and fully utilized, his 'correspondence principle'. Besides his derivation of the Balmer formula (1913), this is by many considered to be Bohr's greatest contribution to physics. Bohr's correspondence principle (or postulate) states in general that although classical physics is incomplete there must be a fundamental analogy between quantum theory and classical physics. Actually Bohr at first referred to the postulate as the 'principle of analogy'. It was Bohr's underlying idea that the new quantum theory must satisfy in the limiting cases, e.g., when frequencies  $\nu$  tend to zero or quantum numbers  $n \rightarrow \infty$ , that its predictions approximate those of classical physics. When studying different quantum theoretic problems one can thus utilize already established facts from what classical physics predicts in that particular situation, and then work backwards to arrive at new quantum-theoretic rules for the system. In this major paper, of which the two first parts were

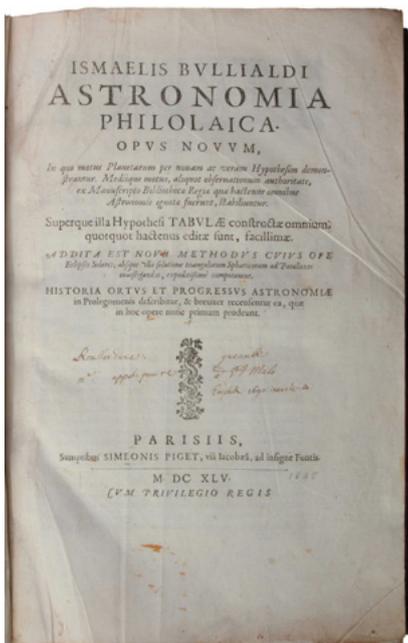
published in 1918 and the third in 1922, Bohr penetrated far into the quantum theory of line-spectra of the Hydrogen atom, and other elements, by using his principle and the classical theory of electrodynamics. Bohr's method was the principle guide to the progress of quantum theory during the early twenties, until it was finally built into the foundations of quantum mechanics.

## The inverse-square law of attraction

10. BOULLIAU, Ismael. *Astronomia philolaica. Opus novum, in quo motus planetarum per novam ac veram hypothesim demonstrantur*. Paris: Simeonis Piget, 1645.

\$20,000

First edition, very rare, of "the first treatise after Kepler's *Rudolphine Tables* to take elliptical orbits as a basis for calculating planetary tables" (*The Cambridge Companion to Newton*), and the first astronomical work to state that the planetary moving



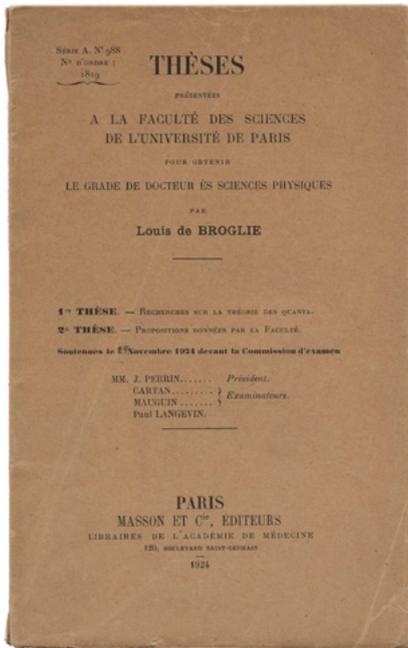
force "should vary inversely as the square of the distance—and not, as Kepler had held, inversely as the first power (Boyer in *DSB*). "The *Astronomia philolaica* represents the most significant treatise between Kepler and Newton and it was praised by Newton in his *Principia*, particularly for the inverse square hypothesis and its accurate tables." (O'Connor & Robertson, *MacTutor History of Mathematics*). Boulliau (1605-94), settled in Paris in 1633, just as the Galilean storm broke. Although a Catholic, he joined his friend Gassendi in support of Galileo and Boulliau soon found himself squarely in the Copernican camp. "In 1645 Boulliau published his most significant scientific work, a more accomplished heliocentric treatise entitled *Astronomia philolaica*. He had now become one of the very few astronomers to accept the ellipticity of orbits" (*DSB*). "He claimed that if a planetary moving force existed then it should vary inversely as the square of the distance (Kepler had claimed the first power) (O'Connor & Robertson).

Sothoran I: 500 ("This important work according to Newton first mentions the sun's attraction, which decreases in inverse proportion to its distance"); Favaro 205.

## “Lifted a corner of the great veil” (Einstein)

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

\$24,000



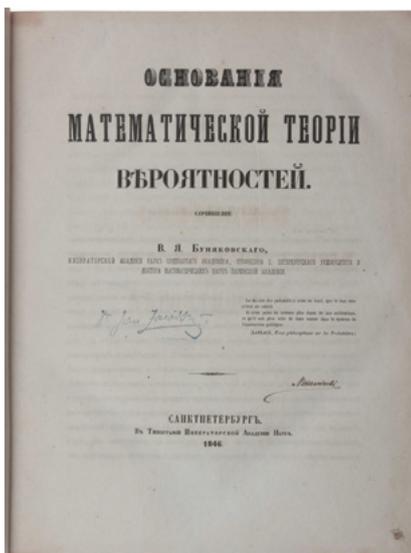
First edition, rare, of de Broglie’s revolutionary doctoral thesis on the quantum theory, which, Einstein said, “lifted a corner of the great veil” (Isaacson, *Einstein: His Life and Universe*, p. 327). In this work he developed the startling and revolutionary idea that material particles such as electrons 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.

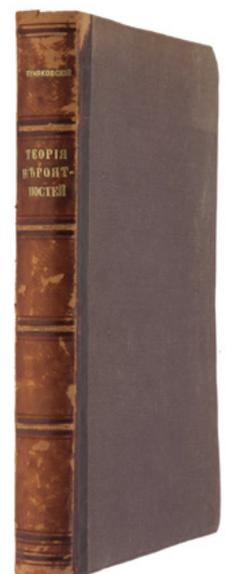
## Russian probability

12. BUNYAKOVSKY, Viktor. *Osnovaniya matematicheskoi teorii veroiatnostei*. [Foundations of the mathematical theory of probability]. Saint Petersburg: Academy of Sciences, 1846.

\$10,500



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



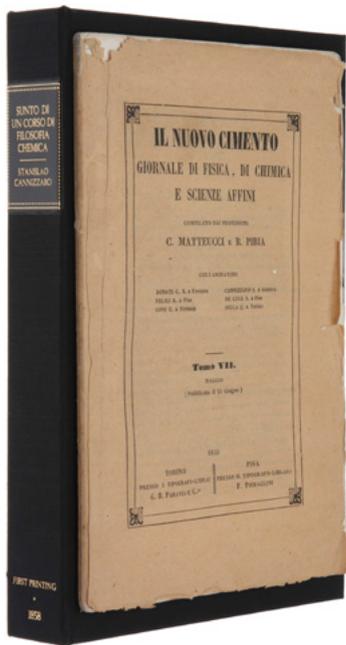
Viktor Yakovlevich Bunyakovsky (1804-89) Bunyakovsky’s prime achievement was the first treatise on probability in the Russian language (Bunyakovsky 1846). Its aim was the simplification and classification of existing theory; its lasting achievement was the creation of a Russian probabilistic terminology” (E. Seneta in *Companion Encyclopedia of the history & philosophy of the mathematical science*, pp. 1325-6).

## Created a revolution in chemical thought

13. **CANNIZZARO, Stanislao.** *Sunto di un corso di filosofia chimica fatto nella Reale Università di Genova.* Turin: G. B. Paravia & Pisa: F. Pieraccini, 15 June, 1858.

**\$13,750**

Extremely rare first appearance of Cannizzaro's famous *Sunto*, "the keystone in the edifice of modern chemistry" (Thorpe, *History of Chemistry*, p. 63), and a remarkable survival in unrestored original printed wrappers. "It is not too much to say that the publication, in 1858, of his *Summary of a Course of Chemical Philosophy* created a revolution in chemical thought hardly less momentous than that which followed the appearance of Dalton's *New System*... it may be said to have saved the position of the atomic theory" (Thorpe, *Essays*, p. 513). "Cannizzaro's lasting fame depends... on the letter that he wrote in 1858 to his friend Sebastiano de Luca, who had succeeded Bertagnini in Piria's chair at Pisa. This was the famous "Sunto di un corso di filosofia chimica fatto nella Reale Università di Genova," published in the journal *Nuovo cimento*, established at Pisa by Piria, in the same year and reprinted as a pamphlet in 1859. It has frequently been republished and translated... When Cannizzaro wrote the *Sunto*, there was no agreement among chemists as to what values should be adopted for atomic, molecular, or equivalent weights; no possibility of systematizing the relationship of the various elements; and no unanimity as to how organic compounds should be formulated... It was Cannizzaro's recognition of true atomic weights that permitted Meyer and Mendeleev to formulate the periodic law at the end of the 1860s" (*DSB*). No copy located in auction records.



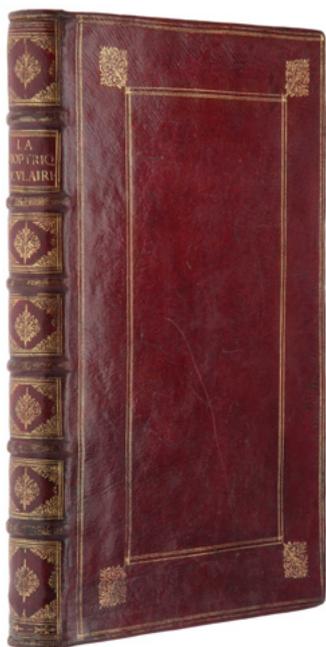
✎ E. Thorpe, *History of Chemistry*, 1910; *ibid.*, *Essays in Historical Chemistry*, 1911; Partington IV, 489. Not in the Roy G. Neville Historical Chemical Library.

## Optics in 17th century red morocco

14. **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.

**\$48,000**

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).

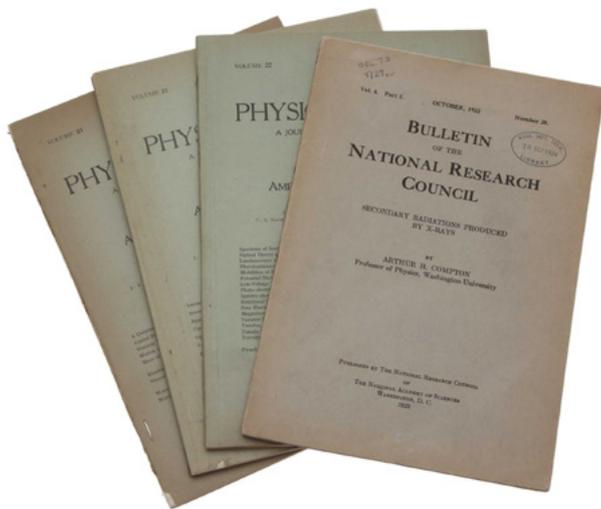


## The Compton effect

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

**\$6,850**

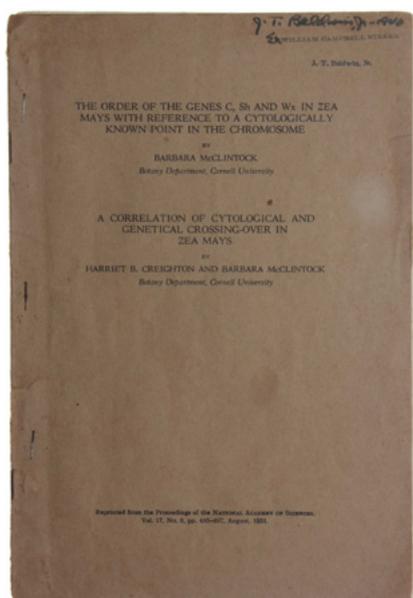
First edition of the ‘Compton effect’, which demonstrated the existence of quanta of electromagnetic radiation, later called photons. Compton’s paper is here accompanied by the initial announcement made six months earlier, and by the two papers which document the experimental basis for his discovery. “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.



## Jumping genes

**16. CREIGHTON, Harriet & McCLINTOCK, Barbara.** *The order of the genes C, Sh and Wx in Zea Mays with reference to a cytologically known point in the chromosome. [Bound as issued with:] A correlation of cytological and genetical crossing-over in Zea Mays*. National Academy of Sciences, 1931.

