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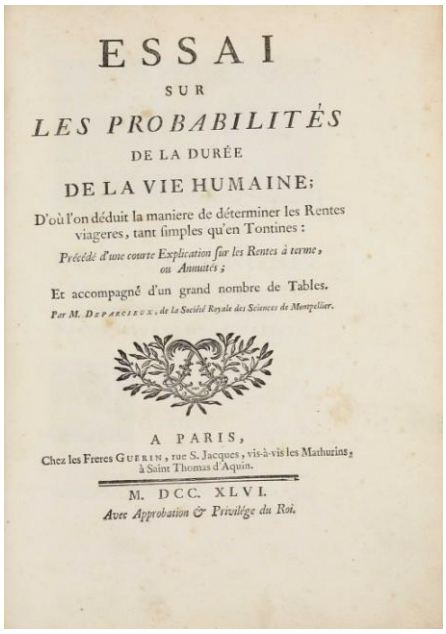
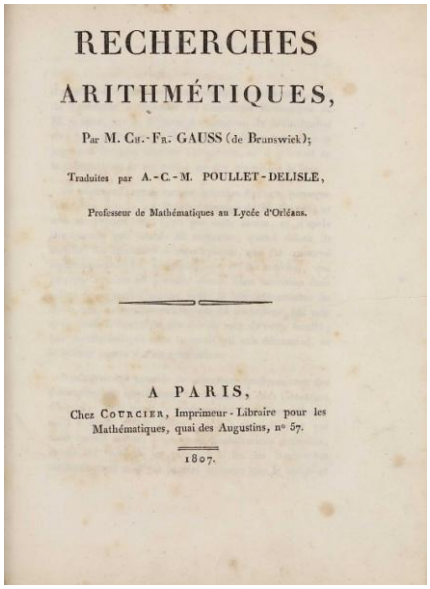
1 **DEPARCIEUX, Antoine**. *Essai sur les Probabilités de la Durée de la Vie Humaine; d'où l'on déduit la maniere de déterminer les Rentes viageres, tant simples qu'en Tontines: Précédé d'une courte Explication sur les Rentes à terme, ou Annuités…* Paris: Guerin Bros., 1746. Finely engraved arms in vignette at head of dedication. 22 Tables in the text. vi, [2], 132, [32], i-xxii, [1] pp. [**bound with**]: **IDEM**. *Addition a l'Essai sur les Probabilités de la Durée de la Vie humaine…avec quelques Listes ou Ordres de mortalité du genre humaine*. Paris: H.L. Guerin & L.F. Delatour, 1760. [5], 5-32 pp., 1 folding table. [**bound with**]: **(—)**. [Drop-title]: *Objections faites à M. Deparceiux…sur son Livre des Probabilités de la durée de la vie humaine; avec les réponses à ces objections*. 16 pp. Large 4to. [Paris: 1746]. Large 4to (258 x 192 mm), contemporary mottled calf, spine nicely gilt, red morocco lettering piece to spine, marbled endpapers, red edges (top cover hinge cracked but tight, corners bumped). Interior bright, clean and unfoxed, first and last blanks present. A beautiful, wide margined copy in fine condition, the prinicipal work printed on strong paper. (#001646) € 3,000


ESSAI
SUR
LES PROBABILITÉS
DE LA DURÉE
DE LA VIE HUMAINE;
D'où l'on déduit la maniere de déterminer les Rentes viageres, tant simples qu'en Tontines :
Précédé d'une courte Explication sur les Rentes à terme, ou Annuités ;
Et accompagné d'un grand nombre de Tables.
Par M. DEPARCIEUX, de la Société Royale des Sciences de Montpellier.
A PARIS,
Chez les Freres GUERIN, rue S. Jacques, vis-à-vis les Mathurins, à Saint Thomas d'Aquin.
M. DCC. XLVI.
Avec Approbation & Privilége du Roi.

Coquelin et Guillaumin, I, p. 550 ; Einaudi, 1529 ; Garrison-Morton, 1691.1, Smith, *History of Mathematics,* II, p. 530; *D.S.B.,* IV, pp. 38-39. - First editions, complete with the exceedingly rare *Addition* published fourteen years later, and very pretty copies of this notable works in the history of statistics bound together. Deparcieux (1703-68), was a maker of sundials at Paris and the author of several other interesting mathematical works. "After long investigations of tontines, individual families, and religious communities, Deparcieux published his results in the famous *Essai sur les probablités…,* one of the first statistical works of its kind. It consists of treatises on annuities, mortality, and life annuities. Deparcieux showed a real progress in his theoretical explanation of the properties of the tables of mortality. His tables were for a long time the only ones on life expectancies in France,-"Deparcieux was the first to construct correct life tables." Smith, *History of Mathematics,* II, p. 530.

In prize binding of the Académie de Paris

2 **GAUSS, Carl Friedrich**. *Recherches arithmétiques*. Paris: Courcier, 1807. 4to (255 x 195 mm). xx, [2], 502 pp., including half-title and errata leaf. Contemporary prize binding in green calf, spine lettered in gilt, boards and spine with embossed decoration and gilt ruling, each board with a central gilt vignette of the Academy of Paris lettered "Prix du concours général", and gilt-decorated edges and turn-ins, marbled endpapers, all edges gilt (rebacked with the original spine laid-down, little rubbing to boards and extremities, boards slightly stained and sun faded towards spine). Little browning and scattered foxing of text (half-title, title, preliminaries and final few leaves somewhat stronger), but otherwise quite crisp and clean. A few manuscript corrections in text. A very good, wide-margined copy. (#003096) € 2,200

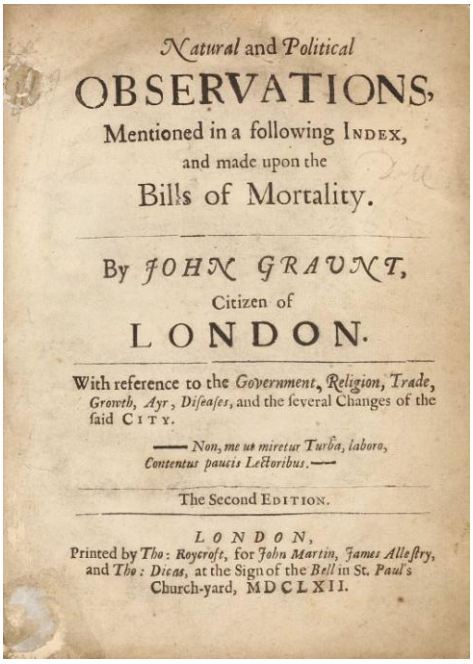

RECHERCHES
ARITHMÉTIQUES,
Par M. Cr.-Fr. GAUSS (de Brunswick);
Traduites par A.-C.-M. POULLET-DELISLE,
Professeur de Mathématiques au Lycée d'Orléans.
A PARIS,
Chez COURCIER, Imprimeur-Libraire pour les Mathématiques, quai des Augustins, n° 57.
1807.

FIRST FRENCH EDITION, and the first in a modern language, of the work which revolutionised number theory, and established Gauss as a mathematical genius. First published in Latin under the title *Disquisitiones arithmeticae* in Leipzig, 1801, this edition is dedicated to giant French mathematician Pierre Simon de Laplace. The translation was done by Antoine Charles Marcelin Poullet-Delisle (1778-1849), professor of mathematics at the Lyceum of Orleans. Gauss, the son of a bricklayer, had actually discovered the theory of quadratic reciprocity, which both Euler and Legendre had failed to prove, at no more than 18 years of age. He also described the discovery of a method of inscribing in a circle a regular polygon of seventeen sides - the first

discovery of this kind in Euclidean geometry for over two thousand years. The book is divided into seven chapters: *Des nombres congrus en général; Des congruences du premier degré; Des résidus des puissances; Des congruences du second degré; Des formes et des équations indéterminées du second degré, Applications des recherches précédentes*, and *Des équations qui déterminent les divisions du cercle*. References: PMM 257; Dibner 114; Horblit 38; Norman 878 (all citing the original Latin edition).

