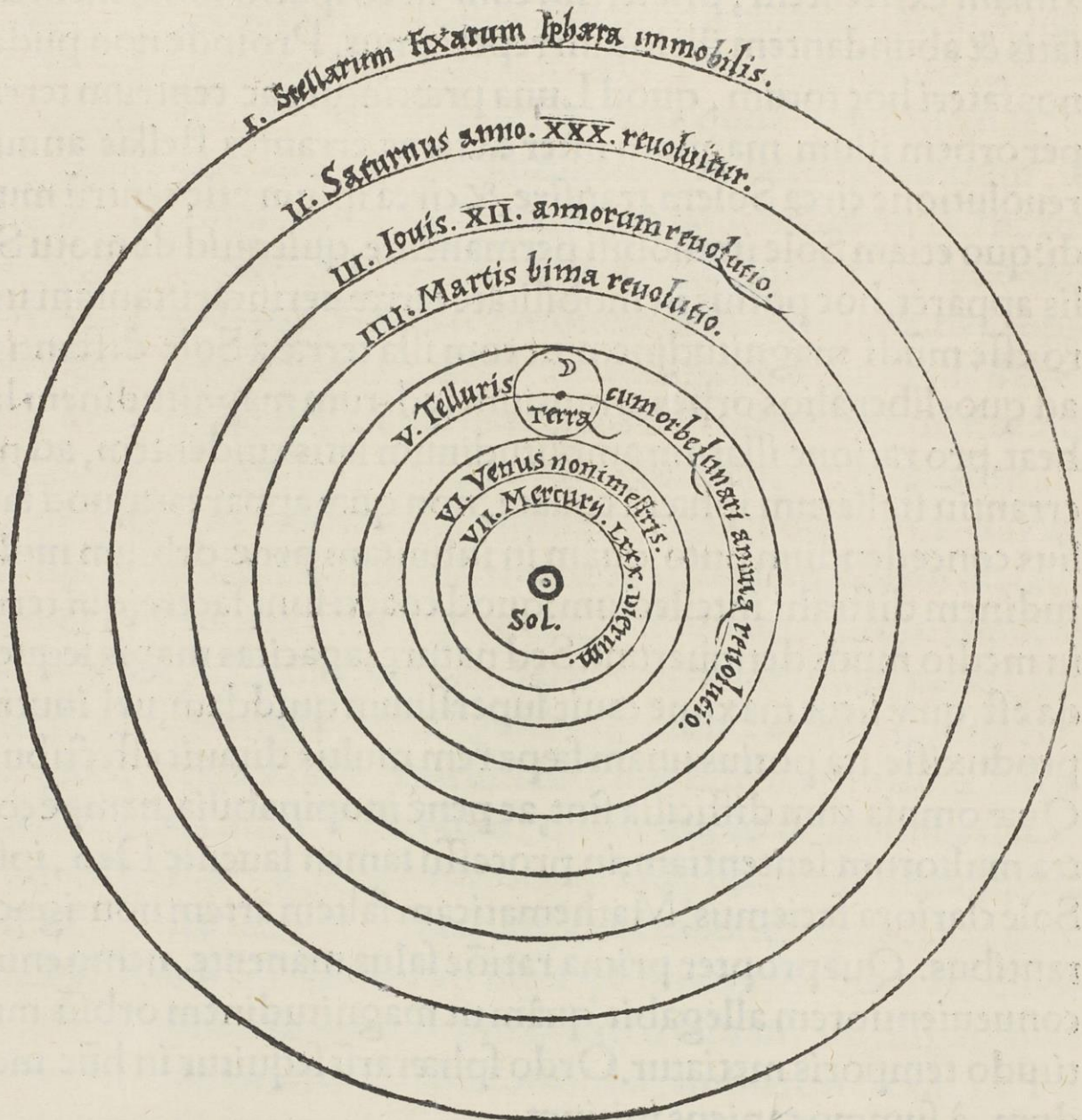




NICOLAI COPERNICI

net, in quo terram cum orbe lunari tanquam epicyclo contineri diximus. Quinto loco Venus nono mense reducitur.; Sextum deniq; locum Mercurius tenet, octuaginta dierum spacio circū currens, In medio uero omnium residet Sol. Quis enim in hoc



pulcherimo templo lampadem hanc in alio uel meliori loco poneret, quàm unde totum simul possit illuminare? Siquidem non

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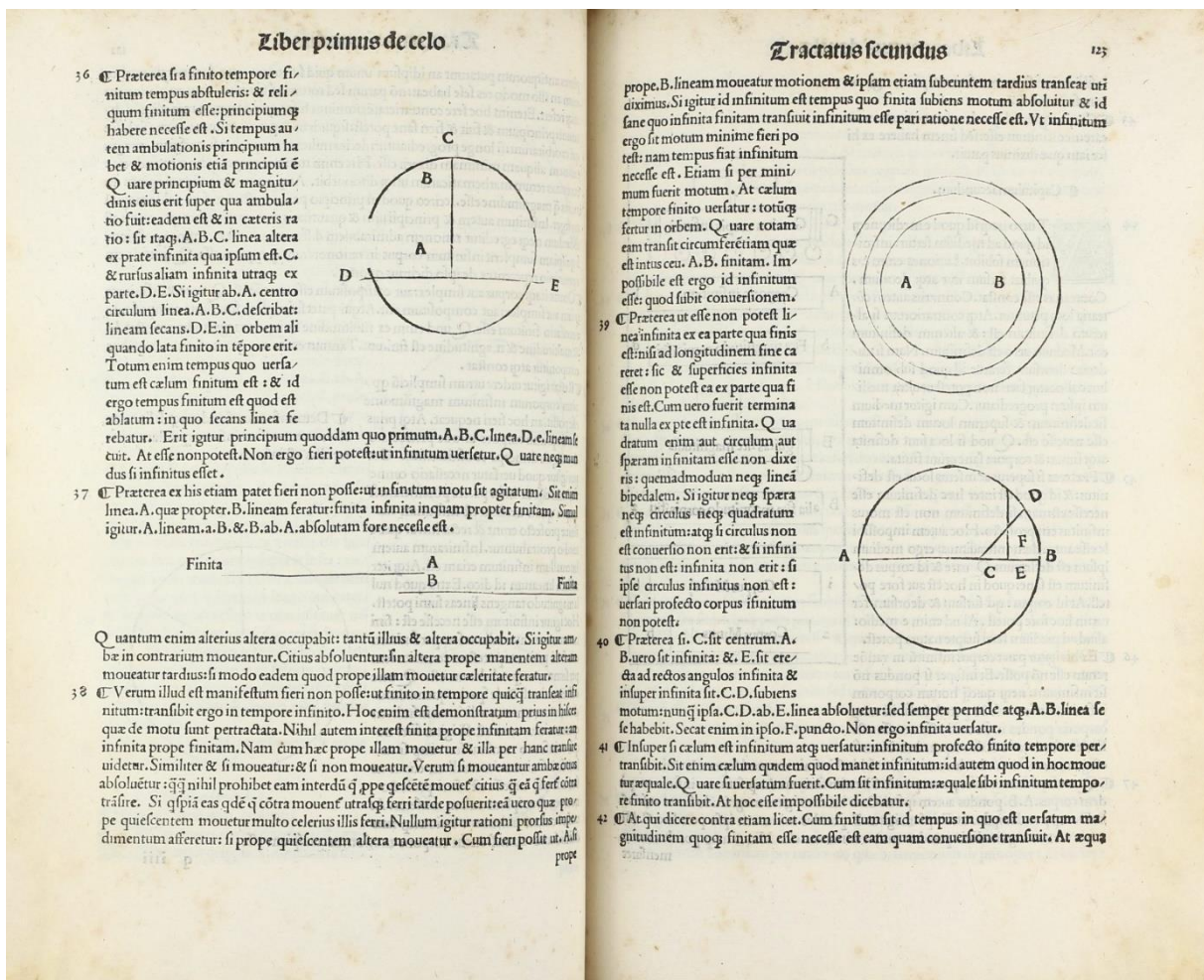
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The Aristotelian World System

1 ARISTOTELES (ARISTOTLE). *De caelo et mundo.* In: [Opera nonnulla]. Hoc in volumine continentur infrascripta opera Aristotelis videlicet: in principio: Vita eiusdem. Epistola eiusdem ad Alexandrum Ioanne argyropilo Bizantio interpretate. *Phisicorum libri octo...* Venice: per Gregorium de Gregoriis expensis Benedicti Fontanae, July 13, 1496. Folio (311 x 215 mm). [4], 403 (i.e., 503), [1] leaves. Signatures: aa⁴ a-g⁸ h⁶ i-s⁸ t⁶ u-x⁸ y⁶ z⁸ &⁸ [cum]⁸ [rum]⁸ A⁸ B-C⁶ D-N⁸ O⁶ P-OO⁸ PP-QQ⁶. 44 lines and headline, types 135G, 110R; printer's device and colophon on QQ6r, leaf h6 blank, several pagination errors (page numbering jumps from 199 to 100). 351 woodcut diagrams in text, ornamental and historiated woodcut initials on black ground. Occasional rubrication in dark red with initial strokes and partly filled woodcut initials. Several deckle edges preserved. Copiously annotated in Latin and Greek in at least four different contemporary hands using red, brown and black ink. Bound in contemporary (original) calf over wooden boards, richly blind-stamped in a checked pattern with additional blind ruling, original brass clasps, catches and leather straps. Spine ends chipped, hinges partially cracked but bands holding firmly, leather rubbed, extremities worn. Paper somewhat browned, a few leaves stronger, occasional minor spotting, ink smudges and marginal soiling, final two leaves with light dampstain towards lower corner, first leaf with old paper repair at top margin, upper corner of leaf k1 torn not affecting text. Provenances: illegible ownership inscription on front pastedown dated MDL, partially cancelled inscription on first leaf recto dated 1554 and with motto "vinit post funera virtus" (wine after the funeral) added; Václav Perek* (original invoice with envelope by bookseller Gilhofer & Ranschburg Vienna dated Dec. 14, 1916 attached). An outstanding, broad-margined copy in original binding. (#003281) € 45,000



De Caelo et Mundo (On the Heavens) is Aristotle's chief cosmological treatise: written in 350 BC it contains his astronomical theory and his ideas on the concrete workings of the terrestrial world. According to Aristotle in *On the Heavens*, the heavenly bodies are the most perfect realities, (or 'substances'), whose motions are ruled by principles other than those of bodies in the sublunary sphere. The latter are composed of one or all of the four classical elements (earth, water, air, fire) and are perishable; but the matter of which the heavens are made is

imperishable aether, so they are not subject to generation and corruption. Hence their motions are eternal and perfect, and the perfect motion is the circular one, which, unlike the earthly up-and-down-ward locomotions, can last eternally selfsame - an early predecessor to Newton's First Law of Motion. European philosophers had a similarly complex relationship with *De Caelo*, attempting to reconcile church doctrine with the mathematics of Ptolemy and the structure of Aristotle. Aristotle proposed a geocentric model of the universe in *On the Heavens*. The Earth is the center of motion of the universe, with circular motion being perfect because Earth was at the center of it. There can only be one center of the universe, and as a result there are no other inhabited worlds within it besides Earth. As such the Earth is unique and alone in this regard. Aristotle theorized that beyond the sublunary sphere and the heavens is an external spiritual space that mankind cannot fathom directly. This work is significant as one of the defining pillars of the Aristotelian worldview, a school of philosophy that dominated intellectual thinking for almost two millennia. Similarly, this work and others by Aristotle were important seminal works by which much of scholasticism was derived. (Wikisource)