**\$1,850**

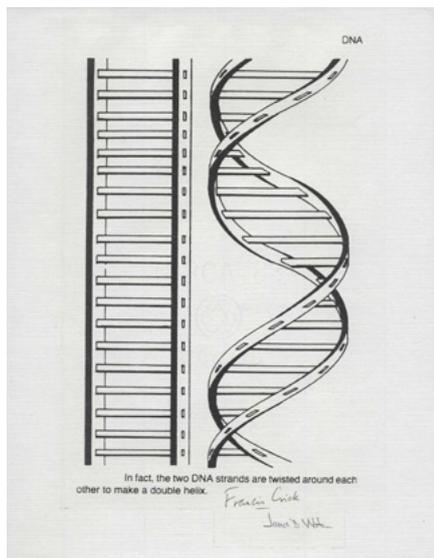


First edition, the very rare offprint issue, of these landmark papers, issued back-to-back in a single offprint, which describe the “revolutionary” discovery of ‘jumping genes.’ The Nobel Prize in Physiology or Medicine for 1983 was awarded to McClintock “for her discovery of mobile genetic elements” (nobelprize.org). “Beyond any question, this is one of the truly great experiments of modern biology, and the conclusion—that pairing chromosomes heteromorphic for two or more regions exchange parts at the same time that they exchange genes assigned to these regions—will doubtless continue to stimulate as much research during the next as they have during the 25 years following its publication” (Gabriel & Fogel, *Great Experiments in Biology*, 1955, pp. 267-8). No copy of this offprint listed in OCLC. “McClintock’s work was revolutionary in that it suggested that an organism’s genome is not a stationary entity, but rather is subject to alteration and rearrangement – a concept that was met with criticism from the scientific community at the time. However, the role of transposons eventually became widely appreciated, and McClintock was awarded the Nobel Prize in 1983 in recognition of this and her many other contributions to the field of genetics” (Pray & Zhaurova, ‘Barbara McClintock and the discovery of jumping genes (transposons); *Nature Education*, Vol. 1, 2008.

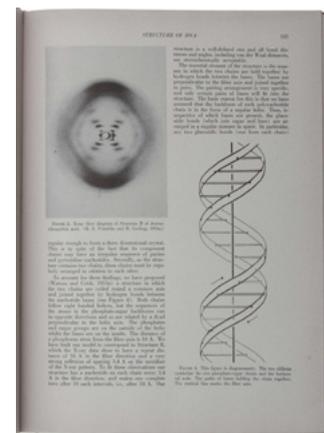
*With a signed original print of the DNA double-helix*

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

**\$9,350**



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.



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.

*Descartes' system of the world*

**18. DESCARTES, René.** *Le Monde ou le Traité de la lumière et des autres principaux objets des Sens. Avec un discours du mouvement local et un autre des fièvres, composez selon les principes du même auteur*. Paris: Théodore Gira[r]d, 1664.

**\$11,850**

First edition, the La Rochefoucauld copy in a contemporary armorial binding, of Descartes' first account of his influential system of physics based upon vortices, written in the early 1630s. His great achievement was to develop a system of physics based on a simple theory of the known properties of light. "Descartes's first attempt to explain the formation of the physical world was composed during the 1630s but suppressed, like *L'Homme*, after Galileo's condemnation. In it Descartes gave his account of cosmogony strictly in terms of matter in motion, making the laws of motion the ultimate 'laws of nature' and all scientific explanation thus ultimately mechanistic" (Norman 629). "Descartes' achievement in [Le Monde] is two-fold. In the first place, his vortex theory explains the stability of planetary orbits in a way that presents an intuitively plausible picture of orbital motion which requires no mysterious forces acting at a distance... Secondly, this account also enables Descartes to account for all the known principal properties of light, thereby providing a physical basis for the geometrical optics he had pursued so fruitfully in the 1620s" (Gaukroger, *Rene Descartes: The World and Other Writings*, xxiii).



based on a simple theory of the known properties of light. "Descartes's first attempt to explain the formation of the physical world was composed during the 1630s but suppressed, like *L'Homme*, after Galileo's condemnation. In it Descartes gave his account of cosmogony strictly in terms of matter in motion, making the laws of motion the ultimate 'laws of nature' and all scientific explanation thus ultimately mechanistic" (Norman 629). "Descartes' achievement in [Le Monde] is two-fold. In the first place, his vortex theory explains the stability of planetary orbits in a way that presents an intuitively plausible picture of orbital motion which requires no mysterious forces acting at a distance... Secondly, this account also enables Descartes to account for all the known principal properties of light, thereby providing a physical basis for the geometrical optics he had pursued so fruitfully in the 1620s" (Gaukroger, *Rene Descartes: The World and Other Writings*, xxiii).



Norman 629; Honeyman 867.

## The best edition of Descartes' Geometry - used by Newton

**19. DESCARTES, René.** *Geometria*, à Renato Des Cartes anno 1637 Gallicè edita ; postea autem unà cum Notis Florimondi de Beavne, In Curia Blesensi Consilarii Regii, Gallicè conscriptis in Latinam linguam versa, & commentariis illustrata ; operâ atque studio Francisci à Schooten, in Acad. Lugd. Batava Matheseos Professoris, Nunc demum ab eodem diligenter recognita, locupletioribus Commentariis instructa, multisque egregiis accessionibus, tam ad uberiorem explicationem, quàm ad ampliandam hujus Geometriæ excellentiam facientibus, exornata. Editio secunda, multis accessionibus exornata, & plus alterâ sui parte adaucta. Amsterdam: Elzevir, 1659-1661.

**\$9,350**



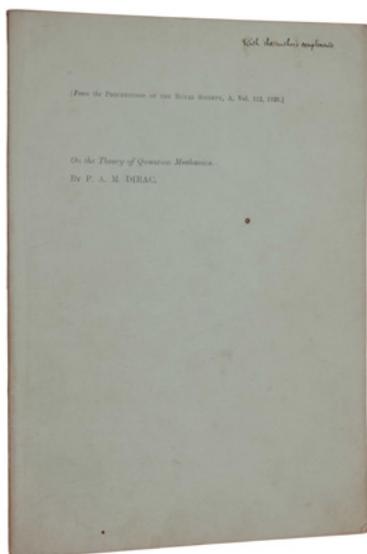
A fine copy of van Schooten's important second edition of the *Geometria*, Descartes's *magnum opus* (DSB), and one of the key texts in the history of mathematics. Descartes' "application of modern algebraic arithmetic to ancient geometry created the analytical geometry which was the basis of the post-Euclidean 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

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

**\$23,000**

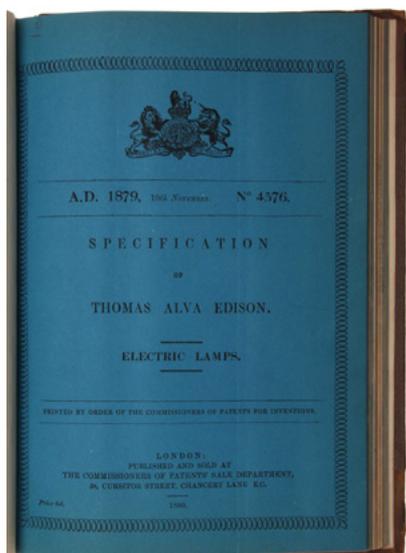
First edition, offprint with presentation inscription in Dirac's hand, of Dirac's paper, which "is justly seen as a major contribution to quantum theory" (Kragh, *Dirac: A Scientific Biography*, p. 36). It introduced his quantum mechanical derivation of what is now called Fermi-Dirac statistics, which 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.**



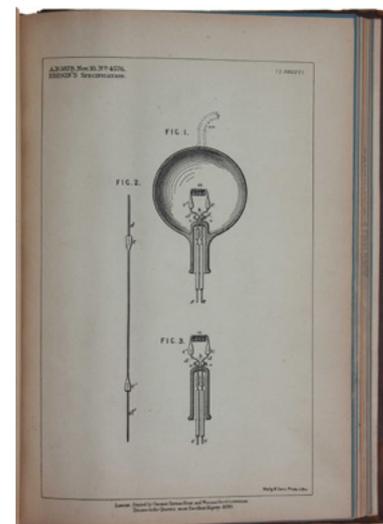
## Let there be light

**21. EDISON, Thomas Alva.** *Specification of Thomas Alva Edison. Electric lamps. No. 4576, 10 November, 1879.* [Bound with thirteen other patents, including eight more by Edison, most concerned with electric lighting, the design and manufacture of light bulbs, and the supply of electricity]. London: Published and sold at the Commissioners of Patents Sale Department [British Patent Office], 1880.

\$18,750



First edition, of the greatest rarity, of the first British patent granted to Edison for his most famous invention, that of an incandescent electric light. Perhaps more than any other, it was this invention that ushered in the modern age. This British patent, filed just six days after the US patent 223,898, enabled Edison and his English rival Joseph Swan to establish an effective monopoly on the electric lighting market in Britain until Edison's patent expired in 1893. This is the finest possible association copy, having formed part of the working library of the English-born engineer Charles Batchelor, Edison's 'right-hand man' for several decades, and his chief experimental assistant from 1873. This patent is extremely rare even in institution-

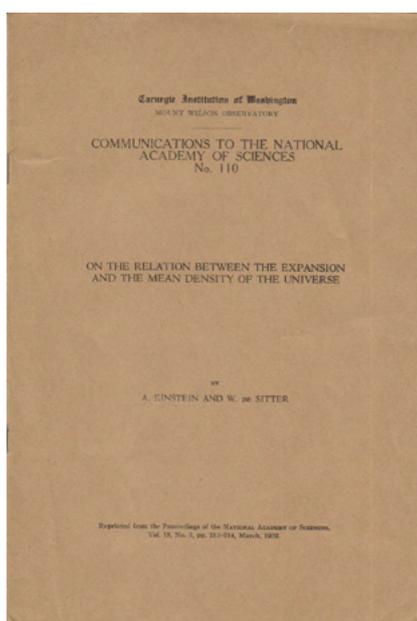


al collections – no copy is listed on OCLC, although there is a copy at Rutgers, which holds the bulk of Batchelor's papers. We have located no copy in auction records, and the last copy on the market was offered almost 80 years ago. The US patent has been selected as one of the 100 most important documents in the US National Archives.

## Einstein banishes the cosmological constant

**22. EINSTEIN, Albert; DE SITTER, Willem.** *On the Relation between the Expansion and the mean Density of the Universe.* Washington: National Academy of Sciences, 1932.

\$3,500

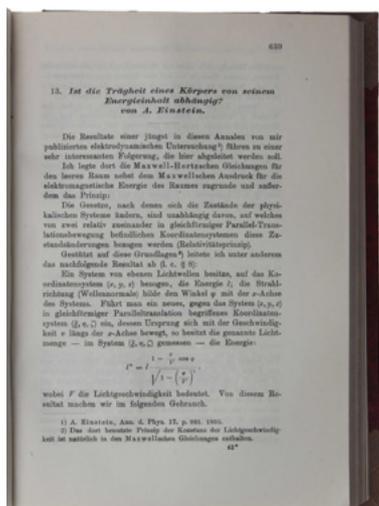


The rare offprint of the paper which introduced the 'Einstein–de Sitter' cosmological model, the basis for the discussion of relativistic cosmology over the next several decades. Here Einstein finally banishes the cosmological constant, which he had introduced in 1917 to secure a static universe, but which he subsequently regarded as his 'biggest blunder.' "In 1932 Einstein and de Sitter proposed that the cosmological constant should be set equal to zero, and they derived a homogeneous and isotropic model that provides the separating case between the closed and open Friedmann models; i.e., Einstein and de Sitter assumed that the spatial curvature of the universe is neither positive nor negative but rather zero. The spatial geometry of the Einstein–de Sitter universe is Euclidean (infinite total volume), but space-time is not globally flat (i.e., not exactly the space-time of special relativity). Time again commences with a big bang and the galaxies recede forever, but the recession rate (Hubble's 'constant') asymptotically coasts to zero as time advances to infinity. Because the geometry of space and the gross evolutionary properties are uniquely defined in the Einstein–de Sitter model, [astronomers have] long considered it the most fitting candidate to describe the actual universe" (*Britannica*).