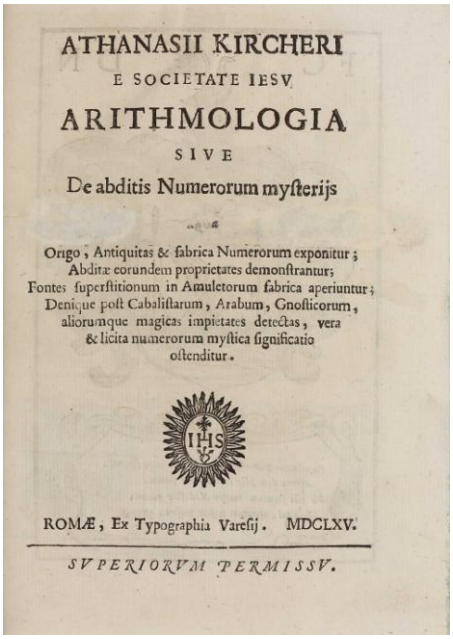
The exceptionally rare second printing

3 **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, Air, Diseases, and the several Changes of the said City, the Second Edition*. London: John Martin & James Allestry, 1662. 4to (190 x 148 mm). [16], 79 [1] pp. Two folding tables. Bound in 19th-century plain vellum, spine titled in ink, marbled endpapers, several blank leaves bound in at end. Text browned mainly in outer margins, occasional minor spotting, title-page dust-soiled, with two larger stains near gutter (likely glue residues from removed stickers not affecting paper itself) and with lower corner somewhat rounded, extensive manuscript notes on first flyleaf. Provenance: American physician Huntington Williams (armorial bookplate to front pastedown and original sales receipt by Maggs Brow, dated 1st May 1922). Still a very good copy, collated & complete. (#003088) € 12,000


Natural and Political
OBSERVATIONS,
Mentioned in a following INDEX,
and made upon the
Bills of Mortality.
By JOHN GRAUNT,
Citizen of
LONDON.
With reference to the Government, Religion, Trade, Growth, Ayr, Diseases, and the several Changes of the said CITY.
— Non, me ut miretur Turba, laboro,
Contentus paucis Lectoribus. —
The Second EDITION.
LONDON,
Printed by Tho: Roycroft, for John Martin, James Allestry, and Tho: Dicas, at the Sign of the Bell in St. Paul's Church-yard, MDCLXII.

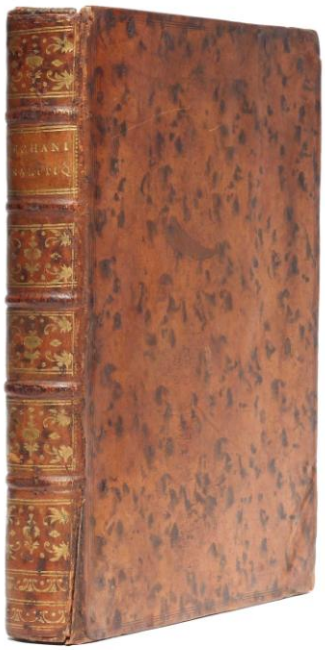
NLM/Krivatsy 4952 (imperfect); not in Wellcome; PMM 144 (1st edition); Norman 933 (1st edition); Goldsmiths' 1665; Kress 1155; Wing G1599A; ESTC R12046. - RARE SECOND EDITION, published in the same year of the first. Graunt's observations on the bills of mortality led to the publication of the first life table to be based on real mortality data. Designed to provide a warning against the plague epidemic, the bills of mortality did not give the age of death, but did provide the cause of death, and from this Graunt was able to estimate that 36% of all deaths concerned children under the age of six. Among the wide range of deaths listed in the Table of Casualty are the more common as well as Excessive drinking, Fainted in a Bath, Grief, Killed by several Accidents, Lethargy, Leprosie, Overlaid and starved at Nurse, and Suddenly (PMM). "Graunt was a friend of Sir William Petty. Some authorities attribute authorship of the above work to Petty. In his *A bibliography of Sir William Petty F.R.S. and of Observations on the bills of Mortality by John Graunt, F.R.S*, (1971) Geoffrey Keynes traces the interrelationship of these authors." (Garrison-Morton 1686). The second edition can be regarded even rarer than the first. According to Book Auction Records and rarebookhub no copy is recorded to have sold at auction in the past 50 years.

4 **KIRCHER, Athanasius**. *Arithmologia, sive de abditis numerorum mysteriis qua origo, antiquitas & fabrica numerorum exponitur; abditae. . . proprietates demonstrantur; fontes superstitionum in amuletorum fabrica aperiuntur. . .* Rome: Varese, 1665. 4to (226 x 168 mm). [16], 301, [11] pp., including final blank, engraved allegorical frontispiece, 3 folding letterpress tables (one in red and black), full-page woodcut arms of dedicatee on verso of title-page, woodcut initials, tailpieces and illustrations. Two neat composite eclectic zodiacs in contemporary ink are bound at the end. Bound in contemporary vellum over wooden boards with the original clasps intact, boards ruled in blind, blue-dyed edges, spine with faint ink lettering (vellum cleaned, spine with horizontal split and minor chipping, glue residue from old label at foot of spine, light soiling and spotting of boards). Text crisp and clean, first gathering very little browned only, faint brown spotting to lower margin of 4 leaves, frontispiece trimmed close just touching plate frame at top, table III trimmed close at upper margin just into headline, lower torn corner of leaf O1 repaired, short tear in leaf Q2 without loss. A fine copy, stunningly crisp internally. (#002936) € 6,500


ATHANASII KIRCHERI
E SOCIETATE IESV
ARITHMOLOGIA
SIVE
De abditis Numerorum mysterijs
Origo, Antiquitas & fabrica Numerorum exponitur; Abditæ eorundem proprietates demonstrantur; Fontes superstitionum in Amuletorum fabrica aperiuntur; Denique post Cabalistarum, Arabum, Gnosticorum, aliorumque magicas impietates detectas, vera & licita numerorum mystica significatio ostenditur.
ROMÆ, Ex Typographia Varesij. MDCLXV.
SVPERIORVM PERMISSV.

Merrill 19; Caillet II, 5769; Dünnhaupt/Kircher 18; Sommervogel IV, 1063; Wellcome III, 395. - FIRST EDITION of a treatise on numerology. A rare work of the famous Jesuit and scholar on number mysticism, hieroglyphs etc. Historically very interesting. Beginning with a speculative history of the origin of numbers, it further deals with the decipherment of hieroglyphs and includes much on ancient Near Eastern, gnostic, kabbalistic, and neo-Pythagorean doctrines. "The *'Arithmologia'*, one of Kircher's more curious works, is a veritable gold mine of curiosities: magic formulas, amulets, and symbolic matrices" (Merrill) "Un des plus curieux ouvrages de ce prodigieux savant, traitant des nombres mysterieux, magiques, cabalistiques, gnostiques, mystiques, etc... Comme tous ses ouvrages, ce livre est base sur des principes occultes. - C'est l'un des rares ouvrages donnant les proprietes mystiques et cabbalistiqus des nombres" (Caillet).

5 **LAGRANGE, Joseph Louis**. *Méchanique Analitique*. Paris: chez la Veuve Desaint, 1788. 4to (254 x 200 mm). xii, 512 pp., including half title. Contemporary French mottled calf, spine with floral gilt decoration, 5 raised bands and gilt-lettered label (lower joint of front board partially split and with old repair, little wear to extremities, corners scuffed), marbled endpapers, red-stained edges. Internally clean with only little browning and very minor occasional spotting, faint dampstain to upper gutter of first three and the final gatherings including title-page. Provenance: illegible stamp and manuscript shelf mark to title page. A near fine copy in well preserved binding of the time. (#002930) € 6,000



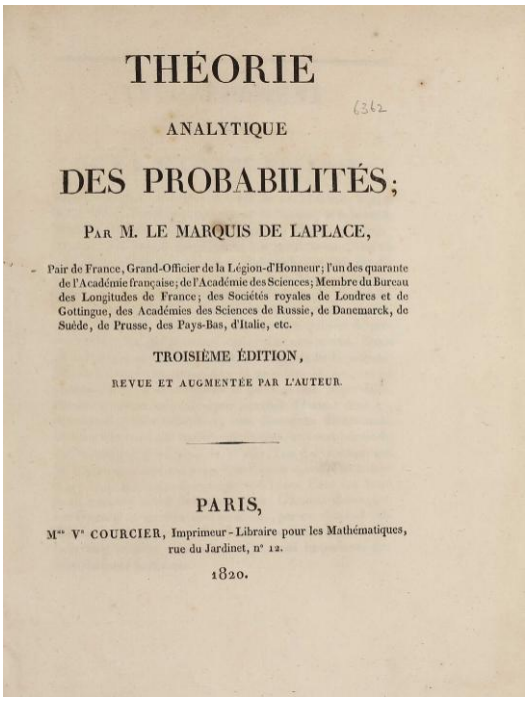
Dibner 112; Horblit 61; Norman 1257; Sparrow 120; Honeyman 1880; En Francais dans le texte 179. - **FIRST EDITION OF LAGRANGE'S FOUNDATION WORK ON ANALYTICAL MECHANICS**. Lagrange's masterpiece was an extension on Newton's work on mechanics. In it he moulded theoretical mechanics into a system from which fundamental equations describing the motions of any systems of bodies could be derived. To achieve this Lagrange combined the principle of virtual velocities with d'Alembert's principle. He thereby set down the principle of virtual velocities as applied to mechanics. In his preface, Lagrange draws attention to the absence of diagrams in the book, which he believed the lucidity of his own presentation had rendered superfluous. "With the appearance of the Mechanique Analitique 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).

