AMPÈRE, André Marie.

Mémoires sur l'action mutuelle de deux courans électriques, sur celle exise entre un courant électrique et un amiant ou le globe terrestre, et celle de deux aimans l'un sur l'autre.

Paris: l'Academie Royale des Sciences, 1820. First edition, offprint issue.

The **rare separate printing of the founding paper of electrodynamics** (Dibner 62; Norman 64). Ampère first heard of Ørsted's discovery of electromagnetism on the 4th of September when Arago announced Ørsted's results to the Paris Academy of Sciences. In Ørsted's experiment a current-carrying wire is held over, and under, a compass needle - the result being that the needle is positioned at 45 degrees in respect to the wire. Ampére immediately saw that this result made no physical sense and realized that the true nature of the effect could not be observed until the force of terrestrial magnetism was somehow neutralized; what Ørsted had observed and reported on was the resultant of the force from the wire and that from the earth's magnetic field. Ampère discovered that the compass needle sets at 90 degrees to the current-carrying wire when the effect of terrestrial magnetism is eliminated. He also observed that current-carrying wires which are formed as spirals act as permanent magnets, and this lead him to his theory that electricity in motion produces magnetism and that permanent magnets must contain electrical currents. And thus Ampère laid the foundation of the new field of electrodynamics. Scarce. 8vo: 197 x 127 mm. Contemporary plain blue wrappers. 68 pp. and five folding engraved plates. A fine copy.

€7,500.00

ARRHENIUS, Svante August.

Ueber den Einfluss des atmosphärischen Kohlensäuregehalts auf die Temperatur der Erdoberfläche.

Stockholm: P.A. Norstedt, 1896. First edition.

A mint copy of the paper in which Arrhenius gave **the first quantitative study of the greenhouse effect** and the relation of carbon dioxide levels in the atmosphere to global warming. Arrhenius "developed a theory for the explanation of the glacial periods and other great climatic changes, based on the ability of carbon dioxide to absorb the infrared radiation emitted from the earth's surface. Although the theory was based on thorough calculations, it won no recognition from geologists" (DSB). Joseph Fourier proposed already in 1824 that gases in the atmosphere might increase the surface temperature of the Earth. It was however Arrhenius who investigated this quantitatively and worked out a relationship between CO_2 levels and the earth's temperature. "He examines the importance of carbon dioxide in the earth's heat balance and concludes that a doubling of the concentration of CO_2 in the atmosphere would result in an average global temperature increase of about 6 Kelvins, or 6°C. He publishes his results in the paper *On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground* (Parkinson, p.433). 8vo: 216 x 140 mm. Original printed wrappers; mint. Issued in the series *Bihang till K. Svenska Vet.Akad. Handlingar*. Papers from this supplement series are often mistakenly identified as offprints or 'first separates' because they have their own title page with the publishers named and their own pagination, but they are not - all publications from this series were printed separately in this way and issued in a wrappers mentioning issue number and volume. 102 pp.

€3,500.00

BARTSCH, Jacob.

Planisphaerium stellatum seu Vice-Globus Coelestis in plano delineatus.

Nürnberg: Christoph Gerhard for Paul Fürst, 1661.

First edition of this collection. Jakob Bartsch (1600-1633) married Kepler's daughter Susanna and was his father-in-law's assistant in his later years. The present work contains a complete cosmographical handbook with 23 worked problems for the student (first published in 1624), a perpetual solar ephemeris by Laurentius Eichstadius, a planetary ephemeris for 25 years from 1662, a star catalogue based on Brahe, Kepler and Severinus, a catalogue of European cities with their coordinates, tables of right and oblique ascensions, a table of polar elevations for Nuremberg by Cyprian Leowitz, and an historical preface by the editor Andreas Goldmayer. According to Warner, the positions of the stars charted on Bartsch's three maps are not simply based on a Ptolemaic or Tychonic source — in the text, he discusses the positions of Brahe, Keyser and Habrecht, and in the star catalogue those of Copernicus, Brahe and Bayer. Warner: Sky Explored p.16-1a. Houzeau & Lancaster 15252 (note); Zinner 245; Bibl. Dt. Mus. Libri Rari 25. 4to: 195 x 156 mm, uncut. Contemporary vellum. Engraved title with the astronomers of Nuremberg seated in discussion at a table with the city in the background, 3 engraved folding celestial maps, 6 (3 double page) engraved folding plates, and 4 woodcut illustrations in the text. (42), 152(:recte 148), (170), (2: instructions for the binder) pp. As in all copies p. 1/2 and 5/6 are omitted in pagination. Complete. Some browning in the printing area, a few closed tears professionally repaired with Japan paper, otherwise a fine copy.

€4,500.00
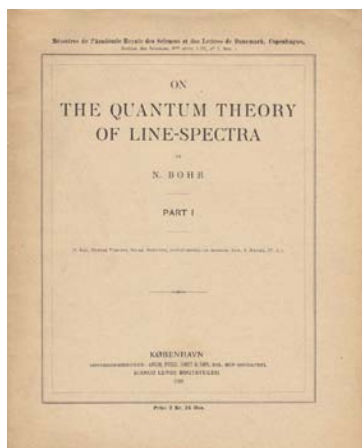
BOHR, Niels Henrik David.

On the Quantum Theory of Line-Spectra, I-III [all published].

Copenhagen: Bianco Luno, 1918-1922. All first editions.

A fine set of this major work: It was in this fundamental paper that Bohr first gave a clear formulation of, and fully utilized, his **'correspondence principle'**. Besides his derivation of the Balmer formula (1913), this is by many considered to be Bohr's greatest contribution to physics. Bohr's correspondence principle states in general that although classical physics is incomplete there must be a fundamental analogy between quantum theory and classical physics. Actually Bohr at first referred to the postulate as the 'principle of analogy'. It was Bohr's underlying idea that the new quantum theory must satisfy in the limiting cases, e.g., when frequencies v tend to zero or quantum numbers $n \rightarrow \infty$, that its predictions approximate those of classical physics. In this major paper, of which the two first parts were published in 1918 and the third in 1922, Bohr penetrated far into the quantum theory of line-spectra of the Hydrogen atom, and other elements, by using his principle and the classical theory of electrodynamics. Bohr's method was the principle guide to the progress of quantum theory during the early twenties, until it was finally built into the foundation of quantum mechanics. 4to: 268 x 218 mm. All three parts bound in one fine half morocco, signed Ole Olsen 1980 Co'libri. All front and back wrappers with-bound, a fine set.

€2,800.00
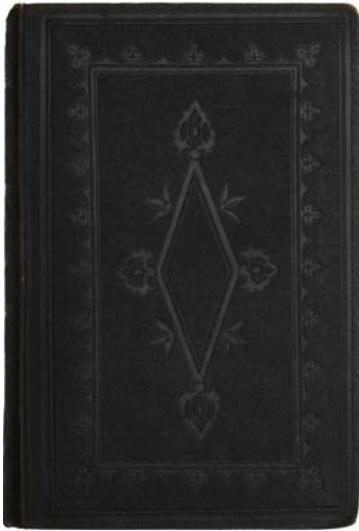
BOOLE, George.

An Investigation of the Laws of Thought, on which are founded the Mathematical Theories of Logic and Probabilities.

London: Walton and Maberly, 1854. First edition, first issue.

A beautiful and un-restored copy of **the rare first issue**. In this main work of Boole's he gave the first proper presentation of Boolean algebra - "Boole invented the first practical system of logic in algebraic form, which enabled more advances in logic to be made in the decades of the nineteenth century than in the twenty-two centuries preceding. Boole's work led to the creation of set theory and probability theory in mathematics, to the philosophical work of Peirce Russell, Whitehead, and Wittgenstein, and to computer technology via the master's thesis of Claude Shannon, who recognized that the true/false values in Boole's two-valued logic were analogous to the open and closed states of electric circuits." (Hook & Norman). "Since Boole showed that logics can be reduced to very simple algebraic systems - known today as Boolean Algebras - it was possible for Babbage and his successors to design organs for a computer that could perform the necessary logical tasks. Thus our debt to this simple, quit man, George Boole, is extraordinarily great. ... In Boole's system *1* denotes the entire realm of discourse, the set of all objects being discussed, and *0* the empty set. There are two operations in this system which we may call + and ∞ or we may say *or* and *and*. It is most fortunate for us that all logics can be comprehended in so simple a system, since otherwise the automation of computation would probably not have occurred - or at least not when it did" (Goldstine). This is the rare first issue (see Hook & Norman for issue pointers). OOC 224 (1st issue, re-backed); Erwin Tomasch B198 (2nd issue); Haskell Norman 266 (3rd issue). 8vo: 225 x 143 mm, uncut. Original publishers black blind-paneled cloth. (10: irregularly paginated), 424, (2:errata) pp. A fine copy.

€9,500.00
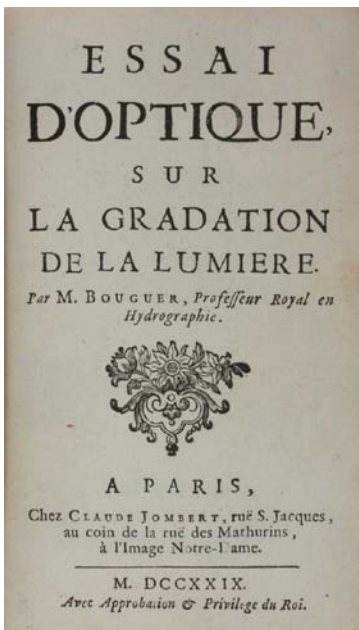
BOUGUER, Pierre.

Essai d'optique sur la gradation de la lumiere.

Paris: Claude Jombert, 1729. First edition.

A very nice copy in contemporary binding of **the founding work of photometry**. "Bouguer is regarded as the founder of photometry, the branch of optics concerned with measuring the intensity of light. His two most important contributions to the subject are contained in his *Essai*, the first part of which states his method of comparing the relative brightness of two lights by using the eye as a null indicator (i.e., to establish the equality of brightness of two adjacent surfaces) and applying the laws of inverse squares. The second part contains the first statement of what is often called Bouguer's law: that in a medium of uniform transparency, the light remaining in a collimated beam is an exponential function of the length of its path in the medium. This law was restated thirty-one years later in Lambert's *Photometria* and is thus sometimes referred to as Lambert's law" (DSB). Norman 283. 8vo: 166 x 100 mm. (22), 164, (4:errata) pp. and 3 engraved folding plates. Contemporary mottled calf, richly gilt spine, all edges and boarders gilt, head of spine with some chipping, hinges slightly worn, engraved book plate to front paste down.