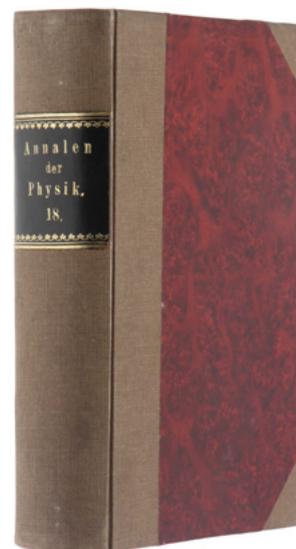
## Mass-energy equivalence

**23. EINSTEIN, Albert.** *Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?*. Leipzig: Johann Ambrosius Barth, 1905.

\$5,000



A very fine and completely unsophisticated copy, without stamps or any other markings in strictly contemporary cloth binding, of Einstein's ground-breaking 1905 paper, the introduction and derivation of the most famous equation in modern physics:  $E=mc^2$ . "A few months after first publishing the theory of relativity, Einstein discovered something that particularly intrigued him; the relation between inertial mass and energy. He wrote to Conrad Habicht during the summer of 1905: 'One more consequence of the paper on electrodynamics has also occurred to me. The principle of relativity, in conjunction with Maxwell's equations, requires that mass be a direct measure



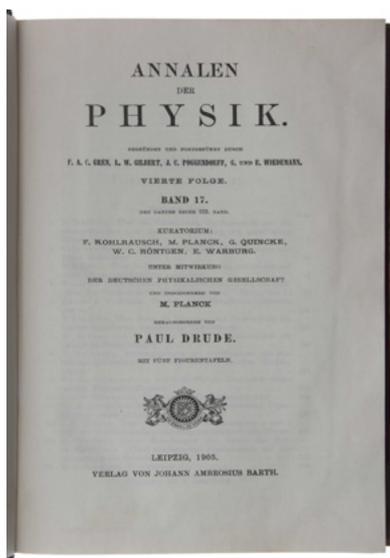
of the energy contained in a body; light carries mass with it. A noticeable decrease of mass should occur in the case of radium" (Stachel, *Einstein's Miraculous Year*).

☞Weil \*10.

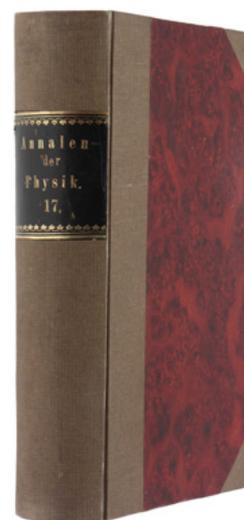
## Relativity, light quanta and the existence of atoms

**24. EINSTEIN, Albert.** *Zur Elektrodynamik bewegter Körper; Über einen die Erzeugung und Verwandlung des Lichtes betreffenden heuristischen Gesichtspunkt; Über die von der molekularkinetischen Theorie der Wärme geforderte Bewegung von in ruhenden Flüssigkeiten suspendierten Teilchen.* Leipzig: Johann Ambrosius Barth, 1905.

\$20,500



A very fine and completely unsophisticated copy, without stamps or any other markings in strictly contemporary cloth binding, of "one of the most remarkable volumes in the whole scientific literature. It contains three papers by Einstein, each dealing with a different subject and each today acknowledged to be a masterpiece, and the starting point of a new branch of physics" (Max Born). In the first paper ('On a Heuristic Viewpoint Concerning the Production and Transformation of Light', "Einstein postulated that light is composed of individual quanta (later called photons) that, in addition to wavelike behavior, demonstrate certain properties unique to particles. In a single stroke he thus revolutionized the theory of light and provided an explanation for, among other phenomena, the emission of electrons



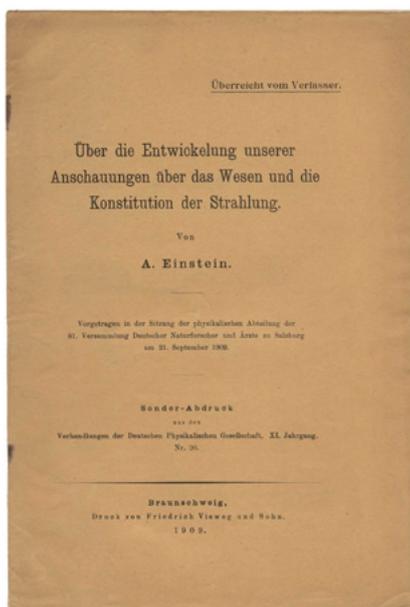
from some solids when struck by light, called the photoelectric effect" (Britannica). The second paper ('On the motion required by the molecular kinetic theory of heat of small particles suspended in a stationary liquid') provided the first mathematical model of Brownian motion. It is generally regarded as the first proof that molecules exist. The third paper is his most celebrated work, introducing the special theory of relativity, in which he revolutionized the field of mechanics – probably the greatest achievement since the publication of Newton's *Principia*.

☞Dibner 167; Grolier/Horblit 26b; Norman 691a.

## Wave-particle duality

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

**\$21,850**

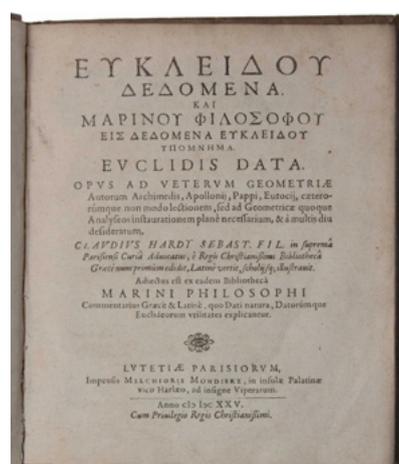


The true first printing (see below), extremely rare author's offprint issue, of this paper which Wolfgang Pauli said "can be considered as one of the landmarks in the development of theoretical physics" (Schilpp, p. 154). This paper marks the introduction of the modern "photon" concept (although the 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

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

**\$11,850**



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. Rectilinear figures are "given in species" or "given in form" when their angles and the ratio

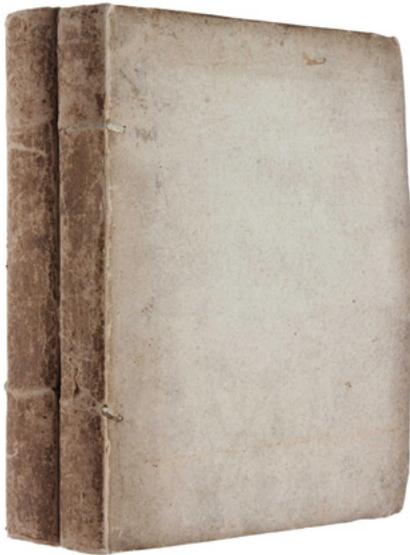


of their sides are given. Points, lines, and angles are "given in position" when they always occupy the same place, and so on. After the definitions there follow ninety-four propositions, in which the object is to prove that if certain elements of a figure are given, other elements are also given in one of the defined senses" (DSB IV.524). OCLC lists 5 copies.

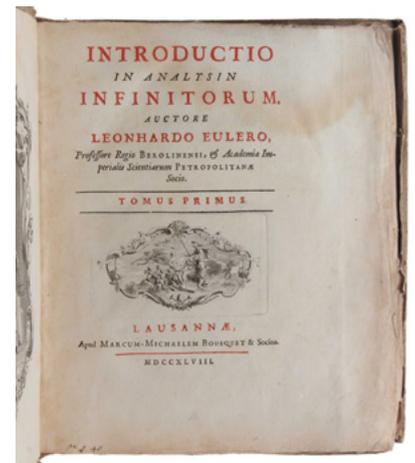
## The Haskell F. Norman copy

27. EULER, Leonhard. *Introductio in analysin infinitorum*. Lausanne: Marcus-Michaelis Bousquet & Socii, 1748.

\$24,350



First edition, and a really remarkable copy in original state (the Norman copy), of Euler's great textbook on analysis. This is the only work of Euler listed in *Printing and the Mind of Man*. "In his 'Introduction to Analysis' Euler did for modern analysis what Euclid had done for ancient geometry" (PMM). The editors of Euler's collected works emphasize that the *Introductio* "still today deserves to be not only read, but studied with devotion" and that the *Introductio* "marks the beginning of a new epoch and that this work has become influential for the whole development of the mathematical science by virtue of not only its content, but also its language." Extremely rare in this condition.



☛PMM196;Norman732(this copy);Landmark Writing in Western Mathematics 13.

## Fermat's Last Theorem

28. [FERMAT, Pierre de] DIOPHANTUS of Alexandria. *Arithmeticonum libri sex, et de numeris multangulis liber unus. Cum commentariis C.G. Bacheti V.C. & observationibus D.P. de Fermat senatoris Tolosani*. Toulouse: Bernard Bosc, 1670.

\$60,000



First edition of Fermat's discoveries in number theory and first printing of his celebrated 'last theorem', one of the most famous problems in mathematics and unsolved for over 325 years until its solution in 1995. Norman 777. A Toulouse parlementaire with a passion for numbers, Fermat was one of the most brilliant mathematicians of his or any time. He made important discoveries in analytic geometry and algebra, and was the first European to make extensive contributions to the theory of numbers, which he restricted in principle to the domain of integers, establishing it as an independent branch of mathematics. Since most of his work in the realm of number theory remained unpublished in his lifetime and of limited circulation later, "it was neither understood nor appreciated until Euler revived it and initiated the line of continuous research that culminated in the work of Gauss and Kummer in the early nineteenth century. Indeed, many of Fermat's results are basic elements of number theory today... The importance of Fermat's

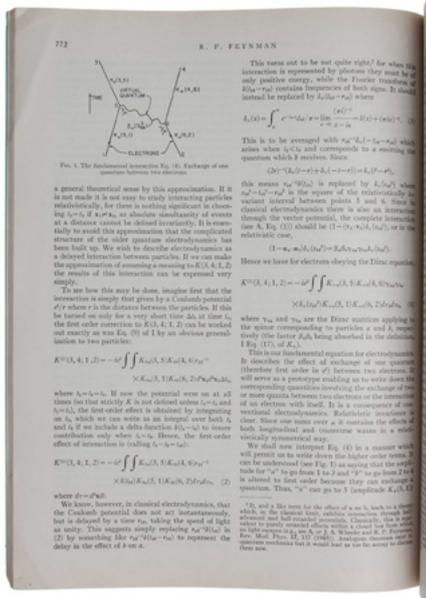


work in the theory of numbers lay less in any contribution to contemporary developments in mathematics than in their stimulative effect on later generations" (DSB). ☛Norman 777.

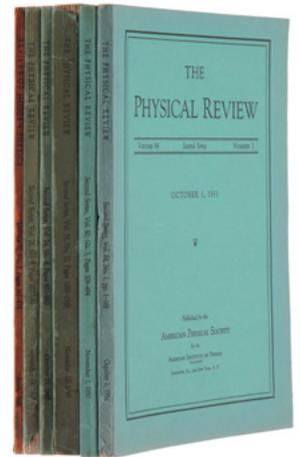
## Feynman path-integrals and Feynman diagrams

**29. 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; VI. Mathematical Formulation of the Quantum Theory of Electromagnetic Interaction; VII. An Operator Calculus Having Applications in Quantum Electrodynamics.* Lancaster: American Physical Society, 1948-51.

**\$16,000**



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).



## Beautifully illustrated astronomical encyclopedia

**30. GALLUCCI, Giovanni Paolo.** *Della Fabrica et Uso di diversi Stromenti di Astronomia et Cosmographia. Ove si vede la somma della Teorica, et Practica di queste due nobilissime Scienze.* Venice: Ruberto Meietti, 1597.

**\$22,500**



The rare first issue, and an exceptionally fine copy with all three volvelles in pristine condition, of the first encyclopedia of astronomical instruments. "This work is an illustrated encyclopedia of astronomical and surveying instruments. It describes instruments designed by others (Fine, Apian, Gemma Frisius, etc.) and gives credit to the original inventors. The one exception is the Visorio, which Gallucci claims as his own... Other instruments, such as the Hemispherical Uranico (a complicated device used for computations dealing with the moon, sun and stars) appear to be of Gallucci's invention. Besides the usual portable instruments, he also includes a simple quadrant and a two-ringed armillary built into the church of Santa Maria Novella in Florence. There are also a number of elementary diagrams and volvelles that illustrate various astronomical phenomena such as why the sky looks different at different latitudes.