With all the supplements in first edition

6 **LAPLACE, Pierre Simon, Marquis de.** *Theorie analytique des probabilités. Troisième édition, revue et augmentée par l'auteur*. [With:] *Supplement [Premiere - Deuxieme - Troisieme - Quatrième]*. Paris: Courcier, 1820, 1816-1825. 4to (250 x 200 mm). [4], cxlii [1], 4-506, [2]; 34; 50; 36; [2], 28 pp. Includes errata leaf, bound without half-title, all supplements separately paged and preceded by a half title each. Contemporary mottled calf, rebacked preserving original spine label, gilt stamp of Francis Egerton (probably 1st Earl of Ellesmere, 1800-1857) to boards, marbled endpapers, all edges

gilt. Internally very little browned only, occasional minor spotting, a few leaves with soiling at top margin. Provenance: Rothamsted, Lawes Agricultural Trust collection (stamp to first free endpaper). A very good copy with ample margins. (#003061) € 9,000

D.S.B. XV, pp. 367-376; Evans, *First Editions of Epochal Achievements*, 12; S. Stigler, *History of Statistics*, pp. 146-148; Honeyman 1923; PMM 252 (note).



THÉORIE

ANALYTIQUE

DES PROBABILITÉS;

PAR M. LE MARQUIS DE LAPLACE,

Pair de France, Grand-Officier de la Légion-d'Honneur; l'un des quarante de l'Académie française; de l'Académie des Sciences; Membre du Bureau des Longitudes de France; des Sociétés royales de Londres et de Gottingue, des Académies des Sciences de Russie, de Danemarck, de Suède, de Prusse, des Pays-Bas, d'Italie, etc.

TROISIÈME ÉDITION,

REVUE ET AUGMENTÉE PAR L'AUTEUR.

PARIS,

Mme Ve COURCIER, Imprimeur-Libraire pour les Mathématiques, rue du Jardinet, n° 12.

1820.

EXCEPTIONALLY RARE THIRD EDITION, INCLUDING ALL FOUR SUPPLEMENTS as issued, of Laplace's seminal work in probability theory, providing for the first time an important theory of error, lacking in previous studies. Both, the third edition as well as the second edition published in 1814 are of greatest rarity, much rarer than the first edition, with no copy recorded at auction in the past 50+ years (a copy of the third edition apparently lacking the supplements was sold at Sothebys, London in 1962).

In 1812, Laplace issued his *Théorie analytique des probabilités* in which he laid down many fundamental results in statistics. The first half of this treatise was concerned with probability methods and problems, the second half applies those methods to a variety of problems in error theory, decision theory, judicial probability and credibility of witnesses. The first chapter opens with the famous characterization of probability as a branch of knowledge both required by the limitation of human intelligence and serving, in part, to repair its deficiencies. "Rather than drawing together the lifework of a leading contributor to a vast and classical area of science, it was the first full-scale study completely devoted to a new specialty, building out from old and often hackneyed problems into areas where quantification had been nonexistent or chimerical. Later commentators have also sometimes castigated the obscurity and lack of rigor in many passages of the analysis. Once again, it may be so. It is constitutionally and temperamentally very difficult, however, for many mathematicians to enter sympathetically into what was once the forefront of research. Important parts of Mécanique céleste were also in the front lines, of course-but that was the location of Théorie analytique des probabilités as a whole. What no one has denied is that it was a seminal if not a fully systematic work" (DSB).

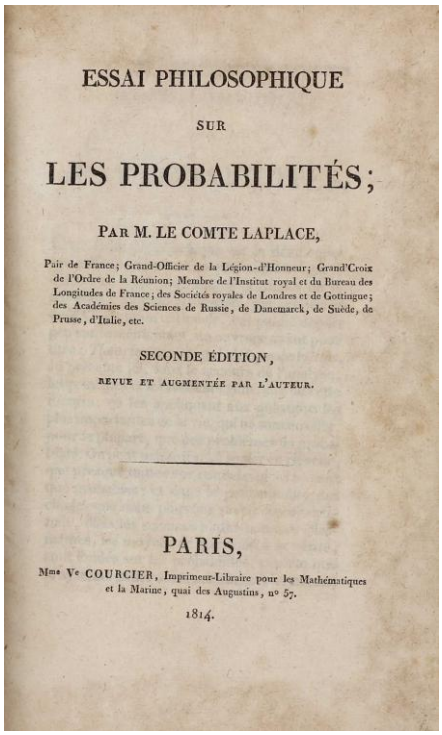
A second edition appeared in 1814. This new edition added an introduction of 106 pages, which includes the *Essai philosophique sur les probabilités*. The text expanded from 445 to 481 in length as a result of additions. The dedication to Napolean was replaced with the following foreword by Laplace: The first edition appeared in the course of 1812, namely, the first Part around the beginning of the year, and the second Part some months after the first. Since this time, the Author has occupied himself especially to perfect it, either by correcting slight faults which were slipped into it, or by some useful additions. The principal is a quite extended Introduction, in which the principles of the Theory of Probabilities and their most interesting applications are exposed without the help of the calculus. This Introduction, which serves as preface to the Work, appears yet separately under this title: *Essai philosophique sur les Probabilités*. The theory of the probability of testimonies, omitted in the first edition, is here presented with the development which its importance requires. Many analytic theorems, to which the Author had arrived by some indirect paths, are demonstrated directly in the Additions, which contain, moreover, a short extract of the Arithmetic of the infinity of Wallis, one of the Works which have most contributed to the progress of Analysis and where we find the germ of the theory of the definite integrals, one of the foundations of this new Calculus of Probabilities. The Author desires that his Work, increasing by one third at least by these diverse Additions, merits the attention of the geometers, and excites them to cultivate a branch so curious and so important to human knowledge. With this third edition, dated 1820, Laplace further expanded the introduction to 142 pages but kept the text of the main section the same as in the second. Most importantly, three supplements were added with the issuing. The first two of these supplements were already separately published in 1816 and 1818 respectively, and the third at the time of this new edition. The fourth supplement, published in 1825, was added by Laplace to those copies of this third edition which were still at his disposal. A second foreword by Laplace is added to this edition, which reads as follows: This third Edition differs from the preceding: 1 by a new Introduction which has appeared last year, under this title: *Essai philosophique sur les Probabilités, fourth Edition*; 2 by three Supplements which are related to the application of the Calculus of Probabilities in the natural sciences and to the geodesic operations.

The first two have already been published separately; the third, relative to the operations of surveying, is terminated by the exposition of a general method of the Calculus of Probabilities, whatever be the sources of error.

Content: 1. Calcul des fonctions génératrices - 2. Théorie générale des probabilités - Additions - Supplément a la théorie analytique des probabilités - Deuxième supplément a la théorie analytique des probabilités - Troisième supplément a la théorie analytique des probabilités - Quatrième supplément a la théorie analytique des probabilités.