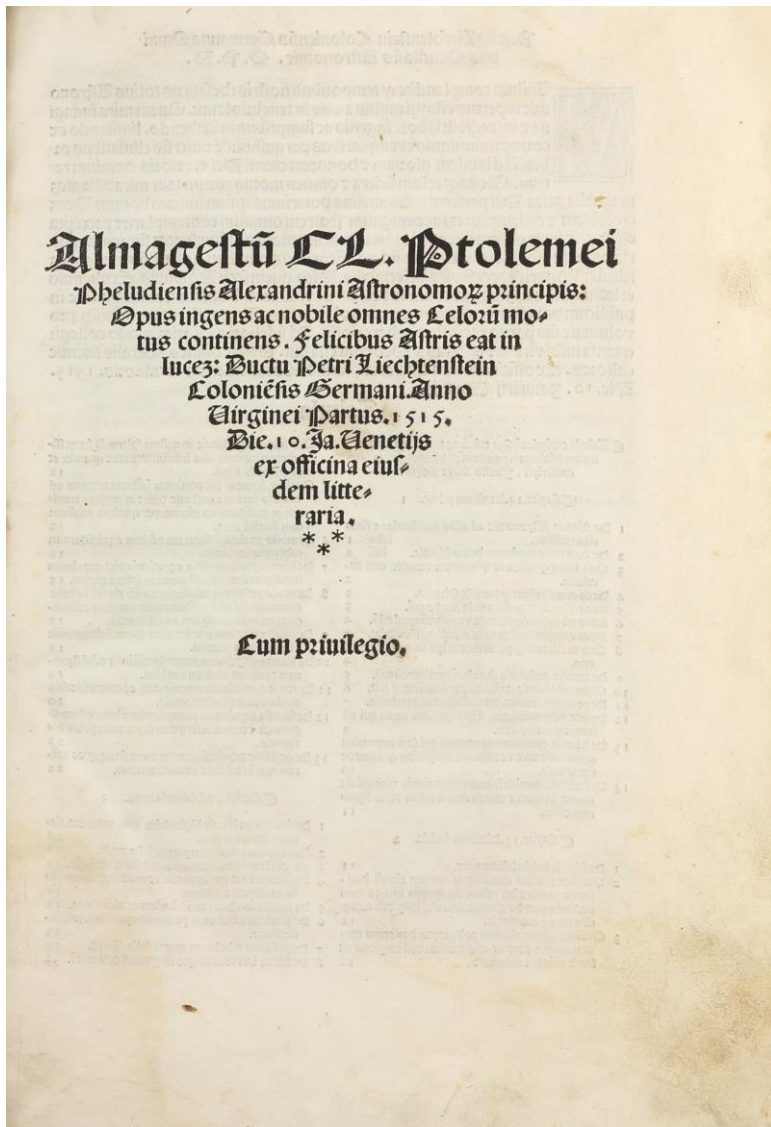
For the entire work see: Klebs 82.7; Goff A-966; Hain 1659; Proctor 4552; British Museum Cat. V 349. - RARE FIRST AND ONLY EDITION IN THIS FORM. The only *Opera Latina* of Aristotle printed in the 15th century as a single, unified edition emerged from Gregorii's shop, for Benedetto Fontana on 13 July 1496 (see Goff A-966). This edition, for which Fontana held a ten-year privilege, included in one volume almost all of Aristotle's known or earlier attributed works on Natural Science, but omitted the traditional commentaries of Averroes, Johannes de Mechlinia, and others. It contains some texts which do not exist in early separate editions: *de coloribus*, *de plantis*, *de vegetabilibus*, *de respiratione et inspiratione*, *de Nilo*, *de lineis insecabilibus*, *de causis*. The translations were made by Argyropoulos, Georgius Valla, Leonardus Aretinus and others. Some other tracts, e.g. the *Liber sex principiorum* of Gilbert de la Porree, are added. It begins with a letter of Democritus to Fontana in praise of his enterprise in publishing Aristotle, followed by an address to the reader summarizing the ten years' exclusive privilege of printing and selling Aristotle's works granted to Fontana on 26 March, 1496.

Refining Aristotle: The Ptolemaic Model of Defents and Epicycles

2 **PTOLEMAEUS, Claudius.** *Almagestum ... opus ingens ac nobile omnes celorum motus continens.* Venice: Peter Liechtenstein, 10 January 1515. Folio (312 x 220 mm). [2], 152 leaves. Signatures: *² a-z⁶ A⁶ B⁸. Woodcut initials, several woodcut diagrams at text margins, final page with woodcut printer's device printed in red and black above colophon. Some neat early annotations at start of text, title page a bit finger soiled, small tear in leaf A6, faint dampstain to lower blank gutter of about 20 leaves at beginning, tiny worm hole at foot, well away from text area. [Bound with:] **PTOLEMAEUS, Claudius.** *Quadriparti. Ptole. que in hoc volumine contentur hec sunt: Liber quadripartiti Ptolemei. Centiloquium eiusdem. Centiloquium Hermetis.* . . Venice: Ottaviano Scoto, 6 February 1519. [4], 140 leaves. Signatures: 2a⁴ A-Q⁸ R-S⁶. Woodcut initials and horoscopic diagrams, woodcut printer's device below colophon. Bifolium S1_6 at end somewhat browned. Two works in one volume. Bound in contemporary Italian blind-tooled calf, title lettered across head of upper cover "ALMAGESTUM CL PTOLEMEI" (rebacked retaining most of original spine, sewing untouched, leather spotted and soiled, lacking 4 pairs of ties). The text exceptionally crisp and clean throughout, very minor occasional spotting confined mostly close to outer edges. An outstanding, tall and crisp copy in its first binding and with some deckle edges still preserved. (#003634) € 75,000

EDITIO PRINCEPS of Ptolemy's complementary astronomical and astrological works. His astronomical survey, the *Almagest*, appears here in the first printing of Gerard of Cremona's Latin translation, made in Toledo in the twelfth century from an Arabic manuscript. It contains a star catalogue in books seven and eight which were still being used by Halley at the beginning of the eighteenth century, although Tycho Brahe had already corrected some of the coordinates. Ptolemy also describes various instruments for measuring the heavens.

"It was commonly assumed that [Ptolemy's] conceptions could be traced back to an essentially Aristotelian cosmology. As a matter of fact, Aristotle and Ptolemy were in agreement with regard to the sphericity of the Earth and its position at the center of the universe, as well as the sphericity and the circular motion of the heavens. Hence, the physical considerations of the philosopher and the mathematical arguments of the Alexandrine astronomer could reinforce each other concerning these central issues. What is more, the *Almagest* began with a mention of Aristotle's partition of speculative knowledge into the three disciplines (mathematics, physics and theology) and repeated some physical theories of Aristotle... In this consensual spirit, Sacrobosco, for one, assumed the essential concordance between Aristotle and Ptolemy and could therefore rely on both authorities in his (very) elementary introduction to spherical astronomy which, in spite of its intrinsic scientific limits, was one of the most successful textbooks ever. In Latin Europe, an 'Aristotelian-Ptolemaic cosmology' thus emerged, bringing together elements from both classical authorities. This unified geocentric worldview was



assumed by most philosophers and theologians, for instance Robert Grosseteste. In his narrative of the Copernican revolution, Kuhn therefore felt legitimized to talk about an Aristotelian-Ptolemaic 'paradigm' which Copernicus' *De revolutionibus* was to undermine." (Omodeo, Pietro Daniel and Tupikova, Irina (2016). *Cosmology and Epistemology: A Comparison between Aristotle's and Ptolemy's Approaches to Geocentrism*. In: *Spatial Thinking and External Representation: Towards a Historical Epistemology of Space*. Berlin: Max-Planck-Gesellschaft zur Förderung der Wissenschaften").

The second work is on the philosophy and practice of astrology, emphasising its logical aspects, and it contains details on the significance of comets and eclipses as well as numerous horoscopes. Ptolemy called the first work *Mathematical Composition*, but the transmission of the text through the medieval Islamic world resulted in the Arabic title *al-Majisti*. Similarly, his *Quatrobiblon* is a Latin version of the Greek title *Τετραβιβλος*, "In four books", although it is thought that Ptolemy called this text *Αποτελεσματικά*, "Effects". The text of the *Quadripartitum* is printed alongside other similar astrological works, attributed to Hermes, Al-

Battani, Al-Mansur, Plato of Tivoli and Al-Misri. Ratdolt printed an edition of just the *Quadripartitum* and *Centiloquium* in 1484, and Peter Liechtenstein printed a volume entitled *Liber novem iudicium in iudiciis astrorum*, containing many of these supplementary works, in 1509.

References: Adams P-2213; Houzeau & Lancaster 865; Stillwell 97; DSB XI, p. 196; Norman 1760 (for the 1528 edition).

The Visualization of the Ptolemaic Universe

3 SACROBOSCO, Johannes de. [*Sphaera mundi, cum commento Wenceslai Fabri de Budweiss*]. *Opusculum Johannis de sacro busto spericu[m] cum notabili commento atq[ue] figuris textum declarantibus utilissimis.* Leipzig: Wolfgang Stöckel, 1499. 4to (210 x 140 mm). 49 leaves (of 50, lacking 16, blank only). 39 lines, types: 160 (title and headings), 81, (text, leaded), 73 (commentary). Capital spaces with capitals, initial strokes and underlines supplied in red. Woodcut printer's device at end hand-colored in red and green, 28 woodcuts in-text, a few hand-colored in outline in red, one full-page. Signatures: A-C⁶ D⁴ E-G⁶ H⁴ I⁶ (-16). Bound in later stiff vellum, later endpapers (some minor soiling of boards). Text little browned throughout, few leaves a bit stronger, occasional brown spotting, dust- and finger-soiling. Copiously annotated in at least three different hands of red-brown and black ink, diagram drawings including a large one depicting the geocentric planetary system on title-page; some annotations slightly shaved at fore-margin. Provenance: Jois Henrici (?) Gisimberti (inscription on title dated 1640); Dr. Eugene Vigil, Antiquariat Botanicum. (#003616) € 18,500



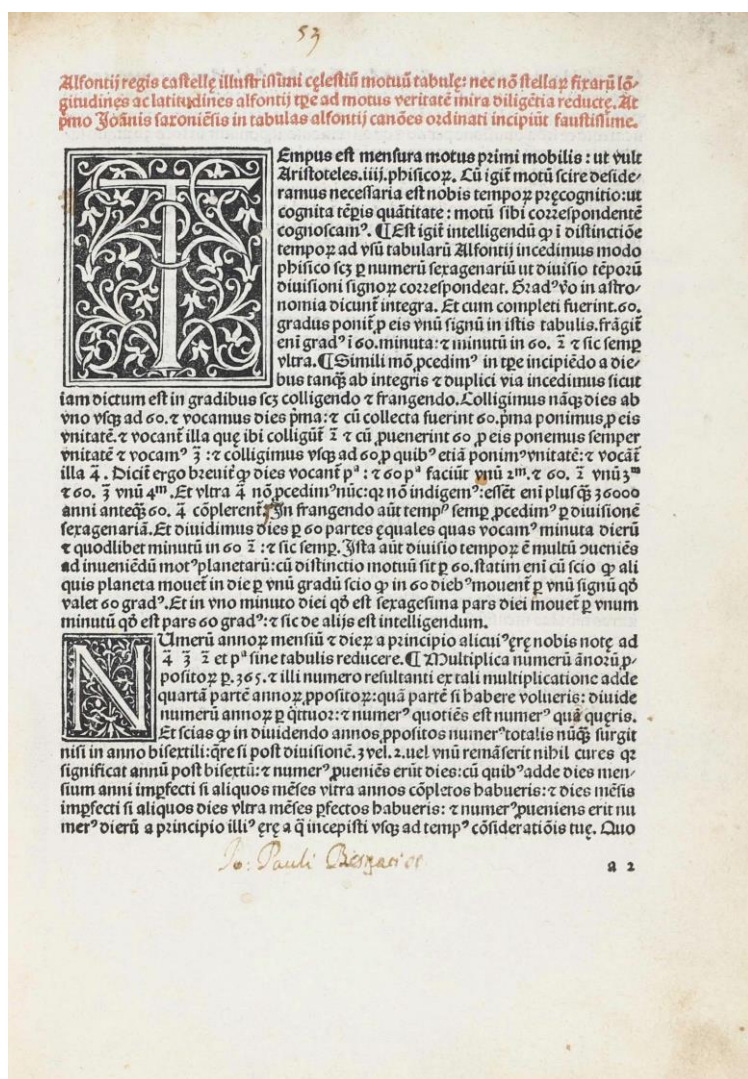
A close reprint of Landsberg's edition of ca 1497, the first to be published with commentary by Wenzel Faber von Budweis (1455-1518), an astronomer, astrologer and theologian from Bohemia. Sacrobosco's *Sphaera Mundi*, in which he sets out the basic principles of spherical astronomy, was widely commented upon, corrected and republished across Europe. First written in about 1220, the *Sphaera Mundi* is "a small work based on Ptolemy and his Arabic commentators antedating the *De sphaera* of Grosseteste. It was quite generally adopted as the fundamental astronomy text, for often it was so clear that it needed little or no explanation. It was first used at the University of Paris and from the middle of the thirteenth century it was taught in all the schools of Europe. In the sixteenth century it gained the attention of mathematicians, including Clavius. As late as the seventeenth century it was used as a basic astronomy text" (DSB XII, p. 61).

RARE: according to online records, only one copy of this edition has sold at auction in the last 50 years (Ketterer Hamburg, 2004, €16,100); ISTC traces only 12 copies at institutions worldwide. BMC III 655; Goff J420; GW M14592; HC 14123; not in BSB-Ink; OCoLC: 953259513.

