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

SOPHIA ∑ RARE BOOKS

Booth A1
London International Antiquarian Book Fair
Olympia Exhibition Centre
Thur: 2-8pm; Fri: 11-7pm; 11-5pm
28-30 May 2015

SOPHIA ∑ RARE BOOKS

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

'The most important biological book ever'

*First edition, untouched in its original binding, inscribed by Darwin's
closest collaborator Joseph D. Hooker just eleven days after its publication.
A magnificent association copy.*

Hooker collaborated with Darwin on the manuscript of *On the Origin of Species* and was the first person Darwin trusted with his theory of evolution by natural selection. In a letter Darwin wrote to Hooker 'it is like confessing a murder'.
Hooker was also, together with Lyell, responsible for the famous joint publication in 1858 by Darwin and Wallace.

Item # 16

'No single set of letters was more important to Darwin than those
exchanged with his closest friend, the botanist Joseph Dalton Hooker'
(*The Darwin Correspondence Project*)

'One of the first technological books of modern times'
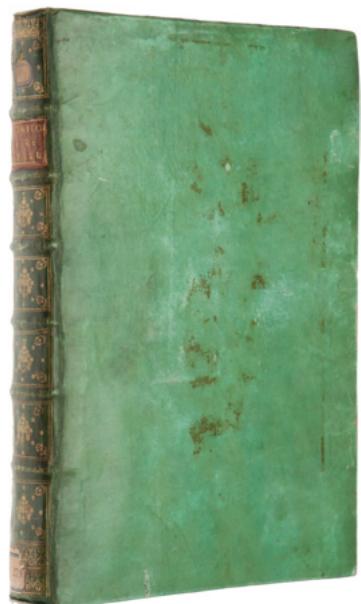
1. AGRICOLA, Gerorgius. *De re metallica.* Basel: Froben & Bischof, 1556.

£48,500

A beautiful copy, in a contemporary German binding of green vellum, of "the first systematic treatise on mining and metallurgy and one of the first technological books of modern times... The *De Re Metallica* embraces everything connected with the mining industry and metallurgical processes, including administration, prospecting, the duties of officials and companies and the manufacture of glass, sulphur and alum. The magnificent series of two hundred and seventy-three large woodcut illustrations by Hans Rudolph Manuel Deutsch add to its value. Some of the most important sections are those on mechanical engineering and the use of water-power, hauling, pumps, ventilation, blowing of furnaces, transport of ores, etc., showing a very elaborate technique." (*Printing and the Mind of Man).*
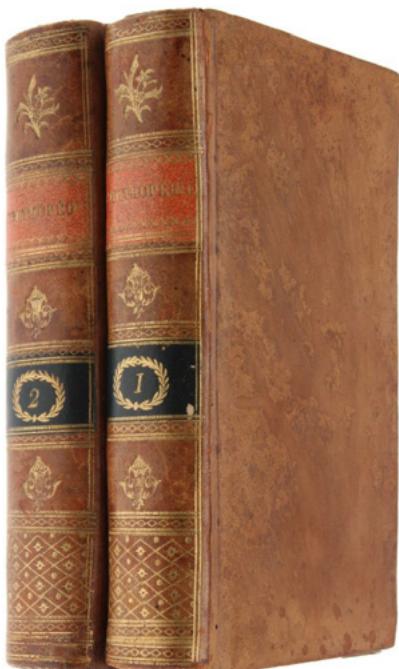
PMM 79; Dibner 88; Grolier/Horblit 2b; Sparrow, *Milestones of Science* 4.

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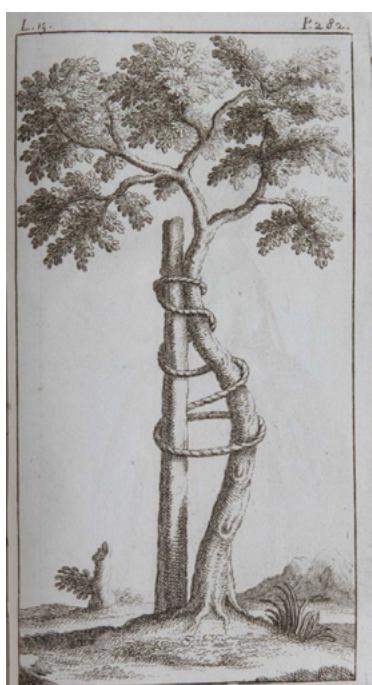
2. ANDRY, Nicolas. *L'orthopédie ou l'art de prevenir et de corriger dans les enfans, les difformités du corps.* Paris: Chez la veuve Alix; Lambert & Durand, 1741.

£10,500

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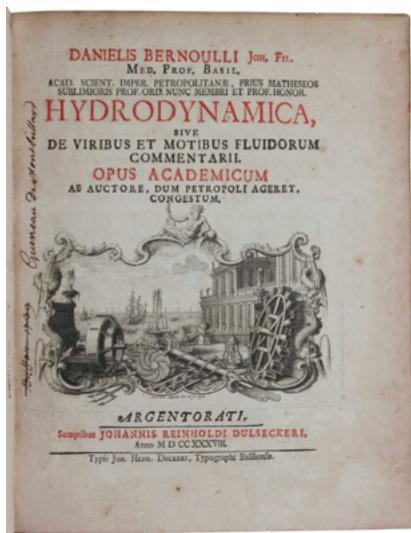
Grolier/Medicine 42; Lilly, *Notable Medical Books* 113; Norman 55; *Heirs of Hippocrates* 697; Garrison-Morton 4301.

The copy of Comte de Buffon

3. BERNOULLI, Daniel. *Hydrodynamica, sive de viribus et motibus fluidorum commentarii.* Strasbourg: Johann Reinhold Dulsseker, 1738.
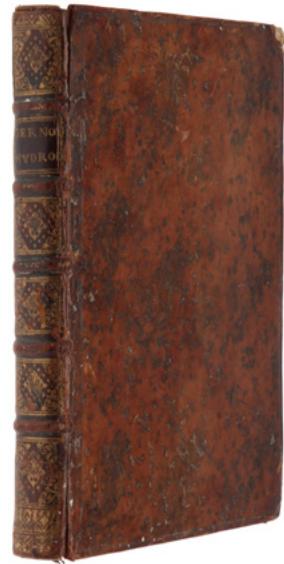
£13,000

First edition with outstanding provenance, the copy of the great French naturalist, mathematician, cosmologist, and encyclopedic author, Comte de Buffon (1707-1784) and later his collaborator Philippe Guéneau de Montbeillard (1720-1785). A beautiful and very large copy, in unrestored contemporary calf, of Bernoulli's epochal work on fluid dynamics and kinetic gas theory. "Bernoulli's *Hydrodynamica* [was] one of the major works initiating the mathematical study of fluid flow… He also examines the equilibrium oscillation of an inertialess ocean, and explicitly states that the flow equations are appropriate not only for the more common applications of fluid dynamics but also for the flow of blood in veins and arteries. Bernoulli, like Galileo Galilei in 1638 and Christian Huygens, assumes conservation of mv^2 rather than conservation of momentum mv, m and v symbolizing a body's mass and velocity respectively… [The *Hydrodynamica* also] initiates the mathematical study of the kinetic theory of gases ... and analytically deduces Boyle's Law that volume and pressure of a gas are inversely related, a law originally obtained empirically" (Parkinson, *Breakthroughs*).

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

Honeyman copy

4. BERNOULLI, Johann. *Opera omnia, tam antea sparsim edita.* Lausanne & Geneva: Marci-Michaelis Bousquet, 1742.
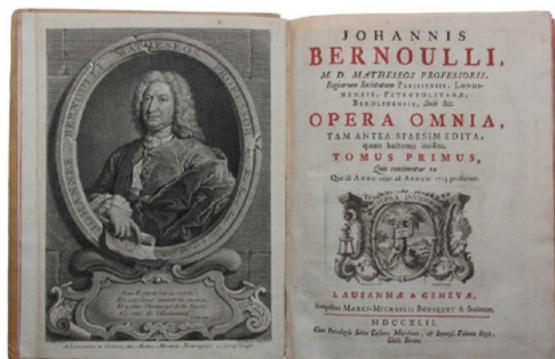
£4,850

An exceptionally fine and complete copy with both the portraits which are often lacking, from the collection of Robert B. Honeyman. " [Johann] Bernoulli published only one book, *Théorie de la manoeuvre des vaisseaux* (1714) and apart from this, his dissertation *De motu musculorum* (1694) and one or two minor pieces, all his work was contributed to journals (189 papers are collected here) or were first published in these volumes, i.e. 59 of his lectures and the *Hydraulica* in volume IV [appearing here for the first time in print], which was written in competition with his son Daniel." (Roger Gaskell). "The first volume is primarily devoted to problems in geometry and the early calculus, but also contains papers on muscular mechanics, the resistance of solids, and a geometrical demonstration of the motion of pendulums and projectiles in resisting and unresisting media. Volumes two and three are almost totally devoted to problems of mechanics, the first of these containing his theoretical essay on the maneuvering of vessels and related papers, as well as numerous contributions on the analysis of trajectories. His discourse on the laws governing the communication of movement opens volume three, which also contains his essay on celestial mechanics. The last volume contains contributions on the curvature of elastic plates, his mechanico-dynamical propositions, and problems in dynamics. A very fine and completley unrestored set, housed in four fine custom half red morocco cases.
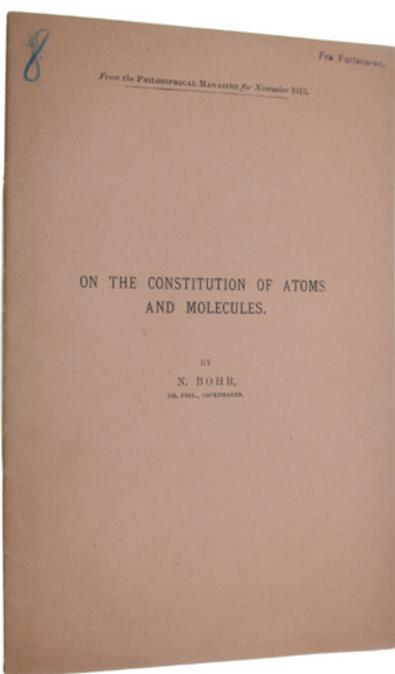
Honeyman 293 (this copy, sold for $1,500 in 1978); Norman 217; Stanitz 55; Arnoud de Vitry 55.

The birth of modern atomic physics

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

£35,000
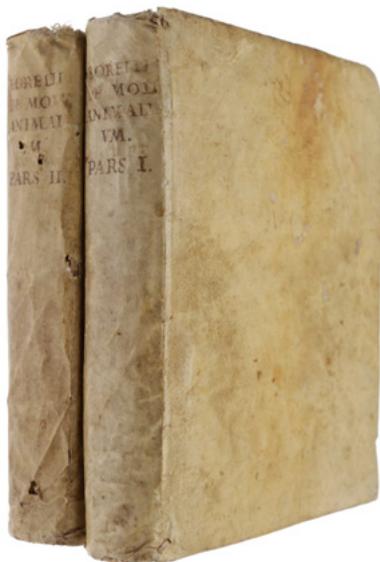
Extremely rare author's presentation offprints of his great trilogy, which constitutes the birth of modern atomic physics. "Bohr's three-part paper postulated the existence of stationary states of an atomic system whose behavior could be described using classical mechanics, while the transition of the 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."

The body as a machine regulated by physical laws

6. BORELLI, Giovanni Alfonso. *De motu animalium.* Rome: Angeli Bernabo, 1680-81.

£6,000

A fine copy of the foundation work of biomechanics. "Pupil of Galileo and teacher of Malpighi, Borelli's lasting fame is his dominating influence in the establishment of the Iatrophysical School of thought, which sought to interpret all physiological phenomena by the laws of mathematics and physics." (*Heirs of Hippocrates*). "Inspired by Harvey's mathematical demonstration of the circulation of the blood, Borelli, a trained mathematician and physicist, conceived of the body as a machine whose phenomena could be explained entirely by the laws of physics. Borelli was the first to recognise that bones were levers powered by the action of muscle, and devoted the first volume of his work to the external motions produced by this interaction, with extensive calculations on the motor forces of muscles. The second volume treats of internal motions, such as the movements of muscles themselves, circulation, respiration, secretion, and nervous activity" (Norman). "Borelli originated the neurogenic theory of the heart's action and first suggested that the circulation resembled a simple hydraulic system. He was the first to insist that the heart-beat was a simple muscular contraction" (Garrison-Morton).

Dibner 190; Grolier/Horblit 13; Norman 270; Garrison-Morton 762; *Heirs of Hippocrates* 496; Lilly *Notable Medical Books* 91.