€3,250.00
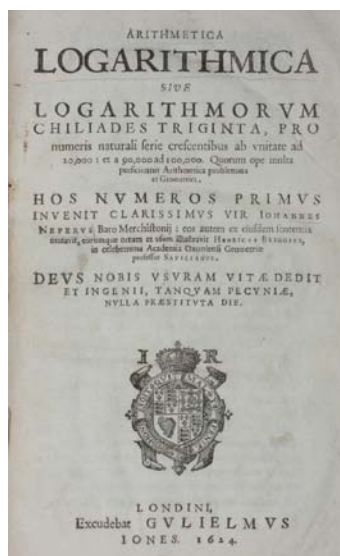
BRIGGS, Henry.

Arithmetica logarithmica sive logarithmorum chiliades trigita, ...

London: William Jones, 1624. First edition.

The first extensive tables of base-ten logarithms. Soon after its publication, Briggs learnt of Napier's *Logarithmorum canonis descriptio* (1614), and from that point he devoted his studies entirely to logarithms. One of Briggs's achievements was to change the logarithms of Napier into a form in which the logarithm of 1 is zero and that of 10 is 1, i.e. base-ten logarithms (Napier had used logarithms which were closer to hyperbolic logarithms, although they did not have the important property that the logarithm of 1 is zero, an improvement suggested by Briggs). Briggs's work culminated in the present work, in which he tabulated thirty thousand base-ten logarithms, each to 14 decimal places, those of numbers from 1 to 20,000 and from 90,000 to 100,000. This book has been underestimated by many historians, who have regarded Briggs merely as the slave and drudge of his master, Napier - as Goldstine points out, Briggs is the true inventor of the calculus of finite differences, and the first discoverer of any case of the binomial theorem for a fractional exponent – one half – almost 50 years before the statement of the general binomial formula by Newton and his work on finite differences. In fact, Briggs's method of computing logarithms was based on the repeated taking of square roots, making use of the binomial expansion. Whiteside points out the curious fact that the first use of a series approximation to find logarithms was not of the logarithm but of the square root. Erwin Tomash B250; Origins of Cyberspace 2; Norman 339. Goldstine: A History of Numerical Analysis, pp. 13-20; Whiteside: Patterns of Mathematical Thought, p.234. Folio: 336 x 210 mm. Contemporary blind ruled calf with five raised bands. Professionally re-backed preserving nearly all of the original spine; a fine copy. Internally clean. (8), 88, (302) pp.

€7,600.00

CARNOT, Lazare Nicolas Marguerite.

Géométrie de Position.

Paris: Duprat, 1803. First edition.

A fine copy of his main work in mathematics. "In *Géométrie de Position* Carnot developed what he had first intended as a somewhat fuller edition of the *Corrélation des figures* (1801) into a vastly more extensive exploration of the problem-solving reaches of geometry" (DSB). "Monge and his school concerned themselves especially with the relations of form, and particularly with those of surfaces and curves in a space of three dimensions. Inspired by the general activity of the period, but following rather the steps of Desargues and Pascal, Carnot treated chiefly the metrical relations of figures. In particular he investigated these relations as connected with the theory of transversals, a theory whose fundamental property of a four-rayed pencil goes back to Pappos, and which, though revived by Desargues, was set forth for the first time in its general form in Carnot's *Géométrie de Position* ... In these works he introduced negative magnitudes, the general quadrilateral and quadrangle, and numerous other generalizations of value to the elementary geometry of to-day" (David Eugene Smith). Honeyman 597. A broad-margined copy in contemporary full calf with richly gilt spine. Rare in such good condition. 4to: 247 x 188 mm. (4),XXXVIII,(2),489,(1) pp. and 15 plates.

€1,100.00

CARRÉ, Louis.

Methode pour la mesure des surfaces, la dimension des solides, leurs centres de pesanteur, de percussion et d'oscillation, par l'application du calcul intégral.

Paris: Jean Boudot, 1700. First edition.

A fine copy of **the first text-book on the integral calculus**. "It was through his wide network of acquaintances in various European countries that Leibniz put into effect all his strategies for the spread of his analysis. The presence first of Jacob Hermann, the favorite pupil of Jacob Bernoulli, and then of Nicolaus I Bernoulli, the nephew of the Bernoulli brothers, as professors of mathematics in Padua was one outlet ... In France it was through the Oratorian circle of Nicolas Malebranche (1638–1715) that Johann Bernoulli introduced in 1691 the Leibnizian calculus. His lessons to the Marquis de l'Hôpital led to the draft of the first treatise of differential calculus (1696), and it was under the influence of Malebranche that some years later appeared the first works on the integral calculus by Louis Carré in 1700 and Charles René Reyneau in 1708. The spread and acceptance of the Leibnizian calculus was transferred in this way to the wide public, through the manuals and textbooks written for students at universities or ecclesiastical colleges." (Landmark Writings in Western Mathematics, p.56). 4to: 257 x 190 mm. Contemporary marbled calf, spine gilt in compartments with title lettered in gold, gilt edges. (12), 115, (1:blank) pp. and 4 folding engraved plates.

€4,500.00

CATENA, Pietro.

Super loca Mathematica contenta in Topicis & Elenchis Aristotelis nunc & non antea, in lucem edita.

Venice: Apud Cominum de Tridinum Montisferrati, 1561. First edition.

"Catena [1501-1571] is historically important as one of the first authors in the 16th century to deal with the problem of a formal and epistemological validation of Euclidean mathematics, naturally proceeding from the viewpoint of Aristotelian logic and philosophy, and treating authoritatively the 'quaestio de certitudine mathematicarum', which, in the mid-century, preoccupied notable authors, such as Francesco Barozzi and Alessandro Piccolomini, in the context of a wider European debate on the methods of science." (Dizionario biografico degli Italiani). "The main thesis common to Piccolomini and Barozzi, but rejected by Catena, was that of the middle position of mathematical entities [i.e. its position between divine philosophy, and natural philosophy], for which Catena substituted a view of mathematical universals as predicates of the rational soul that he derived from his Platonic reading of 'Posterior Analytics'. Unlike physical phenomena, which are perceived primarily through sense experience, mathematical entities are pure intelligibles, constituted only through a rational process of thought and in no need of the senses to be recognized. ... Attributing a common ideal of science of Aristotle and Euclid ... Catena thought that mathematical demonstrations were superior to demonstrations potissimae as instruments of acquiring new knowledge. Hence, he claimed that knowledge of the world was only possible through the use of mathematical methods." (The Cambridge Companion to Galileo pp. 87-89). 4to: 209 x 150 mm. Bound in recent vellum. 16 ff. Scarce.

€6,500.00

CAVALIERI, Bonaventura.

Trigonometria plana, et sphaerica, linearis, & logarithmica.

Bologna: Victor Benatis, 1643. First edition.

A beautiful copy, from the library of the Counts Riccati. "Cavalieri, a pupil of Galileo, introduced logarithms into Italy in his *Trigonometria* and several other works." (Hook & Norman). "From the standpoint of mathematics alone the Italian writer who influenced the science most in the 17th century was probably Bonaventura Cavalieri, ... [he] was one of the first to recognize the great value of logarithms" (Smith). The *Trigonometria* also contains a **preliminary defense by Cavalieri of his method of indivisibles** - "Throughout the last three of the four volumes of his *Centrobaryca* (1635-1641) [Paul] Guldin had commented upon Cavalieri's use of indivisibles and had particularly criticized it very outspokenly in Chapter 5 of the fourth volume. Shortly before Guldin's death [in 1643] Cavalieri published a defense of his method in the section *Admonitio circa auctorem centrobaryacae* of his *Trigonometria* (1643, pp. 6-8)." (Kirsti Andersen: Archive for History of Exact Sciences, vol. 31, p.295). Cavalieri's full defense of his method appeared in his *Exercitationes Geometricae* 1647. Erwin Tomasch C52. 4to: 230 x 155 mm. Fine eighteenth-century Italian half calf. Provenance: contemporary inscription of the Jesuit college of Bologna on title (Cavalieri was professor there); engraved armorial ex libris of the Counts Riccati to the front paste down and rear of the title page; the family had several distinguished mathematicians, including Jacopo Riccati (1676-1754) - known for the Raccati equation. Jacopo Riccati studied astronomy under Stefano degli Angeli, a former pupil of Bonaventura Cavalieri. Frontispiece, 16, 71, (1); (104) pp. and 1 engraved folding plate. A fine copy with distinguished provenance.

€2,850.00
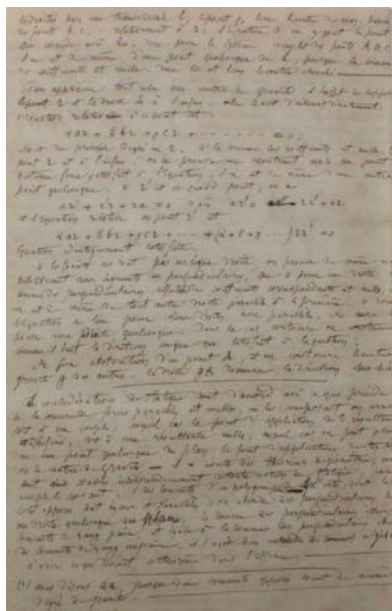
CHASLES, Michel Floréal.

Traité de Géométrie Supérieure.

Paris: Bachelier, 1852. First edition.

An interesting copy of his seminal treatise on synthetic geometry **with more than two hundred contemporary manuscript leaves** inserted throughout the text. Chasles' *Traité de Géométrie* is concerned with the "theories of the cross ratio, homographic ranges and pencils, and involution, all of which were originally defined and discussed in (his *Aperçu historique*, 1837) ... In the case of the cross ratio, which Chasles called the anharmonic ratio, he was anticipated by August Möbius, in his *Barycentrische Calcul* (1827) . However, it was Chasles who developed the theory and showed its scope and power. This book, Chasles felt, showed that the use of sensed magnitudes and imaginary elements gives to geometry the freedom and power of analysis." (DSB). This copy contains no owner's signature or other signs of provenance, but has in all 212 gold leaf papers neatly mounted in the margins of the pages containing contemporary manuscript notes in French. The notes, which in large are spread uniformly out through the text, range from minor comments and corrections to elaborate calculations, corollaries, and illustrations. Chasles published a second edition of this work in 1880. 8vo (218 x 140 mm). Recent fine pastiche binding of half calf with richly gilt spine. Text lightly foxed throughout. (4), LXXXIII, 603 pp. and 12 folding plates.