The Primary Astronomical Source for almost Threehundred Years

4 ALFONSO X, King of Castile and Leon (ALFONSIUS). *Tabulae astronomicae* - Johannes DANCK (fl. first half 14th century). *Canones in tabulas Alphonsi*. [Venice:] Erhard Ratdolt, 4 July 1483. 4to (230 x 163 mm). 93 unfoliated leaves (of 94, bound without the initial blank). Collation: a-l⁸ m⁶ (-a1, a2r incipit, text of the Canons of John of Saxony, b3v supplement to the Canons of John of Saxony, c1r astronomical tables, m3r explanation of figure of solar eclipse, m3v woodcut diagram of solar eclipse, m4r explanation of figure of lunar eclipse, m4v diagram of lunar eclipse, m5r table of the latitude and longitude of principal European and North African cities, m6r colophon, m6v blank). Fol. a7-8 misbound after a2. Text in 40 to 43 lines, gothic type 4:76G, white-on-black woodcut floriated initials, incipit printed in red, smaller lombard initials, woodcut diagrams in text. Leaves partially uncut. Bound in early 20th century sheepskin, decoration and ruling in blind, spine with 4 raised bands. Several pages with contemporary annotations in ink manuscript. Text generally quite crisp and clean, very little occasional finger soiling or spotting, 8 leaves with light marginal dampstaining. Provenance: Pauli Besgarie (signed on a2r); P. Rogi (signed on m6r). A fine, unpressed and exceptionally wide-margined copy. (#003131) € 30,000

RARE FIRST EDITION of the Toledan Tables of the Cordoban astronomer al-Zarqali (c.1029-c.1087), commonly known as the *Alfonsine tables* after the patron who commissioned their translation. This Latin version, which circulated widely in the Middle Ages, was translated from an earlier Spanish version that is now lost. It is the



most famous of numerous translations commissioned by Alfonso X, 'el Sabio,' of Arabic scientific, legal, and magical treatises. Although the translation contains new observations, made from 1262 and 1272, it follows the overall format of al-Zarqali's compilation and adheres to the Ptolemaic system for explaining celestial motion. The present text follows a revised version of the tables completed in the early 14th century; Ratdolt prefaced it with the first appearance of John (Danck) of Saxony's almost equally popular canons, written in 1327, which completed the *Alfonsine tables* in several areas, including supplementary tables of the eclipses and several chapters on the latitudes of the planets.

"Alfonso had a keen interest in astronomy and had many Arabic manuscripts on the subject translated. He also ordered that a new calculation of the Toledan astronomical tables be made to replace those compiled by the Cordoban astronomer al-Zarqali some two hundred years earlier. These new Tablas Alfonsinas, also done in Toledo, were completed by Judah ben Moses (a Spanish/Jewish physician and astronomer) and Isaac ibn Sid (a Spanish/Jewish astronomer and collector of instruments) about 1272. No original

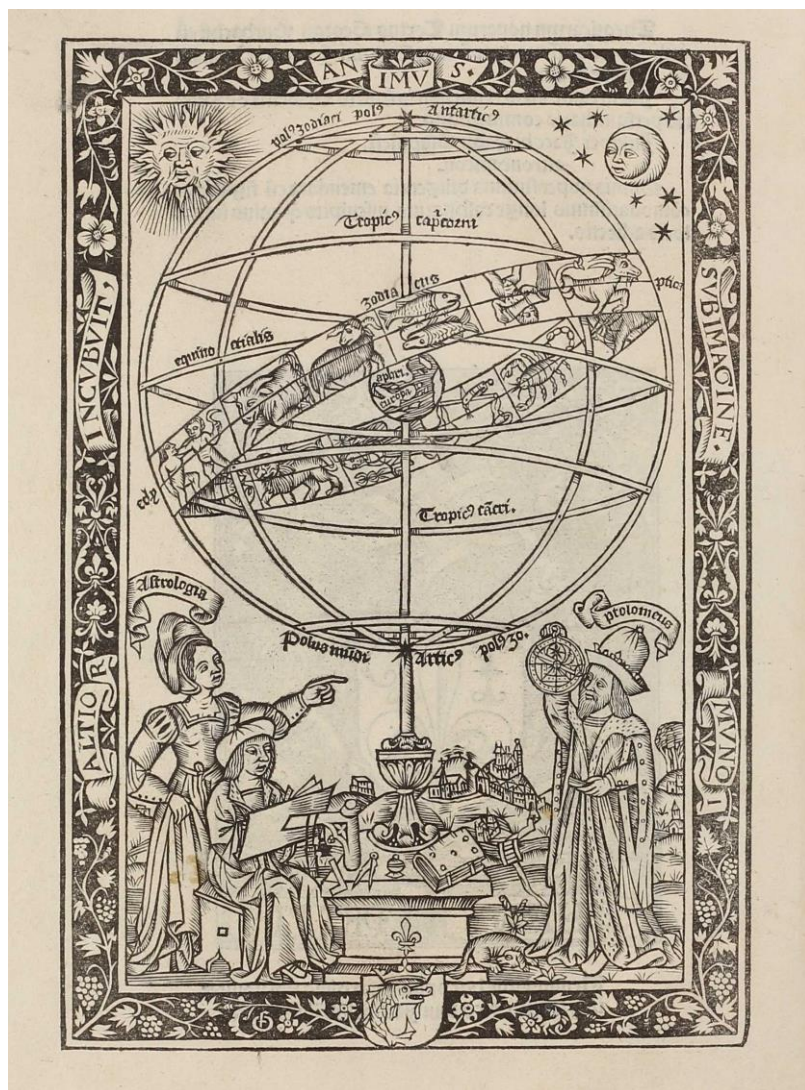
copies of these Alfonsine tables are extant; however, they were translated from Spanish into Latin in the first part of the fourteenth century and in this form remained a major influence on European astronomy for the next three hundred years. During the translation from Spanish to Latin, a number of changes were introduced into the tables (differences in the date of the epoch upon which they are based and also differences in the latitude of Toledo). The resulting tables remained in general use until superseded by Kepler's *Tabulae Rudolphinae* in 1627." (Tomash & Williams).

A copy of the second edition (1492) of the *Tabulae* was acquired by the young student Nicolaus Copernicus while at the University of Cracow, who also used it for his calculations of the planetary orbits. The Alfonsine tropical of 365 days, 5 hours, 49 minutes, and 16 seconds was the mean tropical year taken by Copernicus in his *De revolutionibus*.

References: Tomash & Williams A59; Norman 36; ISTC ia00534000; Crone Library 1; Redgrave, *Ratdolt* 34; Stillwell, *Science* 14; DSB I, p.122.

The First Popular Textbook of Ptolemaic Astronomy

5 PEURBACH, Georg von. *Theoricarum novarum textus Georgii Purbachij ... expositione Dom. Francisci Capuani de Manfredonia: it in easd Reu. p. p. Syluestri de Prierio perfamiliaris commentatio; insuper Jacobi Fabri Stapulen astronomicon; omnia nuper emendata cu figuris.* Paris: Michel Lesclencher for J. Petit and R. Chaudière, 1515. Folio (256 x 188 mm). [1] 2-91 [1] leaves, roman foliation. Signatures: a⁸ b-p⁶. Black letter type, text in double column, large woodcut of Petit's device on title, full-page illustration of an armillary sphere by Oronce Finé on verso, woodcut decorative initials, several woodcut astronomical diagrams in text, colophon on final leaf recto. Rebound in modern half calf over marbled boards, spine lettered and ruled in gilt, all edges gilt, new endpapers. Internally quite clean and bright with only very minor brown spotting, several small closed wormholes throughout, mostly marginal but one in middle of leaves sometimes touching text, including the full-page illustration on verso of title, the small loss skilfully supplied in pen manuscript, worming stronger in upper margin of gatherings e-i, larger repair in corner of e5 (not affecting text), a few clean closed tears including a longer one across leaf d6 (without loss). Provenance: Sotheby's Sale Nov. 2, 1981, lot 130. A fine, expertly restored copy, collated complete. (#002972) € 12,000

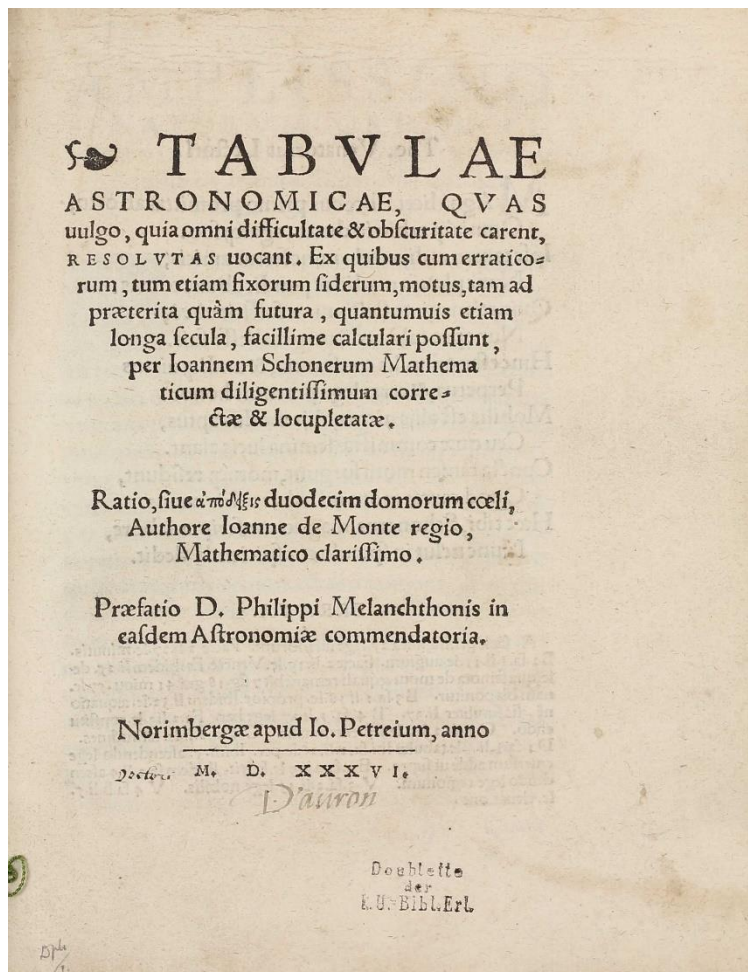


Houzeau-Lancaster 2252; Mortimer/Harvard French, 432; DSB XV, Suppl. 1, p.475-6. - FIRST PARIS PRINTING as an independent work, with a commentary by Francesco Capuano and Silvestro Mazzolini da Prierio. Of exceptional rarity, only two copies have appeared at auction in the past 40 years (our copy and an incomplete copy lacking the title-page). The work contains the earliest known woodcut by Oronce Finé, an illustration of the armillary sphere with his monogram and crowned dolphin in the lower border. "*Theoricae novae Planetarum* is an elementary but thorough textbook of planetary theory written by Peurbach to replace the old, and exceedingly careless, so-called *Theorica planetarum Gerardi*, a standard text written probably in the second half of the thirteenth century. The original version of the *Theoricae novae*, completed in 1454 ... contained sections on the sun, moon, superior planets, Venus, Mercury, characteristic phenomena and eclipses, theory of latitude, and the motion of the eighth sphere according to the Alfonsine Tables. Peurbach later enlarged the work ... by adding a section on Thabit ibn Qurra's theory of trepidation. Regiomontanus brought out the first printed edition

(Nuremberg, ca, 1474). Zinner reports no fewer than fifty-six editions through the middle of the seventeenth century ... The diagrams are of considerable importance. Since parts of Peurbach's text would be unintelligible without them ... The *Theoricae novae* contains very careful and detailed descriptions of solid sphere representations of Ptolemaic planetary models that Peurbach based either upon Ibn al-Haytham's description of identical models in his *On the Configuration of the world* (translated into Latin in the late thirteenth century) or upon some later intermediary work. Peurbach's book was of great importance because his models remained the canonical physical description of the structure of the heavens until Tycho disproved the existence of solid spheres. Even Copernicus was to a large extent still under their influence, and the original motivation for his planetary theory was apparently to correct a number of physical impossibilities in Peurbach's models relating to nonuniform rotation of solid spheres." (DSB XV, p.475).