☛ Horblit sale 439; The Barchas Collection, *The Making of Modern Science* 11; Erwin Tomash Library G23 (second issue from 1598).

## Microsoft's manifesto

31. GATES, William Henry III [Bill]. *An open letter to the hobbyists*. Albuquerque, NM: Micro Instrumentation and Telemetry Systems, 1976.

\$4,350

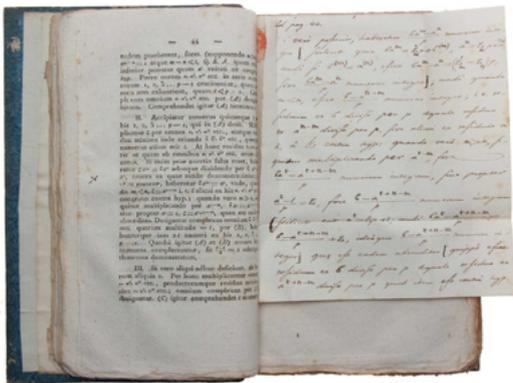


First edition, exceptionally scarce, of this key document in the development of home computing, and Bill Gates' first clear published statement of what was to become Microsoft's hugely successful business model, the development and marketing of proprietary software. "On February 3, 1976 William Henry Gates III (Bill Gates), in his role as "General Partner Micro-Soft," Albuquerque, New Mexico, wrote *An open letter to the hobbyists*, making the distinction between proprietary and open-source software. Gates' one page letter was first published in *Computer Notes*, 1, #9 (February 1976). *Computer Notes* was the house journal of MITS, the company that developed the MITS Altair 8800 and licensed Microsoft's version of BASIC" (Jeremy Norman's historyofinformation.com). Given the ephemeral nature of the publication (it is in a large 'newspaper' format) the condition of the magazine is remarkable: it is folded, as it would have been for distribution; clean and bright throughout, with only very minor yellowing to the spine. Copies of these early 'hobbyist' computer magazines are notoriously scarce, and in this condition virtually unobtainable.

## Gauss' masterpiece

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

\$60,000

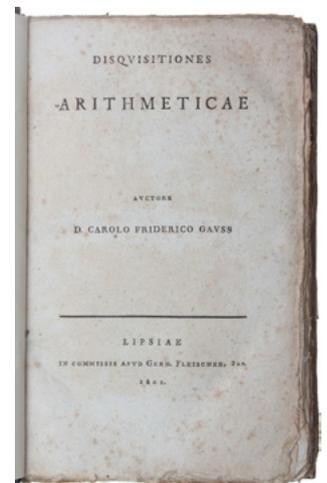


A very fine copy of Gauss' masterpiece - uncut, contemporarily bound and with numerous mathematical notes inserted. "Gauss ranks, together with Archimedes and Newton, as one of the greatest geniuses in the history of mathematics" (*Printing and the Mind of Man*). "Published when he was just twenty-four, *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 until the publication in 1863 of Dirichlet's less austere exposition in his *Vorlesungen über Zahlentheorie*." (Norman).

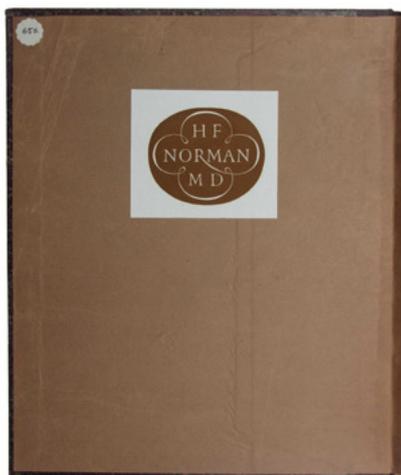
PM 257; Evans 11; Horblit 38; Dibner 114.



## Gauss' second masterpiece

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

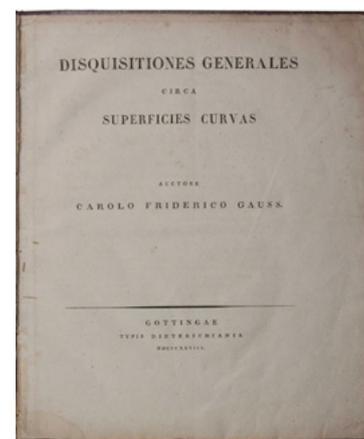
\$15,000



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 'Über die Hypothesen welche die Geometrie zu Grunde liegen'.

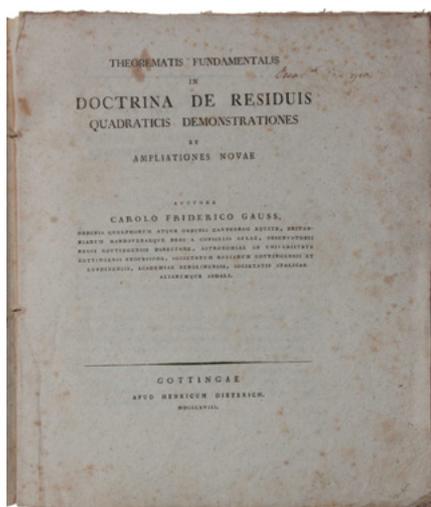
Norman 880 (this copy). I. Grattan-Guinness (ed.), *Companion Encyclopedia of the History and Philosophy of the Mathematical Sciences*, 1994; A. N. Kolmogorov & A. P. Yushkevitch, *Mathematics of the 19th century: Geometry. Analytic Function Theory*, 1996; E. Zeidler, *Quantum Field theory III. Gauge Theory*, 2013, pp. 15-19.



## Gauss' Golden Theorem

34. GAUSS, Carl Friedrich. *Theorematis fundamentalis in doctrina de residuis quadraticis demonstrationes et ampliationes novae*. Göttingen: H. Dieterich, 1818.

\$4,350



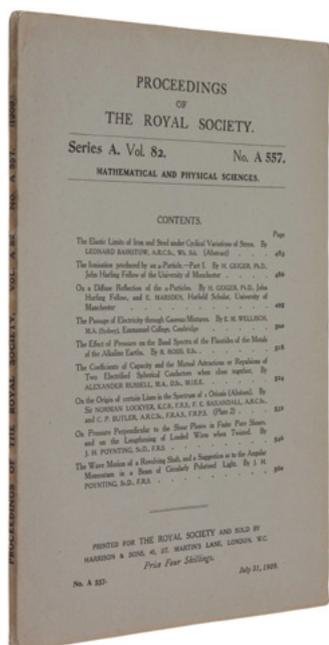
First edition, offprint issue and an exceptionally fine copy, of this important memoir in which Gauss provided a fifth and sixth proof of his great law of quadratic reciprocity, which he privately referred to as the *Aureum Theorema* (Golden Theorem). These two proofs are particularly important since, as Gauss explains in the introduction to the present work, the techniques they employ ('Gauss's lemma' and 'Gauss sums,' respectively) can be applied to the study of cubic and biquadratic reciprocity. These ideas were indeed used by many mathematicians, including Gauss himself, in the study of higher reciprocity laws from the nineteenth century through to the present day. Attempts to demonstrate one of these higher reciprocity led in 1995 to the proof of Fermat's last theorem by Andrew Wiles.



## The nuclear model of the atom

35. GEIGER, Hans; MARSDEN, Ernest. *On a Diffuse Reflection of the alpha-Particles*. London: Harrison and Sons, 1909.

\$2,000



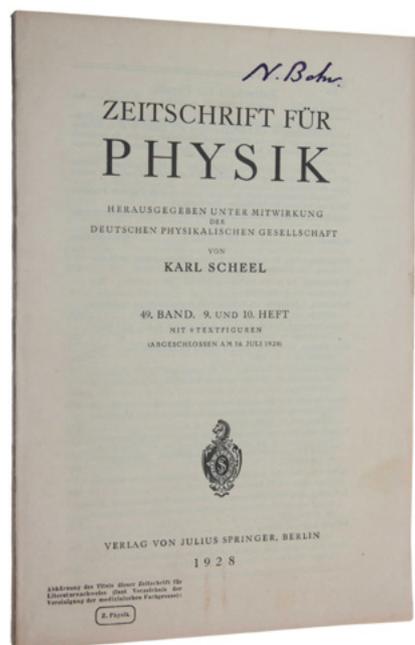
A fine copy, in the original wrappers, of the famous Geiger-Marsden experiment (or gold foil experiment) which demonstrated for the first time the existence of the atomic nucleus, leading to the downfall of Thomson's plum-pudding model of the atom, and the development of the Rutherford (or planetary) model. "One of the most important experiments in physics took place in 1909 when Hans Geiger (1882-1945) and the undergraduate student Ernest Marsden (1889-1979), under the direction of Rutherford, sent alpha particles towards a very thin film of gold, and discovered that the majority of them passed through the foil without hitting anything. Only a tiny number of particles were scattered back (towards the source) after hitting the nucleus of a gold atom. The results of the experiment were analyzed by Rutherford (the experimental results were first described [in the present paper] by Geiger and Marsden), and led to several far-reaching conclusions. The first was that most of the atom is empty! The nucleus occupies only the  $10^{-15}$  the part of the volume of the atom (a radius  $10^5$  times bigger than the newly found radius of the nucleus). Thus, the orbits of the outer-most electrons (which define the radius of the atom) are far away from the nucleus. The second conclusion was that the force acting between the positive charge in the nucleus and charged scattered projectiles obeys the Coulomb law" (Shaviv, *The Life of Stars*, Springer 2009).

## Bohr's copy of Heisenberg on ferromagnetism

36. HEISENBERG, Werner. *Zur Theorie des Ferromagnetismus*. Berlin: Julius Springer, 1928.

\$3,150

A remarkable association copy, from the library of Niels Bohr, of Heisenberg's solution of the problem of ferromagnetism. Bohr and Heisenberg are also linked by the subject matter of the present work. In his doctoral thesis *Studier over*



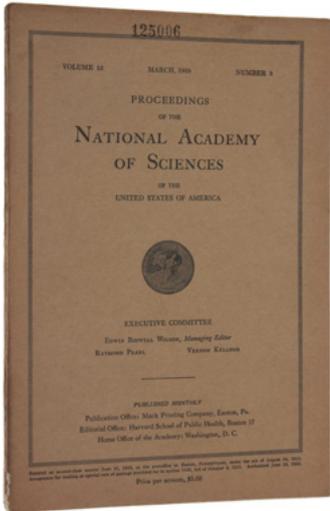
*Metallernes Elektrontheori* (1911), Bohr proved what was later called the 'Bohr-van Leeuwen theorem', which shows that classical physics cannot account for magnetic phenomena. This probably provided at least part of the motivation for his subsequent work on quantum theory, of which Heisenberg gave the first mathematically consistent formulation in 1925. In this paper, Heisenberg applies his new quantum mechanics to finally explain one of the most puzzling magnetic phenomena, that of ferromagnetism. "Following a series of papers published in the years 1925 to 1927 — during which quantum mechanics was developed, interpreted and applied to atoms with more than one electron outside a closed shell — Werner Heisenberg solved the mystery of ferromagnetism using the concept of spin plus the exclusion principle formulated by Wolfgang Pauli, which states that two electrons with the same energy and momentum cannot occupy the same quantum state. In other words, two electrons with the same energy but different spins can lie in the same orbital. The facts that an electron has spin, as well as charge, and that two identical electrons must occupy different states, are the keys to the periodic table. "Heisenberg's research in Leipzig concentrated upon applications and extensions of quantum mechanics. In 1928 he showed that a quantum-mechanical exchange integral that had played a crucial role in his earlier solution of the helium problem could account for the strong molecular magnetic field in the interior of ferromagnetic materials" (DSB).