€1,200.00
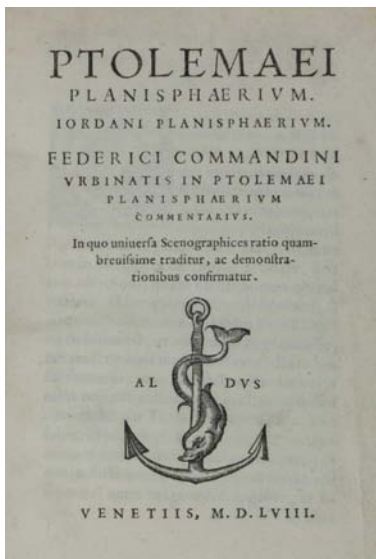
COMMANDINO, Federico.

Ptolomaei Planisphaerium. Jordani Planisphaerium. Federici Commandini Urbinatis in Ptolemaei Planisphaerium Commentarius.

Venice: Aldus (Paolo Manuzio), 1558.

First edition with Commandino's commentary. The Greek text of this writing by Ptolemy on stereographic projection is lost, a Latin version appeared in Basel in 1536, but this is **the first separate and best edition**, translated from the Arabic and edited by Commandino with his commentary. The *Planisphaerium* concerns the stereographic projection of the celestial sphere on a plane with the south celestial pole at the center, a technique which Ptolemy used for mapping points in the heavens on the plane of the equator. In working with this projection and conic sections, Commandino noticed that conic sections can be considered sections in visual cones or perspective images. This inspired him to include in his work a study of perspective which occupies the first nineteen leaves of his commentary, and represents one of the earliest mathematical formulations of a method already widely employed by artists. Houzeau 769; Riccardi I, 360.1; Adams P-2242; Sarton I, 277 and II, 616; Two parts bound in one volume (as issued). Small 4to: 211 x 156 mm. Contemporary limp vellum. ff. 3, (1:blank), 37, (1:printers device); 28.

€6,500.00
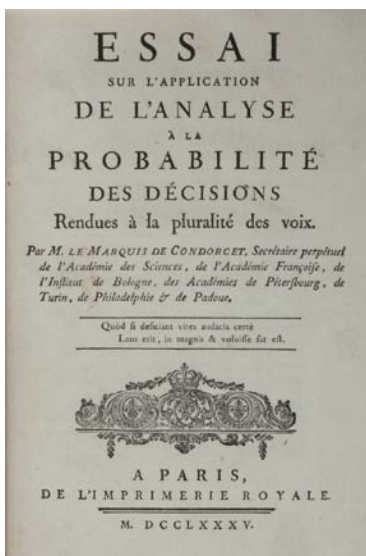
CONDORCET, Marquis de.

Essai sur l'Application de l'Analyse a la Probabilité des Décisions Rendues à la Pluralité des Voix.

Paris: Imprimerie Royale, 1785. First edition.

The **first large-scale attempt to apply mathematics to knowledge of human phenomena**. "Condorcet's most significant and fruitful endeavor was in a field entirely new at the time ... Condorcet called this new science 'social mathematics'. It was apparently intended to comprise ..., a statistical description of society, a theory of political economy inspired by the Physiocrats, and a combinatorial theory of intellectual processes. The great work on the voting process, published in 1785, is related to the later. Condorcet there sought to construct a scheme for an electoral body the purpose of which would be to determine the truth about a given subject by the process of voting and in which each elector would have the same chance of voicing the truth. Such a scheme was presented exactly like what is today called a model. Its parameters were the number of voters, the majority required, and the probability that any particular vote voices a correct judgment. Condorcet's entire analysis consisted, then, of calculating different variable functions of these structural parameters. Such, for example, was the probability that a decision reached by majority vote might be correct. ... He showed that a complex questionnaire could be reduced to a sequence of dichotomies and that constraints implicitly contained in the complex questionnaire are equivalent to rejection of certain combinations of 'Yes' and 'No' in the elementary propositions." (DSB). In his analysis Condorcet described several now famous results, including Condorcet's jury theorem, his voting paradox, and the Condorcet election method. Scarce. 4to: 255 x 203 mm. Contemporary calf, skillfully re-backed. Some slight browning to the last 20 pages. (2), CXCI, 304 pp.

**€7,500.00**
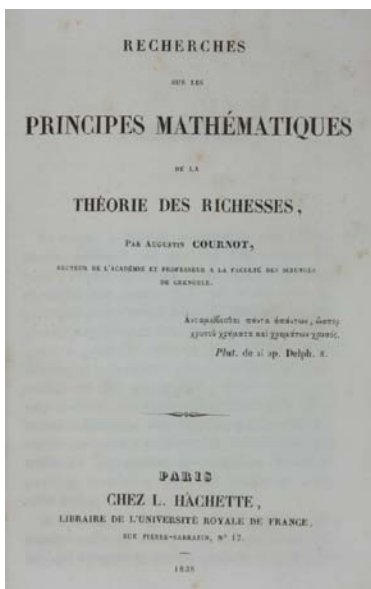
COURNOT, Antoine-Augustin

Recherches sur les Principes Mathématiques de la Théorie des Richesses.

Paris: L. Hachette, 1838. First edition.

A fine copy of **the foundation work of mathematical economics**, with the often lacking folding plate. "If a symbolic date were to be chosen for the birth of mathematical economics, our profession, in rare unanimous agreement, would select 1838, the year in which Augustin Cournot published his *Recherches sur les Principes Mathématiques de la Théorie des Richesses.* (Nobel lecture of Gerard Debreu). "With the publication in 1838 of his *Recherches* he was a third of a century ahead of Walras and Jevons and must be considered the true founder of mathematical economics. By reducing the problem of price formation in a given market to a question of analysis, he was the first to formulate the data of the diagram of monopolistic competition, thus defining a type of solution that has remained famous as 'Cournot's point'. ... Undoubtedly, he remains the first of the important pioneers in this field." (DSB). The development of monopolistic competition in the 1930s drew much inspiration from Cournot's work. As the theory of games advanced in the 1950s, Mayberry, Nash and Shubik (1953) restated Cournot's duopoly theory as a non-cooperative game with quantities as strategic variables. They showed that Cournot's solution was nothing other than its "Nash equilibrium". Einaudi 1365; Goldsmiths 30281; Kress C-4590. 8vo: 216 x134 mm. Contemporary cloth-backed marbled boards, re-backed. Occasional light foxing. XI, (1), 198, (2) pp. and one engraved plate.

€9,500.00
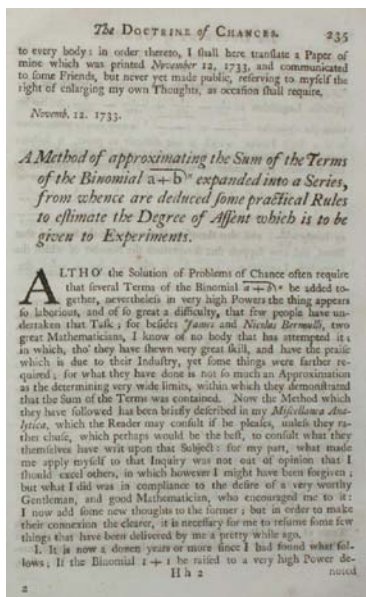
DE MOIVRE, Abraham.

The Doctrine of Chances: Or, A Mehtod of Calculating the Probabilities of Events in Play.

London: H. Woodfall, 1738.

The important second edition, as it contains De Moivre's main contribution to the field, i.e., the normal distribution, which "became **the most fruitful single instrument of discovery used in probability theory and statistics for the next two centuries**." (DSB). De Moivre's result was first published in a privately circulated pamphlet which is, however, virtually unobtainable. "In 1733, ..., de Moivre succeeded in finding a simple and accurate approximation to the binomial distribution. He considered this result so important that he printed a seven-page paper, *Approximatio ad Summam Terminorum Binomii $(a+b)^n$ in Serium expansi*, for private circulation. The Latin pamphlet was translated by de Moivre himself, and with some additions it was included in the second [edition] of the *Doctrine of Chances* (1738, pp.235-243 ...) under the title, 'A Method of approximating the Sum of the Terms of the Binomial $(a+b)^n$ expanded into a Series' ... Only six copies of the *Approximatio* have been found" (Hald: History of Probability and Statistics, p.485). Large 4to: 280 x 233 mm. Contemporary calf (skillfully re-backed, corners repaired). A few contemporary calculations and English annotations in the text. Title page and first three leaves stained otherwise clean. (4), XIV, 256 pp.

€3,000.00
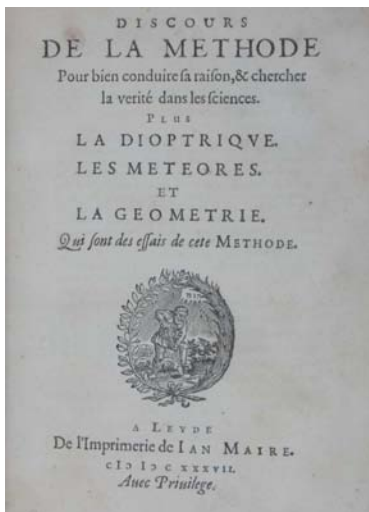
DESCARTES, René.

Discours de la methode pour bien conduire sa raison, & chercher la verité dans les sciences.

Leiden: Jan Maire, 1637. First edition.