6 **SCHÖNER, Johannes.** *Tabulae astronomicae, quas vulgo, quia omni difficultate & obscuritate carent, resolutas vocant ... per Ioannem Schonerum ... correctae & locupletatae. Ratio, siue duodecim domorum coeli, authore Ioanne de Monte regio, ... praefatio D. Philippi Melanchthonis.* Nürnberg: Johann Petreius, 1536. 4to (207 x 159 mm). 94 unnumbered leaves. Signatures: [*]⁶ A-V⁴ X⁶ [Y]². Contemporary limp vellum with 2 (of 4) ties still present, spine titled in manuscript (covers soiled and spotted, book block rehinged). Pages partially uncut. Text quite crisp and clean with only very minor occasional spotting, annotations in old hand to leaves T4r and V2r, the two final leaves of errata supplied (little frayed at outer margins and somewhat smaller in size). Provenance: D'Auron (faint ink inscription on title page); Erlangen Universitätsbibliothek (small duplicate stamp to title-page). Exceptionally well preserved and wide-margined copy in its original binding. (#003089) € 6500

Zinner 1647; VD16 S 3505; Adams p.684. - EXCEPTIONALLY RARE FIRST EDITION, FIRST ISSUE, of Schöner's *Astronomical Tables* intended for use by astronomers and students; a work well committed to the tradition of the Alfonsine Tables. A commendatory preface, addressed to Schöner, is a famous contribution by the leading Lutheran theologian and scholar Philipp Melanchthon in which he underlines once more the adherence to and



importance of astrology and in which he praises the care of mathematics in Nuremberg, ranking it higher than Athens, Miletus and Alexandria and names Johannes Regiomontanus, Johannes Werner, Melchior Pfinzing, Willibald Pirckheimer and Christoph Coler. He also honors Schöner's educational and publishing work for the vital mathematics and thus his services to Nuremberg and the students. The book was published in Nuremberg by the celebrated printer Johannes Petreius, who had collaborated with Schöner as his editor on a number of mathematical works, including Regiomontanus' *De triangulis*, and who became immortal with the first publication of Copernicus' *De revolutionibus orbium coelestium* in 1543.

There are two issues of this work known: the first with large title vignette but without printer and year mentioned on the title-page, 86 numbered leaves and no errata, the second (our copy) with 94 unnumbered leaves including two final leaves of errata. The former issue appears to be of later date since the errors listed in the errata of our issue are corrected in the text and the entire

text being completely reset. Our issue has on the title-page the mention of Regiomontanus "*Ratio, siue Apodeixis duodecim domorum coeli, authore Ioanne de Monte regio, mathematico clarissimo*" which is completely absent from the other issue's title-page.

7 **FRACASTORO, Girolamo (FRACASTORIUS).** *Homocentrica. Eiusdem de causis criticorum dierum per ea quae in nobis sunt. Cum gratia per annos decem MD XXXVIII.* Venice: [Nicolini da Sabio?], 1538. 4to (210 x 150 mm). [4], 78 leaves. Full-page woodcut portrait of Fracastoro on verso of leaf [4], several woodcut diagrams and initials within text. Contemporary limp vellum (binding restored, new endpapers), spine with faint hand-lettering. Paper repair to lower blank margin of title-page and two final gatherings, some light dampstaining and purple mildew staining (not weakening paper condition) at lower margin. Provenance: Library of the Pontifical University Antonianum, Rome (old ink stamps with shelf-mark on title-page and few pages elsewhere). Italian export license can be provided with this copy upon request. Still very good copy. (#002744) € 2,800

Honeyman 1362; NLM/Durling 1640; D.S.B. V, p. 106; Adams F-825; Houzeau-Lancaster I, 2454; Riccardi I, p. 481-482. - RARE FIRST EDITION of this astronomical work on concentric spheres by Veronese physician Girolamo Fracastoro [ca. 1478-1553], "in which the movements of the heavens and the celestial spheres with their orbits, the seasons, and various types of days (civil, solar, sidereal) are illustrated ... Apart from the intrinsic value of the work, its attempts to solve certain problems in astronomical and terrestrial physics are interesting, as are the studies on refraction. In the course of the latter Fracastoro points out the apparent enlargement and approach of celestial objects (as well as the moon) observed through two superimposed lenses, analogous to the appearance of a body immersed in water, which varies exactly according to the quantity and density of the water itself" (D.S.B. V, p. 106).

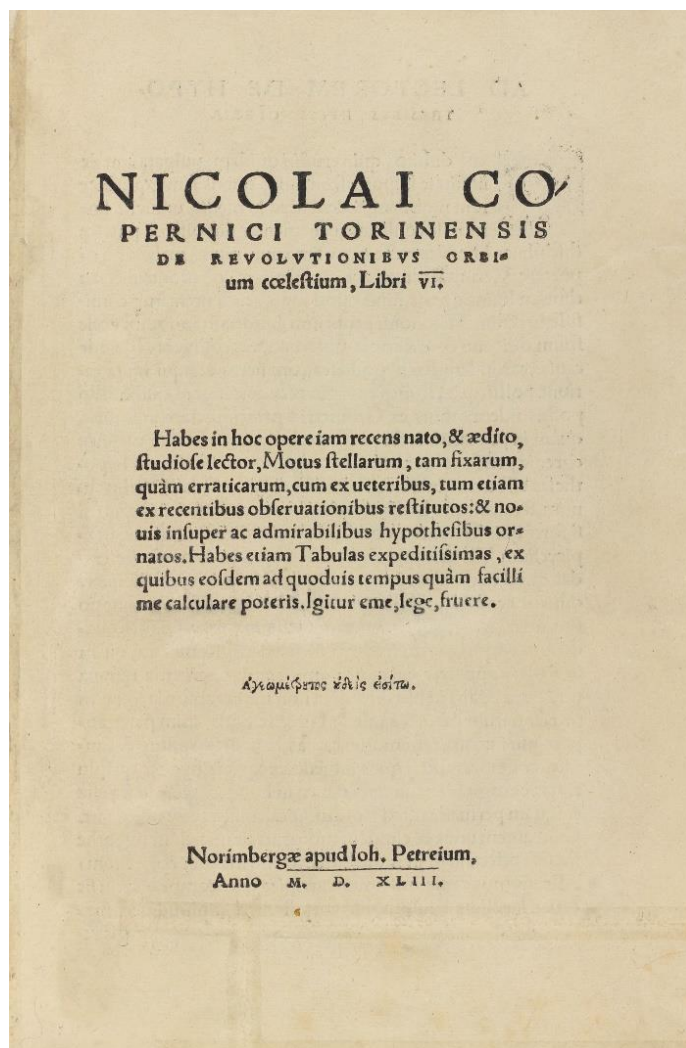


"Copernicus's *De revolutionibus* and Girolamo Fracastoro's *Homocentrica* were both addressed to Pope Paul III. Their dedicatory letters represent a rhetorical exercise in advocating an astronomical reform and an attempt to obtain the papal favour ... Copernicus knew of Fracastoro's *Homocentrica*, and [...] at least part of the rhetorical strategy laid out in *De revolutionibus*'s dedicatory letter can be read as a sophisticated response to Fracastoro's arguments." (Granada, Miguel A. & Tessicini, Dario (2005). *Copernicus and Fracastoro: the dedicatory letters to Pope Paul III, the history of astronomy, and the quest for patronage*. In: *Studies in History and Philosophy of Science Part A*, 36 (3): 431-476).

A Landmark in Human Thought

8 COPERNICUS, Nicolaus. *De revolutionibus orbium coelestium, libri VI.* Nürnberg: J. Petreius, 1543. 4to (248 x 174 mm). [6], 196 leaves. 148 woodcut text diagrams, including 6 repeats (Gingerich count), tables of calculations and ornamental woodcut initials. Bound without errata leaf which is found in only a few copies*. Signatures: [pi]⁶ a-z⁴ A-Z⁴ Aa-Cc⁴. Leaf 52 misfoliated 49. Mid-19th century straight-grained black morocco, boards and spine with rich gilt decoration, spine with additional gilt lettering, all edges gilt (minor rubbing of extremities, corners a trifle scuffed, gilt decoration partially rubbed), endpapers of the time of binding. Title repaired at foot and gutter not affecting any letters. The entire copy has been carefully washed at the time of binding. Seven individual and conjoint leaves in the first half of the book (i.e., f.11, 21/24, 45, 61/64, and 77) show stronger signs of cleaning and pressing and we must suspect that they have been supplied at the time of binding. These leaves are slightly thinner and some faded letters retraced in ink. For the most part however, the paper is sound and strong and displays the usual age-toning of comparable (unwashed) copies. A few leaves have paper repairs of tears (f.11, 94, 121, 151) and f.157 a clean tear at the upper inner margin. It is certain that all leaves are original, showing the typical watermark pattern. Moreover, the copy was examined leaf by leaf at the Bavarian State Library (BSB) and compared against the two BSB library copies known to be original. Optical inspection of the paper watermarking as well as x-ray fluorescence spectroscopic analysis of printer's ink and paper stock confirms the originality of all text leaves. The book is accompanied by an independent expertise accordingly. Our copy is not listed in Owen Gingerich's census and it is not one of the six copies known to be stolen or missing. Provenance: Marchionis de Monteynard (bookplate to first flyleaf and another unidentified armorial bookplate to front-pastedown). Despite the cleaning and restoration work still a very good copy with ample margins. (#003298) SOLD

FIRST EDITION of the most important scientific publication of the sixteenth century and a landmark in human thought. *De revolutionibus* was the first work to propose a comprehensive heliocentric theory of the cosmos,



according to which the sun stood still and the earth revolved around it. It thereby inaugurated one of the greatest ever paradigm shifts in the history of human thought.

"It challenged the authority of antiquity and set the course for the modern world by its effective destruction of the anthropocentric view of the universe. We owe this book, which was more or less completed as early as 1530, to Georg Joachim Rheticus of Wittenberg, who persuaded Copernicus to allow him to publish it; for until 1540 the author himself had permitted only preliminary statements to circulate in manuscript. He died on the eve of its publication. Nicolaus Copernicus studied at Cracow, Bologna and Padua. Returning to his native Poland he eventually became Canon of the cathedral at Frauenberg, where he lived quietly until his death. He was a physician -- having studied medicine at Padua -- diplomat, economist, Doctor of Canon Law, and artist -- a self-portrait survives. Renaissance mathematicians, following Ptolemy ([PMM]18*), believed that the moon, sun and five planets were carried by complex systems of epicycles and deferents about the central earth, the fixed pivot of the whole system. In Copernicus's day it was well known that conventional astronomy did not work accurately, nor did further study of Ptolemy seem to put the matter right. Copernicus, stimulated by the free entertainment of

various new ideas among the ancients, determined to abandon the fixity of the earth, and all the complexities in the treatment of the motions of the celestial bodies that follow from such a conception. With the sun placed at the centre, and the earth daily spinning on its axis and circling the sun in common with other planets, the whole system of the heavens became clear, simple, and harmonious. The revolutionary nature of his theory is evident in his famous diagram illustrating the concentric orbits of the planets. Moreover, the new system worked mathematically as well as the Ptolemaic though not, indeed, much better. Like Ptolemy, Copernicus believed that the heavenly motions must be perfect, uniform and circular; he still employed epicycles. It was Tycho Brahe who finally destroyed the heavenly spheres, and Kepler ([PMM]112) who destroyed the myth of the circle. In the first book of the *De Revolutionibus* Copernicus explains how the daily rising and setting of the heavenly bodies is a consequence of the daily diurnal rotation of the earth on its polar axis. The course taken by the sun through the zodiacal constellations and the phenomena of the seasons are shown to be due to the annual revolution of the earth about the sun. Book 2 contains the mathematics of astronomy and a star catalogue based on Ptolemy; Books 3-6 treat of the particular motions of the earth, moon and planets. The relative distances between the earth and the planets are now determined. Copernicus (who dedicated his book to Pope Paul III) expected to be ridiculed by the unthinking for supposing that the earth moved; but he did not anticipate that it would attract religious prejudice. The early neglect of *De Revolutionibus* was due to its difficulty and strangeness; later the fundamentalist issue became critical and it was condemned by the Church in 1616. The Church had no objection to the Copernican system as a mere calculating device, in the manner disarmingly proposed in the anonymous preface inserted in the first edition, without Copernicus's knowledge, by the Lutheran minister Andreas Osiander; it was the reality of the earth's motion that was at stake. Within a century the Copernican view was generally accepted by the leaders of science; Galileo ([PMM]128) and Gilbert ([PMM]107) were strong supporters as well as Mästlin and Kepler. Newton ([PMM]161) finally established its truth and his views were further developed by the eighteenth-century mathematicians to find their final summing up in the *Traite de Mecanique Celeste* of Laplace ([PMM]252). When it was stated in modern times that the planets were originally ejected from the sun by centrifugal forces a new significance was given to the heliocentric theory, but it must be said that with the arrival of Einstein's theory of relativity ([PMM]408) any statement about the absolute motion or rest of bodies has become somewhat irrelevant. But beyond these influences on astronomical science, it is obvious that the publication of this book at that particular moment in history powerfully helped to re-direct the whole outlook and thinking of mankind." (PMM 70).

*Most surviving copies do not have the errata. They can appear on a separate leaf, or on the verso of the main or additional title. More often, though, they are absent, as here; of the 279 copies of the work in Gingerich's census all but 86 are without the errata.