'The birth of atomic physics' (PMM 203)

7. BOSCOVICH, Rogerius Josephus. *Philosophiae naturalis theoria redacta ad unicam legem virium in natura existentium.* Vienna: In Officina Libraria Kaliwodiana, 1758.
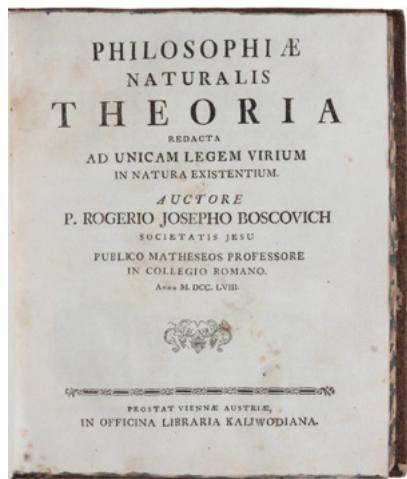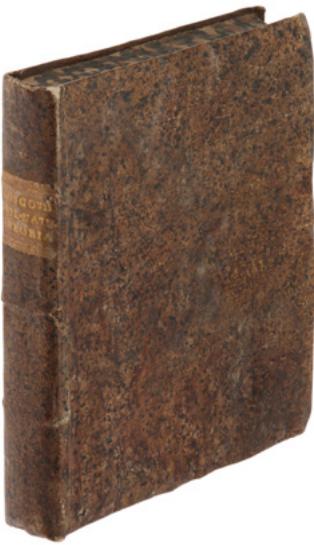
£98,500

Fine copy in contemporary boards of "Boscovich's masterpiece" (Norman), a work "now recognized as a fundamental influence on modern mathematical physics" (*Printing and the Mind of Man*), and a notorious rarity. Only two copies of this rare work have appeared at auction: 1. The Honeyman-Garden copy - this lacked the 16-page letter to Scherffer. 2. The Norman-Freilich copy – this had one gathering supplied from another, shorter, copy, and was in a 19th-century binding. Its impact was felt by such scientific luminaries as Joseph Priestley, Humphry Davy, Michael Faraday, James Clerk Maxwell, Lord Kelvin, J. J. Thompson, and Niels Bohr.

Boscovich suggests that a single law is the basis of all natural phenomena and of the properties of matter, and that the multiplicity of physical forces is only apparent and due to inadequate mathematical knowledge, anticipating the modern search for a unified field theory. The chapter *De Spatio, & Tempore, ut a nobis cognoscuntur* (Space and Time as They are Perceived by Us) can be seen as an anticipation of the theory of relativity, and his discussion of cosmology postulates a version of the current many-universes scenario. His attempt to explain the structure of matter in terms of point atoms, together with a law of force acting between them, anticipates the modern theory of quarks.

❧PMM 203; Norman 277; Garden Sale 150; Freilich Sale 73; Honeyman Sale 427.

'One of the great books in the history of thought' (Fulton)
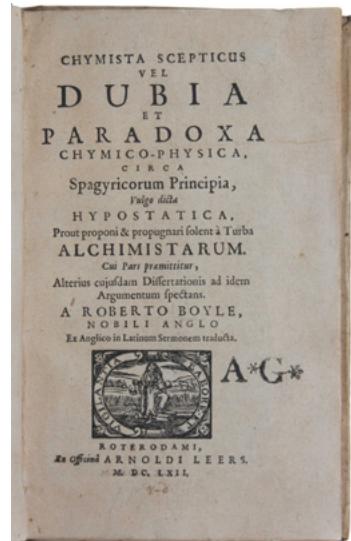
8. BOYLE, Robert. *Chymista scepticus vel dubia et paradoxa chymico-physica, circa spagyricorum principa, vulgo dicta hypostatica, Prout proponi & propugnari solent à Turba Alchimistarum. Cui pars premittitur, alterius cujusdem dissertationis ad idem argumentum spectans.* Rotterdam: A. Leers, 1662.

£10,750

First Latin edition, one of two issues, each published one year after the first English edition (the other was published at London, no priority established), of this milestone in the history of chemistry. "His most important work [where he] set down his corpuscular theory of the constitution of matter, which finally freed chemistry from the restrictions of the Greek concept of the four elements, and was the forerunner of Dalton's atomic theory" (Sparrow). "Boyle's most celebrated book is his Sceptical Chymist … It contains the germs of many ideas elaborated by Boyle in his later publications" (Partington II, p. 496). This Latin edition is the second edition overall; both issues are very rare: we have been unable to locate any copy of either issue in auction records. OCLC lists six copies of the Rotterdam issue and four of the London issue in the US. This second edition is the earliest most collectors can reasonably expect to acquire: the last copy of the first edition sold at auction made £362,500 (The Library of the late Hugh Selbourne M.D., Part One, Bonham's London, 25 March 2015, lot 236).

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

The observational basis for Kepler's laws of planetary motion

9. BRAHE, Tycho. *Astronomiae Instauratae Mechanica.* Nuremberg: Levinus Hulsius, 1602.

£31,000

First trade edition, a fine copy with provenance, of one of Brahe's most important works, a description of his famous astronomical instruments (the most advanced in the world for their time), his globe, and his observatory on the island of Hven. "Brahe's observations formed the basis upon which Kepler established his three laws of planetary motion" (Sparrow). "In 1576, King Frederick II conferred upon Brahe the lifelong use of the island of Hven in the Danish Sound. There the astronomer constructed the most advanced astronomical observatory of his time, which he christened Uraniborg (heavenly castle)' (DSB).
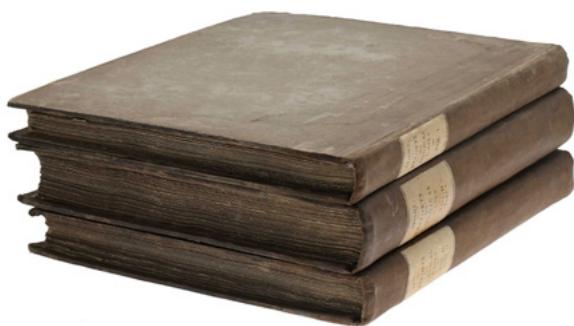
Provenance: The Danish astronomer John Louis Emily Dreyer (1852-1926) (bookplate, signature dated 1875 and a few notes laid in): Dreyer wrote the standard biography of Brahe and published in 1864 a supplement of approximately 1000 new nebulae to Herschel's *A General Catalogue of Nebulae and Clusters of Stars* (London 1864); Francisco J.M. Duarte (owner's signature).

℘ Norman 320; Sparrow *Milestones of Science* 29; Dreyer, *Tycho Brahe*, pp. 260-264 and 370.

'The plates are among the finest medical illustrations known' (Friedman)

10. BRIGHT, Richard. *Reports of Medical Cases, selected with a view of illustrating the symptoms and cure of diseases by a reference to morbid anatomy.* London: Richard Taylor for Longman, Rees, Orme, Brown, and Green & S. Highley, 1827-31.
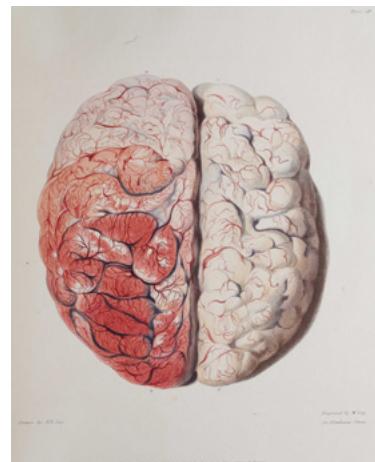
£54,000

A fine copy of Bright's most important work. The 47 large hand-coloured engraved "plates in Bright's Reports are among the most beautiful of medical illustrations" (Grolier/Medicine). Most were drawn by Frederick Richard Say, a distinguished portraitist whose portrait of Bright now hangs in the Royal College of Physicians of London. "In order to achieve the most poignant reproductions of his post-mortem material, Bright was probably required to bring Say to the autopsy room whenever a specimen of interest arose. Say presumably produced a water color image of the specimen on the spot which was subsequently copied by the engraver" (Fine). Say's father William, who produced the majority of the plates, used mezzotint variously combined with line-engraving, stipple, and soft-ground etching to create the printed images.
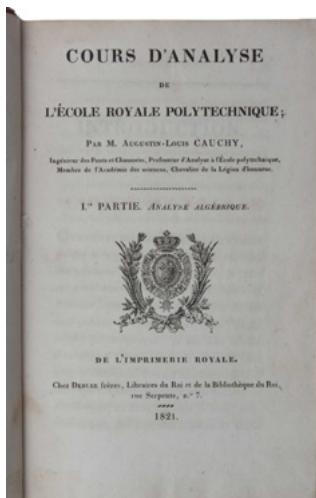
℘ Grolier Medicine 60a; Lilly, *Notable Medical Books* 183; Norman 341; Garrison-Morton 2285 & 4206; *Heirs of Hippocrates* 1451. Fine, 'Pathological specimens of the kidney examined by Richard Bright,' *Kidney International* 29 (1986), pp. 779-83

One of the most influential mathematics books ever written
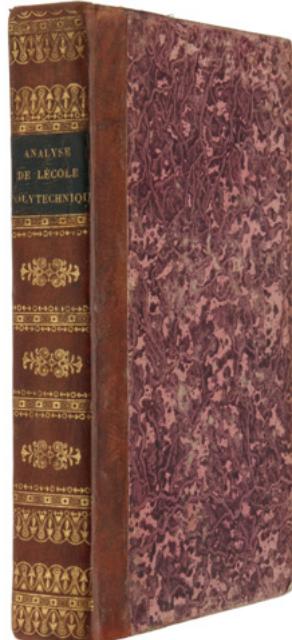
11. CAUCHY, Augustin-Louis. *Cours d'analyse de l'École Polytechnique; I.re Partie. Analyse algébrique.* Paris: De l'imprimerie Royale, chez Debure frères, 1821.

£4,500

An exceptionally fine copy of the first edition of Cauchy's great textbook, one of the most influential mathematics books ever written, in which "Cauchy gave the foundation of the calculus as we now generally accept it". (D.J. Struik). "In 1821, Augustin-Louis Cauchy (1787-1857) published a textbook, the *Cours d'analyse*, to accompany his course on analysis at the École Polytechnique. It is one of the most influential mathematics books ever written. Not only did Cauchy provide a workable definition of limits and a means to make them the basis of a rigorous theory of calculus, but he also revitalized the idea that all mathematics could be set on such rigorous foundations. Today the quality of a work of mathematics is judged in part on the quality of its rigor; this standard is largely due to the transformation brought about by Cauchy and the *Cours d'analyse*" (Bradley & Sandifer, p. vii).
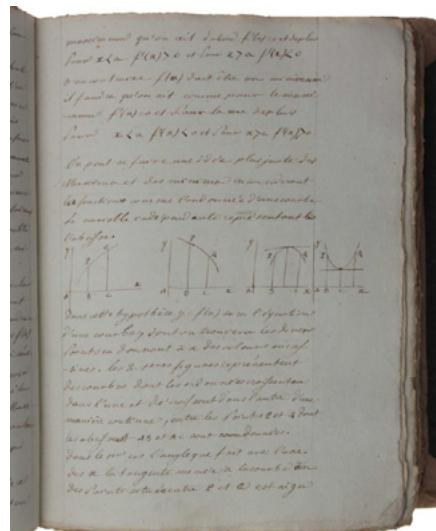
☙*Landmark Writtings in Western Mathematics* 25; *En Francais dans le texte* 231.

Historically important manuscript lecture notes

12. CAUCHY, Augustin-Louis. *Manuscript volume of lecture notes on analysis and mechanics delivered at the École Polytechnique.* [Paris, 1824-25].

£11,500

A remarkable survival, the only recorded set of notes of Cauchy's first-year undergraduate lectures at the École Polytechnique for 1824-25, taken by his student Louis de la Moricière. No other set of notes of Cauchy's lectures at the École Polytechnique has appeared in commerce, and we have been able to trace only three sets in French public libraries (for the years 1815-16, 1822-23 and 1828-29). "The most important figure in the initiation of rigorous analysis was Augustin-Louis Cauchy. It was, above all, Cauchy's lectures at the École Polytechnique in Paris in the 1820s that established a new attitude toward rigor and developed many characteristic nineteenth-century concepts and methods of proof" (Grabiner, pp. 2-3). These notes are of considerable historical importance: although the lectures on analysis were published in four great treatises, the content of the lectures evolved significantly during Cauchy's 15 years of teaching so that the content of a particular series of lectures may differ significantly from the published version. Moreover, the notes provide a unique insight into Cauchy's lectures on mechanics, which were never published.

'The work which most established his claim to have ushered in the dawn of the integral calculus' (De Morgan)

13. CAVALIERI, Bonaventura. *Exercitationes geometricae sex. I. De priori methodo indiuisibilium. II. De posteriori methodo indiuisibilium. III. In Paulum Guldinum è Societate Iesu dicta indiuisibilia oppugnantem. IV. De vsu eorumdem ind. in potestatibus cossicis. V. De vsu dictorum ind. in vnif. diffor. grauibus. VI. De quibusdam propositionibus miscellaneis, quarum synopsim versa pagina ostendit.* Bologna: Giacomo Monti, 1647.

£11,500

Very rare first edition, and a fine copy, of Cavalieri's second work on integration methods, a sequel to and elaboration of his *Geometria indivisibilibus* (1635), one of the most important forerunners of the integral calculus. The method of indivisibles was used by Galileo, Pascal, Cavalieri's pupil Torricelli, Wallis and others. The *Exercitationes* contains numerous applications of the method, as well as replies to those who criticised the earlier work. It also contains an important contribution to optics. "Cavalieri took the first important step beyond Kepler in analysing the focal properties of spherical surfaces and lenses in *Exercitationes geometricae sex*" (Alan Shapiro in *Before Newton: The Life and Times of Isaac Barrow*, M. Feingold (ed.), pp. 127-8).
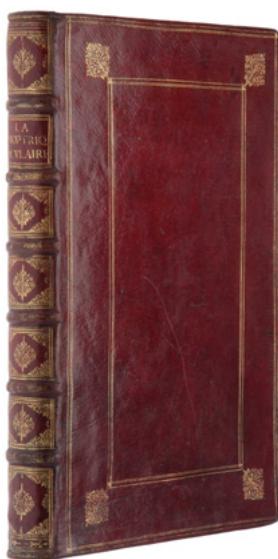
In his copy of the present work, held by the Senate House Library, University of London, Augustus de Morgan wrote in 1852, 'This work must not be confounded with the *Geometria* of Cavalieri published in 1635, and reprinted after his death. But of the two, this is the work which most established his claim to have ushered in the dawn of the integral calculus.'