The Erwin Tomash copy

7 **LAPLACE, Pierre Simon, Marquis de.** *Essai philosophique sur les probabilités. Seconde Edition, revue et augmentée par l'auteur*. Paris: Mme Ve Courcier, 1814. 8vo (197 x 124 mm). [4], 190, [2] pp, including half-title, leaf of contents bound at end. Contemporary calf, gilt-decorated plain spine and board edges, gilt-lettered red morocco spine label (one corner slightly bumped, extemities little rubbed, top of spine chipped), red sprinkled edges, marbled endpapers. Text very little browned, half-title and title leaf browned a bit stronger and soiled in outer margins, small ink spot to p.111, otherwise generally clean and crisp. Provenance: Bibliotheque de F. Hugueny (ink stamp to second flyleaf); Erwin Tomash (bought from Cedric & Ithier de Fougerolle, Issy-les-Moulineaux, 1997). Very good, wide-margine copy. (#003074) € 1,700


ESSAI PHILOSOPHIQUE

SUR

LES PROBABILITÉS;

PAR M. LE COMTE LAPLACE,

Pair de France; Grand-Officier de la Légion-d'Honneur; Grand'Croix de l'Ordre de la Réunion; Membre de l'Institut royal et du Bureau des Longitudes de France; des Sociétés royales de Londres et de Gottingue; des Académies des Sciences de Russie, de Danemarck, de Suède, de Prusse, d'Italie, etc.

SECONDE ÉDITION,

REVUE ET AUGMENTÉE PAR L'AUTEUR.

PARIS,

Mme Ve COURCIER, Imprimeur-Libraire pour les Mathématiques et la Marine, quai des Augustins, no 57.

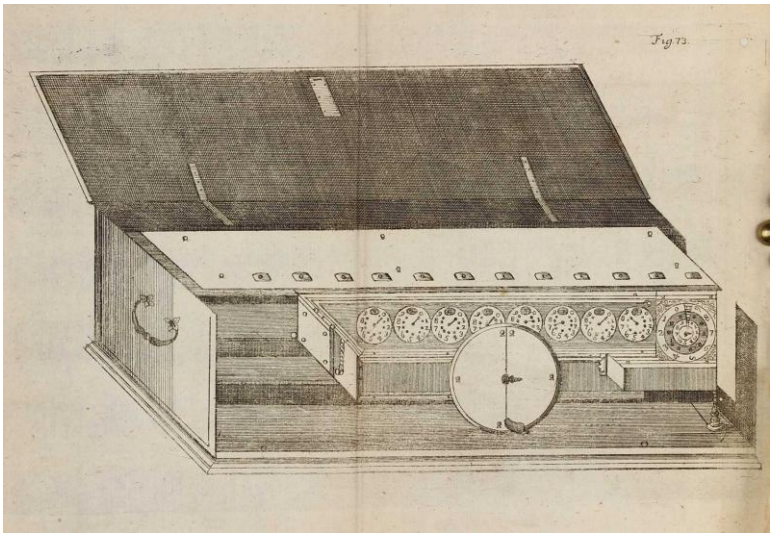
1814.

Tomash & Williams L27 (this copy); D.S.B. XV, pp. 367-376; S. Stigler, *History of Statistics*, pp. 146-148. SECOND EDITION (first edition published the same year). "This work is one of Laplace's contributions to statistics and the theory of probability. This is, as the title indicates, a philosophical examination of the subject rather than a rigorous mathematical presentation as in his other, more famous work (see Laplace, *Théorie analytique des probabilitiés*, 1812). This Essai grew out of a lecture he had given at the École Normale in 1812 - the same year that he published his Théorie analytique. It was used, essentially unchanged, as the introduction to the second and third editions of *Théorie analytique* (see Laplace, *Théorie analytique*, 1820) He indicates that he was initially led to the study of problems in celestial mechanics by his early work in probability." (Tomash & Williams L27).

The Erwin Tomash copy

8 **LEIBNIZ, Gottfried Wilhelm**. *Miscellanea Berolinensia ad incrementum scientiarum ex scriptis Societati Regiae Scientiarum Exhibitis edita...* Berlin: Johann Christian Papen, 1710. First volume only. 4to (194 x 145 mm). [22], 394 pp., including folding engraved allegorical frontispiece, some woodcut diagrams in text, and 31 folding engraved plates. Later carta rustica, modern folding cloth box. Some offsetting and browning of text and plates, minor occasional spotting, some plates little frayed at fore-margin, occasional short tears to folds. Provenance: Erwin Tomash Library (bookplate to inner front cover), bought from Bernard Quaritch, London, 1985. (#003075) € 9,000

Tomash & Williams L69 (for Leibniz paper, this copy), L66 (for journal, this copy); Ravier 305; Cantor III, 37. - FIRST EDITION. Published in only seven volumes in thirty-four years between 1710 and 1744, the *Miscellanea Berolinensia ad incrementum scientiarum* was the primary journal of the Royal Prussian Society of Sciences, founded on 11 July 1700, in Berlin by the Elector and Margrave of Brandenburg, Friedrich III. One day later, Leibniz was appointed as the first president of the Society. In a 'Pro Memoria' he wrote for Friedrich III, in 1702, Leibniz promised an annual volume of *Miscellanea*. After more than two years of preparation, and one year of printing, the first volume of the *Miscellanea Berolinensia* was ready in May 1710. It contains sixty scientific contributions, among them twelve articles written by Leibniz, including the most important one "*Brevis*

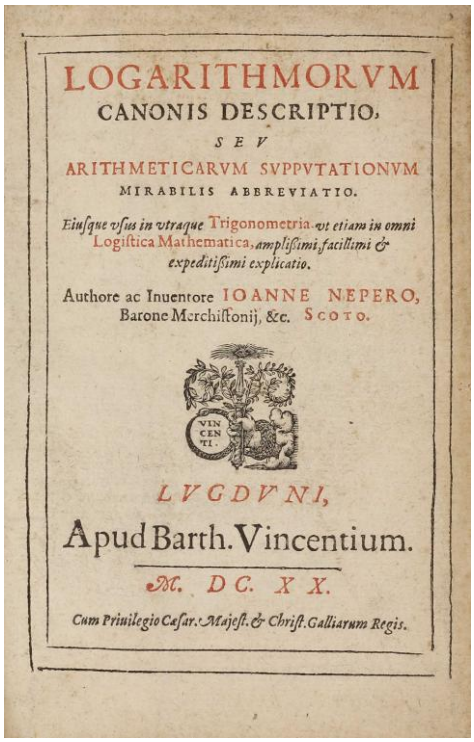


descriptio machinae arithmeticae, cum figura; quam vid. Fig 73" with the engraved plate showing Leibniz calculating machine. The first volume is quite rare, especially when complete as here with all 31 engraved plates and the frontispiece. "This volume is a collection of papers, mainly by Leibniz, including the description of his calculating machine. The engraving of the machine is not exact. A great deal of artistic license has been used in order to show some of the dials and the top of the machine uncluttered by the human-assisted carry mechanism. Thirteen years after this publication, the first of the continuations of this title were issued when it was adopted as the title for the official journal of the Royal Prussian Academy of Science.The volume also contains a plate showing two Japanese men engaged in a game of Go (a game more complex than chess, played with black and white counters called stones). It is noteworthy that the details of the game had reached Europe by the end of the eighteenth century. The man playing white (on the right side of the image) is using the traditional two-finger method of holding a stone. He must have been the stronger player because black has two stones on the “4,4” points, which are used as a handicap to make the game even. This level of detail suggests that this illustration was copied from a picture sent directly from Japan. However, the engraver erred when depicting the board. Go is played on a square board with nineteen rows and columns of lines - this board is not square and appears to be fifteen by seventeen. The lower part of the frontispiece shows a tiny model of Leibniz's calculator and two bits of text associated with Leibniz: one a series summing to π/4 (1 - 1/3 + 1/5 - 1/7, etc., discovered by Leibniz in 1674) and the other an expression from calculus (a dx = 2y dy)" (Tomash & Williams, L69).