A fine copy of his most celebrated work (PMM 129; Grolier/Horblit 24). "It is no exaggeration to say that Descartes was the first of modern philosophers and one of the first modern scientists; in both branches of learning his influence has been vast. ... The revolution he caused can be most easily found in his reassertion of the principle (lost in the middle ages) that knowledge, if it is to have any value, must be intelligence and not erudition. His application of modern algebraic arithmetic to ancient geometry created the analytical geometry which is the basis of the post-Euclidean development of that science. His statement of the elementary laws of matter and movement in the physical universe, the theory of vortices, and many other speculations threw light on every branch of science from optics to biology. Not least may be remarked his discussion of Harvey's discovery of the circulation of blood, the first mention of it by a prominent foreign scholar. All this found its starting point in the 'Discourse on the Method for Proper Reasoning and Investigating Truth in the Sciences'. Descartes's purpose is to find the simple indestructible proposition which gives to the universe and thought their order and system. Three points are made: the truth of thought, when thought is true to itself (thus cogito, ergo, sum), the inevitable elevation of its partial state in our finite consciousness to its full state in the infinite existence of God, and the ultimate reduction of the material universe to extension and local movement." (Printing and the Mind of Man). Dibner 81; Norman 621. 4to: 194 x 145 mm. Bound in a fine 20th century full black morocco, with five raised bands and title gilt on spine. All edges gilt. A short worm track to gutter of the first leaves, professionally repaired. 78; (2), 413, (1); (34) pp. Rare in such fine condition.

**€72,000.00**
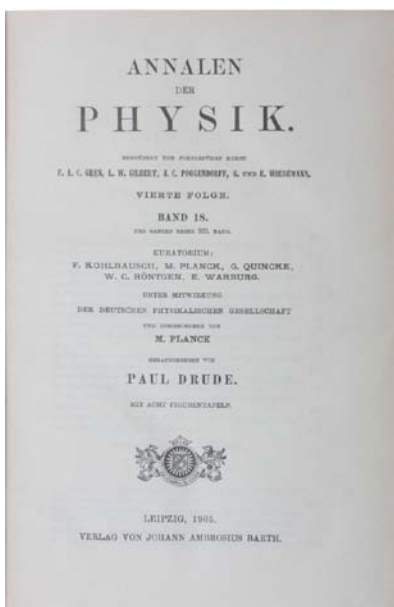
EINSTEIN, Albert.

Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?

Leipzig: Johann Ambrosius Barth, 1905. First edition.

A very good and un-restored copy in contemporary binding, of the paper in which he first derived the **mass-energy equivalence $E=mc^2$**. Weil *10.

In: Annalen der Physik, Vol. 18, pp.639-641. The complete volume (VIII,1084 pp. and 8 plates) offered in contemporary half cloth with spine gilding. Small closed tear to upper capital, slightly shaken, bookplate of the Joseph Henry Apple Library of Hood College to front paste down, and rubber stamp of the private library of H.W. Morse to the front free end paper. Internally fine and clean. In all a very good copy with the half title and title unmarked.

€3,500.00
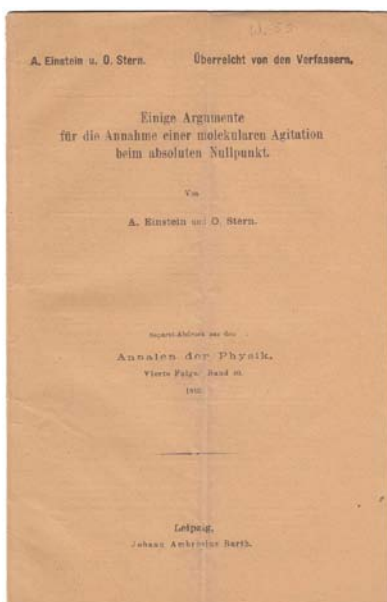
**EINSTEIN, Albert. & Otto Stern.**

Einige Argumente für die Annahme einer molekularen Agitation beim absoluten Nullpunkt.

Leipzig: Johann Ambrosius Barth, 1913. First edition, author's offprint issue.

Scarce offprint issue, with 'Überricht vom Verfasseren' printed on front wrapper. In this paper (co-authored with Nobel laureate Otto Stern) two expressions, given by Planck, for the energy of a Planck oscillator are examined. To obtain a decision between the two expressions, Einstein and Stern note that one could greatly benefit from a monochromatic system, whose frequency value could be changed independently of its temperature. Such systems do not exist, however, in a recent paper Nernst had shown that in thermal relationships rotating gas molecules behave very similarly to monochromatic systems. Using the measurements of Eucken on the specific heat of hydrogen they are able to demonstrate that only one of the two expressions given by Planck can hold. 8vo: 224 x 143 mm. Original printed wrappers. Slight vertical crease, otherwise in fine condition. Offprint from: Annalen der Physik, vol. 40, pp. 551-560. Weil 53, Boni 51. Weil mentions (p.4) that **only few of these offprints were made** of Einstein's papers from before 1914.

€2,400.00
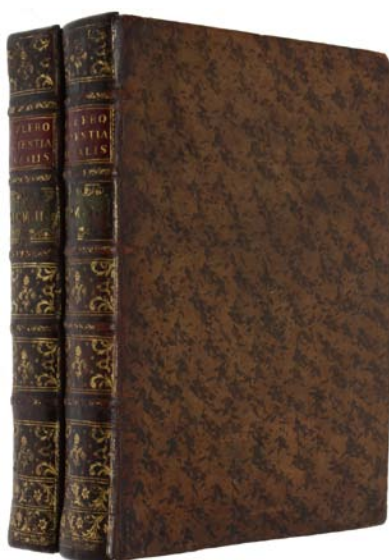
EULER, Leonhard.

Scientia Navalis seu Tractatus de Construendis ac Dirigendis Navibus.

St. Petersburg: Typis Academiae Scientiarum, 1749. First edition.

A fine copy, in contemporary binding, of **Euler's first large work on fluid mechanics**. "With this work Euler made a major contribution to the study of fluid mechanics. In the first volume he presents a general theory of equilibrium of floating bodies with an original theory of stability and small oscillations in the neighborhood of the equilibrium position. The second volume applies the general theory to ship design, and deals with ships in general, stability and equilibrium, the motion of ships, and the wind; as well, it treats of such parts as masts, sails, oars, and rudder" (Roberts & Trent, p.105). Eneström 110. Bibliotheca Mechanica, p.105. 4to: 251 x 188 mm. Two volumes in contemporary mottled calf with richly gilt spines. (2),44, 444, (2) pp. and 37 plates; (2), 534 pp. and 28 plates. Scarce in such good condition.

€6,000.00

FERNEL, Jean François.

De Proportionibus Libri Duo. Prior, qui de simplici proportione est, & magnitudinum & ...

Paris: Simon de Colines, 1528. First edition.

"This book is **one of the best sixteenth-century treatises on the mediaeval proportion**. It follows the Boethian treatment, as seen in the work of Bradwardian." (Smith: Rara Arithmetica, p.157). This work is one of Fernel's early publications and one of three books on mathematical sciences published in two successive years; the *Monalsophere*, the *Cosmotheoria*, and lastly *De Proptionibus*, all published by Simon de Colines. The work was designed for students of Boethian mathematics, possibly to be used during his lectures, and has a very useful index. The first book defines proportion, the second gives the different kinds and specialist types, he also describes the use and theory of fractions. Graesse II p.540. Smith p.157. Renouard (Colines) p.117. Adams F247. Honeyman II 1298. Schreiber 35 (p.44). Folio: 287 x 187 mm. (IV), 28 ff. Bookplate of the Earls of Macclesfield on front pastedown, small spillage mark at head of one fol. A good copy in half calf by Hatton of Manchester, spine with two raised bands and gilt title.

€5,800.00

FRAENKEL, Abraham.

Der Begriff "definit" und die Unabhängigkeit des Auswahlaxioms.

Berlin: Preussischen Akademie, 1922. First edition, author's offprint.

Rare presentation offprrint of this milestone in mathematical logic (van Heijenoort: From Frege to Gödel, 1922b). In this article, "**the first work on models of set theory**" (Gregory H. Moore), Fraenkel gave the first proof of the independence of the axiom of choice. "In an important paper [ibid] Fraenkel clarified the notion of 'definiteness' in Zermelo's separation axiom by restricting the function involved to a finite number of logical operations ... This was one of his modifications to Zermelo's system which has led his name to be attached to it, and the acronym 'ZF'." (Grattan-Guinness: The Search for Mathematical Roots 1870-1940, p.478). Offprint from: Sitzungsberichte der Preussischen Akademie der Wissenschaften, XXI, pp. 253-257. Large 8vo: 254 x 184 mm. Original printed wrappers with 'Überreicht vom Verfasser' printed on the front wrapper. Slight vertical crease from having been folded, and some very light smudging to front wrapper, otherwise fine. Scarce.

€1,600.00
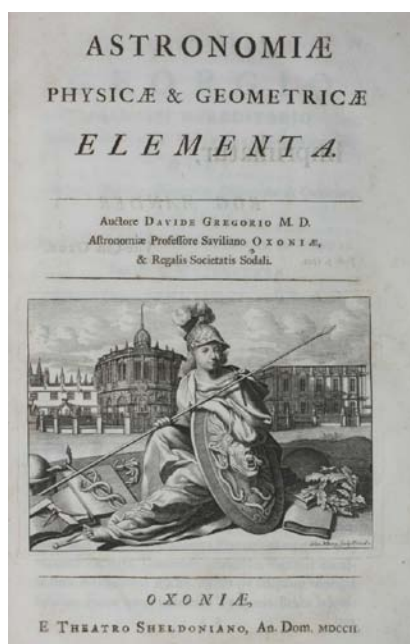
GREGORY, David.

Astronomiae Physicae & Geometricae Elementa.

Oxford: Sheldonian Theatre, 1702. First edition.

A fine copy of **the first text book of astronomy based on Newtonian principles**, which contains the **first printings of Newton's lunar theory and his "*Classical Scholia*"**. Babson 71; Gray 87. "The nephew of James Gregory, the mathematician, and the son of the Laird of Kinnairdie, David Gregory (1659-1708) was educated at the University of Edinburgh where he was soon appointed to it chair of Mathematics in 1683. In 1684 he sent Newton a manuscript showing the application of the method of infinite series to a variety of geometrical problems. The two met in 1691 and shortly afterwards Newton helped him obtain the Savilian Chair of Astronomy at Oxford. In 1702 Gregory published *Astronomiae Physicae & Geometricae* as the first textbook of astronomy based on Newtonian principles. The introduction includes the "Classical Scholia" which Newton had prepared for insertion in his planned second edition of the *Principia*. This attempted to show that essential elements of Newtonian science were also espoused in classical times. Gregory also included Newton's Theory of the Moon's Motion [*Lunae Theoria Newtoniana*, pp.332-336], long used as a guide for practical astronomers in determining the moon's motion." (Gjertsen: The Newton Handbook). Wallis 87; Houzeau 9240. Folio: 369 x 245 mm. Contemporary paneled calf. Expertly re-backed, preserving the original gilt leather label. A very nice copy. Internally clean and fine throughout. Provenance: armorial book-plate to front paste-down of the Earl of Breadalbane. (12), 494, (2) pp.