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

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.

£25,000

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 first treatise on solid analytic geometry
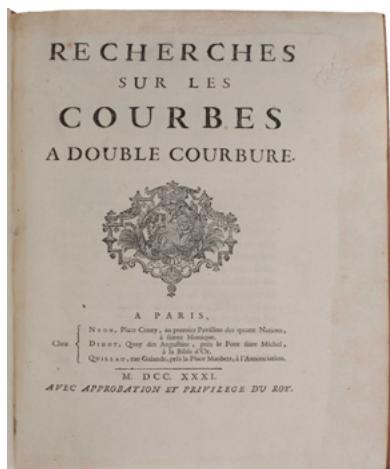
15. CLAIRAUT, Alexis Claude. *Recherches sur les courbes a double courbure.* Paris: Nyon, Didot and Quillau, 1731.

£4,200
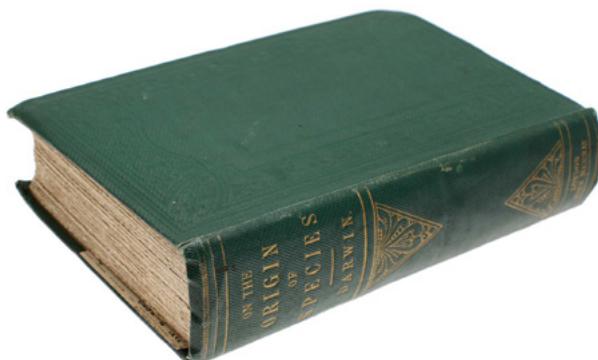
Fine large-paper copy of this celebrated treatise, "the first treatise on solid analytic geometry" (Boyer), written when the author was only sixteen. In it Clairaut demonstrates a claim made by Newton that all cubic curves in three dimensions are projections of a cubic curve of a special form. This publication led to Clairaut's election to the Académie des Sciences at the age of eighteen, the rules of admission being suspended to accommodate the mathematical prodigy. "In the year of his election Clairaut published a celebrated treatise, *Recherches sur les courbes a double courbure,* the substance of which had been presented to the Académie two years earlier ... The treatise of Clairaut carried out for space curves the program that Descartes had suggested almost a century before - their study through projections on two coordinate planes. It was, in fact, this method that suggested the name given by Clairaut to gauche or twisted curves inasmuch as their curvature is determined by the curvatures of the two projections."

'The most important biological book ever written' (Freeman)

16. DARWIN, Charles. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life.* London: John Murray, 1859.
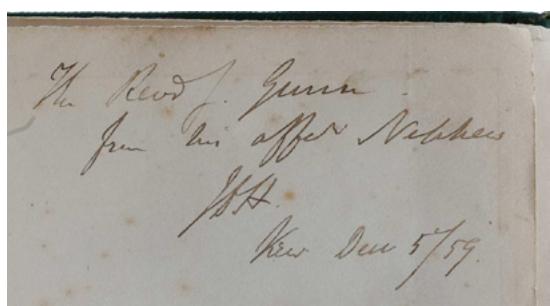
£220,000

First edition, untouched in its original binding, inscribed by Darwin's closest friend and intellectual confidant Joseph Hooker just eleven days after its publication. A magnificent association copy, of "the most influential scientific work of the nineteenth century" (Horblit) and "the most important biological work ever written" (Freeman). "Darwin not only drew an entirely new picture of the workings of organic nature; he revolutionized our methods of thinking and our outlook on the natural order of things. The recognition that constant change is the order of the universe had been finally established and a vast step forward in the uniformity of nature had been taken" (*PMM*). Hooker was the first person Darwin trusted with his theory of evolution by natural selection, and he collaborated with Darwin on the manuscript of *Origin of Species*. Hooker was also, together with Lyell, responsible for the famous joint publication in 1858 by Darwin and Wallace. It is hard to imagine an association that would bring us closer to Darwin's inner circle.
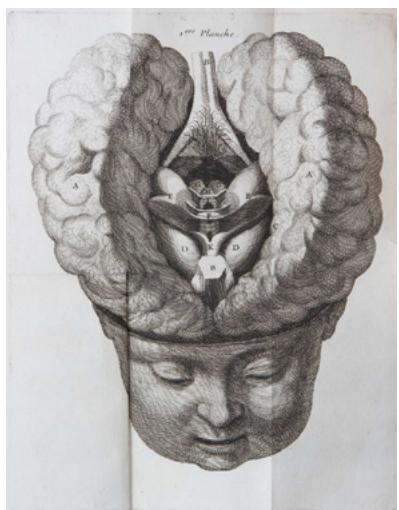
Dibner 199; PMM 344b; Evans 110; Grolier/Horblit 23b; Grolier/ Medicine 70b; Sparrow 49; Norman 593.

Seventeenth century neuroanatomy
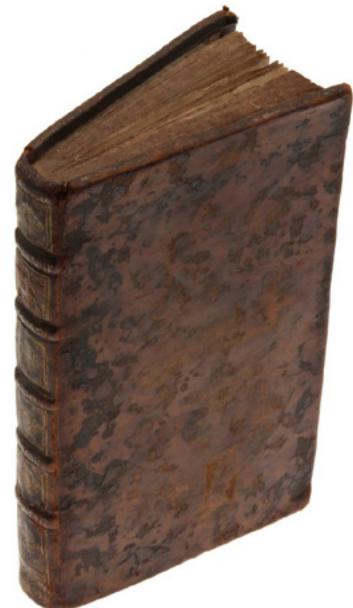
17. DROÜIN, Vincent Denis. *Description du cerveau, des principales distributions de ses dix paires de nerfs, et des organes des sens.* Paris: Guillaume De Lüyne, 1691.

£4,850

First edition, very rare, and a fine copy, of this important work on the brain and the sense organs. "Drouin enjoyed an excellent reputation as a skilled surgeon in the French army and returned to private life to become chief surgeon at Des Petites Maisons in Paris. This work, important in the development of neuroanatomy during the late seventeenth century, is the result of keen observation and careful dissection. In it, Drouin discusses the skull, the brain and its circulation, and the structure of the nose, eye, tongue, and ear. The nine folding plates were engraved from Drouin's own drawings" (*Heirs of Hippocrates*). Very rare, only two copies recorded to have come to auction during the past 30 years.
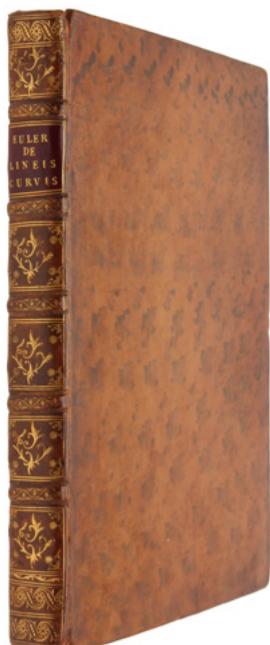
❧*Heirs of Hippocrates* 700; Krivatsy 3404; Wellcome II, p487.

Creation of the calculus of variations

18. EULER, Leonhard. *Methodus inveniendi Lineas Curvas Maximi Minimive proprietate gaudentes, sive Solutio Problematis isoperimetrici latissimo sensu accepti.* Lausanne & Geneve: Bosquet & Socios, 1744.

£8,000

An exceptionally fine copy of "Euler's most valuable contribution to mathematics in which he developed the concept of the calculus of variations." (Norman). "This work displays an amount of mathematical genius seldom rivaled." (Cajori). "The book brought him immediate fame and recognition as the greatest living mathematician." (Kline). "Starting with several problems solved by Johann and Jakob Bernoulli, Euler was the first to formulate the principal problems of the calculus of variations and to create general methods for their solution. In Methodus inveniendi lineas curvas … he systematically developed his discoveries of the 1730's (1739, 1741). The very title of the work shows that Euler widely employed geometric representations of functions as flat curves. Here he introduced, using different terminology, the concepts of function and variation and distinguished between problems of absolute extrema and relative extrema, showing how the latter are reduced to the former. (DSB). "Basel had achieved enough glory in the history of mathematics through being the home of the Bernoullis, but she doubled her glory, when she produced Léonard Euler." (Smith).

❧Horblit 28; Evans 9; Dibner 111; Sparrow 60; Norman 731.
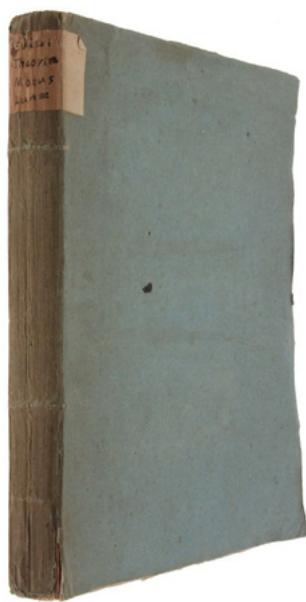
One of Euler's rarest publications

19. EULER, Leonhard. *Theoria Motus Lunae Exhibens Omnes Eius Inaequalitates. In additamento hoc idem Argumentum aliter Tractatur simulque ostenditur quemadmodum Motus Lunae cum Omnibus inaequalitatibus Innumeris aliis Modis repraesentairi atque ad Calculum revocaripossit.* St. Petersburg: Academiae Imperialis Scientiarum, 1753.

£9,750

Very rare first edition, untouched and unopened in its original wrappers, of Euler's 'first lunar theory', the theoretical basis for Tobias Mayer's lunar tables that won the British Parliament prize for the longitude problem (see below). "Based on Newton's universal law of gravitation, Euler first developed his first lunar theory with the aid of his method of variation of orbital parameters. This method is fairly general in the sense that it cannot only be applied to the theory of lunar motion, but also to the planetary motion. Euler published his first lunar theory in his celebrated treatise 'Theory of lunar motion' in 1753. He continued his research for almost the next three decades to make significant improvement of his first lunar theory including the lunar orbit, Moon's position, equations for the Moon's motion, lunar eclipses and the period of revolution of the Moon." (Debnath, *The Legacy of Leonhard Euler*, p.365). "Astronomy owes to Euler the method of variation of arbitrary constants. By it he attacked the problem of perturbations, explaining, in case of two planets, the secular variations of eccentricities, nodes, etc. He was one of the first to take up with success the theory of the moon's motion by giving approximate solutions to the 'problem of three bodies'. He laid a sound basis for the calculation of tables of the moon." (Cajori, *History of Mathematics*, p.240).
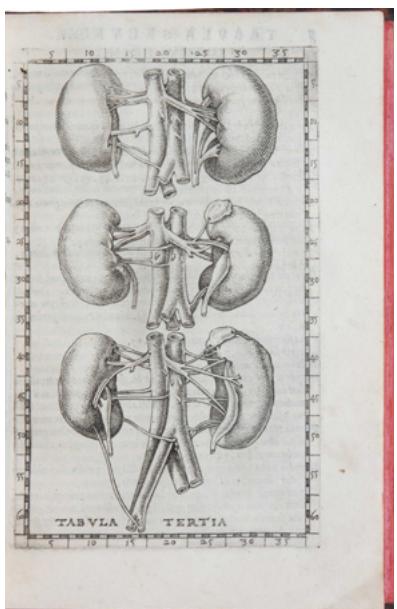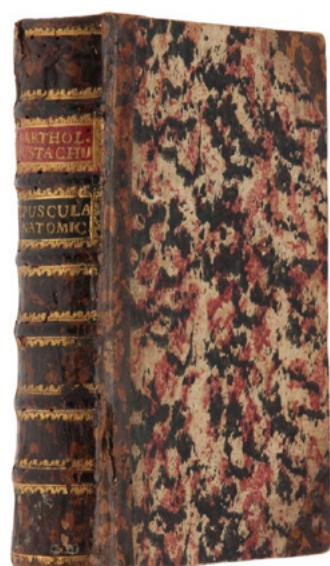
A founder of modern anatomy

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

£42,000

First edition, very rare, of one of the most important of all anatomical books. It includes the first specific treatise on the kidney, the first account of the Eustachian tube in the ear, the first description of the thoracic duct, and the Eustachian valve, as well as the first systematic study of teeth. The fine etchings illustrating the edition "were the first eight in an intended series of forty-seven anatomical plates engraved by Giulio de' Musi after drawings by Eustachi and his relative, Pier Matteo Pini, an artist. These were prepared in 1552 to illustrate a projected book entitled De dissensionibus ac controversiis anatomicis, the text of which was lost after Eustachi's death. Had the full series of plates been published at the time of their completion, Eustachi would have ranked with Vesalius as a founder of modern anatomy" (Norman).
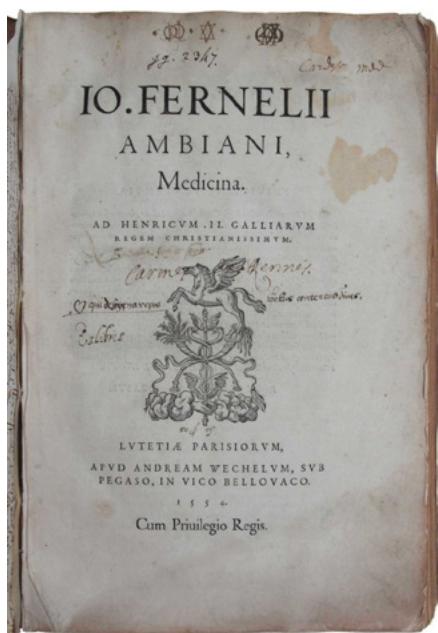
☙Grolier, *One Hundred Books Famous in Medicine* 21; *Heirs of Hippocrates* 322; Norman 739. Garrison-Morton 801.