Literature: PMM, *Printing and the Mind of Man* 70; Norman, *Library of Science & Medicine* 516; Dibner, *Heralds of Science* 3; Horblit, *One Hundred Books Famous in Science* 18b; Sparrow, *Milestones of Science* 40; Zinner 1819 & p. 42; Evans, *Epochal Achievements in the History of Science* 15; Gingerich, *An Annotated Census of Copernicus' De Revolutionibus*, 2002; Gingerich, *Rara Astronomica*, 16; Swerdlow & Neugebauer, *Mathematical Astronomy in Copernicus's De Revolutionibus*, 1984; Baranowski, *Bibliografia Kopernikowska, 1509-1955*, Warsaw, 1958; VD 16 K 2099; IA 144.356; STC 221; Adams C 2602; Houzeau/Lancaster I, 2503.

Tycho's Own Geocentric Model

9 BRAHE, Tycho. *Astronomiae instauratae mechanica*. Nürnberg: L. Hulsius, 1602. Folio (311 x 194 mm). 54 unnumbered leaves, title with engraved portrait of the author, 6 large engravings and 23 woodcut illustrations in text, woodcut initials and tailpieces. Signatures:)::⁴ A-E⁶ F⁴ G-H⁶ I⁴. Contemporary blindstamped pigskin with stamped coat of arms monogrammed "H R" on both covers, front cover with the coat of arms of the Landgrafschaft Hessen (leather rubbed and somewhat spotted, closing straps gone, corners bumped, inner front hinge partially cracked). Leaf G6r corrected with mounted word "Ingeniose." Text generally crisp and clean with just a little paper browning title and A4 a bit stronger), leaves A2 and A3 with light narrow waterstain at fore-margin. [Bound after:] DÜRER, Albrecht. *Opera Alberti Dureri. Das ist, alle Bücher des weitberühmbten und Künstreichen Mathematici und Mahlers Albrechten Durers von Nürenberg, so viel deren von ihm selbst in An. 1525 und 1528 kurtz vor und gleich nach seinem todt in Truck geben.* . . . Arnheim: Johan Jansen, 1604-1603. Three parts. 2, 90, 26 (including 10 folding), 132 (including 4 folding) unnumbered leaves. With separate title to each part, Dürer's woodcut monogram on general title and on first two part-titles, woodcut initials and numerous text-illustrations and diagrams, many full-page, double-page or folding. Part I with 2 printed woodcut folding extension slips on P4v and Q1r, and final blank Q4; part II title with large woodcut coat of arms of Ferdinand I; part III with elegia by Willibald Pirckheimer on Z5 and final blank Z6. Signatures: [pi]², A-N⁶ O-Q⁴; A⁶ [bifol. A4/5 fold.] B⁴ [bifols. B1 and B3 folding] C-E⁶ [bifols. C1, C3, D3/4, E1/6 and E3/4 folding] F² [bifols. F1 and F2 folding]; A-M⁶ N⁴ O-R⁶ S⁸ [bifols. O2/5, S4/5, S6/7 folding] T⁴ V-Z⁶ [bifol. Y3/4 folding]. Browning and minor spotting as usual. (#003556) € 65,000

SECOND- AND FIRST TRADE- EDITION of Tycho Brahe's important astronomical work, first privately published in a very small print run of about 40 copies at Wandsbeck near Hamburg in 1598. "This work contains illustrations



of Brahe's instruments and observatories . . . In this famous book Brahe described his fine instruments, which were either his own inventions or considerably improved versions of older ones. Brahe's accurate observations of the positions of the sun, moon, stars, and planets provided the basis for refinements of the Copernican doctrine. His work led to Kepler's reformation of astronomy." (L. A. Kenney, *Johann Kepler Bibliography: Holdings in the San Diego State College Library*, 28).

Newly set and corrected compared to the first edition of 1598. The illustrations come from the original plates and blocks, with the exception of the newly added portrait on the title and the engraved rather than cut armillar sphere on leaf C6v. - Tycho Brahe's most important astronomical work, providing an illustrated description of his astronomical instruments (sextants and quadrants) and of the Uraniborg and Stjerneborg observatories on the island of Hven. The work also contains a short autobiography and a summary of the principal results of Brahe's observations, and an appendix in which the construction of the observatories is shown. A copper shows Brahe in his study. It is little known that this book provides a source for Hamlet. As Strong has shown, it is most likely that Shakespeare took the names Rosenkranz and Guildenstern from the coat of arms around the portrait of Brahe on the title (cf. Weil).

The Tychonic system is conceptually a geocentric model. Brahe admired aspects of Copernicus' heliocentric model, but felt that it

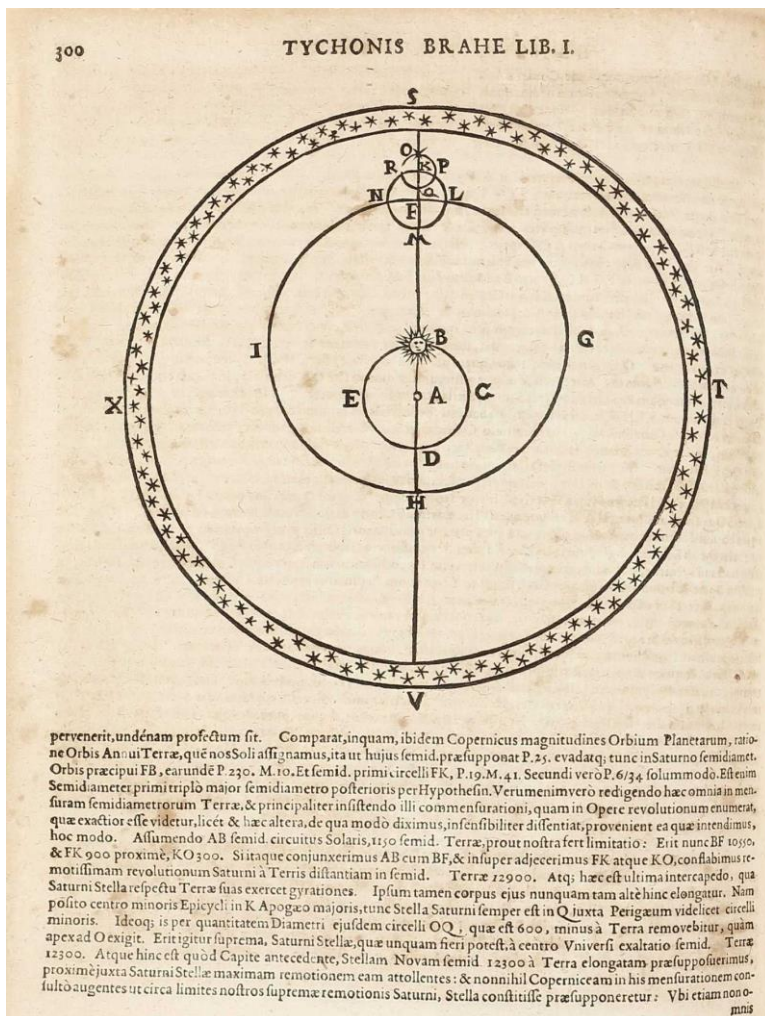
had problems as concerned physics, astronomical observations of stars, and religion. He comments that "this innovation expertly and completely circumvents all that is superfluous or discordant in the system of Ptolemy. On no point does it offend the principle of mathematics. Yet it ascribes to the Earth, that hulking, lazy body, unfit



for motion, a motion as quick as that of the aethereal torches, and a triple motion at that." (see Owen Gingerich, *The eye of heaven: Ptolemy, Copernicus, Kepler*, New York: American Institute of Physics, 1993, p.181). In regard to physics, Tycho held that the Earth was just too sluggish and heavy to be continuously in motion. According to the accepted Aristotelian physics of the time, the heavens (whose motions and cycles were continuous and unending) were made of 'Aether' or 'Quintessence'; this substance, not found on Earth, was light, strong, and unchanging, and its natural state was circular motion. By contrast, the Earth (where objects seem to have motion only when moved) and things on it were composed of substances that were heavy and whose natural state was rest. Consequently, the Earth was considered to be a 'lazy' body that was not readily moved. Thus while Tycho acknowledged that the daily rising and setting of the Sun and stars could be explained by the Earth's rotation, as Copernicus had said, still, such a fast motion could not belong to the earth, a body very heavy and dense and opaque, but rather belongs to the sky itself whose form and subtle and constant matter are better suited to a perpetual motion, however fast. (see Ann Blair, *Tycho Brahe's critique of Copernicus and the Copernican system*, *Journal of the History of Ideas*, 51, 1990, pp. 355–377).

Literature: Dibner 4; Zinner 3929; VD 17 23:270097W; STC B 1970; Zinner 3929. Houzeau/Lancaster I, 2703; Weil, Cat. XXVII, 48; Honeyman 490.

10 BRAHE, Tycho. *Opera omnia, sive astronomiae instauratae progymnasmata in duas partes distributa.* Two parts in one volume. Frankfurt: Johann Gottfried Schönwetter, 1648. 4to (221 x 178 mm). 470, [10] pp. (last leaf blank); 217, [5] pp., including 2 leaves of dedication by Schönwetter bound at the end. Separate title-page to second part, printer's woodcut devices to each title-page and page [218] of second part, numerous (9 full page) woodcut illustrations and diagrams in text. 19th-century half vellum over marbled boards (slightly soiled, extremities little rubbed), fore-edge of book block lettered in black ink. Light even browning of text, occasional spotting and light foxing as usual, general title with old ink stamp (partly erased and paper slightly thinned). Provenance: first flyleaf with illegible ownership entry dated 1655; title page with ownership signature dated 1656. A very good copy, collated complete. (#001663) € 6500

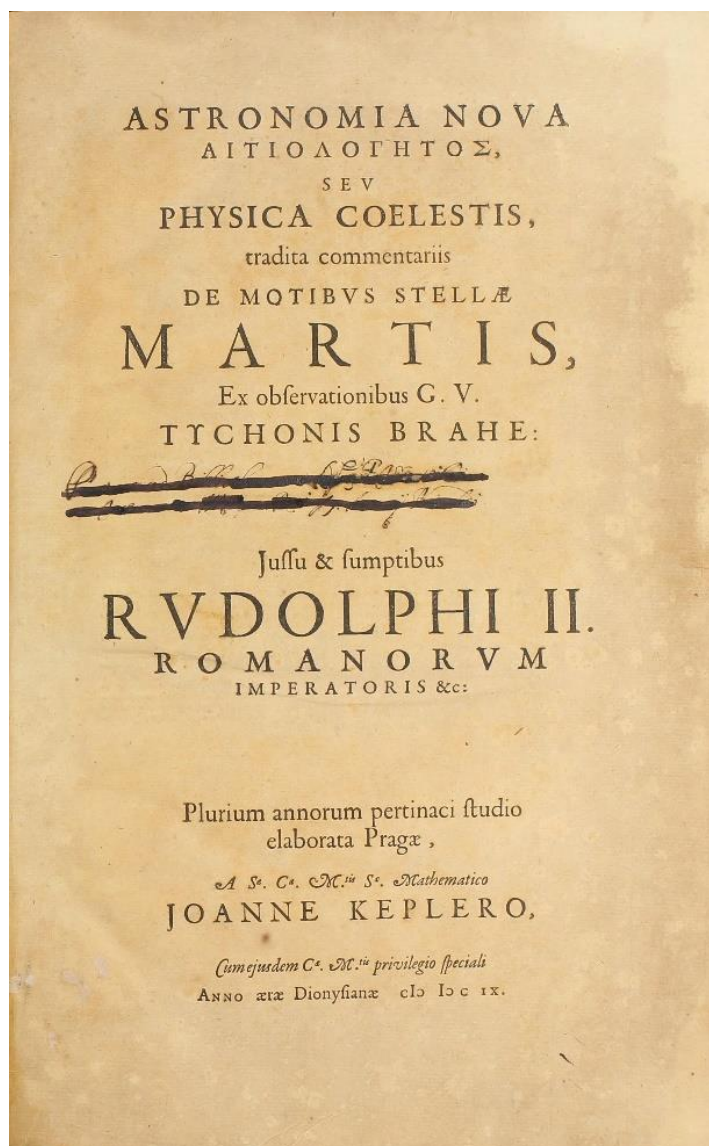


Norman 321; Lalande 225; Houzeau-L. 2704; Waller 12004; Sotheran 6440. Starp, Schönwetter 195 (in AGB I); Brüning 987; Warner, *Sky Explored*, 41, 2 b. SECOND EDITION (first Page 1611). "Despite its title, this work contains only Brahe's 'Protogymnasmata' (1602) and 'De mundi aetheri' (1588), the first two volumes of a never-completed trilogy. The first is a scholarly work on the 1572 supernova in Cassiopeia, containing Tycho's observations of the supernova, revisions of the theories of solar and lunar motion, and a catalogue of the positions of 777 fixed stars. The second work records Tycho's observations of the great comet of 1577, and includes a description of his geoheliocentric theory of the universe. Tycho's observations of the supernova and comet led him to abandon the Ptolemaic concept of heavenly spheres and to deny the Aristotelian hypothesis that nothing new could be born in the heavens." (Norman).