In addition to numerous other important essays, the first volume contains the description and depiction of the so-called "four-species calculating machine", which is extremely important and trend-setting - not only from the retrospective of the 20th century. Leibniz had discovered that computational processes can be most easily represented when they are broken down into binary combinations of numbers, as he explained in his essays "De progressione Dyadica" of 1679 and "Explication de l'Arithmetique Binaire" 1703. By means of a staggering roller, which moves several gears in different moments of displacement, computing processes are triggered, which are readable by means of numerical codes on eight different wheel dials and a result wheel. Thus, Leibniz concretely translated his theory into a functional apparatus, with which he already knowingly formulated the approach of transferring complex calculations with greater precision from man to a machine: "It is unworthy of wasting the time of excellent people with servile calculations, because when you use a machine even the simplest can safely write down the results," is Leibniz's credo, which leads in a direct way to the invention of the computer in the 20th century. Thus, Konrad Zuse (1910-1995) takes over Leibniz's theoretical approach and with his "Z3" became the inventor of the first freely programmable, functional computer in binary switching technology and floating-point calculation, which he presented on May 12, 1941 - also in Berlin. Leibniz's essay covers pages 317-319, to which the copper plate "Fig. 73" belongs, on which the machine is depicted: "Brevis descriptio Machinae Artithmeticae". It is the first published description of an independent, functional calculating machine based on binary code. Likewise no less significant essays by Leibniz on the calculus of the infinite, among others, the "Symbolism mem orabilis calculi algebraici et infinitesimalis . . . et de lege homogeneousorum transcendentali "(p. 160-165) or Leibniz's essay on gravitation: "Construction problematis ducendi rectas quae tangunt lineas centrorum gravitatis" (pp. 170-173). This is followed by a paper from Johann Bernoulli's "De appropinquationibus". Furthermore summaries of research in chemistry, such as a groundbreaking paper on phosphorus "Historia inventionis Phosphori". In section "Literaria" can be found "Annotatio de quibusdam ludis", an essay on the games of the peoples, among them the popular Chinese "Weiqi game", a kind of chess, which is illustrated with a lovely board (see Cantor III , 354f and Van der Linde I, 91; Walravens, China illustrata, 150, with a note to the also included "De libris sinensibus" by La Croze). "De originibus gentium ductis potissimum ex indicio linguarum" deals with the comparative history of language, an early type of comparative literature and "etymology as historical auxiliary sciences" (NDB XIV, 128).

The Horblit-Tomash copy

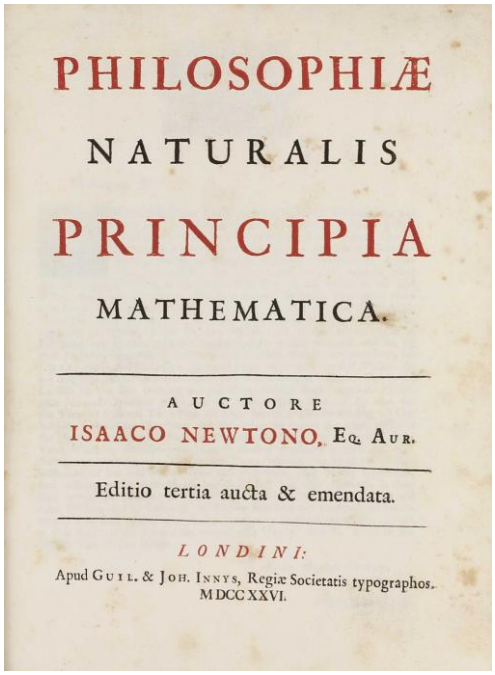
9 **NAPIER, John.** I. *Logarithmorum canonis descriptio seu arithmeticarum supputationum mirabilis abbreviatio;* II. *Sequitur tabula canonis logarithmorum;* III. *Mirifici logarithmorum canonis constructio et eorum ad Naturales ipsorum numeros habirudines; Una cum Appendice.... Quibus accessere Propositiones ad triangula sphaerica.... Una cum Annotationibus aliquot doctissimi D. Henrici Brigii in eas, & memoratam appendicem.* Three parts in one volume. Lyon: Bartholomaeum Vicentium, 1620. 8vo (198 x 135 mm), [8], 56; [92]; [2] 3-62, [2] pp., separate title page to each part, first title printed in red and black, woodcut diagrams in text, privilege leaf at end. Old reused vellum, spine with later gilt-lettered morocco label, later endpapers (some soiling of vellum, minor repair to head of spine). Protected in custom-made red morocco-backed cloth slipcase with red cloth chemise. Text only very little browned, occasional minor spotting, single small wormhole in inner margin at end of first part and beginning of second affecting some letters and numbers. Provenance: James Bell (signed on free-endpaper); Harrison D. Horblit, Erwin Tomash (bookplate each to front inner cover). A fine copy, much less browned than usual. (#003076) € 7,000


LOGARITHMORVM
CANONIS DESCRIPTIO,
SEV
ARITHMETICARVM SVPPVTATIONVM
MIRABILIS ABBREVIATIO.
Eiusque vsus in vtraque Trigonometria, vt etiam in omni Logistica Mathematica, amplissimi, facillimi & expeditissimi explicatio.
Authore ac Inuentore IOANNE NEPERO, Barone Merchistonij, &c. SCOTO.
VIN CEN TI.
LVGDVNI,
Apud Barth. Vincentium.
M. DC. XX.
Cum Priuilegio Cæsar. Majest. & Christ. Galliarum Regis.

Tomash & Williams N5bis (this copy); Macdonald, *Napier*, pp.141-143 Honeyman 2292; Dibner 106; Horblit 77a-b; PMM 116; Norman 1573; J. Shurkin, Engines of the Mind: A History of the Computer (New York, 1984), pp. 28-31; STC 18349 (original editions) - This copy is the First continental (Lyon) edition of Napier's 1614 description and canon of logarithms and posthumous 1619 treatise on their construction; second issue, with first title dated 1620 instead of 1619. III: "His 'Description of the Wonderful Table of Logarithms' is unique in the history of science in that a great discovery was the result of the unaided original speculation of one individual without precursors and almost without contemporaries in his field. Napier began work on his tables in 1594, but it was twenty years before he was ready to publish them, in this thin quarto volume of ninety pages" (PMM). Napier's logarithms reduced multiplication and division to a simple process of addition and subtraction, and the extraction of roots to division. "The idea of using logarithms in mathematics was accepted almost instantly, and the slide rule, one of the most important offspring of logarithms, lasted for more than 300 years, until solid-state electronics finally replaced it" (Shurkin, p.30). Napier's invention was immediately adopted by mathematicians both in England and on the continent, including Briggs and Ursinus, who introduced logarithms to Kepler. The book's impact on the art of navigation cannot be underestimated: "Probably no work has ever influenced science as a whole, and mathematics in particular, so profoundly as this modest little book. It opened the way for the abolition, once and for all, of the infinitely laborious, nay, nightmarish, processes of long division and multiplication, of finding the power and the root of numbers..." (D.W. Waters, The Art of Navigation in England in Elizabethan and Early Stuart Times, New Haven, 1958, p.402). Henry Briggs saw the immense power of Napier's tool and "with his strong navigational bent" put the work into English so that it could be "of very great use for Mariners... a booke of more than ordinary worth, especially for Sea-Men" (Waters, p.404).

In untouched contemporary binding

10 **NEWTON, Isaac**. *Philosophiae naturalis principia mathematica. Editio tertia aucta & emendata*. London: Apud Guil. & Joh. Innys, 1726. 4to (241 x 187 mm). [34], 530, [8] pp., including half-title, title-page printed in red and black, engraved portrait of Newton by George Vertue bound before page one, privilege leaf, dedication leaf, Halley's commendatory verse leaf, ad leaf bound at end; numerous woodcut diagrams and the engraving on p. 506. Contemporary Dutch vellum (soiled and slightly spotted, boards a bit bowed, top corner of front board scuffed), sprinkled edges. Minor occasional spotting internally (a bit stronger to half-title, title, privilege and portrait), occasional light marginal soiling, mainly to top margin, but generally quite bright and crisp. Provenance: illegible

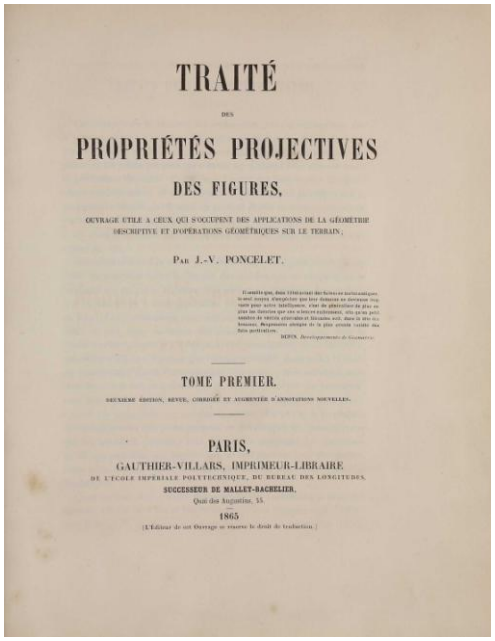

PHILOSOPHIÆ
NATURALIS
PRINCIPIA
MATHEMATICA.
AUCTORE
ISAACO NEWTONO, Eq. Aur.
Editio tertia aucta & emendata.
LONDINI:
Apud Guil. & Joh. Innys, Regiæ Societatis typographos.
MDCCXXVI.