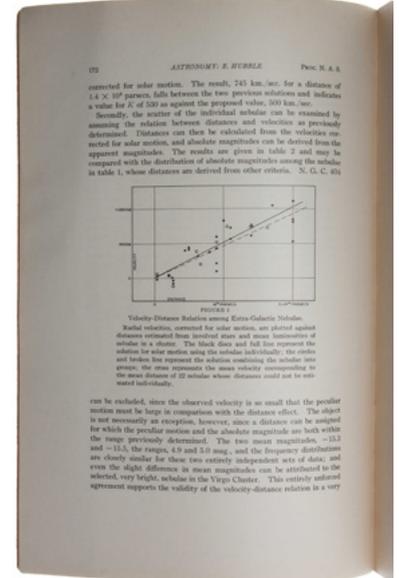
## The expanding universe

**39. HUBBLE, Edwin.** *A Relation between Distance and Radial Velocity among Extra-Galactic Nebulae.* Washington: National Academy of Sciences, 1929.

**\$18,750**



A fine copy, in the rare original printed wrappers, of Hubble's landmark paper which "is generally regarded as marking the discovery of the expansion of the universe" (*Biographical Encyclopedia of Astronomers*). It established what would later become known as Hubble's Law: that galaxies recede from us in all directions and more distant ones recede more rapidly in proportion to their distance. "...the repercussions were immense. The galaxies were not randomly dashing through the cosmos, but instead their speeds were mathematically related to their distances, and when scientists see such a relationship they search for a deeper significance. In this case, the significance was nothing less than the realization that at some point in history all the galaxies in the universe had been compacted into the same small region. This was the

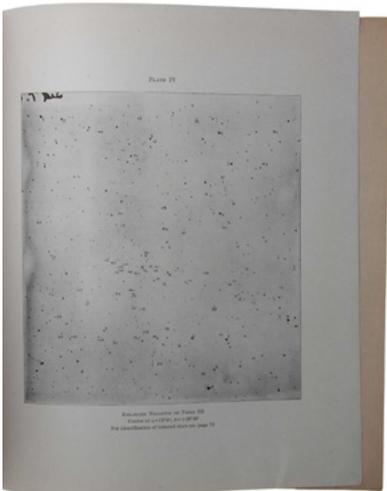


first observational evidence to hint at what we now call the Big Bang" (Simon Singh, *Big Bang*). Hubble's "result has come to be regarded as the outstanding discovery in twentieth-century astronomy. It made as great a change in man's conception of the universe as the Copernican revolution 400 years before" (DSB).

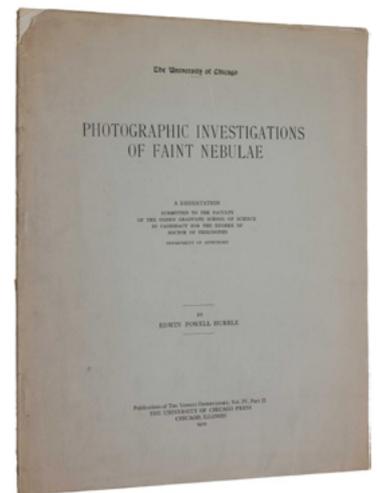
## Hubble's doctoral thesis

**40. HUBBLE, Edwin.** *Photographic investigations of the faint nebulae.* Chicago: University of Chicago Press, 1920.

**\$5,600**



First edition of the doctoral thesis of the foremost observational astronomer of the twentieth century, which foreshadows much of Hubble's later work. In particular, it contains the first suggestion that some of the 'nebulae,' or galaxies, lie outside the Milky Way, and thus that the observable universe is much larger than our own galaxy: "Considering the problematic nature of the data, the agreement is such as to lend some color to the hypothesis that the spirals [i.e., spiral galaxies] are stellar systems at distances to be measured often in millions of light years" (p. 9). He confirmed this, one of the most important discoveries in astronomy, in 1926 when he had



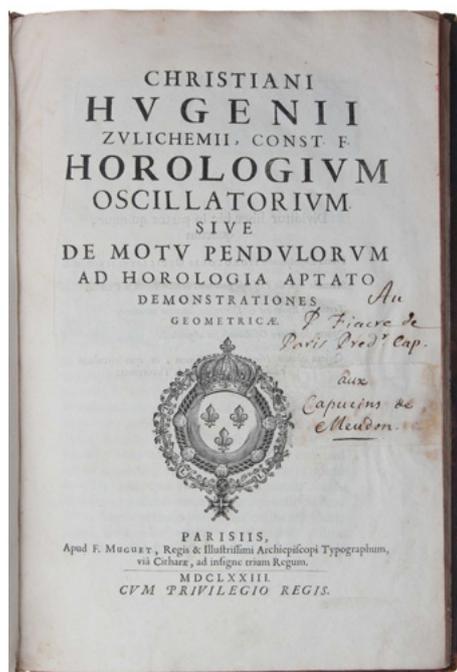
access to the 100-inch telescope at Mount Wilson. In his thesis, Hubble also identified for the first time the class of 'elliptical galaxies.' Hubble's thesis is very rare on the market.

📖 Parkinson, Breakthroughs, p. 508.

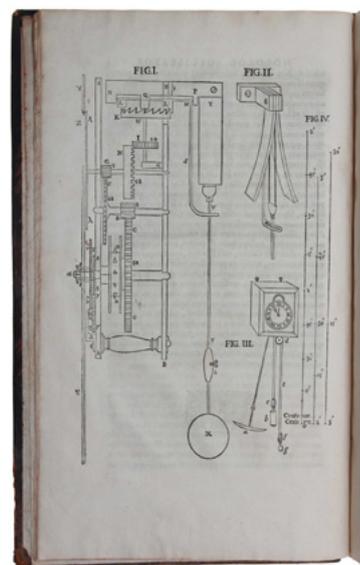
## Second only to Newton's Principia

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

\$62,500



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*, 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.

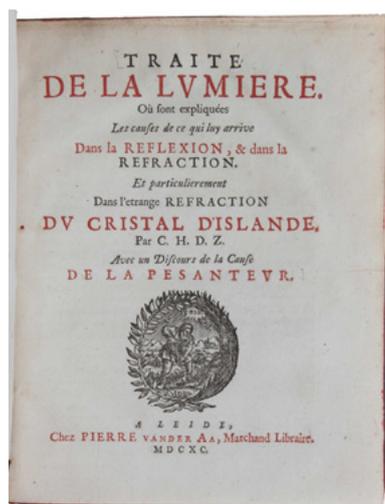


☛PMM 154; Dibner 145; Horblit 53; Evans 31; Sparrow 109; Norman 1137.

## The wave theory of light

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

\$49,500



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 attractive force intrinsic to matter.

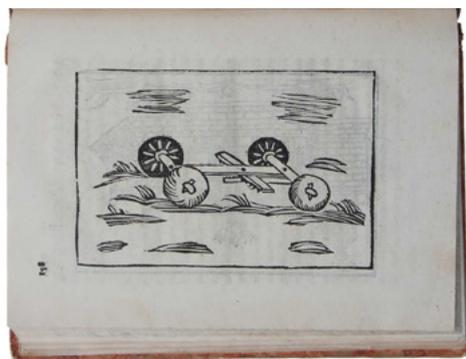


☛Grolier/Horblit, One Hundred Books Famous in Science 54; Dibner, Heralds of Science 145; Evans, First Editions of Epochal Achievements in the History of Science 32; Sparrow, Milestones of Science 111.

## A sixteenth century automobile?

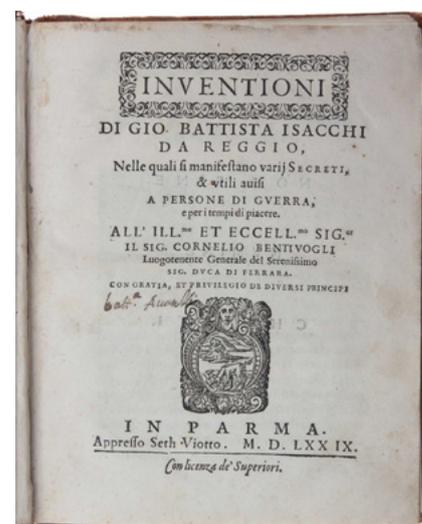
**43. ISACCHI, Giovanni Battista.** *Inventioni nelle quali si manifestano varij secreti, & utili auisi a persone di guerra.* Parma: Seth Viotto, 1579.

**\$11,850**



Rare first and only edition of one of the most remarkable 16th century illustrated works of engineering, containing one of the earliest printed descriptions of a prototype automobile, a device which embodies the principle of the modern-day telegraph, as well as over 50 other inventions and 'secrets' connected with weapons, firearms, fireworks and mechanical contraptions. Many of the machines shown relate to the art of warfare, but others are for industrial, surveying or even leisure purposes. The book is well known for its strikingly early description of the 'horseless carriage': "Far

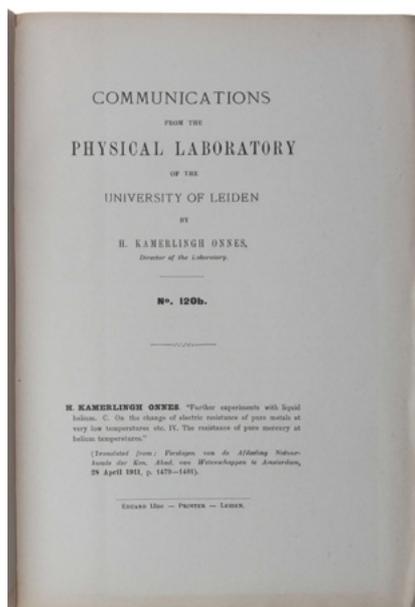
caminare una Carrozza senza Cavalli, ma con industria di Ruote, o Molinelli" "Isacchi da Reggio in his *Inventione* 1579, a very rare volume, describes and illustrates in great detail a means of propelling a carriage without horses by means of the hand labour of four persons applied to spoke-wheels; he gives instructions for making the steering gear and proposes to run at the rate of two miles an hour" (J. E. Hodgkin, *Rariora* III, p. 8). Also remarkable are the 'recipes' for fireworks intended for both recreational and military use. "This is in some respects one of the most remarkable books on fireworks I possess. I have never seen another copy, nor is the book described in any work I have consulted" (Hodgkin, loc. cit.).



## Discovery of superconductivity

**44. 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.

**\$5,650**

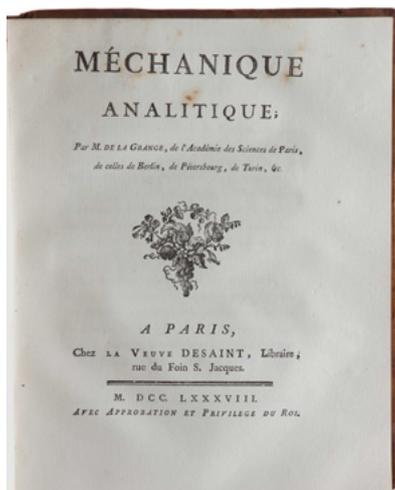


First printing of the first announcement of the discovery of superconductivity, the disappearance of electrical resistance in certain materials at very low temperatures. "Of all the discoveries in condensed matter physics during the 20th century, some might call superconductivity the "crown jewel". Others 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 Kamerlingh Onnes stumbled across superconductivity... the scientific community was caught by complete surprise" (P. M. Grant, "Down the path of least resistance", *Physics World* 24, April 2011, p. 18). In the course of the same experiment, Kamerlingh Onnes and his team also made the first, albeit serendipitous, observation of superfluidity. Very rare in original printed wrappers. According to van Delft & Kes (p. 43), Kamerlingh Onnes's report of his 8 April experiment was published first in the offered journal, and was reprinted later in the same year in Vol. 13 of the *Verslagen van de Afdeling Natuurkunde der Koninklijke Nederlandse Akademie van Wetenschappen te Amsterdam*. Dirk von Delft & Peter Kes, 'The discovery of superconductivity', *Physics Today*, Vol. 63, pp. 38-42.

## Lagrange's two greatest works

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

\$23,150



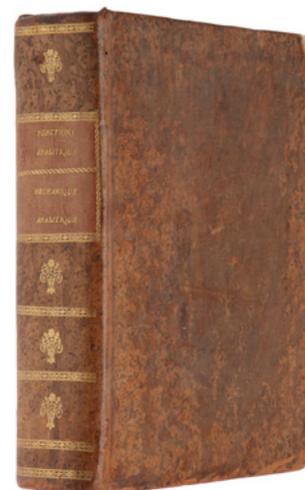
First edition of Lagrange's two most important works contemporarily bound. The *Méchanique* is "perhaps the most beautiful mathematical treatise in existence. It contains the discovery of the general equations of motion, the first epochal contribution to theoretical dynamics after Newton's *Principia*" (Evans). "Lagrange's masterpiece, the *Méchanique Analytique* (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 derives,' 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).