A New Astronomy - the Laws of Planetary Motion

11 KEPLER, Johannes. *Astronomia nova AITIOΛΟΓΗΤΟΣ, seu physica coelestis, tradita commentariis de motibus stellae Martis, ex observationibus G.V. Tychonis Brahe.* [Heidelberg]: [Gotthard Vögelin], 1609. Folio (388 x 250 mm). Work in five parts, each with separate half-title page, but continuous pagination and signatures. Text in Latin with small sections in Greek. [40], 337, [3] pp., folding letterpress table, woodcut initials, head- and tailpieces, approx. 300 woodcut diagrams in text, complete with first and final blanks. Signatures: π^2 2*-4*⁶ A-2D⁶ 2E⁸ (π 1 and 2E8 blanks). Recased in early 18th century vellum, new endpapers. Text mostly heavily browned, tiny holes in leaves O6 and P1 with loss of a few letters of text, repaired tear in leaf T1 without loss, a few wormholes at gutter (sometimes touching text), burn hole in leaf S6. Provenance: "Pertinet ad Bibliothecam [--]", obscured inscription on title-page. Although heavily browned as usual, a very good and wide-margined copy. (#003475) € 340,000

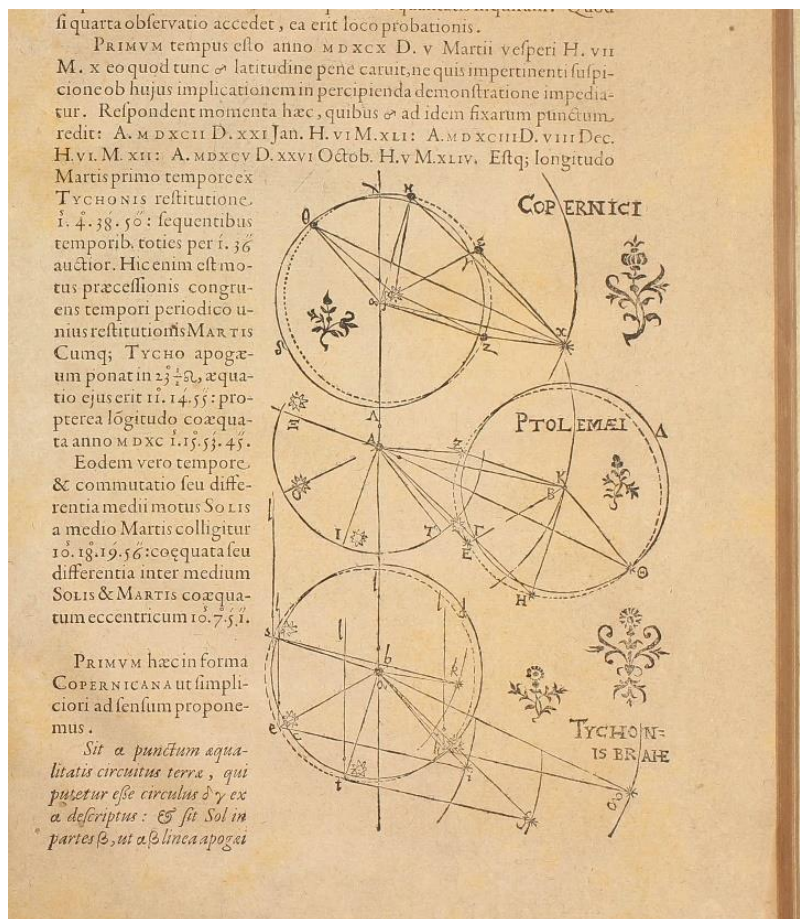
FIRST EDITION, AND EXCEPTIONALLY RARE, of Kepler's most important work and a masterpiece of modern astronomy containing the first enunciation of the first two laws of planetary motion: the law of elliptical orbits, formulating that the orbits of planets are shown to be elliptic rather than circular, demonstrated by his calculations of the orbit of Mars, and the law of equal areas, which shows that the planets move faster when they are closer to the sun.



In 1607 Kepler had the wood blocks cut in Prague, and in 1608 he sent the text to be printed by the successors of Ernst Vögelin (1529-89) in Heidelberg. The absence of an imprint was due to the fact that the edition was not intended for commerce: the Emperor held the rights to its distribution, since Kepler had written it in his post of court astronomer, and it had been printed at imperial expense. Kepler, however, thought otherwise, his salary being long in arrears, and he sold his copies to the publisher. Although the size of the press run is not recorded, Kepler later stated that only "a few copies" had been printed (Caspar, p. 55).

The influence this book had on other great astronomers, from his contemporary Galileo to the later Newton, was substantial and enabled Newton to form his own laws of motion and universal gravitation. Kepler's and Newton's laws became the basis of celestial mechanics. Kepler, a student of the "cautious Copernican" Michael Maestlin in Tübingen, used Copernicus's theory of heliocentrism as the basis for his treatise, and combined it with the observational accuracy of Tycho Brahe, whose calculations he acquired through his post as imperial mathematician to Rudolf II, following Tycho's death in Prague in 1601. Disagreement with Tycho's heirs led to delays with the publication which only commenced in the summer of 1608, once Tycho's son-in-law, Franz Tengnagel, was able to add a note to the reader regarding Kepler's deviance from

Tycho's calculations. The publication was supposed to be distributed privately by the Emperor, who held the rights to its distribution, since Kepler had written it in his post of court astronomer, but Kepler sold some copies to the printer Ernst Vögelin successors in Heidelberg in an attempt to recoup some of his salary, which was in arrears. Although the size of the press run is not recorded, Kepler later stated that only "a few copies" had been printed (see Caspar, p. 55).



Johannes Kepler stands, with Galileo between Copernicus and Newton among the founders of modern astronomy and of a new conception of the universe. 'The New Astronomy' is perhaps his most important book . . . Compelled as a Protestant to give up his post as a teacher of mathematics at Graz, he joined Tycho Brahe, the famous Danish astronomer, at Prague and on his death became mathematician to the Emperor Rudolf II, a great patron of science. It was fortunate that Kepler was able to use the mass of material collected by Tycho Brahe. Brahe had greatly improved the construction of astronomical instruments and with these had made systematic and accurate observations over many years. Although he departed from the traditional picture of the universe on some critical issues, he regarded the idea of the motion of the earth as absurd: but he had lacked time to construct his own system of the universe from observation. This

task he left to Kepler. Copernicus had shown the sun to be the centre of the universe round which the earth and planets revolve, but his description of their movements was still strongly influenced by ancient conceptions of order and harmony. It was Kepler's aim to determine the true movements of the planets and the mathematical and physical laws controlling them. In this task he succeeded brilliantly . . . Kepler attempted to construct a new physical cosmology into which his laws would fit, but he had no conception of the inertia of matter and still believed, like Aristotle, that movement was due to 'animal force or some equivalent'. He had an inkling of a universal force analogous to that of gravity but he identified it with magnetism. Thus, though Kepler sought for a physical system in the universe, he could not deduce the laws of planetary motion from the universal laws of motion. Of these Galileo was laying the foundations in Kepler's time, and Newton was to bring the whole into one great synthesis with the aid of the concept of universal gravitation." (PMM 112).

Literature: Caspar 31; Norman 1206; PMM 112; Dibner 5; Horblit 57; Sparrow 114; Zinner 4237; Honeyman 1783.

Copernican Astronomy Made Easy

12 KEPLER, Johannes. *Epitome astronomicae Copernicanae [libri I. II. III] de doctrina sphaerica.* Linz: Johann Planck, 1618. - *Epitomes astronomiae Copernicanae Liber quartus. Doctrinae theoricæ primus: quo physica Coelestis.* Linz: Johann Planck and Frankfurt: Gottfried Tampach, 1622. - *Epitomes astronomiae Copernicanae libri V. VI. VII. quibus proprie doctrina theorica.* Frankfurt: for Gottfried Tampach, 1621. Three parts in one volume, 8vo (156 x 93 mm). [28], 1-400, 409-417, [3]; [2], 419-622, [2]; [12], 641-932, [16] pp. Several mispaginations. Signatures: *6 (**-***)4 (A-2B)8 2C6 (C6 blank); [2 daggers]8 (3A-3M)8; [dagger]6 (4A-4S)8 4T2 4V8. Numerous woodcut illustrations and diagrams in text, woodcut initials, head- and tailpieces, folding letterpress table facing p.821, errata leaf after p.622, blank C6. Bound in French 17th-century calf, spine with 5 raised bands and gilt decoration, ruling and lettering in compartments, boards with gilt Duseuil decoration and central medaillon monogrammed "C I", marbled pastedowns, all edges gilt (extremities worn, spine ends chipped with loss, corners scuffed, hinges split but cords holding firmly). Text little evenly browned throughout, occasional very minor spotting, a few contemporary ink annotations, tiny hole in Eee7 costing two letters recto/verso. Provenance: ownership inscription on first title ink-canceled (offsetting of ink to following leaf) and another erased causing small hole backed by paper (no text affected), P. Brauman (20th century stamp on first flyleaf). A very good copy with ample margins and in untouched binding; collated complete. (#003361) € 48,000



FIRST EDITION, second issue of part II. Following the publication of his *Astronomia nova* in 1609, Kepler was asked to write a more popular exposition of Copernican astronomy; however, "despite its title, Kepler's *Epitome* was more an introduction to Keplerian than to Copernican astronomy" (DSB, p.302). The work was written during a period of upheaval (Kepler's mother had been charged with witchcraft and threatened with torture, and the first volume's advocacy of the Copernican system soon earned it a place on the Index librorum prohibitorum), and the seven books were issued in three installments of inexpensive octavo volumes, titled "*Doctrina sphaerica*," "*Physica coelestis*," and "*Doctrina theorica*," over a period of four years. Despite its physical appearance, it is "Kepler's longest and most influential work. J. L. Russell has maintained that from 1630 to 1650 the *Epitome* was the most widely read treatise on theoretical astronomy in Europe." (DSB, p.302). Intended as an easily-comprehensible textbook of the new heliocentric astronomy, the *Epitome* was laid-out in a catechetical form which imparted the information through questions and answers, employing a technique typical of many astronomical textbooks of the period. Beyond its stated educational purpose, the *Epitome* also expanded on Copernican theory - with regard to the motions of the earth, Kepler extended Copernicus' work and correctly

formulated the principles which Galileo would in turn discuss in more detail in his *Dialogo* of 1632 -- and served to enlarge upon Kepler's own work: "the most remarkable section . . . was book IV, on theoretical astronomy, subtitled, 'Celestial Physics' . . . to a great extent it epitomized both the *Harmonice mundi* [of 1619] and the new lunar theory that Kepler completed in April 1620 . . . The harmonic law, which Kepler had discovered in 1619 and announced virtually without comment in the *Harmonice mundi*, received an extensive theoretical justification in the *Epitome*" (DSB, p.303).

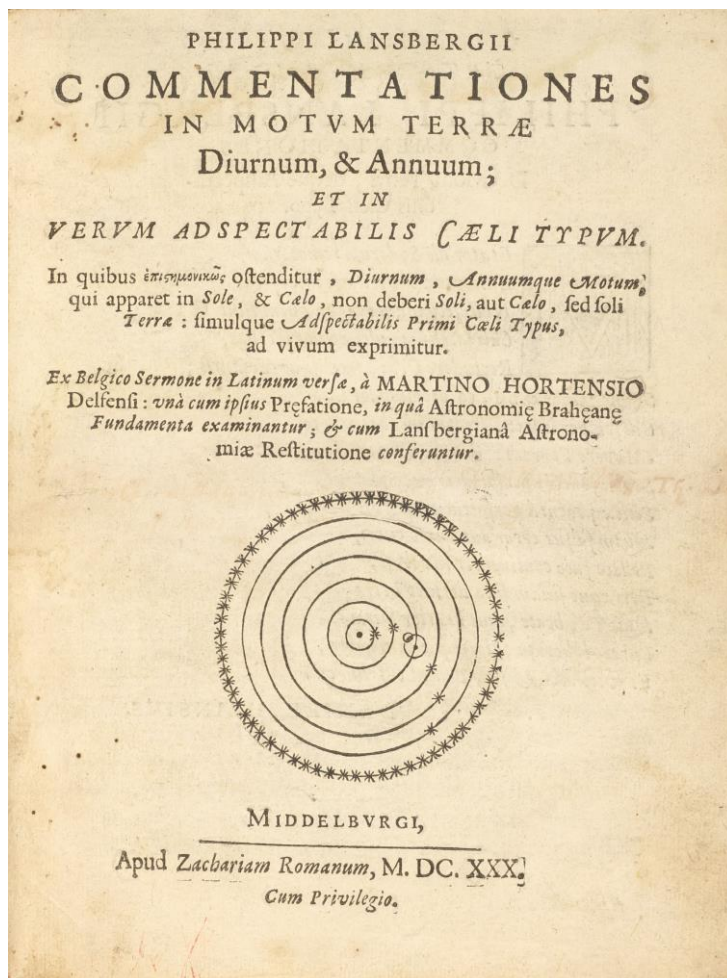
There are two issues of part II, *Liber quartus*: one with the original title page by Johann Planck of Linz, dated 1620, and a second issue, with the title page mentioning Gottfried Tampach (Frankfurt) as printer and dated 1622. The latter issue has the first gathering *Praefatio* (pp. 419-432) reset with slightly differing type and woodcut ornaments, whereas the main text is completely identical with the Linz edition which leads to the assumption that the remaining original sheets of this part printed in Linz were used up in the reissue. References: Caspar 55, 69 and 66; Cinti 60, 72, and 67; DSB VII, pp.302-4; Houzeau & Lancaster 11831.