€3,800.00
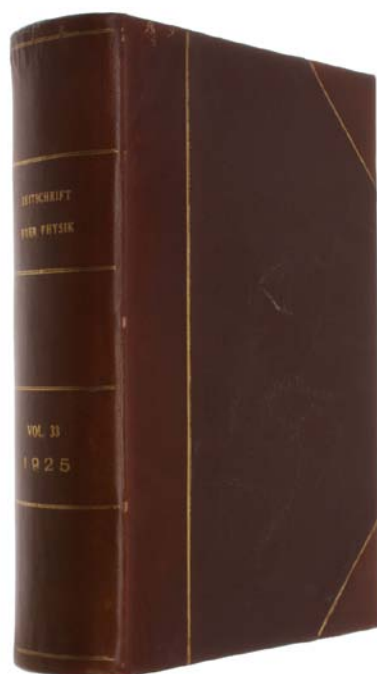
HEISENBERG, Werner.

*Über quantentheoretische Umdeutung kinematischer und mechanischer Beziehungen.*

Berlin: Julius Springer, 1925. First edition.

A fine copy of this breakthrough work, **the first paper on quantum mechanics,** in which he announced his discovery of matrix mechanics. "A severe attack of hay fever in early June forced Heisenberg's retreat to the island of Helgoland. There he completed the calculation of the anharmonic oscillator, determined the constants of motion, and obtained from his multiplication rule the Thomas Kuhn summation rule for spectral lines. After nearly two weeks on Helgoland, Heisenberg returned to Göttingen, where he drafted his fundamental paper *Über die quantentheoretische Umdeutung kinematischer und mechanischer Beziehungen*, which he completed in July. In this paper Heisenberg proclaimed that the quantum mechanics of atoms should contain only relations between experimentally observable quantities. The resulting formalism served as the starting point for the new quantum mechanics, based, as Heisenberg's multiplication rule implied, on the manipulation of ordered sets of data forming a mathematical matrix" (DSB). In: Zeitschrift für Physik, Vol. 33, pp.879-893. Complete volume offered (VIII, 950 pp.). Contemporary half calf. Completely clean - a fine copy.

€2,800.00
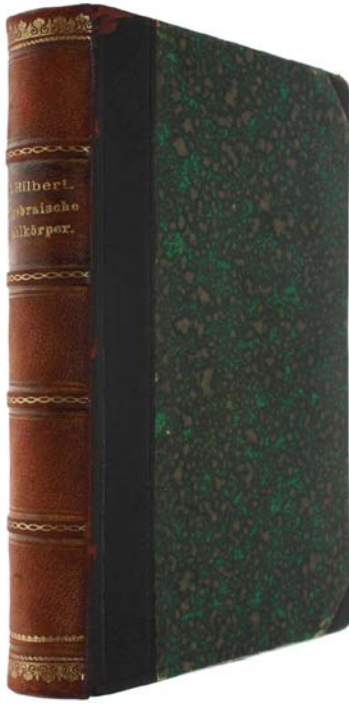
HILBERT, David.

Die Theorie der algebraischen Zahlkörper.

Berlin: Georg Reimer, 1897. First edition.

A fine copy of this masterpiece (Landmark Writings in Western Mathematics, No. 54) from the library of mathematician Georg Bohlmann. "At the 1893 meeting at Munich the Deutsche Mathematiker-Vereinigung ... charged Hilbert and Minkowski with preparing a report on number theory within two years. Minkowski soon withdrew, although he did read the proofs of what would be known as ***Der Zahlbericht*** .... The *Zahlbericht* is infinitely more than a report; it is one of the classics, a masterpiece of mathematical literature. For half a century it was the bible of all who learned algebraic number theory, and perhaps it is still. ... Algebraic number theory was the climax of Hilbert's activity. He abandoned the field when almost everything had yet to be done." (DSB). Provenance: rubberstamp to front free end-paper of Georg Bohlmann (1869-1928), a student of Felix Klein who became the first lecturer at the Institute for Mathematical Stochastics in Göttingen. In 1900 he published a pioneering article on the axiomatization of probability theory which in many ways resembles Kolmogorov's famous treatment 33 years later. He was the first to give a formal definition of independence of events, the definition still in use, and to distinguish between independence and pair wise independence. The axioms for the calculus of probabilities that Hilbert presented in his lectures were taken from Bohlmann's treatment and in his sixth problem of 1900 Hilbert referred to Bohlmann's work as important to physics. 8vo: 228 x 157 mm. Contemporary half calf over marbled boards, spine faded, otherwise fine. (2:title), XVIII(:foreword and contents), pp. 176-546. A fine copy. Scarce.

€2,200.00
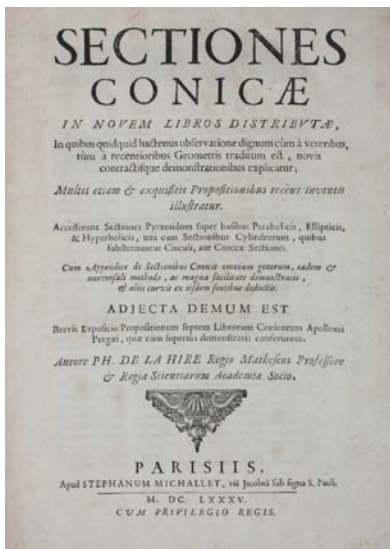
HIRE, Philippe de la.

Sectiones conicae, in novem libros distributae, ...

Paris: Steph. Michallet, 1685. First edition.

A fine copy of this major work on conic sections. La Hire's greatest work, the *Sectiones Conicae* "is devoted to projective geometry. Like Desargues and Pascal, La Hire first proved properties of the circle, chiefly involving harmonic sets, and then carried these properties over to the other conic sections by projection and section. ... in this 1685 work of La Hire we find practically all the now familiar properties of conic sections synthetically proved and systematically established. In fact, La Hire proves almost all of Apollonius' 364 theorems on the conics. ... In all, La Hire proved about 300 theorems. He tried to show that projective methods were superior to those of Apollonius and the new analytic methods of Descartes and Fermat which had already been created. ... On the whole, La Hire's results do not go beyond Desargues's and Pascal's. However, in pole and polar theory he has one major new result. He proves that if a point traces a straight line, then the polar of the point will rotate around the pole of that straight line." (Kline: Mathematical Thought from Ancient to Modern Times, pp.298-99). Honeyman 1886, Macclesfield 5/1186. Large folio: 380 x 262 mm. Uncut in eighteenth century boards. (8), 245, 248-249, (1) pp., Qqq paginated 245/247 as the Macclesfield copy.

€6,000.00

L'HÔSPITAL, Guillaume François Antoine, Marquis de.

Traité analytique des sections coniques et de leur usage pour la résolution des équations dans les problêmes tant détermines qu'indéterminez.

Paris: Jean Boudot, 1707.

The **rare first edition** of his great treatise on conic sections. L'Hôspital became famous as a mathematician through his eminent text-books (e.g., *Analyse des infiniment petits*, 1696 - the first exposition of the differential calculus). "His reputation in that matter does not rest alone on the *Analyse* but to an almost equal extent on his analytic study of the conic sections ..." (Coolidge: The Mathematics of Great Amateurs, p.163). This treatise was published posthumously, however, "for nearly a century [it] was deemed **a standard work on the subject**" (Ball: A Short Account of the History of Mathematics, p.305). And it was reprinted in 1720, 1740, and 1776. (In Dictionary of Scientific Biography the 1720 reprint is mistakenly mentioned as the first edition. And it was this later print which was in the Honeyman and Macclesfied collections). Scarce. 4to: 260 x 196 mm. Contemporary calf, richly gilt spine. Provenance: Armorial bookplate of Charles St. Clair of Hermistoun, and his name in ink on the title. Numerous page-numbered manuscript notes in French laid in throughout the text. (4), 459, (5) pp. and 33 engraved plates. The lower right corner of page 7/8 torn away, no text missing. Plate 2 with old paper repair to the back side. In all a fine copy of the rare first edition.

€1,800.00
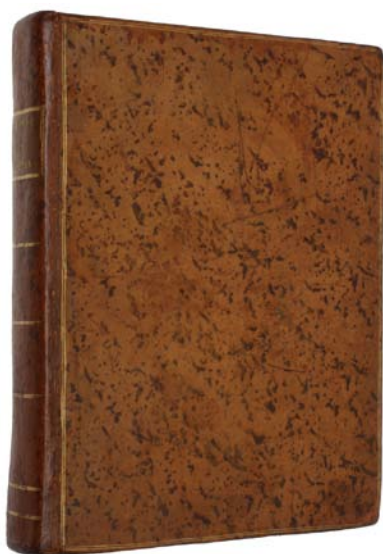
LEGENDRE, Adrien Marie.

Essai sur la théorie des nombres.

Paris: Duprat, 1798. First edition.

A fine copy of **the first book entirely dedicated to number theory**. This work contains Legendre's principal contribution to number theory, an improved exposition of his law of reciprocity of quadratic residues. "The *Essai* also introduced the symbol (a/p), still used to express the law of reciprocity; and gave an outline of Legendre's law of the distribution of prime numbers, which he improved in the second edition" (Norman). Struik: A Source Book in Mathematics, pp.49-54. Thornton-Tully 148; Norman 1325. 4to. Contemporary mottled calf. Rare in this condition. XXIV, 472 pp. and 56 pages of tables.

€3,600.00
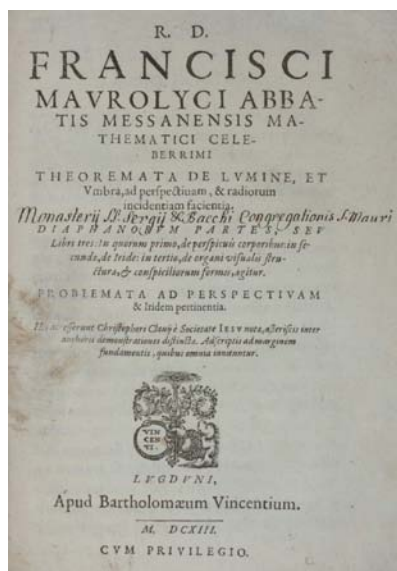
MAUROLICO, Francesco.