signatures front pastedown, half-title and ad leaf verso. All in all a fine and complete copy in untouched binding, free of dampstaining or markings. (#002932) € 15,000

PMM 161 (describing the first edition); Babson 13; Gray 9; Wallis 9; Todd E3(2); HBS 64483. - The stated third edition. According to W.B.Todd, *Bibliography of the Principia*, p.855, this is the second impression, determined by the progressive wearing of type fractures and dislocations. The Babson catalogue notes that the license leaf had no assigned signature location, and is found at various places in copies of the regular edition. This edition was the last published during the author's lifetime and is the basis for all subsequent editions. The editor was Henry Pemberton, M.D., F.R.S., and this recension of the text contains a new preface by Newton and a large number of alterations. The most important of these is in the scholium on fluxions, in which Leibnitz had been mentioned by name in the earlier editions. His name is absent here, leading to claims that Newton was avoiding sharing credit for the development of calculus with his Continental rival.

Dedication copy to Elie de Beaumont, inscribed and signed by the author, also signed by publisher

11 **PONCELET, Jean-Victor**. *Traité des Propriétés Projectives des Figures, ouvrage utile à ceux qui s'occuppent des applications dela géométrie descriptive et d'opérations géométriques sur le terrain*. Paris: Gauthier-Villars, 1865-1866. Two parts in two volumes. 4to (273 x 220 mm). i-ix [2] x-xxxii, 428 pp., 12 engraved plates; [viii], 452 pp., 6 engraved plates. Contemporary three-quarter sheep over grained percaline boards, gilt-lettered spines with 5 raised bands, gilt-stamped author's name to upper boards (rubbing to spine and extremities, partial chipping of percaline coating, corners bumped and worn), marbled endpapers. Text very little age-toned, occasional very minor spotting, a few annotations in pencil, 3 leaves with short tear to lower corner, little fraying to fore-edge of one plate, faint little foxing to plates in vol. I, final text page of each vol. somewhat browned and foxed, but generally quite clean and bright. Provenances: George Philip (book plate to front pastedowns); Jean-Baptiste Elie de Beaumont* (author's inscription to first free endpaper of first vol. "a Monsier Elie de Beaumont / Souvenir de haute estime / J. Poncelet"). Both vols. also inscribed in ink by the publisher "Gauthier Villars" on half-title verso (little off-setting of ink to title-page). (#002979) € 3,800


TRAITÉ
DES
PROPRIÉTÉS PROJECTIVES
DES FIGURES,
OUVRAGE UTILE À CEUX QUI S'OCCUPENT DES APPLICATIONS DE LA GÉOMÉTRIE DESCRIPTIVE ET D'OPÉRATIONS GÉOMÉTRIQUES SUR LE TERRAIN;
Par J.-V. PONCELET.
TOME PREMIER.
DEUXIÈME ÉDITION, REVUE, CORRIGÉE ET AUGMENTÉE D'ANNOTATIONS NOUVELLES.
PARIS,
GAUTHIER-VILLARS, IMPRIMEUR-LIBRAIRE
DE L'ÉCOLE IMPÉRIALE POLYTECHNIQUE, DU BUREAU DES LONGITUDES,
SUCCESSEUR DE MALLET-BACHELIER,
Quai des Augustins, 55.
1865
[L'Éditeur de cet Ouvrage se réserve le droit de traduction.]

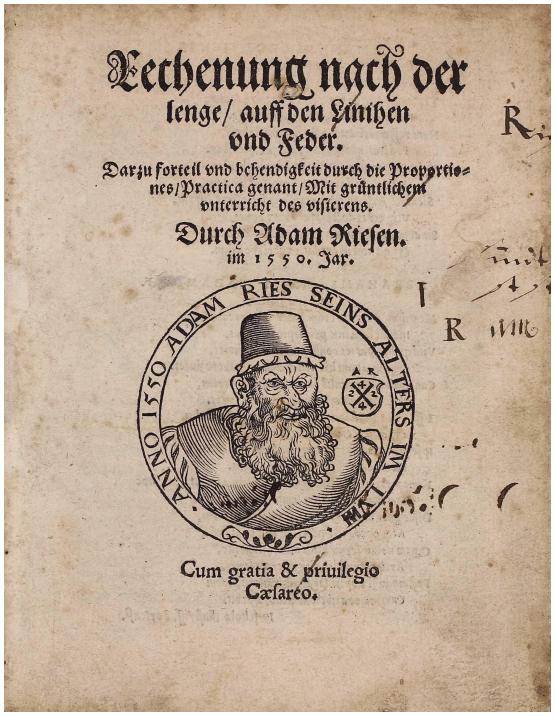
DSB XI, p. 78-80. SECOND EDITION, much enlarged. Poncelet, a pupil of Monge, "during his years in the prisons of Russia, meditated on the real cause of the power which algebraical analysis possessed, on the reason why geometry proper was deprived of it, and what might be done to give it a similar generality. . . . He was thus led to the enunciation of his celebrated and much-criticised principle or law of continuity. Analytical geometry, by substituting an algebraical expression for a geometrical figure, could apply to it all the artifices of abstract analysis" (Merz). In this book Poncelet announced his discovery of the principle of projection and the principle of figures. The *Traité* "was the first book wholly devoted to projective geometry, a new discipline that was to experience wide success during the nineteenth century. In this domain Poncelet considered himself the successor to Desargues, Blaise Pascal, and Maclaurin and the continuator of the work of Monge and his disciples. Concerned to endow pure geometry with the generality it lacked and to assure its independence vis-à-vis algebraic analysis, Poncelet systematically introduced elements at infinity and imaginary elements, thus constructing the space employed in complex projective geometry. Basing his efforts on the principle of

continuity and the notion of ideal chords, he also made extensive use of central projections and profitably utilized other types of transformations ... The distinction Poncelet made between projective and metric properties prefigured the appearances of the modern concept of structure. Among the many original results presented in the *Traité* are those stating that in complex projective space two nondegenerate conics are of the same nature and have four common points (a finding that led to the discovery of cyclic points, imaginary points at infinity common to all the cirlces of a plane), and that all quadrics possess (real or imaginary) systems of generatrices. The decisive influence that *Traité des propriétés projectives des figures* exercised on the development of projective geometry ... is brought to light by most commentators, particularly by E. Kötter, who made the most complete analysis of it. . . Of the later memoirs, the most striking is devoted to the theory of reciprocal polars, which in Poncelet's hands became an extremely fruitful instrument of discovery, although he did not perceive the more general character of the principle of duality, which was pointed out shortly afterward by Gergonne, Plücker, Möbius, and Chasles. Although it was prematurely interrupted, Poncelet's geometric work marks the first major step toward the elaboration of the fundamental theories of modern geometry." (DSB)

* Élie de Beaumont's name is widely known to geologists in connection with his theory of the origin of mountain ranges, first propounded in a paper read to the Academy of Sciences in 1829, and afterwards elaborated in his Notice sur le systeme des montagnes (3 volumes, 1852). According to his view, all mountain ranges parallel to the same great circle of the earth are of strictly contemporaneous origin, and between the great circles a relation of symmetry exists in the form of a pentagonal réseau" (Wiki)

The Honeyman-Tomash copy

12 **RIESE, Adam**. *Rechenung nach der Lenge, auff den Linihen und Feder. Darzu forteil und Behendigkeit die Proportiones, Practica genant*. Leipzig: J. Berwalt, 1550. 4to (184 x 144 mm). [4], 196 leaves, woodcut portrait of the author on title, woodcut initial. Early 19th-century half vellum, spine with gilt-lettered label (soiling of boards and spine, spine label chipped in upper right corner, little chipping of paper at board edges). Text somewhat browned, minor occasional spotting and faint, mainly marginal, foxing, first 3 leaves with tiny hole in text, small occasional ink smudges, a few ink corrections in text. Provenance: Samuel Linse (ownership inscription dated 1660 on f. 196v); Robert B. Honeyman (bookplate and ink note to front pastedown 'Rare - a nice copy' dated 1931); Paul C. Martin; Erwin Tomash (bookplate to front pastedown). (#003077) € 16,000