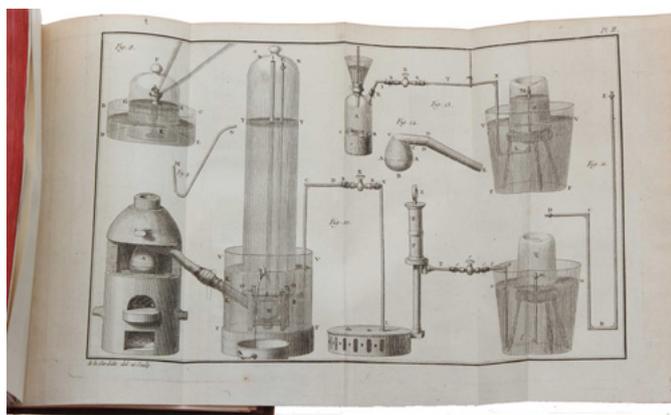
☛Norman 1258; *Landmark Writings in Western Mathematics* 16; Barchas 1198; Honeyman 1881; Stanitz 250.



## A milestone of chemical literature

46. LAVOISIER, Antoine-Laurent de. *Opuscules physiques et chymiques*. Paris: Durand, Didot le jeune, Esprit, 1774.

\$5,000



A beautiful copy of this milestone of chemical literature, "an advance over anything which had gone before" (Partington) and a "very important book" (Duveen). "A founder of modern chemistry and universally acknowledged as the greatest French chemist of the eighteenth century, Lavoisier (1743-1794) was educated as a lawyer. After attending the chemical lectures of G. F. Rouelle (1768), he began his researches in 1772 on combustion and calcination, experimenting with carbon (diamond), phosphorus, sulphur, and the conversion of cakes into metals. "In 1774 Lavoisier published the first

and only volume of his *Opuscules physiques et chymiques*, a pioneer work in which he gives a historical survey of previous workers' efforts and then describes his own experiments on gases and the conclusions to be derived from them" (Duveen & Klickstein). Some of the experiments deal with the composition of the atmosphere and with oxygen. Published the same year as the first volume of Priestley's *Experiments and observations on air* (1774), it exerted a tremendous influence on Continental chemists and set the stage for Lavoisier's overthrow of the phlogiston theory. Partington (pp. 388-393) analyzes the contents and describes this work as "an advance over anything which had gone before." A "very important book" (Duveen), one of Lavoisier's four major works, and a milestone of chemical literature." (Neville).

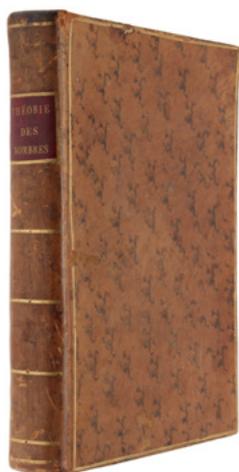
☛Norman 1288; Duveen 339; Duveen & Klickstein 121.



## The most important book on number theory (before Gauss)

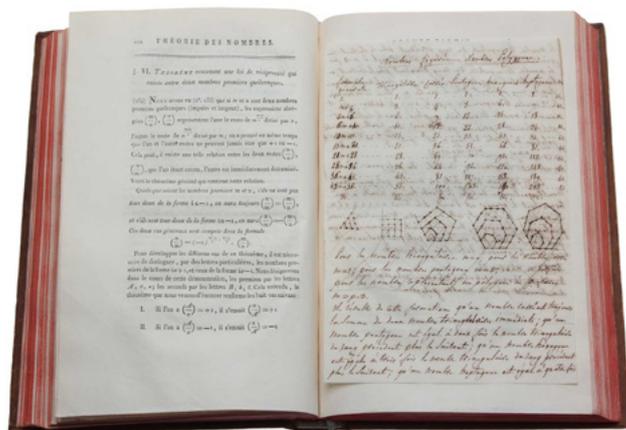
47. LEGENDRE, Adrien Marie. *Essai sur la théorie des nombres*. Paris: Duprat, 1797-1798.

\$4,500



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).

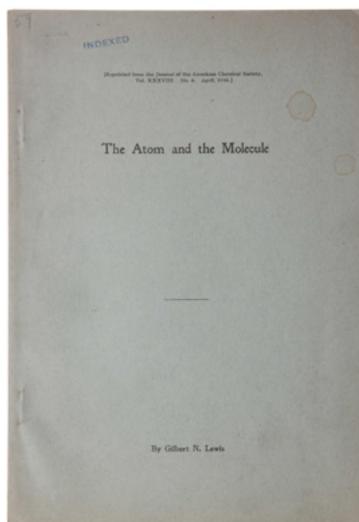


Norman 1325; Parkinson *Breakthroughs* 231.

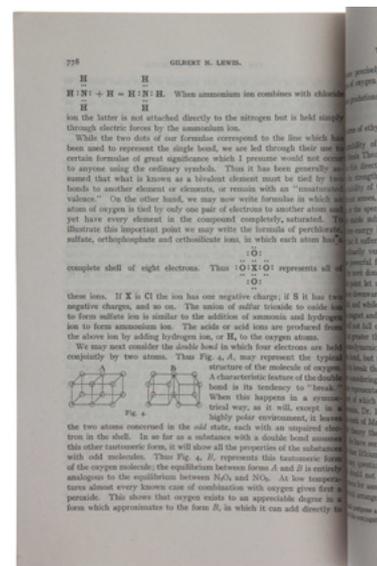
## The covalent bond

48. LEWIS, Gilbert Newton. *The Atom and the Molecule*. American Chemical Society, 1916.

\$6,250



First edition, the extremely rare offprint issue, of the "paper proposing that the chemical bond was a pair of electrons shared or held jointly by two atoms" (DSB), later called the 'covalent bond' by Irving Langmuir. "This remarkable and revolutionary paper laid the foundation for much of our present day understanding of two fundamental concepts of chemistry: the chemical bond and molecular structure. It was, without a doubt, one of the most influential chemistry papers ever published. The enormous influence [Lewis] has had on our understanding of these two essential concepts of chemistry is only equaled by that of Linus Pauling, who acknowledged his great indebtedness to Lewis by dedicating his famous book *The Nature of the*



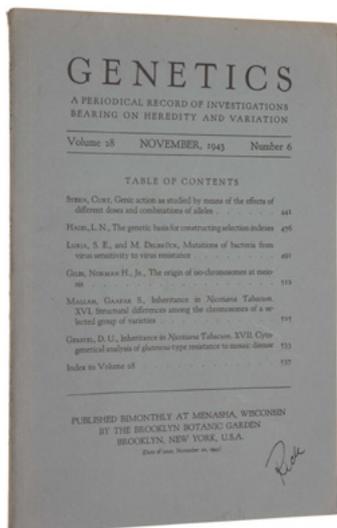
*Chemical Bond* to him" (Gillespie & Robinson, p. 87). On p. 5 of his book, Pauling wrote that Lewis's paper "forms the basis of the modern electronic theory of valence." This offprint is extremely rare: **OCLC list copies at Yale Medical Library and Lilly Library only (the latter being Ian Fleming's copy); no copies located in auction records.** R. J. Gillespie & E. A. Robinson, 'Gilbert N. Lewis and the chemical bond: The Electron Pair and the Octet Rule from 1916 to the Present Day,' *Journal of Computational Chemistry*, Vol. 28, No. 1 (2006), 87-97.

## *The birth of bacterial genetics*

**49. LURIA, Salvador [Salvatore] & DELBRÜCK, Max.** *Mutations of bacteria from virus sensitivity to virus resistance.* New York: Brooklyn Botanic Garden, 1943.

**\$3,150**

First edition of Luria and Delbrück's 'fluctuation test,' one of the most important experiments in the history of biology, "the founding document of modern bacterial genetics" (*New DSB*). "Bacterial genetics was born with the publication in 1943 of the paper by Luria and Delbrück reporting the fluctuation test, and the event has been compared to the birth of genetics itself, in 1865, on the appearance of Mendel's paper" (Judson, p. 56). This experiment, known as the fluctuation test, was published in *Genetics* in 1943. The implications of Luria and Delbrück's work went far beyond the handful of researchers interested in phage. As Luria and others have pointed out, the 1943 paper dealt a blow to the neo-Lamarckian view that viruses somehow induced mutations in bacteria. In a 1947 review, Luria noted that bacteriology had been "one of the last strongholds of Lamarckism," because of the difficulty in providing direct evidence for the existence of both Mendelian traits and the characteristic Darwinian criteria of random change (p. 1). The fluctuation test marked the beginning of Luria's appreciation for the evolutionary implications of his genetics research, and his interest in larger biological questions was evident in his publications through the 1950s. Gunther Stent's classic textbook *Molecular Genetics* equates this publication with Gregor Mendel's 1865 paper on "Versuche über Pflanzenhybriden" (Experiments on plant hybrids), and historian Thomas Brock identifies it as the founding document of modern bacterial genetics" (*New DSB*). Luria and Delbrück shared the 1969 Nobel Prize in Physiology or Medicine



with their longtime collaborator Alfred Hershey for "discoveries concerning virus replication and genetics and ... the importance of your contributions to the biological and medical sciences." Luria also played a role in the establishment of molecular biology, as his first graduate student was James D. Watson.

### *Fewer than a dozen copies are known*

**50. MATTE LA FAVEUR, Sebastian.** *Pratique de chymie, divisée en quatre parties, par S. Matte La Faveur, distillateur & demonstrateur ordinaire de la chymie en la faculté de Medecine de Montpellier. Avec un avis sur les eaux minerales.* Montpellier: Daniel Pech, 1671.

**\$17,500**



Extremely rare complete copy of this important work "less than a dozen copies are known to exist, most imperfect with missing leaves and fewer plates" (*The Roy G. Neville Historical Chemical Library*, vol. 2, p. 153 - describing their copy as "probably the finest example extant" - this copy collates as theirs and is similarly bound in contemporary unrestored calf). "Sold only by the author at his home in Montpellier, the *Pratique* contains clear directions on practical operations and the preparation of chemicals. Matte La Faveur (fl. 1671), distiller and demonstrator of chemistry at Montpellier, simultaneously gave a course at Paris until 1684, when he was succeeded by the famous chemist Nicolas Lemery. Undoubtedly, Lemery used this work when writing his celebrated *Cours de Chymie* (1675), and it is well known that he seldom acknowledged his sources. The *Pratique* forms a direct

link between the *Traite de la Chymie* (1663) of Christophle Glaser and the *Cours* of Lemery. **Extremely rare.**" (Neville).

☛ Caillet, 7225; Dorbon-Aine, 6273; Duveen, 395; Ferchl, 345; Goldsmith, M669; Neu, 2681; Partington, 111, 27; Poggen-dorff, 11, 78; Sotheran, Cat. 800 [1926], 11519; Thorndike, VIII, 141; Thornton 8c, Tully, 122.

## Established obstetrics as a science

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

**\$10,000**



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.

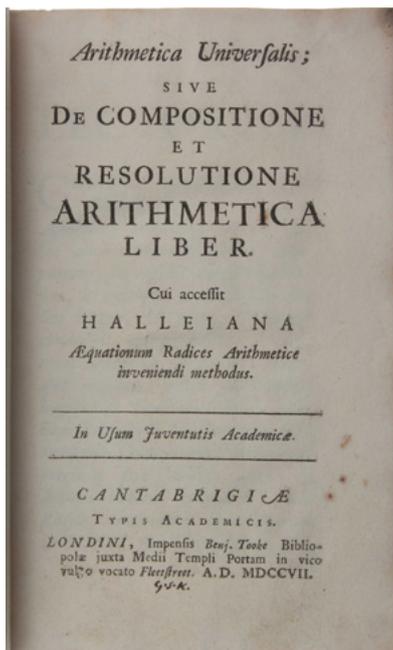
☛ Grolier, *One Hundred Books Famous in Medicine* 33; Lilly, *Notable Medical Books* 85; Norman 1461; Garrison-Morton 6147.