Theoremata de Lumine, et Umbra, ad perspectivam, & radiorum incidentiam facientia.

Lyon: B. Vincent, 1613.

Second edition, rare, of Maurolyco's most important work, "**the best optical book of the Renaissance**" (Sarton), which anticipated Kepler in a number of respects. It was first published by Clavius in Naples in 1611 under the title *Photismi de Lumine*. Both editions are rare. In this work, Maurolico (1494-1575), "perhaps the greatest geometer of the 16th century" (Rose), discusses the rainbow, the theory of vision, the effects of lenses, the principal phenomena of dioptrics and catoptrics, radiant heat, photometry, and caustics. It contains "for the first time in the West an adequate geometrical theory of the camera obscura" (Lindberg: Theories of Vision, p.178). It also contains "a significant alteration into the mathematics of perspective theory" (ibid., p.180). Its similarities to Kepler's *Paralipomena* has led some to accuse Kepler of plagiarism, since the work circulated in manuscript, but it seems just as likely that Clavius was influenced by Kepler's work during the editing process. Small 4to: 219 x 162 mm. Contemporary binding of medieval vellum manuscript. With inscription to the title page: 'Monasterii SS. Sergii & Bacchi Congregationis S. Mauri'. (8), 94, (2:blank) pp. A fine copy.

€8,500.00
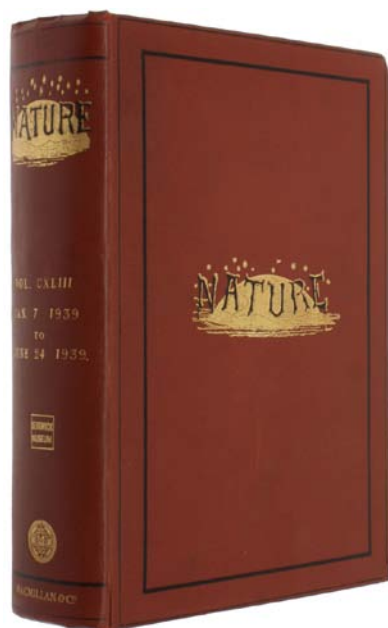
MEITNER; FRISCH; BOHR; HALBAN, JOLIOT, KOWARSKI.

1. Meitner & Frisch: Disintegration of Uranium ... [PMM 422b];
2. Frisch: Physical Evidence for the Division ... [PMM 422c];
3. Bohr: Disintegration of Heavy Nuclei;
4. Halban, Joliot, Kowarski: Liberation of Neutrons ... [PMM 422d];
5. Meitner: Products of the Fission of the Uranium Nucleus;
6. Meitner: New Products of the Fission of the Thorium Nucleus;
7. Halban, Joliot, Kowarski: Number of Neutrons Liberated ...;
8. Frisch: Statistical Calculation of Composite Decay Curves.

London: Macmillan, 1939. All first editions.

Eight seminal papers on **nuclear fission** - **PMM 422**(b,c,d). "Experiments conducted in 1938 at Berlin by Hahn and Strassman were reported to Lise Meitner, an Austrian scientist who had fled to Copenhagen to escape religious persecution. She and her nephew, O.R. Frisch, working in Niels Bohr's laboratory, found the true explanation of these phenomenon. The interpolation of a neutron into the nucleus of a uranium atom caused it to divide into two parts and to release energy amounting to about 200,000,000 electron volts. This process bore such a close similarity to the division of a living cell that Frisch suggested the use of the term 'fission' to describe it." (PMM). In the fourth article, Halban, Joliot and Kowarski established the theoretical possibility of a self-perpetuating reaction chain (PMM 422d). Eight papers in: Nature, vol. 143. The half year volume (Jan 7 - June 24) offered in publishers full cloth. Large 8vo: 270 x 195 mm. Paper 1: pp.239-40; 2: p.276; 3: p.330; 4: p.470; 5: pp.471-72; 6: p.637; 7: p.680; 8: p.852-53. Bookplate of Sedgwick Museum Cambridge to front pastedown and their rubberstamp on title page.

€1,200.00

METIUS, Adriaen.

De genuino usu utriusque globi tractatus adjecta ...;
Mensura geographica et usus globi terrestris, ...

Franeker: Ulderich Balck, 1624. First edition?

Some bibliographies mention a 1611 edition of this work (e.g., Bierens de Haan & Houzeau), however, this earlier edition seems to be a ghost. Adriaen Metius (1571-1635) was "educated at the Latin school in Alkmaar, ... Like his townsman Blaeu [also born in Alkmaar 1571], Adriaen worked under Tycho Brahe at his observatory on the island of Hven; ... He returned to the Netherlands where he assisted his father in his military engineering until, in 1598, he was appointed professor extraordinarius at Franeker ... He bought mathematical and astronomical instruments, observed sunspots, and showed familiarity with the telescope, of which his brother Jacob was a co-inventor. ... His lectures were well attended by an international audience including, in 1629, Descartes." (DSB). The present work is principally concerned with the use of globes, terrestrial and celestial, for the purposes of marine navigation. The use of other instruments such as azimuths, quadrants, and compasses is also treated in some detail, as well as the principles of astronomy and relevant mathematical propositions, such as the computation of longitude and latitude and of position from the height of the sun. The Crone Library, 147; 148. Small 4to: 200 x 162 mm. Fine contemporary Dutch morocco. Two old repairs to title. (16), 210; (2:part-title), 84 pp.

€2,000.00
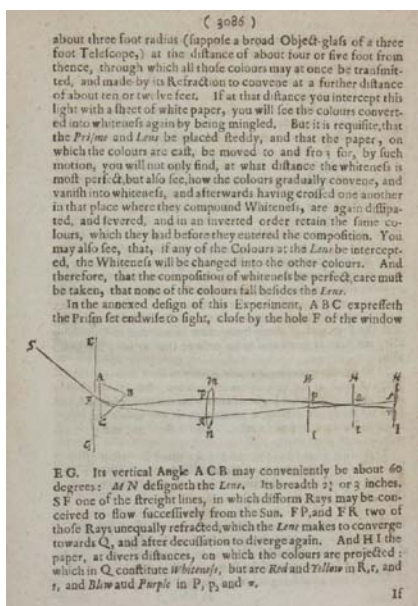
NEWTON, Isaac.

A Letter of Mr. Isaac Newton, ... containing his New Theory about Light and Colors; An Accompt of a New Catadioptrical Telescope invented by Mr. Newton; [with 17 other Newton publications, and the critical replies by Huygens, Linus, Lucas, Pardies, and Moray].

London: for John Martyn, 1670-1676. First edition.

An exceptional collection comprising all, but one, of the "26 letters and replies in the controversy on Light published by the Society, 1671-1676" (Dibner: Heralds of Science, p.67). The first letter is "**Newton's first scientific publication**, with description of the famous analysis of white light by dispersion into its colors" (Grolier/Horblit 79a). "This paper [together with his account of his reflecting telescope, published in the following issue] led to extended controversies with Hooke, Huygens, Linus, Lucas, Pardies and others" (Dibner). "Despite Newton's often-proclaimed detestation of such controversies, these critical reactions to his optical writings played a vital role in stimulating his thought by spurring him to refine and elaborate his theories." (The Newton Project). These letters are among Newton's most important publications, leading to his brilliant work on optics. The present collection comprises all of the 26 letters, except for one reply by Newton published in vol. 8 of the Phil. Trans., pp.6087-92. Offered here are the complete vols. 5 and 6, of the Phil. Trans., bound in one contemporary full calf, the complete vols. 7,9,10,11 bound separately in fine recent and uniform half calf, and the letter no.18 as an extract housed in a custom folding box matching the other new bindings.

€56,000.00
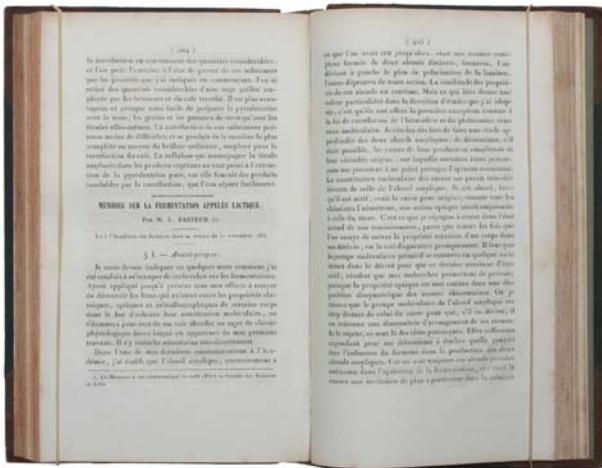
PASTEUR, Louis.

Mémoire sur la Fermentation appelée lactique.

Paris: Victor Masson, 1858. First edition.

Pasteur's first paper on fermentation which contains most of the central theoretical and methodological features of his biological theory of fermentation, in particular the concept of fermentation as a product of the growth of yeast, the idea that air is source of microscopic yeasts and other micro-organisms, and the notion of specificity, in which each fermentation could be traced to a specific micro-organism. Pasteur was able to isolate, observe and propagate the yeast responsible for lactic fermentation, and to demonstrate that its activity was dependent on its environment. Pasteur's concept of fermentation as a biological process challenged the chemical theory of fermentation put forth by Liebig, which Pasteur was able to disprove with his experiments on alcoholic and acetic fermentation. Pasteur's paper was published almost simultaneously in the *Annales de Chimie et de Physique* and the *Mémoires de la Societé des Sciences,* vol. 5, 1858. A much abridged version appeared in the *Comptes Rendus,* vol. 45, 1857. Dibner 198 (abridged version); Garrison-Morton 2472 ; Horblit/Grolier 82 (abridged version); Norman 1653 (offprint). In: *Annales de Chimie et de Physique*, vol. 52, pp. 404-418. 8vo: 222 x 140 mm. Contemporary half calf with gilt spine lettering, a little chipping to the upper part of spine, otherwise fine.

€1,800.00
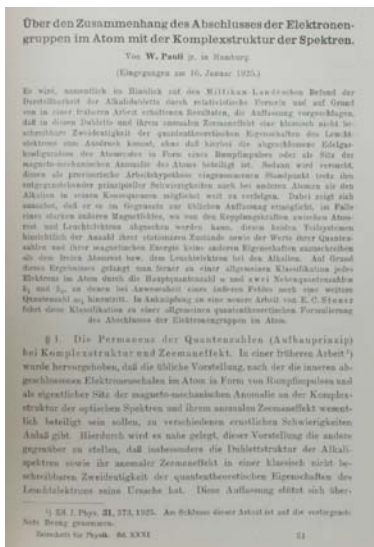
PAULI, Wolfgang.