The first systematic treatise on pathology - Nicolas Fouquet's copy

21. FERNEL, Jean François. *Medicina.* Paris: André Wechel, 1554.

£22,500

Exceptionally fine copy, and with distinguished provenance, of "the first systematic treatise on pathology, which also introduced the names for the sciences of pathology and physiology. In the second part, entitled 'Pathologia', Fernel provided the first systematic essay on the subject, methodically discussing the diseases of each organ. Fernel was the first to describe appendicitis, endocarditis, etc. He believed aneurysms to be produced by syphilis, and differentiated true from false aneurysms" (Garrison-Morton).

Provenance: 'Double-phi' cipher of Nicolas Fouquet (1615-80), finance minister to Louis XIV penned on upper margin of title. From the renowned, but undocumented library of the French non-practicing physician, music publisher, and connoisseur, Jean Blondelet. Contemporary marginalia, including index of diseases related to biblical names on final flyleaf.
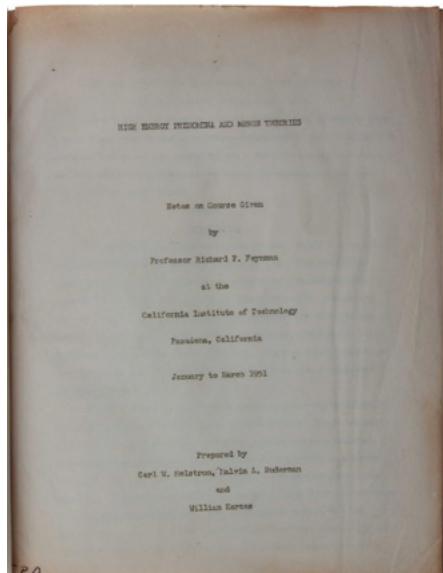
Norman 785; Pincus 107; PMM 68n; Garrison-Morton 2271.

## Feynman on mesons - unpublished
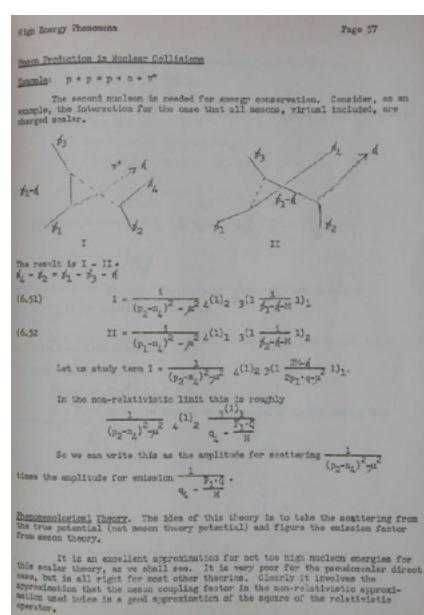
22. FEYNMAN, Richard P. *High Energy Phenomena and Meson Theories. Notes of lectures given by Professor Richard P. Feynman at the California Institute of Technology, Pasadena, California, January - March, 1951. Prepared by Carl W. Helstrom, Malvin A. Ruderman, and William Karzas.* [Not published: California Institute of Technology, Pasadena, 1951].

£9,500

First and only edition, extremely rare, of the mimeographed notes of Feynman's lecture course on meson theory, delivered in his first year as a professor at Caltech. Feynman became interested in meson theory while he was still perfecting his understanding of quantum electrodynamics (QED), but his ideas in this area had remained unpublished - these notes are thus a key historical record of Feynman's work on meson theory. Appearing twelve years before his famous three-volume *Lectures on Physics*, these particular notes were never published again, either separately or as part of his *Selected Papers*. They were probably produced in very small numbers for the graduate students and fellow faculty members who attended this advanced course. OCLC locates copies at Caltech, Stanford and UCLA only. We are not aware of any other copy having appeared in commerce.

The speakable and unspeakable in quantum mechanics - inscribed

23. FEYNMAN, Richard. *The Concept of Probability in Quantum Mechanics.* Berkeley: University of California, 1951.

£9,750

First edition, extremely rare offprint, inscribed by Feynman, of this famous lecture in which Feynman for the first time argues the necessity for a 'quantum probability' (a well developed subject in its own right today), and sets out clearly his own interpretation of the meaning of quantum mechanics, particularly what John Bell later called 'the speakable and unspeakable in quantum mechanics.' All this is done through a brilliant analysis of the 'double-slit' experiment, in which electrons pass through two holes and then fall on a screen. His analysis later became famous when it was included in the Feynman *Lectures on Physics*, but this is its first appearance in print. No copies of this offprint located in institutional collections worldwide. Although signed works by Feynman occasionally appear on the market, they are almost always his popular autobiographical works; technical scientific works inscribed by Feynman are extremely rare in commerce (none are located in auction records).

Gauss' masterpiece

24. GAUSS, Carl Friedrich *Disquisitiones arithmeticae.* Leipzig: Gerh. Fleischer, 1801.
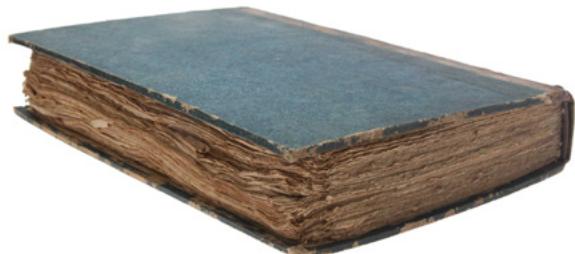
£32,500

A very fine copy of Gauss' masterpiece - uncut, contemporarily bound and with numerous mathematical notes inserted. "Gauss ranks, together with Archimedes and Newton, as one of the greatest geniuses in the history of mathematics" (*Printing and the Mind of Man*). "Published when he was just twenty-four, *Disquisitiones arithmeticae* revolutionized number theory. In this book Gauss standardized the notation; he systematized the existing theory and extended it; and he classified the problems to be studied and the known methods of attack and introduced new methods… The *Disquisitiones* not only began the modern theory of numbers but determined the direction of work in the subject up to the present time. The typesetters of this work were unable to understand Gauss' new and difficult mathematics, creating numerous elaborate mistakes which Gauss was unable to correct in proof. After the book was printed Gauss insisted that, in addition to an unusually lengthy four-page errata, the worst mistakes be corrected by cancel leaves to be inserted in copies before sale [as in the offered copy]… Gauss's highly technical work was printed in a small edition, and the difficulty of understanding it was hardly alleviated by the sloppy typesetting. The few mathematicians who were able to read the *Disquisitiones* immediately hailed Gauss as their prince, but the full understanding required for further development did not occur until the publication in 1863 of Dirichlet's less austere exposition in his *Vorlesungen über Zahlentheorie.*" (Norman).
PMM 257; Evans 11; Horblit 38; Dibner 114.

'The first of their kind in illustration of their subject' (Franklin)
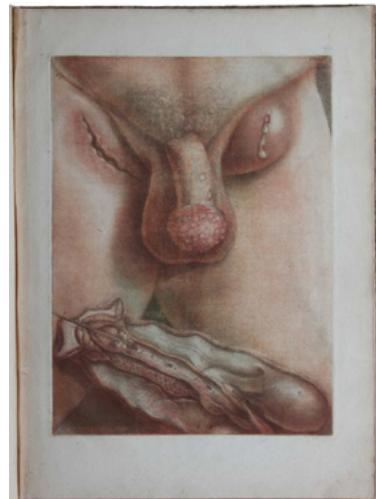
25. GAUTIER D'AGOTY, Jacques Fabian. *Exposition anatomique des maux vénériens, sur les parties de l'homme et de la femme, et les remedes les plus usités dans ces sortes de malades.* Paris: Brunet & Demonville, 1773.

£6,200

Very rare first edition and a beautiful copy, of this provocative example of early colour printing by the artist whom Goethe called "an active, quick, rather impulsive man, certainly gifted, but more than befittingly aggressive and sensational" (*Farbenlehre*). Choulant-Frank 272; Wellcome III 97; Blake 169; Franklin, *Early Colour Printing* 48, V; Goldschmid 67 f. We have traced only four copies at auction in the last 80 years; Cambridge and Wellcome only on COPAC.

The four plates, two representing the male genitals and two the female genitals afflicted with venereal diseases, are each printed in vivid color. "These four plates, two male and two female, are more simply medical than much of his other work - the affected parts are truly shown, but not with the whole figure or face. The same device is used, of living flesh and dissected limb, but with the focus more simply upon disease. Each is therefore a single full-page illustration, without fold or join to its neighbor" (C. & C. Franklin, *A Catalogue of Early Colour Printing,* p. 48). The plates of Gautier are highly valued in the history of art and especially in the history of anatomical illustration.
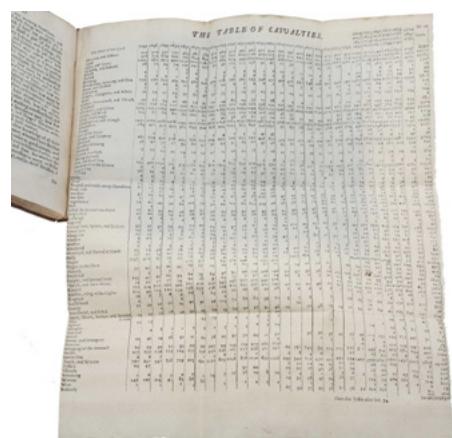
The foundation work of demographics - 'Graunt's remarkable book' (PMM)

26. GRAUNT, John. *Natural and political observations mentioned in a following index and made upon the bills of mortality... with reference to the government, religion, trade, growth, ayre, diseases, and the several changes of the said city.* London: Tho: Roycroft, for John Martin, James Allestry, and Tho: Dicas, 1662.

£105,000

Very rare first edition of the foundation work of demographics and medical statistics: the beginning of studies about why people die, and the beginning of disease control. "The application of critical scientific methods to medical and vital statistics, which underlies so much of modern government and ecomomics, can be traced back to John Graunt's remarkable book" (Printing and the Mind of Man)".

This is a very rare book on the market, only two other copies have sold at auction in the last 30 years, and this is unquestionably the finest. PMM 144; Norman 933; Garrison-Morton 1686; Parkinson, *Breakthroughs* 1662.

'The most important book in the history of medicine'
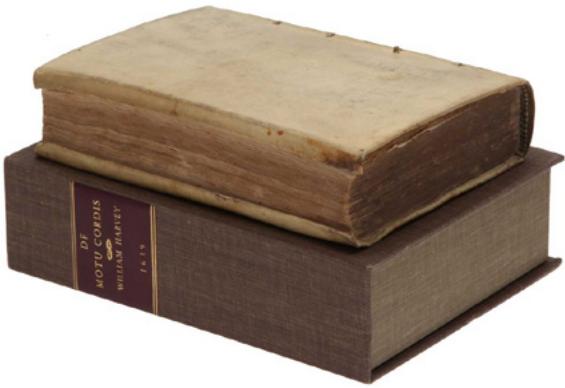
27. HARVEY, William. *De motu cordis & sanguinis in animalibus, anatomica exercitation: cum refutationibus Aemylii Parisani … et Jacobi Primirosii.* Leyden: Johann Maire, 1639.

£35,000

Third, but second complete, edition of the single most important and famous medical book ever published, containing Harvey's discovery and experimental proof of the circulation of the blood, which created a revolution in physiology comparable to the Copernican revolution in astronomy. Harvey's discovery was to become "the cornerstone of modern physiology and medicine" (Garrison-Morton). *De motu cordis* "is probably the most important book in the history of medicine. What Vesalius was to anatomy, Harvey was to physiology; the whole scientific outlook on the human body was transformed, and behind almost every important medical advance in modern times lies the work of Harvey" (*Heirs of Hippocrates*). This is the earliest edition that collectors can reasonably expect to obtain, the first edition (Frankfurt, 1628) being of the greatest rarity. The second edition (Venice, 1635), published with the *Exercitationes* of Emilio Parigiano was fragmentary, lacking the plates, parts of the introduction and chapters I and XVI. In this edition, the publisher Maire restored these passages and included the illustrations.

𝕾*Heirs of Hippocrates* 417 (this edition); Grolier/Medicine 27; *PMM* 127 (describing the first edition).

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

28. HARVEY, William. *Exercitationes Duae Anatomicae De Circulatione Sanguinis Ad Joannem Riolanum filium.* Rotterdam: Arnold Leers, 1649. [Bound, probably as issued, with:] *Exercitatio anatomica de motu cordis & sanguinis. Ccum praefatione Zachariae Sylvii Medici Roterodamensis. Accesit Dissertatio de corde Doct. Jacobi de Back, Urbis Roterodami Medici ordinarii.* Rotterdam: Arnold Leers, 1648.