Discussing about the Earth's Motion

13 **LANSBERGE, Johan Philip van.** *Commentationes in motum terrae diurnum, & annum, et in verum adspectabilis caeli typum...* Middelburg: Z. Romanus, 1630. 4to (207 x 164 mm). [40], 65, [3] pp., woodcut on title showing the heliocentric system, woodcut initials and headpiece, folding engraved plate, errata on leaf L3 verso, including final blank leaf L4. Signatures: A-B⁴ ****⁴ ²A-F⁴ G² H-L⁴. [Bound with:] **FROMONDUS, Libertus.** *Vesta sive Ant-Aristarchi vindex, adversus Jac. Lansbergium Philippi F., medicum Middelburgensem...* Antwerp: Plantin Press (B. Moretus), 1634. [24], 173, [3] pp., title with printer's woodcut device, repeated on final leaf recto, woodcut initials and tailpieces, penultimate leaf with colophon verso. Signatures: *-****⁴ A-Y⁴. Two works in one volume. 4to (208 x 161 mm). Contemporary sprinkled sheep, spine with 4 raised bands, blindstamped and faintly gilt in compartments, red-sprinkled edges, original endpapers (hinges and corners repaired, extremities

rubbed, corners bumped). Text somewhat browned, first work with light waterstaining, more pronounced on pages 25-36 and plate, second work with brown spot near gutter of final 7 leaves (in final leaf causing hole, this backed by paper, not affecting text). Provenance: Joannes Grootloon, Limburg? (prizebook with award inscription on first flyleaf). (#003572) € 4500

Poggendorf I, 1373; DSB VIII, p.28; Bierens de Haan 2667. RARE FIRST EDITION in Latin of *Bedenckingen op den dagelyckschen, ende jaerlyckschen loop van den aerdkloot* (Middelburg, 1629), translated by Martinus van den Hove, of van Lansberge's treatise on the probability of earth's motion according to the Copernican theory. In his preface, Van den Hove considered Lansberge, not Tycho Brahe, as the one who was restoring astronomy. The second work is a reply by the Leuven professor Fromondus (1587-1653) to Jacobus Lansbergius' defense of his father Philippus (Apologia, 1633), who had been attacked by Fromondus in his *Ant-Aristarchus* (1631).



Discussing the World Systems and Rediculing the Pope

14 GALILEI, Galileo. *Systema cosmicum ... in quo quatuor dialogis, de duobus maximis mundi systematibus, Ptolemaico et Copernicano*, translated from Italian by Matthias Bernegger (1582-1640). Strassburg: D. Hauttius for the Elzevirs [at Leiden], 1635. 8vo (194 x 150 mm), [xvi], 495 [1], [24] pp. Engraved frontispiece, full-page engraved portrait by Jacob van der Heyden, woodcut diagrams, final leaf of errata. Text browned throughout as usual, leaves O3 and 3Q2 with small paper flaw at top blank margin, a few small marginal dampstains and occasional minor spotting. Bound in contemporary vellum, spine lettered in manuscript, ties still present (light browning and spotting of vellum), original endpapers. Provenance: illegible 19th-century ownership slip laid in. Very good unsophisticated copy in completely untouched original binding with old (original?) leather ties still present. (#003125) € 28,000

Honeyman IV 1409; Horblit 18c, Dibner 8; Carli-Favaro 32 (148); Caspar 11 (88); Cinti 196 (96); Riccardi I 512. - FIRST LATIN AND FIRST INTERNATIONAL EDITION of Galileo's enormously influential *Dialogo*, demonstrating the validity of the Copernican heliocentric theory over the Ptolemaic theory of the solar system. It was the only major work of Galileo published outside Italy during his lifetime and made a huge impact outside professional scientific circles.



If ordinary educated non-Italians read no other Galileo, they read this edition of this text. This edition also influenced generations of scientists outside Italy, among them Mersenne and Gassendi in France, Kepler in Germany and Wilkins and Wallis in England. Galileo's *Dialogo* is the summation of his ideas, presented in a didactic dialogue. It is a philosophical debate that takes place over four days between three speakers, Salviati (ie. Galileo), Sagredo and Simplicio (both Simplicius the commentator on Aristotle, and 'simplicio' ie. simple or naïve). Salivati puts forward the case for the heliocentric Copernican system and Simplicio puts forward the Aristotelian view. Sagrado, a Venetian nobleman, is the layman who is willing to learn from the other two (but who always agrees with Salivati in the end). The first day is concerned with the principles of motion, which in the second day is extended to include the earth's motion on a daily basis and the principle of relativity in observed motion. The third day treats of the sun's annual motion around the earth, which contains some pro-Copernican arguments, and the fourth gives us Galileo's idea that the ebb and flow of

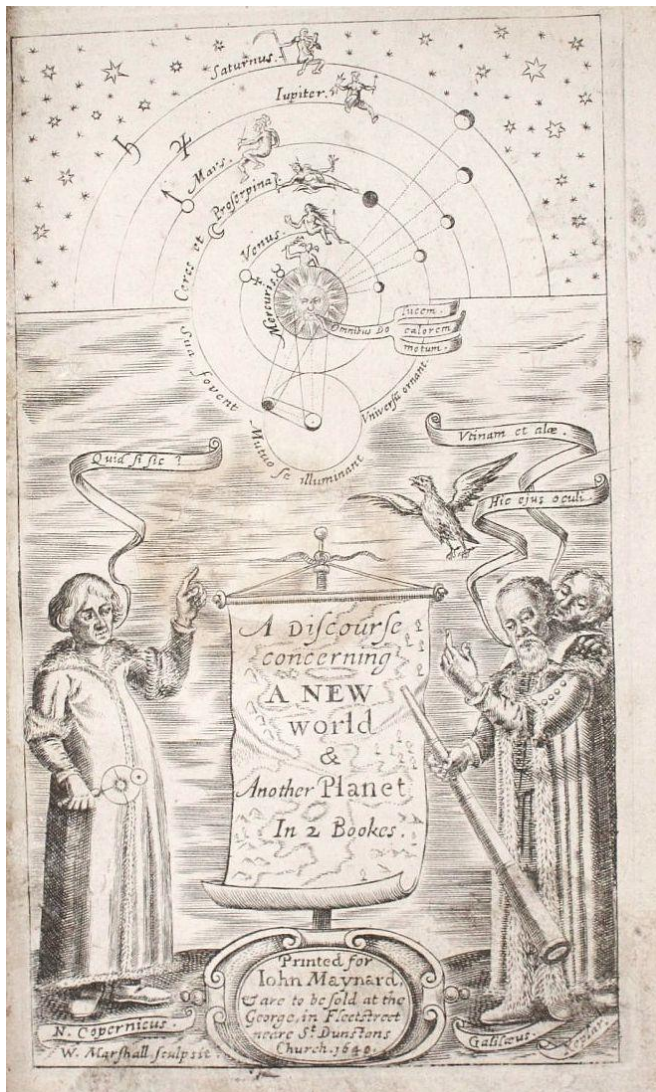
tides is due to the motion of the earth. The text closes with the editio princeps of Kepler's *Perioche* and a long letter of Foscarini on the opinions of Pittagorichi and Copernicus.'

The Dialogue has been described as "the story of the mind of Galileo." The book reveals Galileo as physicist and astronomer, sophisticate and sophist, polemicist and polished writer. Unlike the works of Copernicus and Kepler, the *Dialogue* was a book for the educated public not just specialists, hence this edition's huge importance. In 1616 the Vatican declared the theories of Copernicus to be "foolish and absurd" and "formally heretical." *De Revolutionibus* was not banned but changes had to be made to the text, notably the removal of references to the compatibility of the ideas of Copernicus with scripture. Galileo was warned by the Pope not to continue defending the views of Copernicus, to which he acquiesced. In 1623 Maffeo Barberini became Pope. He had written a poem in praise of Galileo's telescopic discoveries and Galileo felt he might now be more receptive to his ideas. Galileo presented a copy of his *Il Saggiatore* to the Pope in which he ridiculed the Aristotelian views of

Horatio Grassi and argued that scientific investigation should not be hindered by reliance on authority. The Pope enjoyed the book and this emboldened Galileo to ask for permission to publish his theories about tides. The Pope agreed on certain conditions. First, no mention was to be made to tides in the title as this would give too much prominence to a phenomenon which was used as evidence that the Earth moved. Second, Galileo was to state that this was only one of the ways in which the tides could have been created. The *Dialogo* was the result. The Pope felt that he had been misled. Permission had been given for a balanced discussion of the two theories but Galileo had written a barely disguised attempt to demolish the Aristotelian system and to establish the Copernican system as fact. The Pope seemed especially embittered by Galileo's decision to put the Pope's own arguments concerning the tides into the mouth of the simple-minded Simplicio, an attempt, as he saw it, to ridicule him. Galileo was summoned to Rome. After interrogation he was told to abjure his Copernican theories and was sentenced to house arrest for life. This Latin translation, through which the *Dialogo* was to reach the widest audience, is by Matthias Bernegger (1582-1640), an Austrian from Hallstatt, who had studied in Strassburg, where he settled in 1603. In his preface he explains how he came to translate it, how he had taught himself Italian, and how eventually the Elzeviers, at the urging of the Hebraist Marcus Zuerius Boxhorn and others, persuaded him to undertake the work and agreed to publish it. "It is a masterly polemic for the new science. It displays all the great discoveries in the heavens which the ancients had ignored . . . The *Dialogo*, far more than any work, made the heliocentric system a commonplace." *Printing and the Mind of Man* 128 (of the first Italian edition).

Popularizing the New Science

15 WILKINS, John. *A Discourse Concerning A New World & Another Planet, In two Bookes. The First Book. The Discovery of a New World. Or, A Discourse Tending to Prove, That 'tis Probable There May Be Another Habitable World in the Moone. With a Discourse Concerning the Possibility of a Passage Thither.* London: Printed by John Norton for John Maynard, 1640. *The Second Book, A Discourse Concerning a New Planet. Tending to prove, That 'tis Probable Our Earth is one of the Planets.*



London: Printed by R. H. for John Maynard, 1640. Two volumes bound in one. 8vo (170 x 110 mm). [16], 242, [2:blank] pp.; [14], 246, [2:errata] pp., extra engraved title by W. Marshall to vol. 1 (re-inserted on stub), several woodcut diagrams in text, with leaf P7 present in vol. 2 as a cancel leaf (with engraved illustration, bound before p.1) and as a cancellandum, errata leaf to vol. 1 bound before p.1, errata leaf to vol. 2 bound at the end (supplied and re-margined), leaf R1 (pages 241/2, vol. 2) supplied and re-margined, light circular stain on opening gathering, blindstamp on title and last leaf, bookplate of Wigan public library to inner front cover, contemporary calf (hinges repaired, upper joint cracked). An internally sound and complete copy, with all the cancel and errata leaves present. (#001812) € 3900