Über den Zusammenhang des Abschlusses der Elektronengruppen im Atom mit der Komplexstruktur der Spektren.

Berlin: Julius Springer, 1925. First edition.

The first **announcement of the Pauli Exclusion Principle**, for which he was awarded the Nobel Prize. Pauli first formulated his exclusion principle in this article in an attempt to explain the structure of the periodic table. By introducing an additional quantum number, namely the spin of an electron, to the already known three quantum numbers in Bohr's atom model, and by postulating that no two electrons can have the same four quantum numbers, Pauli could explain the number of electrons allowed in the outermost shell, e.g., explaining the varying lengths of successive periods in the table. The exclusion principle turned out to be applicable to all fermions, and thus plays a role in a variety of physical phenomena. For example it explains the formation of degenerate matter in white dwarfs and neutron stars. In 1945 Pauli received the Nobel Prize in physics "for the discovery of the Exclusion Principle, also called the Pauli Principle". In: *Zeitschrift für Physik*, vol. 31, pp. 765-783. Entire volume offered [VIII,952 pp]. 8vo. 224x166 mm. Contemporary half cloth. Corners a little bumped a few scratches to boards, ex-library stamp to title page, otherwise fine.

€1,950.00
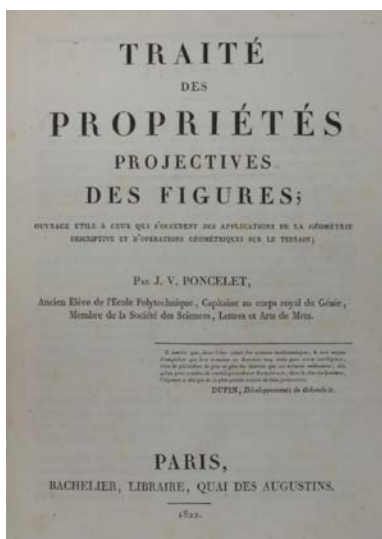
PONCELET, Jean-Victor.

Traité des propriétés projectives des figures; ouvrage utile à qui s'occupent des applications de la géométrie descriptive et d'opérations géométriques sur le terrain.

Paris: Bachelier, 1822. First edition.

"Poncelet's book [*Traité des propriétés*] is **the source of the launch of the modern study of projective geometry**, after the work of various 17th-century authors had not generated sufficient momentum to sustain the subject through the 18th century. He produced a new way of thinking about plane figures that emphasized the properties they have in common with their shadows and played down their metrical properties. He claimed to find many remarkable transformations between figures that enabled complicated figures to be simplified and geometry to work at a new level of generality." Landmarks Writings in Western Mathematics, no. 27. 4to: 259 x 211 mm. XLVI, 426, (2: errata) pp. and 12 folding plates. Provenance: Exlibris of mathematician Kuno Fladt (1889-1977).

€1,750.00
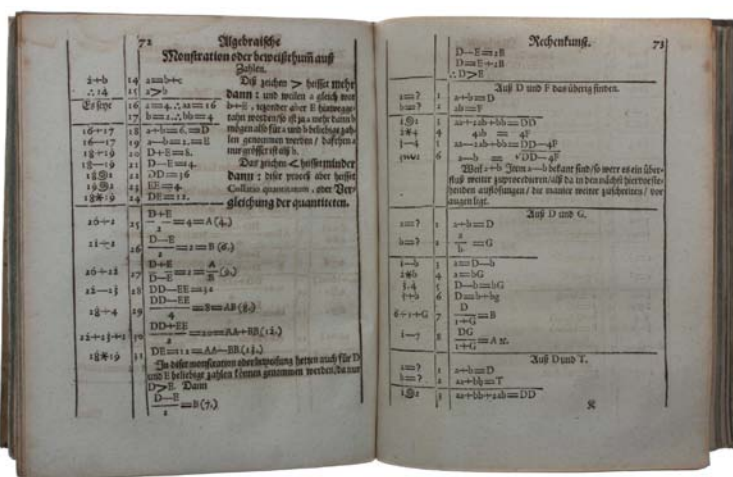
RAHN, Johann Heinrich.

Teutsche Algebra, Oder Algebraische Rechenkunst, zusamt ihrem Gebrauch.

Zürich: Johann Jacob Bodmer, 1659. First edition.

A fine copy, in contemporary vellum, of this rare and important algebra which **contains the first use of ÷ in print as a sign of division, and the first use of ∴ for 'therefore'**. Rahn's work was praised by Leibniz as an 'elegant algebra', and in 1668 an English edition was published with additions by John Pell. "Page 73 of Rahn's *Teutsche Algebra* ... shows: (1) the first use of ÷ in print, as a sign of division; (2) the Archimedean spiral for involution; (3) the double epsilon for evolution; (4) the use of capital letters *B, D, E*, for given numbers, and small letters *a, b,* for unknown numbers; (5) the * for multiplication; (6) the first use of ∴ for 'therefore'; (7) the three-column arrangement of which the left column contains the directions, the middle the numbers of the lines, the right the results of the operations." (Cajori: A History of Mathematical Notations, Vol. I, pp. 211-212. See also sections 205, 208, 232, 237, 266, 304, 307, 328, 333, 341, 385, 386 for Rahn's other contributions, all of which appear in the present work). Scarce: ABPC lists just one copy (Macclesfield sale 2005 - that copy lacking one errata leaf and in a later binding). 4to: 202 x 163 mm. Contemporary vellum, un-restored and in very good condition. (8), 188, (12) pp. and 4 folding tables. Bound after: BIERMANN, Lorenz. *Neue Arithmetische Schatzkammer* ... 1667. (8), 280, (20) pp. and 4 folding plates.

€22,500.00

RIESE, Adam.

Rechenung nach der lenge, auff den Linihen und Feder.

Leipzig: Jacob Berwalt, 1550. First edition.

A beautiful copy, of "**probably the most popular commercial arithmetic of the sixteenth century**. So firmly did it impress itself upon the schools that 'nach Adam Riese' is a common expression in Germany today … It was to Germany what Borghi's book was to Italy and Recorde's to England." (Rara Aritmetica). Riese (1492-1559) was "the greatest of all the Reichenmeisters of the sixteenth century" (David E. Smith). "He was the most influential of the German writers in the movement to replace the old computation by means of counters 'auff der Linien' by the more modern written computation 'auff Federn'." (Smith, p.337). "His largest and most popular computation book of 1550, which, on 196 quarto sheets, was concerned especially with 'Practica': 'Computation on the lines and with the quill / set forth at length / including the advantages and speed of the *Proportiones Practica* / with thorough instructions in mental arithmetic. …' This was considered the best computation book of its time" (Menninger: Number Words and Number Symbols). Erwin Tomash R93; Norman 1834; Honeyman 2652. 4to: 207 x 165 mm. Fine contemporary blind-stamped pigskin over wood, with bronze corner-pieces and clasps. 196 leaves. Various contemporary inscriptions to front and rear end-papers.

€12,000.00
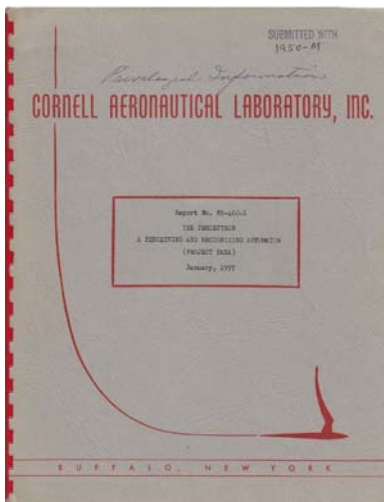
ROSENBLATT, Frank.

The Perceptron: A Perceiving and Recognizing Automaton.

New York: Cornell Aeronautical Laboratory,1957. First edition.

The **very rare research report** (OCLC locates just one copy: Hannover University) in which Rosenblatt first described his pioneering work on artificial intelligence, and which pre-dates his paper in *The Psychological Review* with nearly two years. In 1957 Frank Rosenblatt, an experimental psychopathologist, of the Cornell Aeronautical Laboratory, "proposed a neural net called a 'perceptron' which he simulated on an IBM 704 computer. Rosenblatt's perceptron was simply a layer of McCulloch-Pitts neurons sandwiched between layers of sensor and activation units. Each sensor was a photocell that signaled the amount of light it detected. The McCulloch-Pitts neurons on the second level added up a weighted sum of the sensor signals fired only if the sum exceeded a threshold. The activation unit translated this fired signal into some form of activity. Rosenblatt's contribution was to adjust the weights to allow the connection between the sensor and neural levels to achieve learning." (Gass & Assad: Timeline of Operations Research). Rosenblatt "made major contributions to the field of AI, both through experimental investigations of the properties of neural networks (using computer simulations) and through detailed mathematical analysis. Rosenblatt was a charismatic communicator, and there were soon many research groups in the United States studying perceptrons." (Britannica). His work was highly influential in the development of later multi-layered neural networks. See also OOC 870 (later journal paper). Large 4to: 283 x 220 mm. Original printed wrappers, in original plastic spiral binder. Mimeographed typescript. 31 sheets, printed on one side only, and two blue print diagrams.

€5,000.00
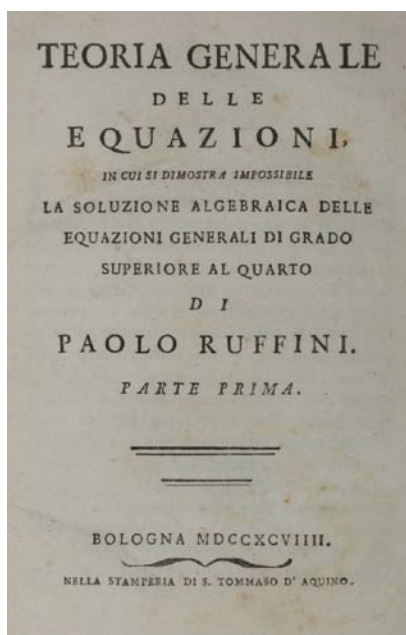
RUFFINI, Paolo.