£14,000

First edition of the *Exercitationes*, one of two issues published simultaneously, of this rare and important work, a defence of his theory of the circulation of the blood against the Parisian physician Jean Riolan the younger. It is here bound after the first Rotterdam edition of *De motu cordis* itself, an important edition in its own right, as it contains a corrected text, with the preface by Zacharias Sylvius (1608-1664); it also contains the first edition of the substantial treatise by James de Back (1593-1657), *Dissertatio de corde … Annexa Appendix pro circulatione Harveiana*. Keynes called the *Exercitationes* "one of [Harvey's] major contributions to medical science" (*Life*, p. 327). They were appended to later editions of *De motu*, as here; as Keynes says in his *Bibliography of William Harvey*, "The two treatises have for too long been considered merely an appendix to *De motu* – they are far more important than this." The only copy of the *Exercitationes* auctioned in the last forty years was the Haskell F. Norman copy, also bound with the Rotterdam edition of *De motu* (Christie's, June 1998, $9200, re-sold at Sotheby's *PMM* sale, October 1999, £6900).
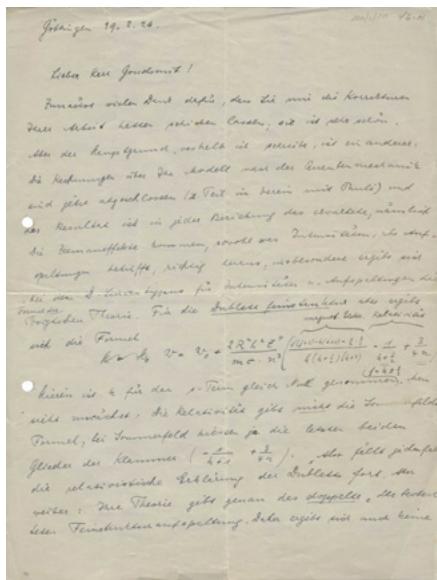
𝕾Norman 1007 & 1010.
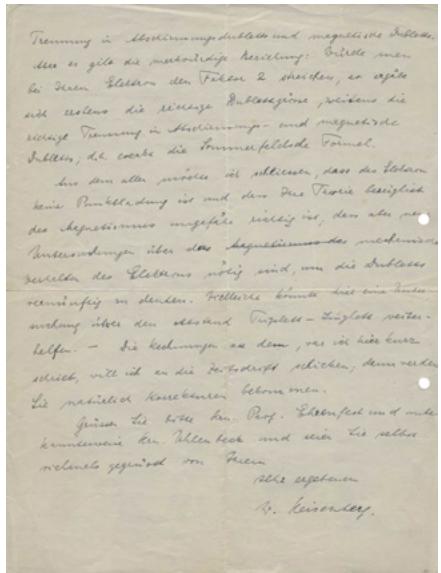
Heisenberg's struggle to incorporate electron spin into quantum mechanics

29. HEISENBERG, Werner *Autograph letter to Samuel Goudsmit, the co-discoverer of electron spin, signed 17 Werner Heisenberg, Göttingen, 19 February 1926. Two pages on a single sheet.* Göttingen:1926.

£11,500
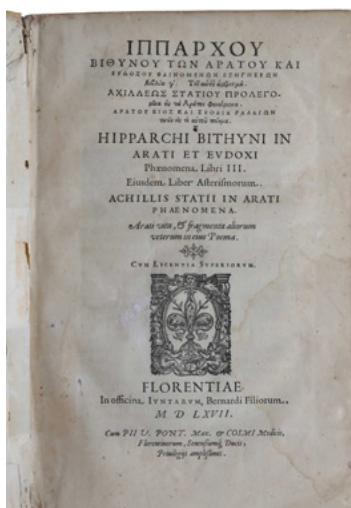
Historically important, very detailed, scientific letter showing how Heisenberg, who had invented quantum mechanics just six months earlier, grappled with the difficulties presented by a basic new discovery in quantum physics, that of electron spin by Samuel Goudsmit and George Uhlenbeck. Heisenberg describes calculations he has carried out (partly with Pascual Jordan and partly with Wolfgang Pauli) which show that Goudsmit and Uhlenbeck's theory leads to predictions about spectral lines that do not agree with observations, but which would agree if the electron's spin angular momentum was reduced from the amount postulated by Goudsmit and Uhlenbeck by a factor of two. This letter was written just one day before this missing factor of two was explained by the Cambridge physicist Llewellyn Thomas as an effect arising from special relativity. Heisenberg was at this time teaching at the University of Göttingen, having studied there under Arnold Sommerfeld and Max Born.

The only surviving work of 'the greatest astronomer of antiquity' (Neugebauer)

30. HIPPARCHUS *Hipparchi Bithyni in Arati et Eudoxi Phaenomena libri III; eiusdem libri asterismorum; Achillis Statii in Arati Phaenomena; Arati vita, et fragmenta aliorum veterum in eius Poema.* Florence: In officina Iuntarum, Bernardi filiorum, 1567.

£31,000

First edition, very rare, of the only surviving work of Hipparchus (c. 190-127 BC). "When we consider all that Hipparchus invented or perfected, and reflect upon the number of his works and the mass of calculations which they imply, we must regard him as one of the most astonishing men of antiquity, and as the greatest of all in the sciences which are not purely speculative, and which require a combination of geometrical knowledge with a knowledge of phenomena" (Lalande). Hipparchus invented trigonometry, compiled the first comprehensive star catalogue in the western world, and discovered the precession of the equinoxes. He was probably also the first to consider a heliocentric model of the solar system, but abandoned it because his calculations showed that it was incompatible with perfectly circular orbits. Our knowledge of Hipparchus' works is principally derived from the present work, *Commentary on the Phaenomena of Eudoxus and Aratus*, what may be inferred from it about his earlier work, and from references to him by other contemporary authors, notably Ptolemy, who refers to him repeatedly in the *Almagest*. Only two copies of this work have appeared at auction in the last 40 years.
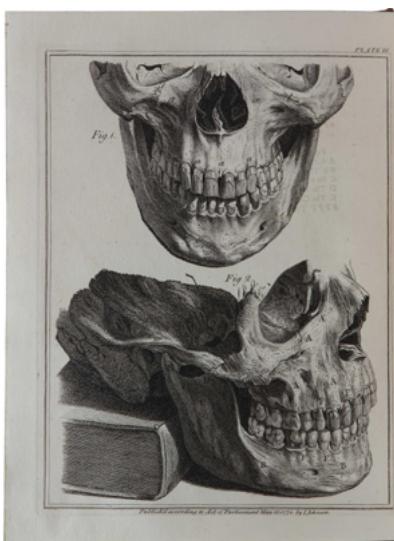
'Basic to all modern dentistry'

31. HUNTER, John. *The Natural History of the Human Teeth.* London: J. Johnson, 1771.

£8,100

An exceptionally fine copy of "the first scientific study of the teeth and basic to all modern dentistry" (*Heirs of Hippocrates*). "Hunter's work on the structure and diseases of the teeth began a new era for dentistry in England, placing what had been an empirical art upon a basis of careful scientific observation, and providing a foundation for further research. In the *Natural history*, Hunter gave detailed accounts of the anatomy and physiology of the oral cavity and jaw, introduced the modern scientific nomenclature for the teeth, established the tooth's construction of bone, pulp and enamel, and examined the processes of tooth development in fetuses and children" (Norman). "In a busy life devoted to research, teaching, and the practice of surgery, Hunter found time to study the structure, development, and diseases of the teeth and to collect and arrange a series of dental specimens… In [the present] book, Hunter classified the teeth in the system still used today and was the first to state definitely that the human teeth 'are never more than thirty-two.' He traced their development in the fetus and the child and established their structure of pulp, bone, and enamel. At the end of the book are descriptions of devices to correct malocclusion and even suggestions for a method of transplantation" (Lilly).
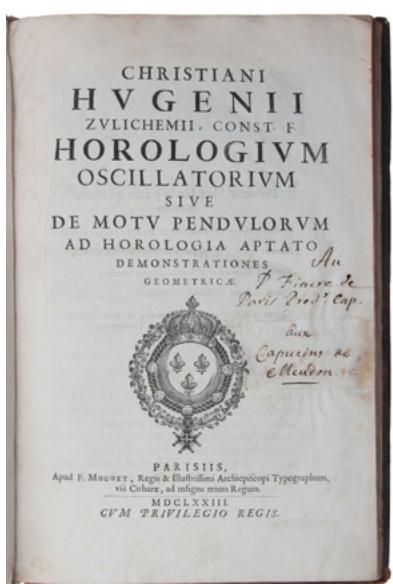
Norman 1116; Lilly, *Notable Medical Books* 131; *Heirs of Hippocrates* 968; Garrison-Morton 3675.

Second only to Newton's Principia
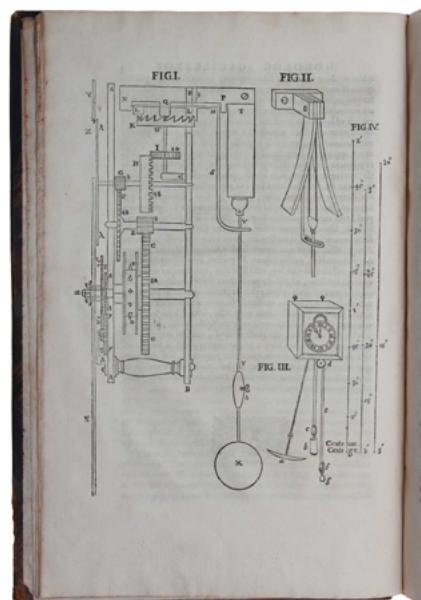
32. HUYGENS, Christiaan. *Horologium oscillatorium sive de motu pendulorum ad horologia aptato demonstrationes geometricae.* Paris: F. Muguet, 1673.

£42,000

First edition and a very fine copy of the author's most important work, "a superb tapestry woven from the three strands of the science of Christiaan Huygens (1629–1695): mathematics, mechanics, and technology" (*Landmark Writings in Western Mathematics*, p. 34). It was the most original work of this kind since Galileo's *Discorsi*" (PMM), and a "work of the highest genius which has influenced every science through its mastery of the principles of dynamics. It is second in scientific importance perhaps only to Newton's *Principia*, which is in some respects based on it" (Charles Singer, *A Short History of Science to the Nineteenth Century*, 1941, p. 258). It is also probably the single most important book in the literature on clocks.
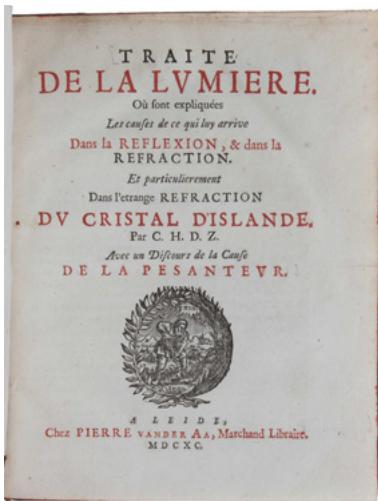
PMM 154; Dibner 145; Horblit 53; Evans 31; Sparrow 109; Norman 1137.
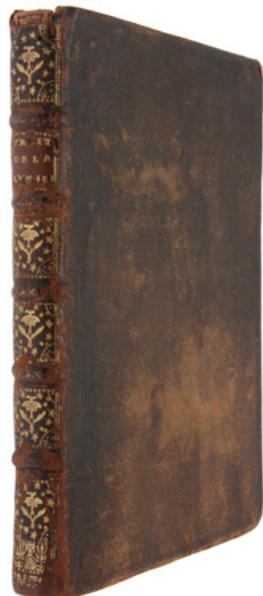
The wave theory of light

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

£27,500

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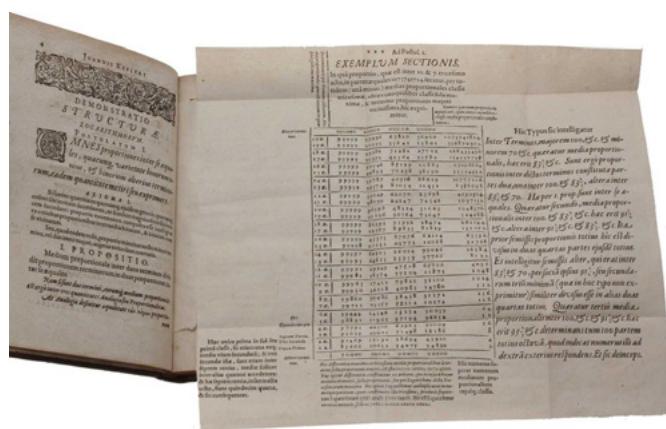
Grolier/Horblit, One *Hundred Books Famous in Science* 54; Dibner, *Heralds of Science* 145; Evans, *First Editions of Epochal Achievements in the History of Science* 32; Sparrow, *Milestones of Science* 111.

Kepler's log tables – the basis for the Tabulae Rudolphinae and the third law

34. KEPLER, Johannes. *Chilias logarithmorum ad totidem numerous rotundos, praemissa demonstration legitima ortus logarithmorum eorumque usus… [Bound with:] Supplementum chiliadis logarithmorum, continens praecepta de eorum usu.* Marburg: Caspar Chemlin, 1624-1625.

£42,000
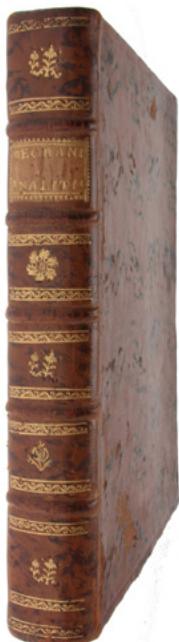
First edition of Kepler's logarithmic tables, constructed by his own original method. It was through the use of these tables that Kepler was able to complete his monumental *Tabulae Rudolphinae* (1627), the superiority of which "constituted a strong endorsement of the Copernican system, and insured the tables' dominance in the field of astronomy throughout the seventeenth century" (Norman). But logarithms played an even more important role in Kepler's astronomical work, since without them he may never have discovered his third law of planetary motion, and it was in terms of logarithms that he first formulated this law: "The proportion between the periodic times of any two planets is precisely one and a half times the proportion of the mean distances" (*Werke* VI, 302). "In a sense, logarithms played a role in Kepler's formulation of the Third Law analogous to the role of Apollonius' conics in his discovery of the First Law, and with the role that tensor analysis and Riemannian geometry played in Einstein's development of the field equations of general relativity" (Brown, *Reflections on relativity*, p. 555). Of the greatest rarity, especially complete with the correction leaf and the second part, which gives examples of the application of logarithms and details of their construction. Although paginated continuously, the Supplement was published independently the following year, and is not always present. Both Caspar and Zinner give separate references. Only one other copy of this work has appeared at auction in the past fifty years (Bibliothèque Jean-Louis Mosès, Christie's Paris, 25 June 2004, lot 103, €29,375).