## Newton’s algebra

**52. NEWTON, Isaac.** *Arithmetica Universalis; sive de Compositione et Resolutione Arithmetica Liber. Cui accessit Helieiana Aequationum Radices Arithmetice Inveniendi Methodus ...* Cambridge / London: Typis Academicus / Benjamin Tooke, 1707.

**\$24,500**

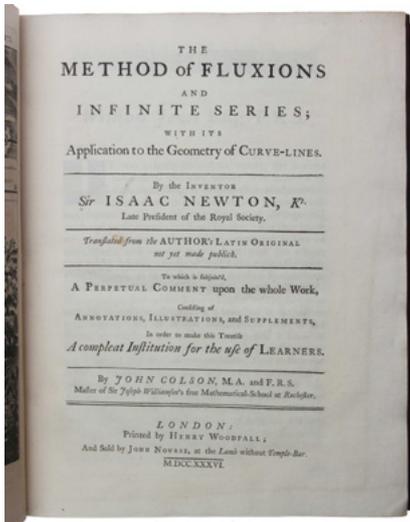


First edition of Newton’s treatise on algebra, or ‘universal arithmetic,’ his “most often read and republished mathematical work” (Whiteside). “Included are ‘Newton’s identities’ providing expressions for the sums of the  $i^{\text{th}}$  powers of the roots of any polynomial equation, for any integer  $i$  [pp. 251-2], plus a rule providing an upper bound for the positive roots of a polynomial, and a generalization, to imaginary roots, of René Descartes’ Rule of Signs [pp. 242-5]” (Parkinson, p. 138). About this last rule for determining the number of imaginary roots of a polynomial (which Newton offered without proof), Gjertsen (p. 35) notes: “Some idea of its originality ... can be gathered from the fact that it was not until 1865 that the rule was derived in a rigorous manner by James Sylvester.” The final chapter, on the extraction of roots, is by Edmund Halley. “Leibniz, unhesitatingly divining their author beneath the cloak of anonymity, gave [the *Arithmetica*] a long review in the *Acta Eruditorum* of Leipzig in 1708. Written thirty years before, he noted, and now deservingly printed by William Whiston, he assured the reader that ‘you will find in this little book certain particularities that you will seek in vain in great tomes on analysis.’ His close associate, Johann Bernoulli, despite some adverse remarks paid Newton the compliment in 1728 of basing his own course on the elements of algebra upon Newton’s text. Perhaps partly in consequence of Newton’s recent death, in Britain too the book began about this time to arouse greater interest than when it was first issued in 1707” (A. R. Hall, *Isaac Newton*, 1992, p. 174).

## Newton on calculus

**53. NEWTON, Sir Isaac.** *The method of fluxions and infinite series; with its application to the geometry of curve-lines... To which is subjoin'd a perpetual comment upon the whole work...* by John Colson. London: Henry Woodfall for John Nourse, 1736.

**\$43,850**



The Haskell F. Norman copy of Newton's first exposition of his fluxional calculus. Originally written in 1671, in Latin, this was Newton's first comprehensive presentation of his method of fluxions which, according to Hall 'might have effected a mathematical revolution in its own day' (*Philosophers at War*, pp. 65-6). It should properly be placed first in the great trilogy of Newton's major works: *Fluxions*, *Principia* (1687), and *Opticks* (1704). The original Latin text remained unpublished until 1779 when it appeared in Samuel Horsley's *Opera Omnia*. It was first in 'Methodus fluxionum' that "Newton introduced his characteristic notation and conceptions. Here he regarded his variable quantities as generated by the continuous motion of points, lines, and planes, rather than as aggregates of infinitesimal elements... In the 'Methodus fluxionum' Newton stated clearly the fundamental problem of the



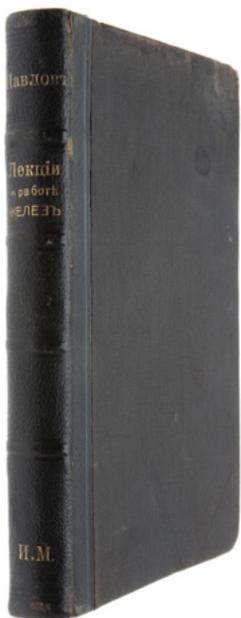
calculus: the relation of quantities being given, to find the relation of the fluxions of these; and conversely (Boyer, *The Concept of Calculus*, pp.192-3).

☛ Babson 171; Gray 232; Wallis 232; Norman 1595 (this copy); Stanitz 46d.

## Pavlov's dogs

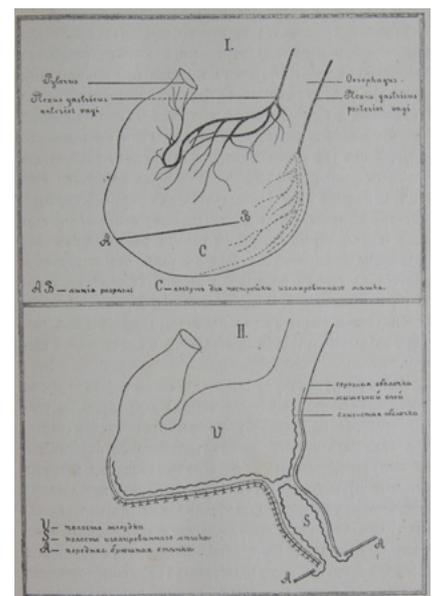
**54. PAVLOV, Ivan Petrovitch.** *Lektsii o rabotie glavnykh pishtshevaritelnykh zhelyos.* St. Petersburg: I. N. Kushnereff & Co., 1897.

**\$25,000**



A fine copy, in contemporary Russian binding, of this famous work on digestive juices by the demonstrator of the 'conditioned reflex'. "The elaboration of these experiments and their extension to children demonstrated how great a proportion of human behaviour is explicable as a series of conditioned reflexes. Indeed some psychologists seem nowadays to believe that behaviour is all. Pavlov's results are, indeed, clearly complementary to those of Freud and many regard them as of more fundamental significance. Like Freud's, this was the work of one man and a completely new departure. Pavlov was awarded The Nobel Proze for Medicine in 1905" (*Printing and the Mind of Man*).

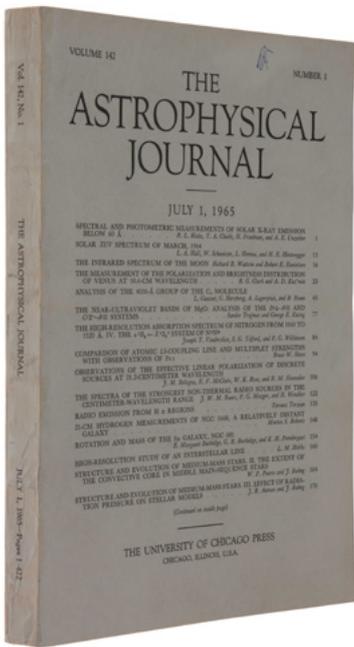
☛ PMM 385; Grolier/Horblit 83; Dibner 135; Grolier/Medicine 85; Lilly Library *Notable Medical Books* 241.



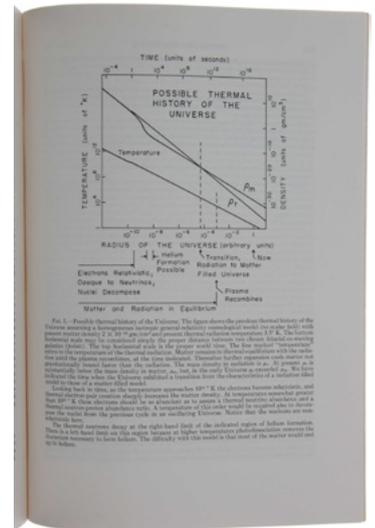
## Cosmic microwave background

**55. PENZIAS, Arno & WILSON, Robert; DICKE, Robert, PEEBLES, James, ROLL, Peter & WILKINSON, David A** *Measurement of Excess Antenna Temperature at 4080 Mc/s [with:] Cosmic Black-Body Radiation*. Chicago: The University of Chicago Press, 1965.

**\$11,850**



First edition, in original printed wrappers, of one of the most important discoveries in the history of cosmology, the cosmic microwave background. This was the first observational evidence for the big bang theory of cosmogenesis. “The discovery of the cosmic background radiation created a sensation in the scientific world, and was widely reported also in newspapers and popular journals” (Kragh, *Cosmology and Controversy* p. 354). Harvard physicist Edward Purcell read this announcement and concluded that “It just may be the most important thing anybody has ever seen” (quoted in T. Ferris, *The Red Limit* (1978), p. 151) and astronomer Robert Jastrow echoed this conclusion by stating that Penzias and Wilson “made one of the greatest discoveries in 500 years of modern astronomy” (Jastrow, *God and the Astronomers* (1978), p. 20).



## Textual foundation of psychiatry

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

**\$4,750**



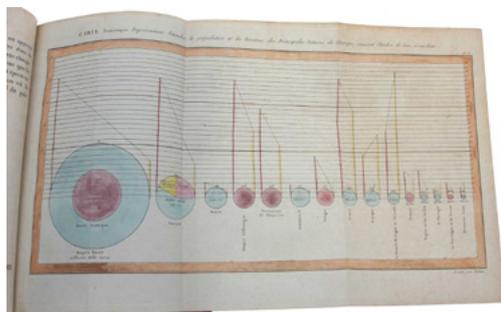
First edition, a fine copy, of “one of the foremost medical classics, giving as it did a great impetus to humanitarian treatment of the insane.” (Garrison). Philippe Pinel’s *Traité médico-philosophique sur l'aliénation mentale mentale, ou la manie*, which presented the textual foundation of psychiatry, 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.

## Pie charts

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

\$5,000



A fine copy of the important first French edition (see below) of *The Statistical Breviary*. Playfair, the founder of graphical methods of statistics, published this work originally in English in 1801. It is considered his most theoretical book about graphics in which he “broke free of analogies to the physical world and drew graphics as designs-in-themselves” (Tufte), and contains what is generally credited as the first pie chart. Donnant did not merely produce a translation but

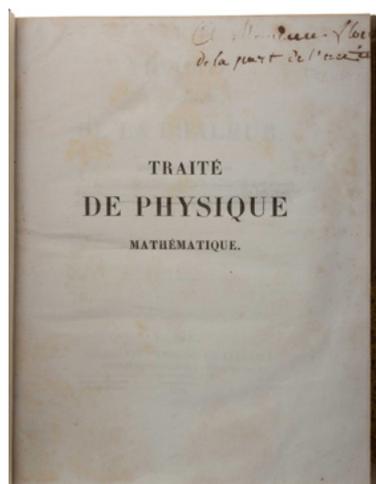
also added several original contributions to this edition, for example *A Statistical Account of the United States of America*, which Playfair translated into English and published in 1805. In “The Statistical Breviary: shewing, on a Principle Entirely New, the Resources of every State and Kingdom in Europe” [Playfair] first introduced the circle diagram and pie chart that used area to represent the relative sizes of geographical regions. Playfair ‘offers a creative combination of different visual forms: circles (used to show the area of nations), a pie chart (to show the divisions of the Turkish Empire), and lines (to show both population and taxes)’ - Akerman & Karrow, p. 231 and illustrated as fig. 131 (English edition). Kress B.4583; see Tufte, *Visual Display of Quantitative Information*, p. 44.” (Tufte sale, this French edition).



## The distribution of heat

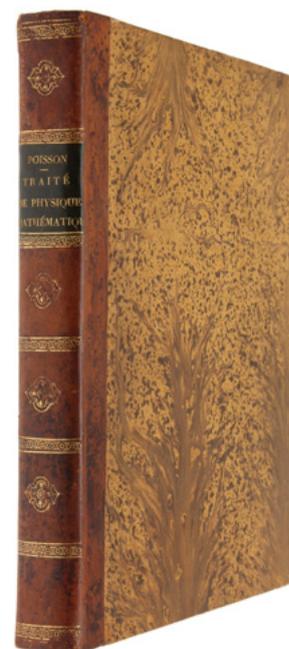
58. **POISSON, Siméon-Denis.** *Théorie mathématique de la chaleur.* Paris: Bachelier, 1835.