Teoria Generale delle Equazioni, in cui si dimostra impossibile la soluzione algebraica dell equazioni generali di grado superiore al quarto.

Bologna: Stamperia di S. Tommaso d' Aquino, 1799. First edition.

The first statement and proof of **the Abel-Ruffini theorem**, that the general equation of degree higher than four cannot be solved algebraically. Although Ruffini's proof was not in general accepted he developed, in this lengthy treatise, many new fundamental methods and the concept of permutation groups, which was essential to the later work of Abel and Galois. It thus marks the transition from classical to abstract algebra. "The first person to claim that equations of degree 5 could not be solved algebraically was Ruffini. In 1799 he published a work whose purpose was to demonstrate the insolubility of the general quintic equation. Ruffini's work is based on that of Lagrange but Ruffini introduces groups of permutations. These he calls *permutazione* and explicitly uses the closure property (the associative law always holds for permutations). Ruffini divides his permutazione into types, namely *permutazione semplice* which are cyclic groups in modern notation, and *permutazione composta* which are non-cyclic groups. The *permutazione composta* Ruffini divides into three types which in today's notation are intransitive groups, transitive imprimitive groups and transitive primitive groups." (MacTutor History of Mathematics). Two volumes bound in one. Small 4to: 207 x 147 mm. Contemporary half-calf with gilt lettering on spine. Old inoffensive repair to the first and second pages of the introduction. A very good copy. viii, 206, (4); (2), 207-509, (7:errata) and two large folding tables.

€3,800.00

SCHWENTER, Daniel.

Geometriae Practicae Novae.

Nuremberg: Simon Halbmayer, 1627.

First complete edition and the first edition of the fourth part (the first part was published in 1616, the first three parts together in 1618). The first book is a treatise on general mathematics and the principles of geometry. The second deals entirely with techniques of surveying. The third part describes a surveying instrument (the 'mensula praetoriana') invented by the scientific instrument maker Johann Praetorius (Richter) and its application. The fourth part is in fact a German translation of Curzio Casati's *Geometricum problema* (1602). He shows himself to be particularly well acquainted with the contemporary Italian mathematical literature, giving in particular a resumé of some of the work of Pietro Antonio Cataldi: "The use of limited continued fractions in the expression of a relationship between large numbers is found in the *Geometria practica* of Daniel Schweneter (1627), published soon after Cataldi's death." (DSB, III, p.128). Cantor, II, p.666-70; Sotheran, 2nd suppl, 2421; Poggendorff II 878. Four parts in one volume. 4to: 200 x 154 mm. Contemporary vellum. With two engraved and two woodcut titles, and two engraved portraits. Some browning throughout. Liechtenstein book plate to front paste down and 'Anno 1640' inscribed at top. (12), 296; (8), 198, (6); (12), 101, (3); 83, (5) pp.

€3,000.00

TURING, Alan.

On Computable Numbers, with an Application to the Entscheidungsproblem.

London: C.F. Hodgson, 1936-1937. First edition.

A fine copy of arguably **the single most important theoretical work in the history of computing**. In this paper Turing introduced the concept of a 'universal machine', an imaginary computing device designed to replicate the mathematical 'states of mind' and symbol-manipulating abilities of a human computer. Turing's idea of a 'universal machine' was given the name "Turing machine" by Alonzo Church. The concept of the Turing machine lies at the foundation of modern computer science. Origins of Cyberspace 394. Richard Green Library (Christie's sale 2013, lot 326). Erwin Thomas Library T61 and T62. In: Proceedings of the London Mathematical Society, Vol.42: pp.230-265 and Vol.43: pp.544-546 ("A Correction"). The two complete volumes offered in near contemporary cloth with gilt spine lettering, completely clean and fresh throughout - a fine set.

€16,000.00
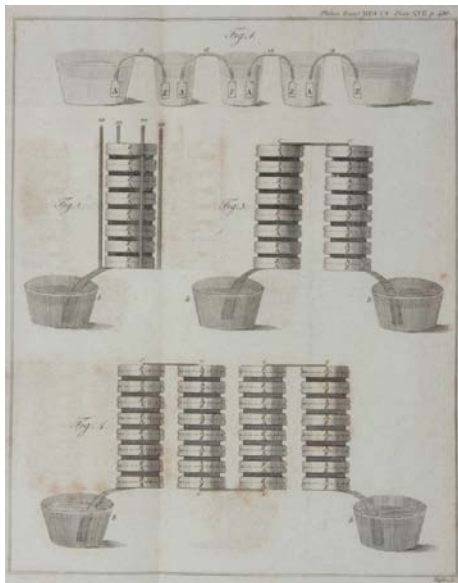
VOLTA, Alessandro.

On the Electricity excited by the mere Contact of conducting Substances of different kinds.

London: W. Bulmer & Co. for Peter Elmsley, 1800. First edition.

"The **first announcement of the voltaic 'pile'**, or electric battery" (Grolier/Horblit 37b). "The voltaic pile revolutionized the theory and practice of electricity, so that within one hundred years of Volta's invention more progress was made than in the two thousand four hundred years between the tentative experiences of Thales and the publication of Volta's letter addressed to Sir Joseph Banks, President of the Royal Society. … The indispensability and ubiquity of electricity, in one form or another, in western civilization today emphasize sharply the fact that before 1800 human environment and existence were closer to life in ancient Egypt than to our own." (PMM). "This paper, in French, was sent by Volta to Sir Joseph Banks in London for communication to the Royal Society. In it Volta describes the pile of alternating dissimilar metals (silver and zinc) which, when moist, generated the flow of constant-current electricity. With this new force, water was decomposed, metal was electro-deposited, the electro-magnet was created and the electrical age was begun" (Dibner). PMM 255; Grolier/Horblit 37b; Dibner 60; Norman 2164. [The Norman copy sold in 1998 for $9,000; the latest auction record we can locate is Swann 2009, an extract in modern binding, which sold for $8,400]. Contemporary extract in old wrappers: Phil. Trans., vol.90, pp.403-431 with 1 engraved plate by James Basire illustrating the first electric battery. 4to: 270 x 214 mm. A fine and clean copy.

€8,250.00
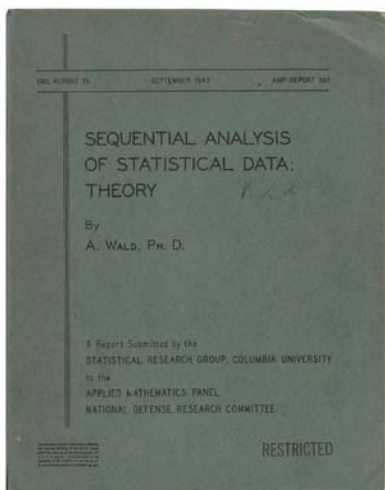
WALD, Abraham. & H.A. Freeman.

1. Sequential Analysis of Statistical Data: Theory;
2. Sequential Tests of Statistical Significance;
3. Sequential Analysis of Statistical Data: Applications.

Washington: National Defense Research Committee, 1943-1944.

An exceptional set of the three classified reports in which Wald's groundbreaking work was first announced. About Wald's later journal paper from 1945 Kotz & Johnson write in their 'Breakthroughs in Statistics': "Probability theory came of age with the advent of Kolmogorov's axiomatics in 1933 ... Statistical inference came of age with the advent of the Neyman-Pearson theory in 1933 ... In the present paper, Wald unified the two seemingly dissimilar areas most elegantly. To probabilists, he offered gems of new results in random walks, martingales, stochastic processes, and limit theorems ... To statisticians, he showed that statistical inference is not just the analysis or 'significance' of an existing body of data; it also entails their entry into the very process of experimentation and continual analysis of the data as they come available. The sequential probability ratio test embodies this aspect. ... Wald's theoretical results first appeared in a 'restricted' report in September 1943, and a companion report on applications by H.A. Freeman appeared in July 1944. The term restricted meant that the Defense Department considered the results significantly important to the war effort and, therefore, decided not to disseminate them to the general public for a while. Nevertheless, a 10-page synopsis of Wald's results, entitled 'Sequential Tests of Statistical Significance', was allowed to be circulated as a memorandum in April 1944 to a select group of individuals" Thus, **a complete set of the original reports pre-dating Wald's journal paper** *Sequential Tests of Statistical Hypotheses*, 1945. All three reports are in the rare original restricted state. OCLC lists 8 copies of the first report, 1 of the second (National Institute of Standards), and the third report is not located in any library.

€7,200.00
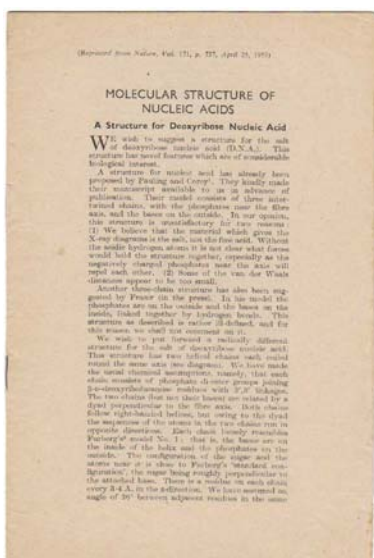
WATSON, James. & CRICK, Francis.

Molecular Structure of Nucleic Acids: A Structure for Deoxyribose Nucleic Acid.

St. Albans: Fisher, Knight & Co., 1953. First edition, offprint issue.

The three-paper offprint **signed by three of its authors**. Watson and Crick's discovery of the molecular structure of DNA is generally considered the most important medical and biological discovery of the second half of the twentieth century. Watson and Crick's paper first appeared in the scientific journal Nature, grouped, under the general title "The molecular structure of nucleic acids," with two other seminal papers on DNA: "Molecular structure of deoxypentose nucleic acids," by Maurice Wilkins, A. R. Stokes and H. R. Wilson; and Rosalind Franklin and Raymond Gosling's "Molecular configuration in sodium thymonucleate," which contains Franklin's famous x-ray photograph of DNA. In 1962, Watson, Crick and Wilkins shared the Nobel Prize in Physiology or Medicine. Dibner 200; Grolier/Medicine 99. Garrison-Morton 256.3. 8vo: 210 x 140 mm. Original self-wrappers, as issued. Lower right corner slightly creased, otherwise fine. Signed by Wilkins and Wilson at end of the second paper, and by Gosling at the end of third paper. 14 pp.

€18,000.00