'The most beautiful mathematical treatise in existence'

35. LAGRANGE, Joseph Louis de. *Méchanique analitique.* Paris: Veuve Desaint, 1788.

£9,500
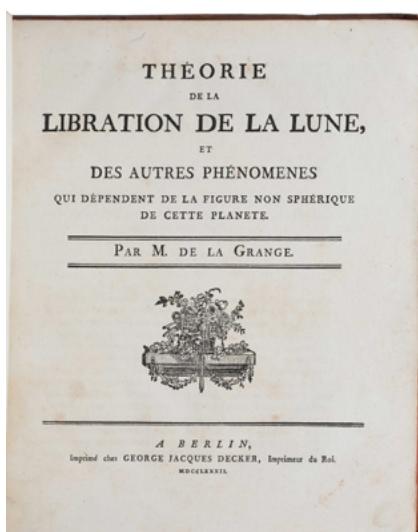
An exceptionally fine copy of "perhaps the most beautiful mathematical treatise in existence. It contains the discovery of the general equations of motion, the first epochal contribution to theoretical dynamics after Newton's *Principia*" (Evans). "Lagrange's masterpiece, the *Méchanique Analitique* (Paris, 1788), laid the foundations of modern mechanics, and occupies a place in the history of the subject second only to that of Newton's *Principia*." (Grolier/Horblit). "With the appearance of the *Mecanique Analytique* in 1788, Lagrange proposed to reduce the theory of mechanics and the art of solving problems in that field to general formulas, the mere development of which would yield all the equations necessary for the solution of every problem ... [it] united and presented from a single point of view the various principles of mechanics, demonstrated their connection and mutual dependence, and made it possible to judge their validity and scope." (*DSB*). "In the preface of the book La Grange proudly points to the complete absence of diagrams, so lucid is his presentation. He regarded mechanics (statics and dynamics) as a geometry of four dimensions and in this book set down the principle of virtual velocities as applied to mechanics." (Dibner).

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

The first general proof of the 'Lagrange equations' of motion

36. LAGRANGE, Joseph-Louis. *Théorie de la libration de la lune et des autres phénomènes qui dépendent de la figure non sphérique de cette planète.* Berlin: George Jacques Decker, 1782.

£16,000

First edition, extremely rare separately-paginated offprint, of this work in which Lagrange introduced the potential function of a system of gravitationally-interacting bodies and gave the first proof of his general laws of motion, now called the 'Lagrange equations,' which were to play a central role in his masterpiece, *Mécanique Analitique* (1788). "Lagrange's work on the libration of the Moon was significant mainly because of the mathematical tools he used to study it, rather than for the results themselves. In his treatment of this particular problem from celestial mechanics, he derived general equations that have served as the basis for the study of dynamical systems ever since" (Linton, *From Eudoxus to Einstein*, p. 320). The present work was published in *Nouveaux memoires de l'Académie des sciences et belles-lettres* (Berlin), 11 (1782), pp. 203-309. OCLC lists copies of this offprint at Berlin and Utrecht only (no copies in US).
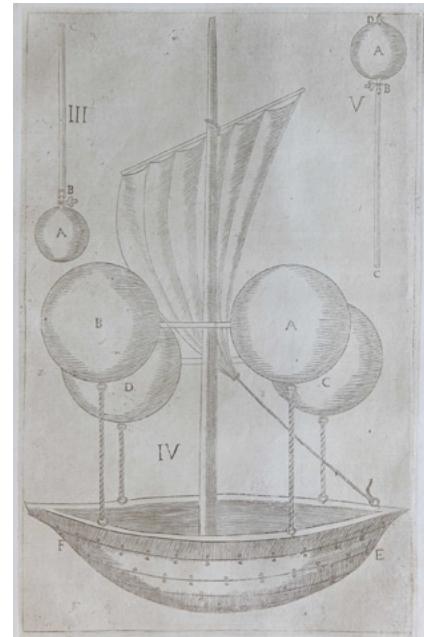
## The first scientific work on the mechanics of flight

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

£6,800
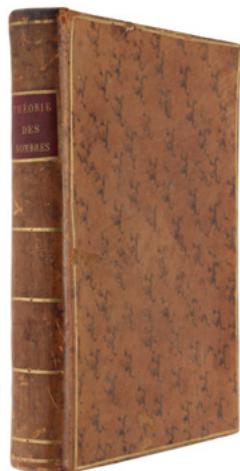
An excellent copy of the first scientific work on the mechanics of flight. "In this volume is presented the earliest concept of flight derived from demonstrable aerostatic principles." (Norman). An important work in the history of aeronautics, in the *Prodromo* Lana Terzi presented several technological innovations, of which the best known is his proposal for a 'flying boat' to be airborne by four spheres of thin copper from which air had been exhausted. Although the vehicle was never tested, and would have proved unworkable, since the copper would not have been able to withstand the atmospheric pressure, Lana Terzi's reasoning was correct. In surmising that a vessel containing a semi-vacuum would weigh less than the surrounding air and would consequently become buoyant, Lana Terzi formulated the earliest concept of flight based on aerostatic principles. "While Lana apparently originated the method of reducing air density in a vessel by heating it, the implications of this phenomenon in relation to flight were not fully understood until the advent of the Montgolfier brothers a century later" (Norman).

Dibner 125; Norman 127.
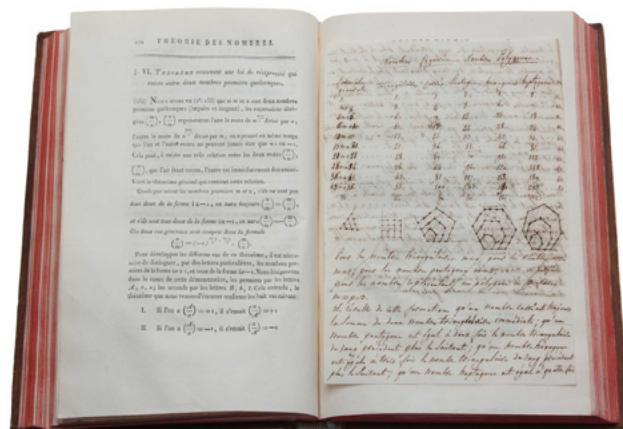
The most important book on number theory (before Gauss)

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

£2,600

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).
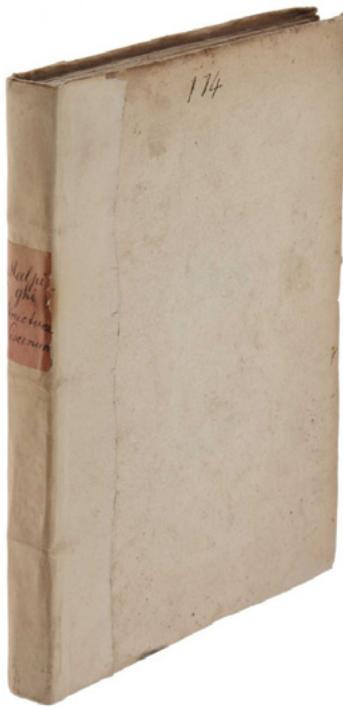
Norman 1325; Parkinson, *Breakthroughs* 231.

39. MALPIGHI, Marcello. *De viscerum structura exercitatio anatomica.* Bologna: Giacomo Monti, 1666.

£21,000

Very rare first edition, and a beautiful copy uncut in original boards, of this classic which includes Malpighi's famous treatise on the kidney, *De renibus premium*, in which he described the uriniferous tubules as well as the 'Malpighian bodies', which have perpetuated his name. The book also includes the first description of Hodgkin's disease… "The great detail and clarity of Malpighi's description was unsurpassed until Bowman [1842]" (Garrison-Morton). "This collection of anatomical treatises contains Malpighi's account of the Malpighian bodies (glomeruli) of the kidney (in 'De renibus'), his observation of red blood corpuscles (in 'De polypo cordis'), and the first description of Hodgkin's disease (in 'De liene'). Malpighi's studies of the kidney gave support to his iatromechanical theory of glands as secretion machines; he concluded that the glomeruli were in direct contact with both arteries and veins, and postulated a similar connection between the glomeruli and urinary vessels. In his treatise on heart polyps, Malpighi demonstrated that the polyps consisted of coagulum found in normal blood; it was while examining a clot of coagulum under the microscope that Malpighi observed a number of red 'atoms' (corpuscles) in the interstices of the coagulum fibers" (Norman).

Norman 1427; Friedman 121; Pincus 175; Garrison-Morton 535 & 1230.

With nearly 1000 contemporarily hand-coloured woodcuts

40. MATTIOLI, Pietro Andrea. *Kreutterbuch jetzt widerumb mit viel schönen neuwen Figuren, auch nützlichen Artzneyen, und andern guten stücken, auss sonderm fleiss gemehret, und verfertiget durch Joachimum Camerarium.* Frankfurt: Feyer, 1586.

£15,500

First edition, contemporarily colored, of Camerarius's version of Mattioli's great herbal. This edition contains the Gesner/Camerarius suite of woodcuts. Gesner had been preparing material for a massive historia plantarum but died before finishing the task; Camerarius acquired the material, utilized the woodcuts in the present work and supplemented them with his own. They are remarkable in their scientific detail, especially the enlarged depictions of floral structure, seeds, and fruit. This is the first time that such representation was consistently followed, and marks the beginning of what only much later became a convention in scientific botanical illustration, when the taxonomic importance of these details was fully appreciated. They first appeared in Camerarius' recension of Mattioli, *De plantis epitome utilissima* of the same year.

Established obstetrics as a science

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

£5,500

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

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

The first condemnation of Copernicus in print
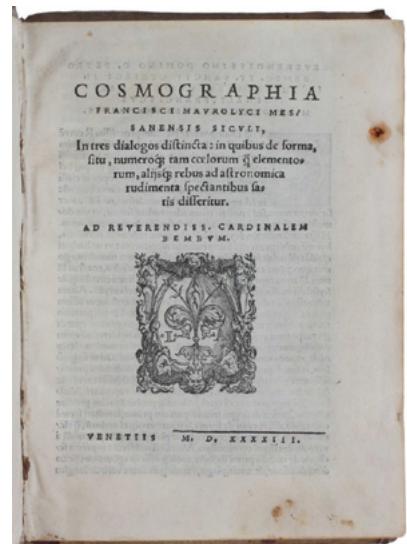
42. MAUROLICO, Francesco. *Cosmographia.* Venice: heirs of Lucca Antonio Junta, 1543.

£22,500

Rare first edition, in a beautiful contemporary binding, of this important astronomy text, which contains what is probably the first condemnation of Copernicus in print. It also includes references to the voyages of Vespucci and Columbus' discovery of America (f. 18r and f. 34v). The *Cosmographia* is the first published work of Francesco Maurolico (1494-1575), known as the greatest geometer of the sixteenth century and one of the most vehement opponents of Copernicus. It was an influential treatise which sought to revive the system of Eudoxus, a geocentric, homocentric system of spheres designed to account for the motion of the planets as seen from the earth without recourse to the epicycles of Ptolemy. In his 'De sphera' in the *Opuscula mathematica* of 1575, Maurolico famously pronounced that Copernicus deserved a whipping rather than a refutation. In the *Cosmographia,* published in the same year as *De revolutionibus,* there is an equally strong rejection of the possibility of the earth moving. Bound with the Cosmographia are Alcabitius' *Iudicorum astrorum Isagoge* (1521) and Leopold of Austria's *Compilatio ... de astrorum scientia* (1520). ✑Honeyman 2181.

First illustrated Spanish Anatomy

43. MONTAÑA DE MONSERATTE, Bernadino. *Libro de la anathomia del ho[m]bre.* Valladolid: Sebastian Martinez, 1551.
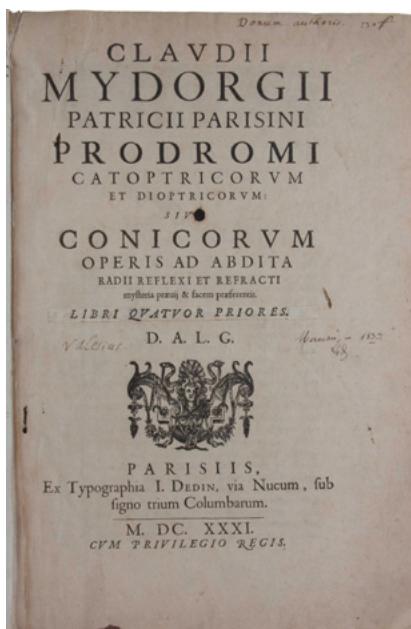
£42,000

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

Norman 739. Garrison-Morton 801.