\$6,000



First edition, presentation copy, of this classic work on the mathematical theory of heat, inscribed by Poisson to Marie-Jean-Pierre Flourens, the founder of experimental brain science and a pioneer in anesthesia. “This is the first edition of an important work in which Poisson formulates equations for the distribution of heat in bodies. As opposed to Fourier, who maintained in his *Mémoire analytique de la chaleur* that the conductivity of heat was contained in the motion of flux, Poisson showed that it must be derived from an absorptive coefficient restoring the neglected functional dimensions.

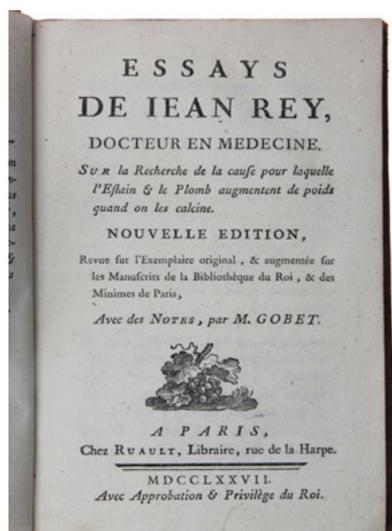
☛ Stanitz 353 (this copy); Roberts & Trent 260; *Bibliotheca Chémico-Mathematica* 3683.



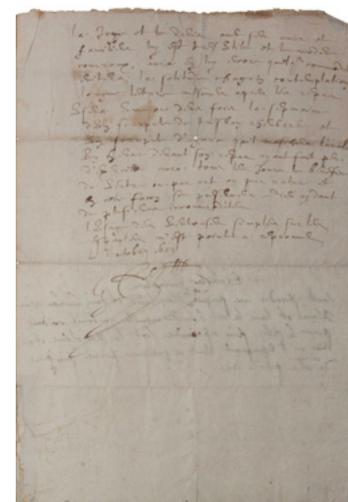
## Anticipated Lavoisier - rare autograph manuscript

**59. REY, Jean.** Autograph document signed, in Latin and French, 1 October 1623. 2 pages. Offered here with the first obtainable edition of Rey's only published work.

\$22,500



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)."

## 17th century manuscript discussing work of Galileo, Boyle, Torricelli...

**60. RINALDINI, Carlo.** *Philosophia Naturalis*. [Manuscript on paper, ca. 1680. Small 4to (215 x 150 mm), 280 leaves, ff. 140v-141 and 257v-258 blank. Latin text in a neat cursive hand with many illustrative diagrams in the text. Watermarks: Heawood, Padua 2597, 2598, 2599 & Venice, 1895, 2864, 3102, 3104. Contemporary vellum-backed boards covered in paper with decorative floral motifs, faint damp stain on the last few leaves otherwise a fine copy in entirely original condition].

\$95,000



Important scientific manuscript, the text of lectures delivered by Rinaldini at the University of Padua, where he served as professor of natural philosophy for 30 years from 1667. Rinaldini had been a close friend of Galileo at Pisa, and was the first to lecture there on his discoveries. As well as discussions of Galileo's work, the present manuscript also contains an account of Rinaldini's own important discoveries, including that of the convection of heat. Among other authors cited and discussed are Brahe, Barrow, Borelli, Boyle, Copernicus, Descartes, Gassendi, Kepler, Riccioli and Torricelli. Rinaldini is an important transitional figure, presenting in this manuscript Aristotelian ideas alongside those of the 'new science' of Galileo and his supporters, to whose circle he belonged.

**Provenance:** Sir Thomas Phillipps (1792 – 1872), with his signature and the catalog number 9608 on the title.

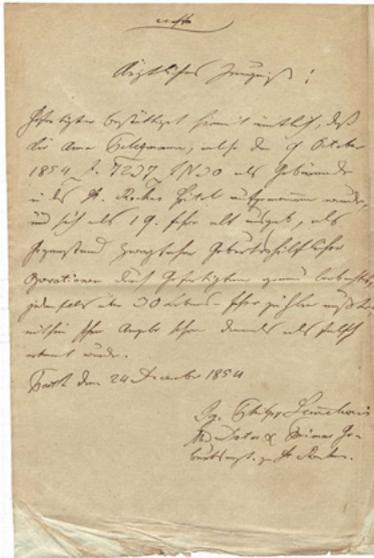


## One of a handful of autograph manuscripts

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

**\$47,350**

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 the three authors 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'". (J. Antall, V. Harko u T. Vida, *Semmelweis Ignac összegyűjtött 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. The large and impressive document (380 x 240 mm) is a medical testimony done 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, the 9th October 1854, that she was 19 years of age. Due to two obstetric surgeries Semmelweis however 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".

## The most important master's thesis of the 20th century

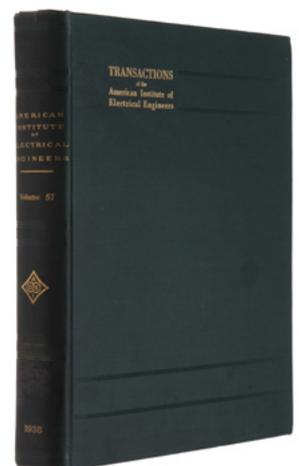
**62. SHANNON, Claude Elwood.** *A symbolic analysis of relay and switching circuits.* New York: American Institute of Electrical Engineers, 1938.

**\$26,250**



This paper, described in a note on p. 713 as "an abstract of a thesis presented at MIT for the degree of Master of Science," has been frequently called the most important master's thesis of the twentieth century with respect to the influence it had on the development of the electronic and computer industries. Shannon obtained B.S. degrees in mathematics and engineering in 1936 from the University of Michigan, and later that year became a graduate student and research assistant at MIT's Department of Electrical Engineering, where he began working toward an advanced degree. As an undergraduate Shannon had studied symbolic logic and Boolean algebra, and while working with the Bush differential analyzer at MIT became interested in the machine's complex relay circuit that controlled the machine's operation. Recognizing that Boolean algebra was "the appropriate mathematics for studying such two-

valued systems," Shannon "developed these ideas during the summer of 1937, which he spent at Bell Laboratories in New York City, and, back at MIT, in his master's thesis, where he showed how Boolean algebra could be used in the analysis and synthesis of switching and computer circuits. The thesis, his first published paper, aroused considerable interest when it appeared in 1938. In 1940 it was awarded the Alfred Noble Prize of the combined engineering societies of the United States" (*Claude Elwood Shannon: Collected Papers* (1993), pp. xi-xii).



## Beautiful obstetrical atlas

**63. SMELLIE, William.** *A Sett of Anatomical Tables, with Explanations, and an Abridgement, of the Practice of Midwifery, With a View to Illustrate a Treatise on the Subject, and Collection of Cases.* London: [D. Wilson], 1754.

\$9,350



First edition of the finest, most accurate, and largest obstetrical atlas published up to that time. “Rare, presumably issued in only 100 copies” (Norman). “Smellie, the foremost obstetrician of the eighteenth century, described more accurately than any previous writer the mechanical relation of the fetal head to the mother’s pelvis during parturition. He introduced the English lock on the obstetrical forceps, and coincidentally with André Levret of Paris, added the pelvic curve. He was the first to rotate the fetal head with forceps and to use them on the aftercoming head of a breech delivery. Smellie was the first to lay down rules for the safe use of the forceps; these remain valid today. He also invented several important obstetric instruments...”



(Grolier/Medicine). The *Sett of Anatomical Tables*, published two years after the first volume of the *Treatise*, was intended as a supplement to the text to illustrate as accurately as possible the female pelvis and the fetus, but is regarded as “a complete work in itself” (Garrison-Morton).

✚Grolier/Medicine 43B; *Heirs of Hippocrates* 826; Norman 1955; Garrison-Morton 6154.

## Spontaneous generation rejected

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

\$14,350



The very rare first edition of Swammerdam’s important entomology work in which he “rejected spontaneous generation and proposed that the process of decay in organic matter was the result of living organisms” (Dibner on the later reworked edition of this work by Boerhave from 1737, i.e., *Bybel der natuure*). The *Biblia natura*, Swammerdam’s major work, was published fifty-seven years after his death by Herman Boerhaave, who assembled it from unpublished manuscript materials integrated with a slightly revised version of Swammerdam’s *Historia insectorum generalis* (1669)” (Norman). “The 1669 *Historia* was devoted to the overthrow of the idea of metamorphosis, as its title explains: ‘General Account of the Bloodless Animals, in Which Will be Clearly Set Forward the True Basis of their Slow Growth of Limbs, the Vulgar Error of the Transformation, Also Called Metamorphosis, Will be Effectually Washed Away, and Comprehended Concisely in Four Distinct Orders of Changes, or Natural Budding Forth of Limbs.’

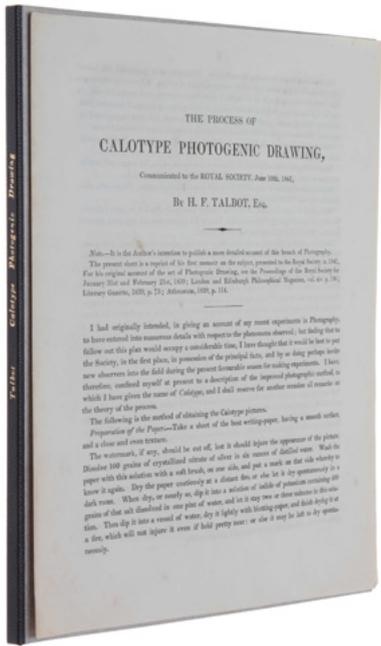


✚Garrison-Morton 294; Barchas 2018. See Dibner 191; Norman 2037; Sparrow 187 for the later *Bybel der natuure*.

## First announcement of the Calotype process

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

\$18,750



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). "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.

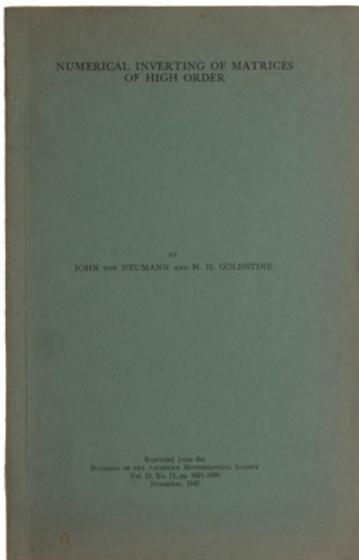
library of his home at Lacock Abbey, survives at the Science Museum in London.

## The birth of numerical analysis

66. VON NEUMANN, John. & GOLDSTINE, Herman H. *Numerical Inverting of Matrices of High Order*. AMS, 1947.

\$3,500

Rare offprint of one of von Neumann's major papers. "The 1947 paper by John von Neumann and Herman Goldstine, 'Numerical Inverting of Matrices of High Order' (*Bulletin of the AMS*, Nov. 1947), is considered as the birth certificate of numerical analysis. Since its publication, the evolution of this domain has been enormous." (Bultheel & Cools, *The Birth of Numerical Analysis*). "Just when modern computers were being invented (those digital, electronic, and programmable), John von Neumann and Herman Goldstine wrote a paper to illustrate the mathematical analyses that they believed would be needed to use the new machines effectively and to guide the development of still faster computers. Their foresight and the congruence of historical events made their work the first modern paper in numerical analysis. Von Neumann once remarked that to found a mathematical theory one had to prove the first theorem, which he and Goldstine did concerning the accuracy of mechanized Gaussian elimination - but their paper was about more than that. Von Neumann and Goldstine described what they surmised would be the significant questions once computers became available for computational science, and they suggested enduring ways to answer them." (John von Neumann's Analysis of Gaussian Elimination: the Founding of Modern Numerical Analysis, Lecture at ICME, Stanford, January 2007). "In sum, von Neumann's paper contains much that is unappreciated or at least unattributed to him. The contents are so familiar, it is easy to forget von Neumann is not repeating what everyone knows. He anticipated many of the developments in



the field he originated, and his theorems on the accuracy of Gaussian elimination have not been encompassed in half a century. The paper is among von Neumann's many firsts in computer science. It is the first paper in modern numerical analysis, and the most recent by a person of von Neumann's genius." (Kees Vuik, *Birthday of Modern Numerical Analysis*).



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