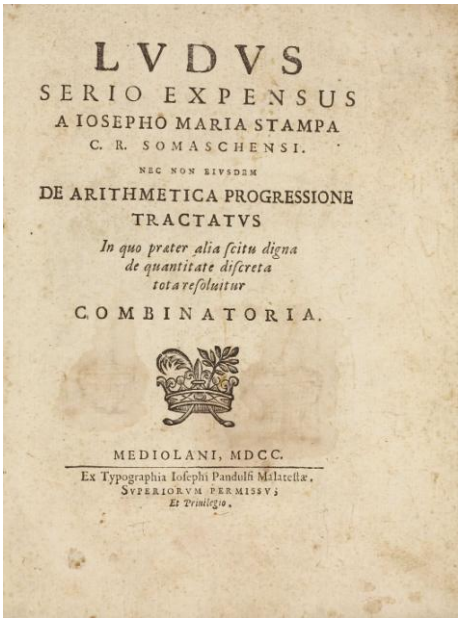


Norman 1834; Tomash & Williams R93 (this copy); Honeyman 2652 (this copy); Hoock & Jeannin R7.29; Smith, *Rara arithmetica*, pp.250-252; Cantor II, 421; Kästner I, 108; DSB XI, p.457; Adams R-535. - FIRST EDITION of "Riese's fourth, and last, arithmetic text. It is an expanded version of his earlier arithmetic books in both the number of examples and content." (Tomash & Williams). "Represents the culmination of Riese's work, and is the best exponent of the practical arithmetic of the middle of the century in Germany" (Smith). "According to Koyré (Taton), this book, the best of its kind in the 16th century, was extremely popular, 38 editions appearing in the course of the century" (Stillwell II, 221). A comprehensive work, which far surpassed his books written at Erfurt, especially in the number of examples. "While he had apparently finished most of the writing by 1525, the book was not published until 1550 because he could not afford the printing costs - Elector Maurice of Saxony eventually advanced them. It contains material on elementary arithmetic done both on the table abacus and with Hindu-Arabic numerals, but unlike his approach in his other arithmetic book, here he assumes some knowledge of simple operations - for example, he does not bother to give a multiplication table. It contains a section on gauging in which there is a discussion of roots of numbers. Riese's presentation of the table of roots has often been cited as a precursor to decimal fractions - however, it lacks the use of the decimal point." (Tomash & Williams). "Riese far surpassed his predecessors in the presentation of his material; it was

clear and orderly, and proceed methodically from the simple to the more difficult" (DSB). The title page contains an impressive portrait of a full-bearded Riese. The portrait's circumferential inscription "Anno 1550 Adam Ries seines Alters im LVIII" (anno 1550 Adam Ries of his age in the LVIII), gives the only known indication for the year of his birth. Riese was a native of Staffelstein near Bamberg and died in 1559.

Early statistical analysis of the Geonese Lottery

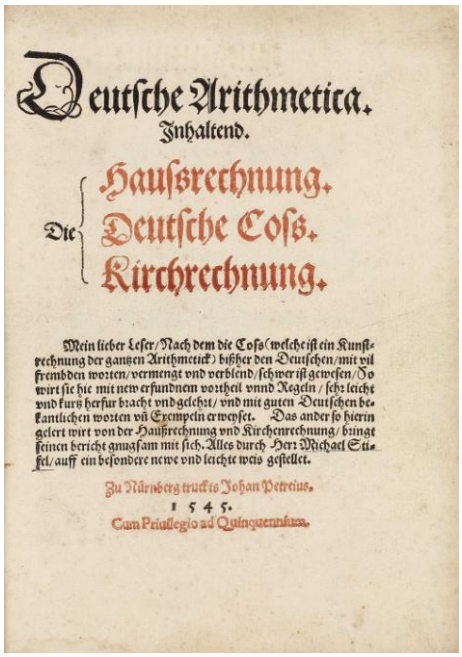
13 **STAMPA, Giuseppe Maria**. *Ludus serio expensus ... nec non eiusdem de arithmetica progressione tractatus. In quo praeter alias scitu digna de quantitate discreta tota resoluitor combinatoria*. Milan: Ex typographia Iosephi Pandulfi Malatestae, 1700. 8vo (236 x 193 mm). [8], 87 [1] pp. Woodcut device on title-page, decorative woodcut initials, head- and tailpieces, errata on final page, double page woodcut table. Near contemporary simple cardboard (light staining and soiling). Text little browned, occasional minor spotting and brown staining, incompletely erased old ink scribbling on 4 pages. (#003036) € 1,200


LVDVS
SERIO EXPENSUS
A IOSEPHO MARIA STAMPA
C. R. SOMASCHENSI.
NEC NON EIVSDEM
DE ARITHMETICA PROGRESSIONE
TRACTATVS
In quo praeter alia scitu digna de quantitate discreta tota resoluitur
COMBINATORIA.
MEDIOLANI, MDCC.
Ex Typographia Iosephi Pandulfi Malatestæ,
Superiorvm permissv;
Et Privilegio.

Riccardi I, 475:2 ('raro'). - RARE FIRST EDITION, devided into two parts, of a Stampa's work on combinatorics and the game of chance. The first, more prosaic and non-mathematical part, *Ludus serio*, deals with the game of chance and the Genoese lottery (*Sortilegio Genuensi*) with verses and prose in Latin and Italian, while the second part, *De arithemtica progressione* treats the arithmetic progressions and combinatorics behind gambling. "The Genoise lottery was the first number lottery. It and its variants were discussed by many mathematicians, including Leonhard Euler, because such lotteries were perceived to be unfair and because they gave rise to many interesting problems. Usually it took the form of choosing 5 from 100 with various payoffs depending upon the wager made. Beside the Genoese lottery there are other games mentioned in the work." (Richard J. Pulskamp, *Sources in the History of Probability and Statistics*, online resource).

The Honeyman-Tomash copy

14 **STIFEL, Michael**. *Deutsche Arithmetica. Inhaltend. Die Haussrechnung, Deutsche Coss, Kirchenrechnung*. Nürnberg: Johann Petreius, 1545. 4to (210 x 151 mm). [4], 92 leaves. Signatures: A-Z^4 Aa^4. Gothic letter, title and a few pages printed in red and black, decorative woodcut initials, woodcuts of abacus reckoning in text. 20th-century three-quarter red morocco over marbled boards, spine with raised bands, gilt lettering and some gilt decoration, new marbled endpapers. Text with little uneven browning, very minor occasional spotting, small repair to f.77 verso, but generally a very clean and crisp copy. Provenance: Horace, Baron de Landau (bookplate to front pastedown); Professor H.R. Robinson (1889-1955); Robert B. Honeyman (bookplate to front pastedown); Dr. Paul C. Martin; Erwin Tomash (bookplate to front pastedown, copy obtained from Bernard Quaritch, London, 1993). (#003078) € 12,000


Deutsche Arithmetica.
Inhaltend.
Die Haussrechnung.
Deutsche Coss.
Kirchrechnung.
Mein lieber Leser/Nach dem die Coss/welche ist ein Kunstrechnung der gantzen Arithmetick) bisther den Deutschen/mit vil frembden worten/vermengt vnd verblend/schwerlich gewesen/So wirt sie hie mit new erfundnen vortheil vnnd Regeln/sehr leicht vnd kurtz herfur bracht vnd gelehrt/vnd mit guten Deutschen bekantlichen worten vñ Exempeln erwyset. Das ander so hierin gelert wirt von der Haussrechnung vnd Kirchenrechnung/bringt seinen bericht gnugsam mit sich. Alles durch Herr Michael Stifel/auff ein besondere newe vnd leichte weis gestellet.
Zu Nürnberg truckts Johan Petreius.
1545.
Cum Priuilegio ad Quinquennium.