Author's presentation copy

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

£8,750

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

Algebra for navigators, by the greatest Portuguese mathematician

45. NUÑEZ, Salaciense Pedro. *Libro de algebra en arithmetica y geometria..* Antwerp: heirs of Arnold Birckman, 1567.

£34,000
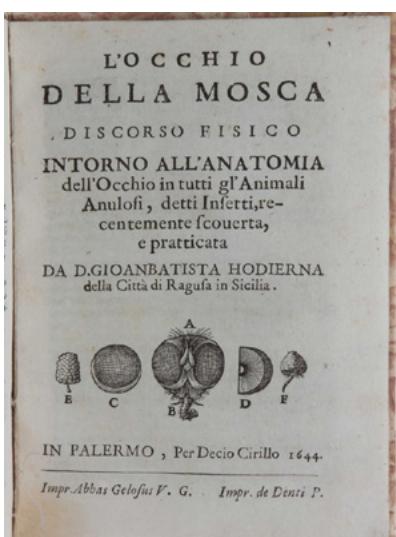
Exceptionally fine copy, bound in citron morocco for Jacques-Auguste de Thou (1553-1617), of this rare and celebrated treatise on algebra. "Considered the greatest of Portuguese mathematicians, Nuñez reveals in his discoveries, theories, and publications that he was a first-rate geographer, physicist, cosmologist, geometer and algebraist" (DSB). Only three other copies have appeared at auction in the last 50 years. J.A. de Thou assembled one of the greatest libraries of his time. Thou's library later became the property of Jean-Jacques Charron, marquis de Ménars (1643-1718) before being sold off in 1789. "Both as Royal Cosmographer under King John III (the Pius) of Portugal and as professor of mathematics at the University of Coimbra, Nuñes gave instruction in the art of navigation to those associated with Portugal's merchant and naval fleets. His Libro de algebra provided the mathematical underpinnings of that instruction — and much more — adopting Pacioli's abbreviated notational style and treating the solution not only of linear and quadratic equations but also that of a cubic equation of the type $x^3 + cx = d$ following the spectacular mid-sixteenth-century work of the Italians Niccolo Tartaglia and Girolamo Cardano" (Katz & Parshall, *Taming the Unknown*, p. 205).

Frank Streeter 392; Macclesfield 1548; Honeyman 2354;Peeters-Fontainas 845 (this copy).

The first microscopical section in biology (Garrison-Morton)

46. ODIERNA (or HODIERNA), Giovanni Battista. *Opuscoli... 1. Il nunzio della terra. 2. La Nuova pendente. 3. L'Occhio della mosca. 4. Il Sole del microcosmo.* Palermo: Decio Citillo, 1644.

£6,200

First edition of this rare collection, containing the second earliest work illustrated with microscopic enlargements, and the first illustrations of microscopic dissections: "the first microscopal section in biology is discussed and illustrated in Odierna's study of the fly's eye, which is also the first description of the faceted eye of an arthropod" (Garrison-Morton). Odierna (1597-1660) was a Sicilian scientist and friend and disciple of Galileo, who supplied Odierna with a telescope. The present work is mostly concerned with optical phenomena and experiments. The first treatise deals with the apparent and relative sizes of planets and stars, effects of telescopes on objects viewed, etc. The second is on meteorological phenomena, appearances of clouds, effects of light, etc. The third work, L'occhio della mosca, contains the first microscopic dissections of an insect. The final work, on the eye and the nature of vision, seems to have been largely ignored by historians of optics and ophthalmology.
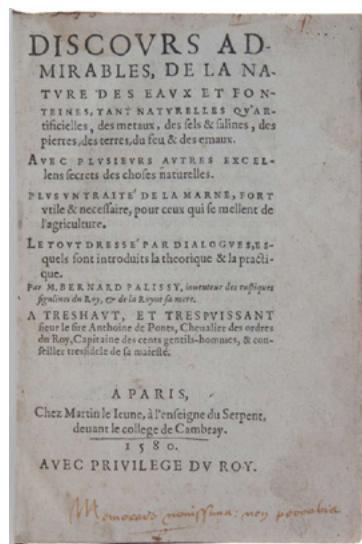
Garrison-Morton 259.1

'A book of great importance in the history of chemistry and science in general'

47. PALISSY, Bernard de. *Discours admirables, de la nature des eaux et fontaines, tant naturelles qu'artificielles, des metaux, des sels & salines, des pierres, des terres, du feu & des emaux.* Paris: Martin le Jeune, 1580.
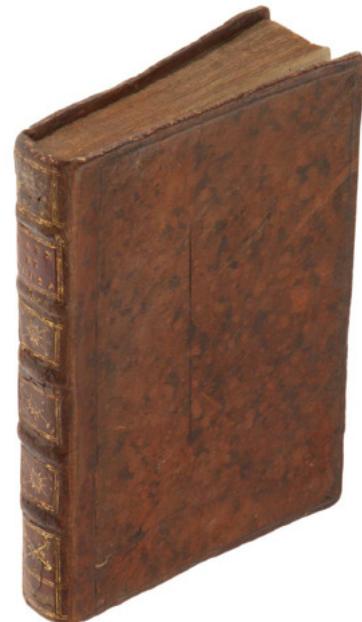
£21,000

First edition. "A book of great importance in the history of chemistry, hydrology, geology, and agriculture. Palissy (ca.1509-1589), who is best known for his discovery of the secret of enameling pottery, was far in advance of his time in scientific ideas. 'Palissy shines as a close and accurate observer of natural objects, a man of eminent common sense, and an original and laborious experimenter'." (Partington). Toward the end of his life he described his work in the present book, which probably incorporates the lectures he gave in Paris about 1575.

This first edition is an extremely rare book. Ferguson acquired his copy, now in Glasgow University, after many years of search, and wrote on the flyleaf: 'At last, after long, long waiting and watching.' It is one of the very few books in Duveen's collection of which he reproduced the title page in his *Bibliotheca Alchemica et Chemica*.

Norman 1629; Freilich 419 (same copy); Honeyman 2393; (both copies in new bindings); *En français dans le texte* 72.

## A key document in the history of twentieth-century physics
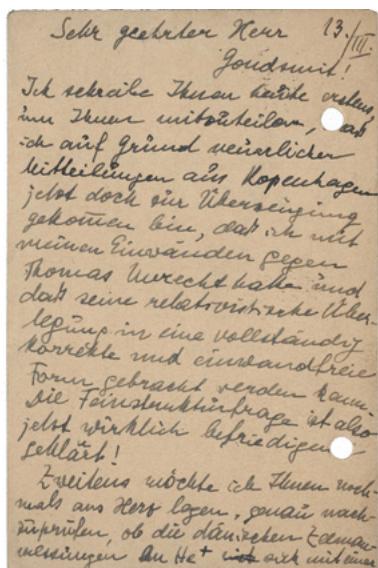
48. PAULI, Wolfang. *Autograph postcard signed 'W. Pauli' to Samuel Goudsmit, in which Pauli finally accepts the concept of electron spin proposed by Goudsmit and George Uhlenbeck.* Hamburg, postmarked 13 March, 1926.

£18,500

An iconic artefact of twentieth-century physics of great historical significance, this is the postcard in which the 26-year old Pauli finally acknowledges that Samuel Goudsmit and George Uhlenbeck were correct in their discovery of electron spin. "*First of all I am writing to you today to inform you that because of recent communications from Copenhagen I have realized that I have been wrong in my objections against Thomas and that his deliberations about relativity can be put into an entirely correct and faultless form. Therefore the questions referring to fine structure can really be satisfactorily answered!*" Known as the 'conscience of physics', Pauli's imprimatur was essential before the concept of spin could be accepted by the wider physics community. Spin is now one of the key concepts in quantum physics. Pauli's bitter initial opposition to spin is doubly ironic: its discovery was based on Pauli's exclusion principle, formulated less than a year earlier, for which Pauli received the Nobel Prize (Goudsmit and Uhlenbeck did not receive the Nobel); and it was Pauli himself who eventually showed how to incorporate spin into quantum mechanics, which had been invented by Werner Heisenberg just nine months earlier.

Editio princeps of 'one of the most influential scientific works of all time' (PMM)

49. PTOLEMY. *De geographia libri octo, summa cum vigilantia excusi.* Basel: Hieronymus Froben & Nikolaus Episcopius, the elder, 1533.

£31,500

Editio princeps, the first printing of Ptolemy's celebrated *Geography* or *Cosmology* in the original Greek. This is a fine, unrestored copy in its original binding. A rare book on the market: only one other copy has appeared at auction since 1977, i.e., the Evelyn-Garden copy (Sotheby's 1989) which was bound in restored seventeenth-century calf. "Ptolemy's *Geography* is the only book on cartography to have survived from the classical period and one of the most influential scientific works of all time. Written in the second century AD, for more than fifteen centuries it was the most detailed topography of Europe and Asia available and the best reference on how to gather data and draw maps. Ptolemy championed the use of astronomical observation and applied mathematics in determining geographical locations. But more importantly, he introduced the practice of writing down coordinates of latitude and longitude for every feature drawn on a world map, so that someone else possessing only the text of the *Geography* could reproduce Ptolemy's map at any time, in whole or in part, at any scale" (Berggren & Jones, *Ptolemy's Geography: An Annotated Translation of the Theoretical Chapters,* 2000).

✠PMM 18 (1462 edition); Garden Sale 23 (this edition).

Coined the term 'Caesarian section'
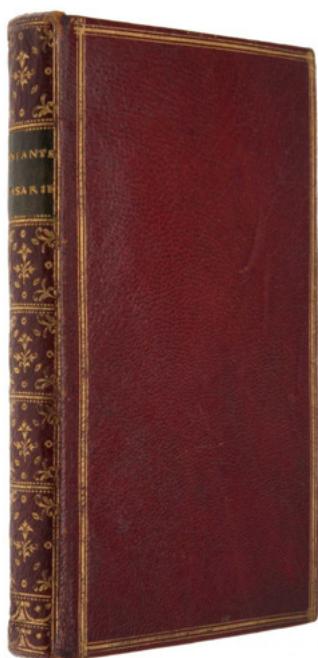
50. ROUSSET, François. *Traitte nouveau de l'Hysterotomotokie, ou Enfantement Caesarien, qui est extraction de l'enfant par incision latérale du ventre, & matrice de la femme grosse ne pouvant autrement accoucher. Et ce sans prejudicier à la vie de l'un, ny de l'autre; ny empescher la fécondité maternelle par après...* Paris: Denys du Val, 1581.

£14,500

Extremely rare first edition of the work which coined the term 'Caesarian section' and was the first to advocate its use, in appropriate circumstances, on a living woman. Only three copies located in auction records, two of which were in modern bindings. This copy is beautifully bound in 17th century red morocco. "In the year 1581, François Rousset, a Parisian physician published *L'hystérotomotokie ou enfantement césarien*, suggesting for the first time a 'laparotomy' with hysterotomy in the parturient who could not be confined in the ordinary way, this of course being done in the last resort. This surgical intervention was not usually performed until then before the woman's death … In support of this proposal, he gathered ten observations, six of them in which he personally took part without operating himself, as he was not a surgeon. Moreover, he did endeavour, by use of reason as well as authoritative arguments, to produce evidence that this intervention was actually feasible, saving sometimes the mother and child's lives while preserving the possibility of future pregnancy. The last part of the book is devoted to a detailed and meticulous description of the intervention. This revolutionary proposal was coldly received and vigorously opposed by the medical milieu, especially by Ambroise Paré... It is only in the nineteenth century that Rousset's book was noticed and acknowledged" (Francis Pottiee-Sperry).
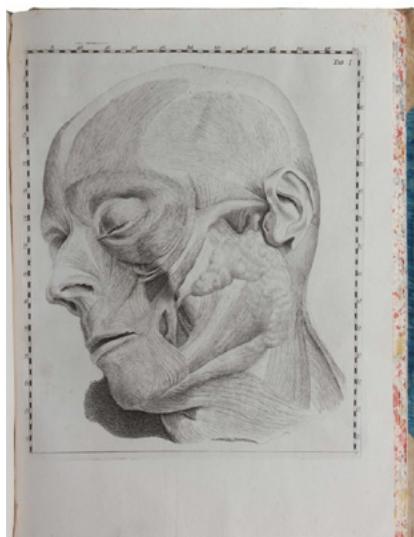
✠Garrison-Morton 6236; Wellcome 5593.
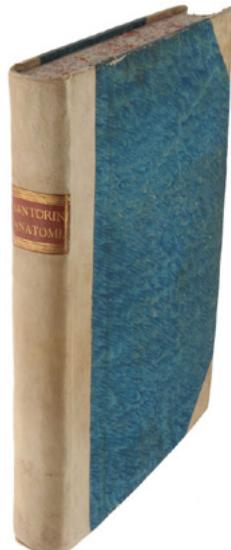
One of the finest anatomies of the eighteenth century

51. SANTORINI, Giovanni Domenico. *Anatomici summi septemdecim tabulae quas nunc primum edit atque explicat iisque alias addit de structura mammarum et de tunica testis vaginali.* Parma: [Giambattista Bodoni for] Regia typographia, 1775.

£4,850

First edition, and a very fine copy. "The book is one of the finest anatomies of the eighteenth century because of its excellent illustrations and comprehensive commentary." (*Heirs of Hippocrates*). It is also one of the rarest of the few medical books printed at the celebrated Bodoni Press in Parma, as well as one of the few medical books issued by a private press. "Santorini was generally acknowledged as the outstanding anatomist of his time. Many corrections and discoveries in the detailed anatomy of the different organs of the human body go back to Santorini. Even today a facial muscle (risorius), a pair of cartilages (comicula) of the larynx, the emissary veins of the skull, and a part of the superior and inferior turbinates of the ethmoid are named after Santorini" (Hagelin, *Rare and Important Medical Books*, p. 112).

Norman 1888; Garrison-Morton 399.1; *Heirs of Hippocrates* 788; Pincus 248.
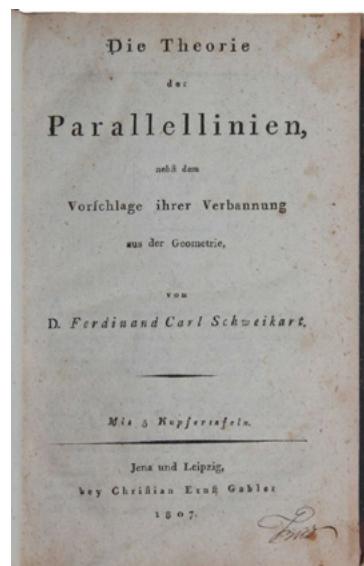
A key work in the pre-history of non-Euclidean geometry

52. SCHWEIKART, Ferdinand Carl. *Die Theorie der Parallellinien nebst dem Vorschlage ihrer Verbannung aus der Geometrie.* Jena & Leipzig: Christian Ernst Gabler, 1807.
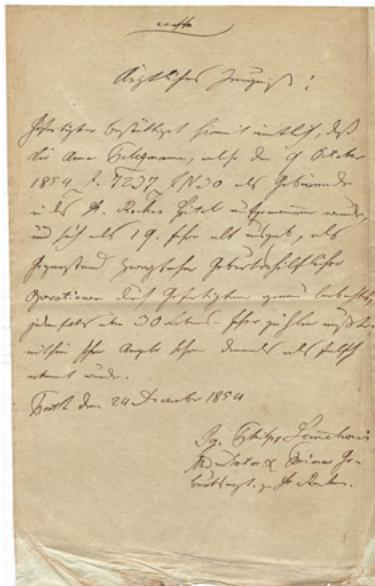
£7,750

First edition, first issue, of this extremely rare and important work on non-Euclidean geometry. Schweikart "holds an important place in the prehistory of non-Euclidean geometry... The three chief founders of hyperbolic geometry [i.e. Gauss, Bolyai and Lobachevsky] surpassed Schweikart only because of the thoroughness with which they examined specific topics in the subject" (DSB). "While a student at Marburg, the lectures of J. K. F. Hauff had stimulated him to consider the problem of parallel lines, which provided the subject of his only publication in mathematics (1807). His approach was still completely Euclidean; but later he arrived at the beginnings of a hyperbolic geometry, which he called astral geometry. He made this advance independently of Gauss, Bolyai and Lobachevsky, as is proved by the correspondence cited by Engel and Stäckel in *Die Theorie der Parallellinien von Euklid bis auf Gauss*. The astronomer Christian Gerling, a student of Gauss, wrote in a letter to Wolfgang Bolyai, the father of János Bolyai, that in 1819 Schweikart had reported on the basic elements of his "astral geometry" to colleagues at Marburg. Schweikart also wrote on this topic to his nephew Taurinus at Cologne. Stimulated by his uncle's work, Taurinus had virtually discovered hyperbolic trigonometry; but unlike his uncle, he still believed in the sole validity of Euclidean geometry" (*ibid.*). Bonola, *Non-Euclidean Geometry*, pp. 75-77; Sommerville, p. 15.

One of a handful of autograph manuscripts

53. SEMMELWEIS, Ignaz Philipp. *Extremely rare autograph document in Semmelweis' hand, from his time at the St. Rochus Hospital in Pest were he eliminated childbed fever, medical testimony regarding a female patient, signed and dated 24. December 1854.*
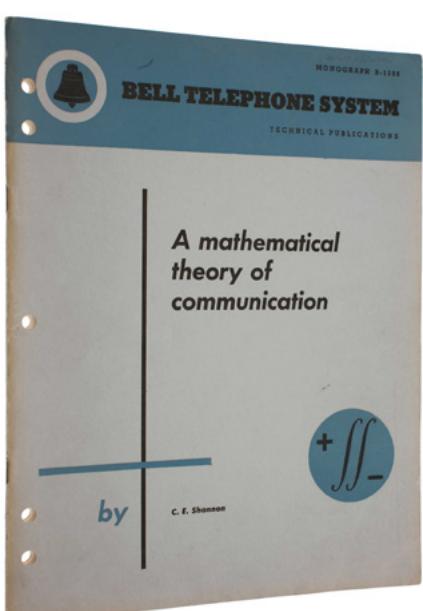
£27,000

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

'Few other works of the twentieth century have had a greater impact'

54. SHANNON, Claude Elwood. *A Mathematical Theory of Communication.* New York: American Telephone and Telegraph Company, 1948.

£6,500

First edition, the rare offprint, of "the most famous work in the history of communication theory" (*Origins of Cyberspace*, 880). "Probably no single work in this century has more profoundly altered man's understanding of communication than C. E. Shannon's article, 'A mathematical theory of communication', first published in 1948" (D. Slepian (ed.), *Key papers in the development of information theory, Institute of Electrical and Electronics Engineers*, Inc., New York, 1974).
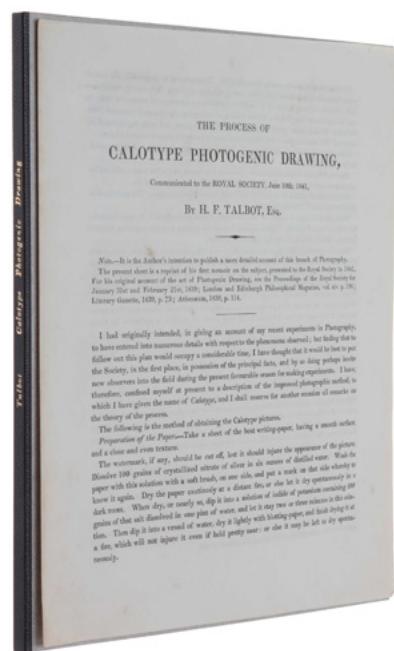
"In 1948 Shannon published his most important paper, entitled 'A mathematical theory of communication'. This seminal work transformed the understanding of the process of electronic communication by providing it with a mathematics, a general set of theorems rather misleadingly called information theory. The information content of a message, as he defined it, has nothing to do with its inherent meaning, but simply with the number of binary digits that it takes to transmit it. Thus, information, hitherto thought of as a relatively vague and abstract idea, was analogous to physical energy and could be treated like a measurable physical quantity … So wide were its repercussions that the theory was described as one of humanity's proudest and rarest creations, a general scientific theory that could profoundly and rapidly alter humanity's view of the world. Few other works of the twentieth century have had a greater impact; he altered most profoundly all aspects of communication theory and practice" (*Biogr. Mems Fell. R. Soc. Vol. 5,* 2009).

First announcement of the Calotype process

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

£10,500

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.

## *With the incredibly rare instrument plate*

56. TARTAGLIA, Niccolò. *Nova scientia inventa. [with:] Quesiti, et inventioni diverse.* Venice; Venice: Nicolo de Bascarini; Venturino Ruffinelli, 1550; 1546.

£15,500

First edition of the *Quesiti*, bound with the second edition of the *Nova Scientia* (first, 1537), the two most important works of Tartaglia (1499-1557), and containing the extremely rare instrument plate, which is virtually unknown. The *Nova scientia* is Tartaglia's first work, the foundation of the new sciences and a major catalyst for the researches of Galileo. "*The New Science*s stands at the threshold of a new age in the history of mechanics" (*PMM*). The *Quesiti*, intended by Tartaglia as a continuation of the *Nova scientia*, continues his discussion of ballistics but is most famous for containing in Book IX "his most important mathematical accomplishment: the independent discovery of the rule for solving third-degree (cubic) equations, a rule first formulated but left unpublished by Sciopione de Ferro in the first or second decade of the sixteenth century. Tartaglia re-solved the problem in 1535 but kept the details a secret for many years, using his knowledge to gain advantage in the frequent public disputations held between scholars in his era. He finally revealed the rule to Girolamo Cardano in 1539 after Cardano swore to keep it secret, but six years later Cardano broke his promise by publishing the rule in his *Ars magna*" (Norman). The large folding plate, of which we know of only one other copy, illustrates, with accompanying text, the construction of various instruments discussed in the text; it is highly important for Galileo's later work on the 'geometric and military compass.'

57. VALSALVA, Antonio Maria. *De Aure Humana Tractatus, in quo integra ejusdem auris fabrica, multis novis inventis, & iconismis illustrata, describitur; omniumque ejus partium usus indagantur. Quibus interposita est musculorum uvulae, atque pharyngis nova descriptio, et delineatio.* Bologna: Constantino Pisari, 1704.

£4,850

Rare first edition, and a fine copy, of "the first full account of the minute anatomy of the ear" (Norman). "This remarkable book became a standard on the subject for over a century" (*Heirs of Hippocrates*). "The 'Treatise' is arranged in six chapters. The first three are anatomic and deal with the parts of the ear; the last three are physiologic and explain the functions of these parts. The auricle and auditory meatus, the tympanum and middle ear, and the labyrinth and inner ear are discussed. Chapter 2 includes Valsalva's report, promised on the title page, of the musculature of the uvula and pharynx; these are depicted on separate plates. The ten illustrations are good line engravings, of which the most striking are those of the nerves and blood vessels of the outer ear, the carotid artery, the semicircular canals, and the structure of the whole ear" (Lilly).

☙Norman 2125; Lilly, *Notable Medical Books* 101; Garrison-Morton 1546; *Heirs of Hippocrates* 729 (later edition).
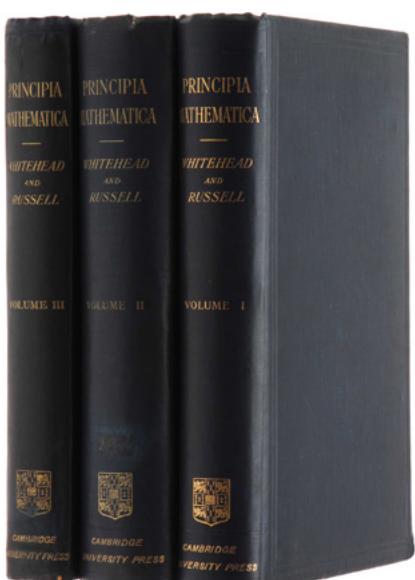
58. WHITEHEAD, Alfred North & RUSSELL, Bertrand. *Principia mathematica.* Cambridge: at the University Press, 1910-12-13.
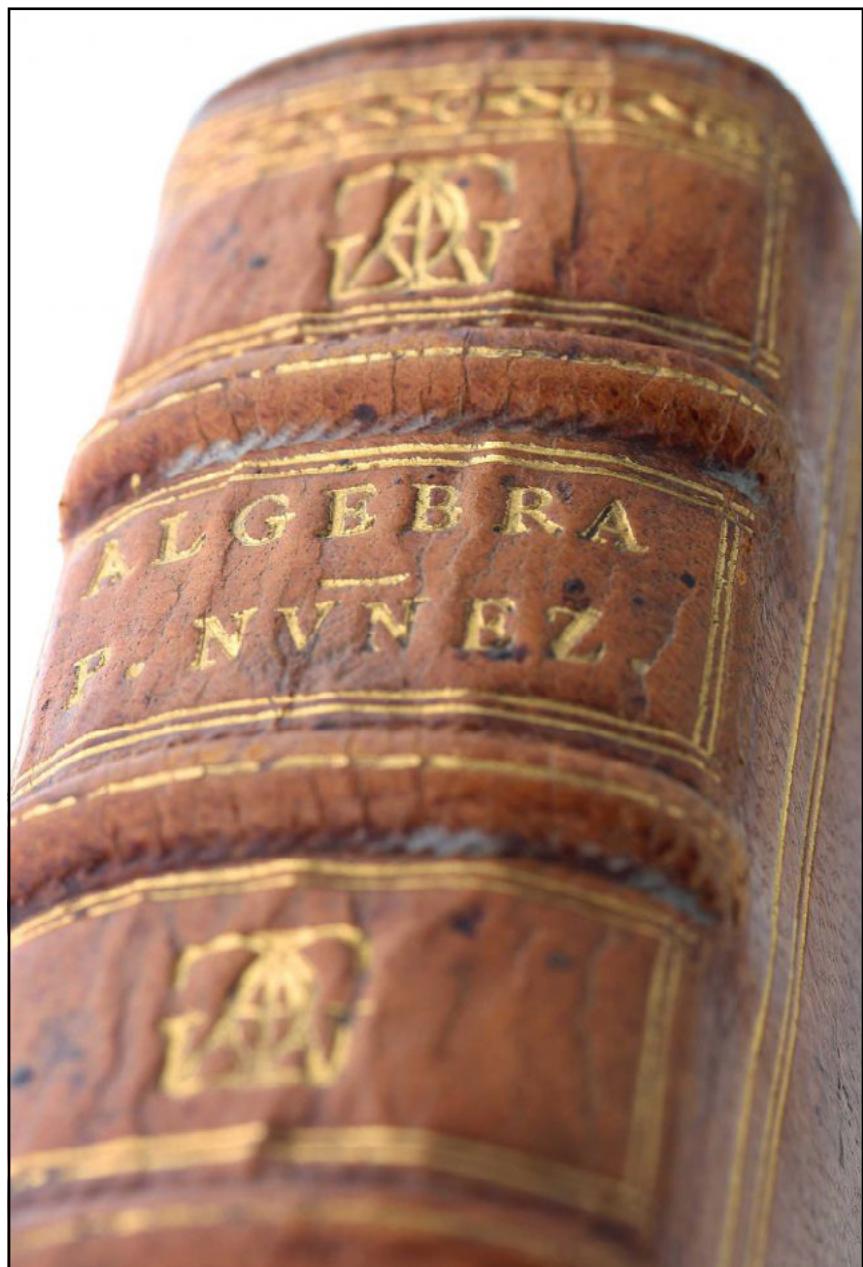
£85,000

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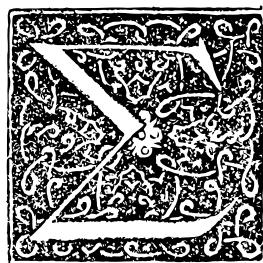
of their 'logicist' thesis that mathematics could be derived solely from logical concepts and by logical methods…[It] has had an influence, direct and indirect, of near Newtonian proportions upon the spheres of its chief influence: mathematical logic, set theory, the foundations of mathematics, linguistic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

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

NUÑEZ: Libro de algebra en arithmetica y geometria, 1567.

Exceptionally fine copy, bound in citron morocco for Jacques-Auguste de Thou (1553-1617), of this rare and celebrated treatise on algebra for navigators.

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