Tomash & Williams S191 (this copy); Honeyman 2913 (this copy); Smith, *Rara arithmetica*, pp.231-232; Adams S 1866; DSB XIII, p.59 USTC 635732; VD16 S9007. - RARE FIRST EDITION. This work is "divided into three sections: the first on arithmetic using the table abacus, the second to Coss (algebra) and the last to the church

calendar. While a useful book to three different groups, its main attribute seems to be that it substituted German words for foreign words and phrases - mainly in the section on algebra" (Tomash & Williams). "In 'Deutsche arithmetica', Stifel sought to make... the coss (algebra) or 'artful calculation' more accessible to German readers by eliminating foreign words" (DSB).

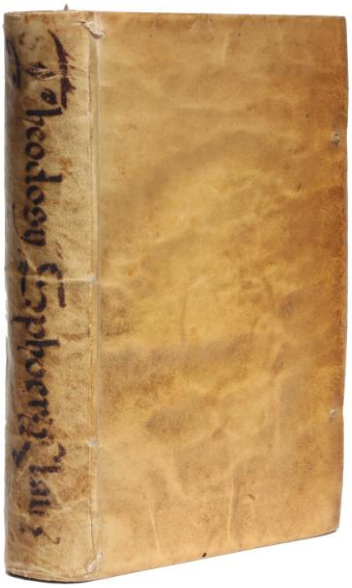
"Michael Stifel was a monk in Esslingen who, because he disagreed with the sale of indulgences, became an early follower of Luther. In 1522, to avoid persecution for his beliefs, he made his way to Wittenberg, where he lodged in Luther's home. Luther managed to find him a post as a pastor, but Stifel's cabalistic leanings soon got him into trouble, and he had to move several times before finally enrolling as a mathematics student at the University of Wittenberg. His teacher, Jacob Milich, urged him to assemble all the information he could on earlier mathematical writings. The result was his *Arithmetia integra*, [published one year before]. For many years, this and Stifel's other mathematical works, were overshadowed by his own view that the most important thing he had done was to produce schemes for cabalism and prognostication. He is now generally appreciated as the most important German mathematician of his century." (Tomash & Williams S190).

Seltene erste Ausgabe des volksnahen, deutschsprachigen Rechenbuches. Behandelt neben der einfachen Rechnung für alle Haushalte (Tl. 1, Rechenpfennige, schriftl. Rechnen, Regula Detri, Bruchrechnung) und der für Laien komplizierten Kalenderrechnung (Tl. 3) im zweiten Abschnitt vor allem die "Coss", die Algebra - eine der ersten umfassenden Darstellungen dieses Themas in deutscher Sprache mit Bezügen auf Adam Riese u. C. Rudolff. - Schöner Nürnberger Druck, durch zahlreiche Rechenpfennig-Beispiele aufgelockert.

15 **TAISNIER, Joannes**. *De usu annuli sphaerici libri tres in quibus quicquid ad geometriae perfectionem requiritur continetur*. Palermo: apud Sanctum dominicu, 1550. 4to (205 x 150 mm). [2], xxix leaves, bound without the final blank. Printed in italic throughout, title-page within woodcut architectural border and full-page woodcut coat-of-arms of Charles V on verso, woodcut initials and 41 woodcut illustrations in text of which 5 are dated 1549 and 16 with the monogram 'is'. 18th-century vellum with two ties, spine gilt-decorated and with gilt-lettered brown label (binding restored, new endpapers). Text with some worming, more pronounced towards the end and repaired (affecting some letters of text and image), occasional light spotting and staining, the last 3 leaves lightly browned. Provenance: Giancarlo Beltrame Library. (#002905) € 2,600

Adams T68; Honeyman 2956. FIRST EDITION of a rare little book, of which copies are to be found in the British Library and at Harvard. The first book deals with geometry in general, the second with the spherical ring in particular, and the third its practical use by artillerymen. Part of the text appeared in Italian in Ferrara in 1548 (see Harvard Catalogue 491). Taisnier served Charles V in a number of capacities, not least that of musician, and was the author of a number of works (see Thorndike, *History of magic and experimental science*, V, p.580).

16 **THEODOSIUS TRIPOLITES; CLAVIUS, Christopher**. *Theodosii Tripolitae Sphaericorum libri III . . . perspicuis demonstrationibus, ac scholijs illustrati. Item eiusdem Christophori Clauii Sinus. lineae tangentes. et secantes. triangula rectilinea. atque sphaerica*. Four parts in one volume. Rome: Domenico Basa, 1586. 4to (212 x 155 mm). [8], 514, [2] pp. Signatures: (dagger)^4 A-2F^4 2G^6 2H-2R^4 2S^6 2T-3M^4 3N^6 30-3R^4. Woodcut Jesuit trigram device with motto "Vocabis nomen eius Iesum" on title page and final leaf recto, each part with separate half-title page, woodcut initials, head- and tailpieces, numerous woodcut tables and diagrams in text. Bound in contemporary limp vellum, yapp edges, manuscript title to spine and upper/lower edges, ties gone, vellum somewhat soiled and wrinkled. Text little browned throughout, occasional minor spotting, a few old repairs to blank margins, little worming outside text area, small marginal tear to Cc, title-leaf slightly chipped at outer margin. Provenance: various ownership inscriptions to flyleaf and title-page, including 'Dionisio



Monaldini, 1757' (scholar), Domenico Pasi(?); Protari(?), 1620; Giancarlo Beltrame Library. A very good copy in untouched binding. (#003020) € 2,600

Censimento 16 CNCE 31619. FIRST EDITION by Clavius of Theodosius' three books of spherics, the standard edition for the 17th and 18th centuries. *Sphaericorum libri III* is the chief work of Theodosius of Tripolis, first century Greek astronomer and mathematician. His treatise on the pure geometry of spherical surfaces, still the classic on that subject in Pappus' time, was first translated into Arabic in the 10th century, then into Latin by Tiburtinus in the 12th century. This edition by Clavius is the first after Thomas Finck's *Liber Inspectionum* (1579) that uses the words *tangent* and *secant*. The trigonometric tables in Clavius' edition agree with the tables published by Finck 3 years before, a plagiarism as Clavius does not mention (the protestant) Finck as the source at all (see De Morgan, In Philosophical Magazine, 1846, pp. 384-86).

The Honeyman-Tomash copy

17 **WIDMANN, Johannes von Eger**. *Behend und hüpsch Rechnung uff allen Kauffmanschafften*. Hagenau: Thomas Anshelm, 1519. 8vo (132 x 91 mm). [1], 154 (i.e. 151) leaves (f. 135-37 ommitted), some misfoliations (corrected in ink), several woodcut diagrams and illustrations in text, woodcut printer's device beneath colophon on f.154r. Old binding of reused vellum manuscript, later vellum labels on spine (cover soiled and spotted). Text little browned only, occasional minor spotting, a few small wormholes, binding slightly rubbed, rebacked retaining most of original spine, lacking 2 pairs of ties. upper margin trimmed close just touching fol. number on two leaves, short tear in f. 83. Provenance: Joannes Laurig (inscribed on title-page and dated1682); Capuchins of Pont-à-Mousson (inscribed on title-page); Robert B. Honeyman (1897-1987); Erwin Tomash (bought from Hans-Horst Koch, Berlin, 1998). A very good copy. (#003079) € 14,000

Tomash & Williams W48; Benzing, *Bibliographie Haguenovienne*, 54; Hoock & Jeannin W7.4 (locating Hagenau, BM only); VD16 W2479 (locating Forschungsbibliothek Gotha only); USTC 615537 (adding Columbia University). - EXCEPTIONALLY RARE FOURTH EDITION of Widmann's *arithmetic*, first published in Leipzig in 1489, here with more elegant illustrations than in previous editions. It is the first printed work to use the signs "+" and "-" but here they refer to a surplus (+) and a deficit (-). This edition "is apparently identical in content to the first edition of 1489. It has been reset to make it a more compact volume, and the illustrations are much more sophisticated than those in the earlier version." (Tomash & Williams W48). Johannes Widmann came from Eger (now Cheb, Czech Republic) in Bohemia and studied in Leipzig. He taught courses in the fundamentals of arithmetic and algebra and earned several university degrees. He eventually obtained his doctor of medicine degree about 1487. Although mainly a medical practitioner, he is known to have lectured on algebra (perhaps the first to do so) at Leipzig ... This work covers the basic operations (including duplation and mediation), progression, etc., and then provides a large number of examples illustrating the process. (Tomash & Williams W47).

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