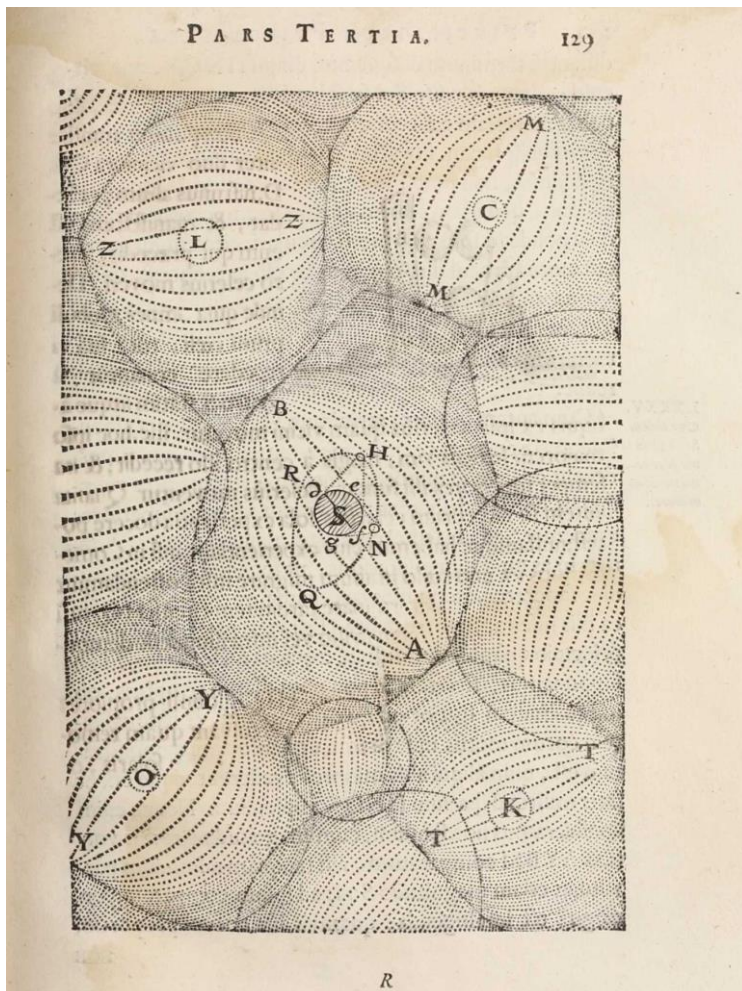
ESTC s.v.; Norman 2240. - Book I: Third Impression, Corrected and Enlarged. Book II: First edition. FIRST COMPLETE EDITION. 'ONE OF THE EARLIEST SIGNIFICANT WORKS OF POPULAR SCIENCE' (Norman), which comprises the third edition of Wilkins' *The Discovery of a New World* as part i and the first edition of *A Discourse Concerning a New Planet* as part ii. 'Wilkins's primary aim was to promote general knowledge and acceptance of the "new" science of Copernicus, Galileo and Kepler and to wean his

readers from an unquestioning dependence upon Aristotelian doctrine and literal biblical interpretation. In the first edition of the Discovery Wilkins had used Galileo's statement that the moon is a world similar to the earth as a foundation for more speculative hypotheses, wondering if the moon might not support life, what its inhabitants might be like, and whether the moon's resemblance to the earth could be extended into a uniformitarian theory of the universe. In [this] edition Wilkins added a section, inspired by Francis Godwin's *Man in the Moone* (1638), on the then-sensational idea of voyaging to the moon, discussing the problems connected with this endeavor -- such as gravity and the nature and height of the atmosphere -- in terms of contemporary physical knowledge' (Norman).

A Mechanistic Way of Explaining the Heliocentric System

16 **DESCARTES, René.** *Principia philosophiae.* Amsterdam, L. Elzevir, 1644. [22], 310 pp., printer's device on title, woodcut initials, several woodcut illustrations in text, some full page, bound without the blank leaves b4 and 2Q4. [Bound with:] *Specimina philosophiae: seu Dissertatio de methodo recte regendae rationis, & veritatis in scientiis investigandae: Dioptrice et Meteora. Ex Gallico translata, & ab auctore perlecta, variisque in locis emendata.* Amsterdam, L. Elzevier, 1644. [16], 331 [1] pp., printer's device on title, woodcut initials, several woodcut illustrations and diagrams in text, 10 full page. 2 works in 1 volume. 4to (200 x 155 mm). Contemporary full vellum with yapp edges, spine lettered in manuscript, marbled pastedown, flyleaves gone (some soiling and spotting of vellum). Text generally crisp and clean with only very minor occasional spotting, some light dampstaining in places, short clean tear in two leaves, first title slightly dust-soiled at outer margins. A very-good, well-margined copy in untouched binding of its time. (#003249) € 6500

I.: Norman 622; Guibert 118-119 nr. 1. STCN (5, i.a. BL London). BN Paris (2). Willems 1008. Guibert 104-105 nr. 1. STCN (3, i.a. BL London). BN Paris (5). Willems 1008. NLM/Krivatsy 3116. - FIRST EDITION OF DESCARTES' SYSTEM OF PHYSICS, in which he developed his theory of vortices. Based in part on his then unpublished work *Le monde*, which treated the creation and function of the universe in completely mechanistic terms, Descartes'



Principia provides a systematic statement of his metaphysics and natural philosophy. The first part, *De principiis cognitionis humanae* (Of the Principles of Human Knowledge) deals with the nature of motion, rest, force, and action. He defines motion in Book II and distinguishes the difference between translation and 'the force that brings about this translation.' Descartes was careful in the *Principia* to qualify his mechanistic Copernican views with the idea that all motion is relative. "His vortical theory allowed him to argue that since the earth is at rest in its surrounding medium it remains unmoved, although it, together with its entire vortex, necessarily circles the sun" (Norman). Descartes' system represents a truly comprehensive look at the universe in a fundamentally new, mechanistic and non-teleological way. His vortex theory was the starting point for all serious work in physical theory in the mid-17th century, including Newton. "In hindsight, Descartes' vortices served an important cultural role as an underlying philosophy for a Copernican heliocentric theory, but very little of the ideas in this work continue on. The model of vortices played an important role in

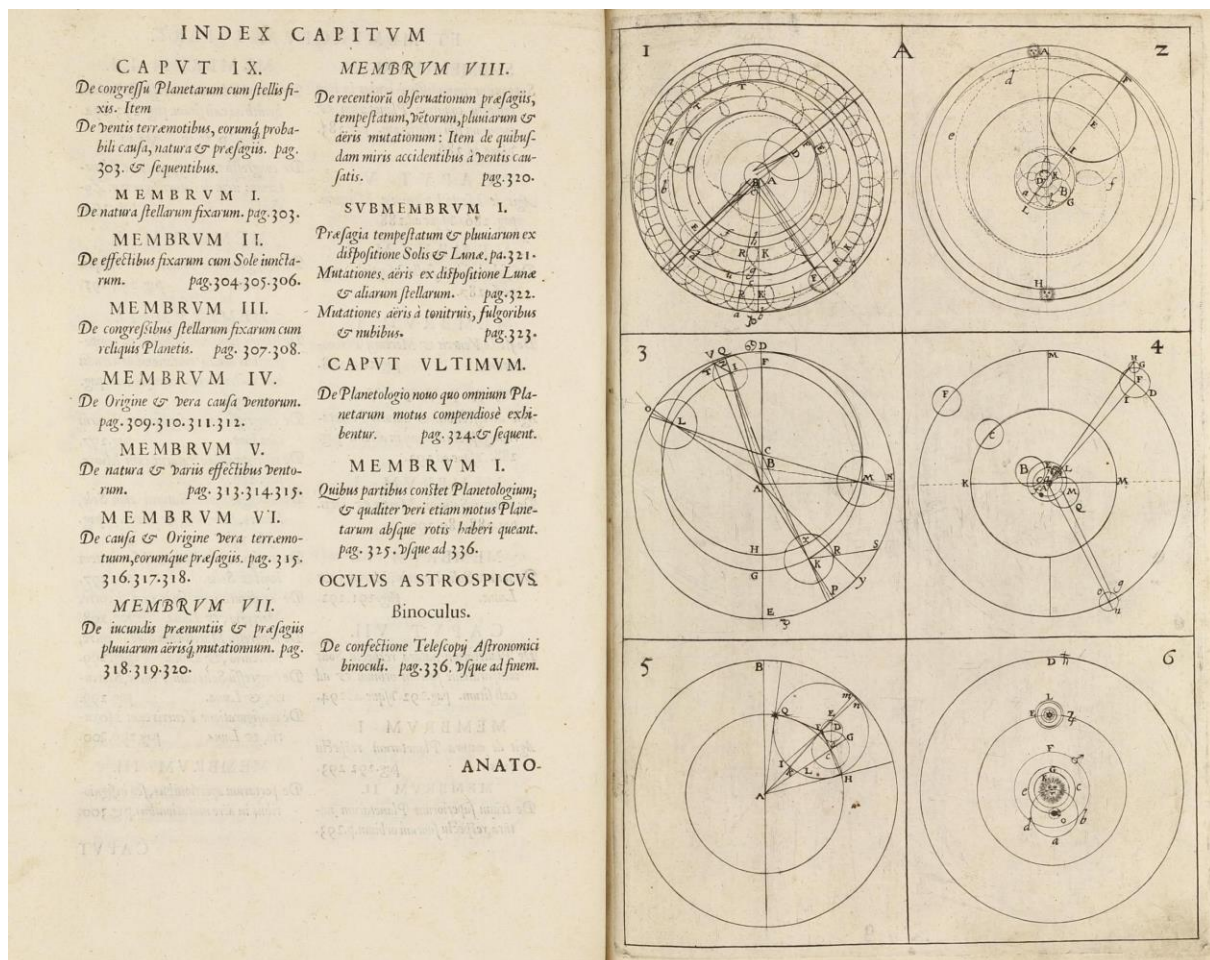
advancing the idea that the stars themselves are suns, and that there may be a plurality of planets orbiting those

suns." (ref. Library of Congress, *Physical Astronomy for the Mechanistic Universe*, online-resource). The fourth and final part of the work contains the first scientific theory of magnetism.

II.: Norman 623; Guibert, p. 104; NLM/Krivatsy 3116; Tchermzine II, p. 777; Willems 1008. - FIRST LATIN EDITION of the *Discours de la méthode*, which omits the treatise *Géometrie*. It includes the first appearance of the Cartesian sound-bite: '*cogito, ergo sum*'. Although separate works, these two Elzevir publications often appear together.

A Determined Anticopernican

17 SCHYRLEUS DE RHEITA, Anton Maria (SCHYRLAEUS). *Oculus Enoch et Eliae, sive radius sidereomysticus pars prima ... Opus philosophis, astronomis, & rerum caelestium aequis aestimatoribus ... quo omnium planetarum veri motus, stationes & retrocessions ... tam in Theoria Tyconica, quam Copernicana ... demonstrantur exhibenturque (Pars altera sive theo-astronomia).* Antwerp: Hieronymus Verdussen, 1645. Two parts in one volume. Folio (303 x 205 mm). [52], 356, [4, blank] pp., 10 engraved plates by Arnold Loemans including a lunar map; [16], 279 [1], [28, index] pp. Each part with separate title-page, first title-page printed in red and black, engraved frontispiece, woodcut device on recto of final leaf. Signatures: *-6*⁴, 7*², A-Z⁴, Aa-Vv⁴, Xx⁸; *-2*⁴, A-Z⁴, Aa-Mm⁴, Nn⁶ Oo-Pp⁴. Contemporary full vellum, blue coloured edges (upper part of spine with unobtrusive repair, some soiling and staining, corners bumped). Text and plates generally crisp and clean, some gatherings and pages with light even browning, occasional very minor spotting, a few contemporary annotations in red and black ink, ink smudge to pp. p.154 and 147, a few smaller marginal waterstains and tears in places. Very good copy. (#002940) € 38,000



Ashworth, *The face of the moon*, Linda Hall 3; Whitaker, *Mapping and Naming the Moon*, p.47. First edition of this very rare and influential work in the history of the telescope. Schyrleus also describes and compares the systems of Ptolemy, Tycho and Copernicus here, but he was a determined anticopernican. In the foreword to his book, which includes a dedication to Jesus Christ and Ferdinand III, Schyrleus boldly declared that after having meditated for a long time on the systems of Ptolemy, Copernicus, Tycho Brahe, and other astronomers, he was convinced that all of these scientists had advanced superfluous theories.

The part on optics "includes a map of the full moon - the first on a reasonably large scale. Rheita is noted in the history of optics for his invention of the erecting eyepiece. It is ironic that his lunar map is one of the first to have the south pole at the top, showing the moon inverted, as it appears through an astronomical telescope *without* his eyepiece ... Rheita's map has not been much appreciated, probably because it was so soon eclipsed by the more splendid efforts of Hevelius, Divini, and Grimaldi, but it captures the brilliant ray system of Tycho much better than any other illustration to that time, as well as the mountainous nature of the Apennines. The floors of the craters Plato and Grimaldi are properly depicted as black." (Ashworth, 3).

"Rheita actually introduced a number of crucial improvements in his work, leading to a real break-through in telescope design. First, Rheita suggested a new and much better method of polishing lenses, leading to a strong reduction of deviations; secondly (and even more importantly), he found that a compound ocular, composed of three or four lenses, resulted in a much better quality than using only a single (compound) ocular" (Van Helden, *The Origin of the Telescope*, p. 334).

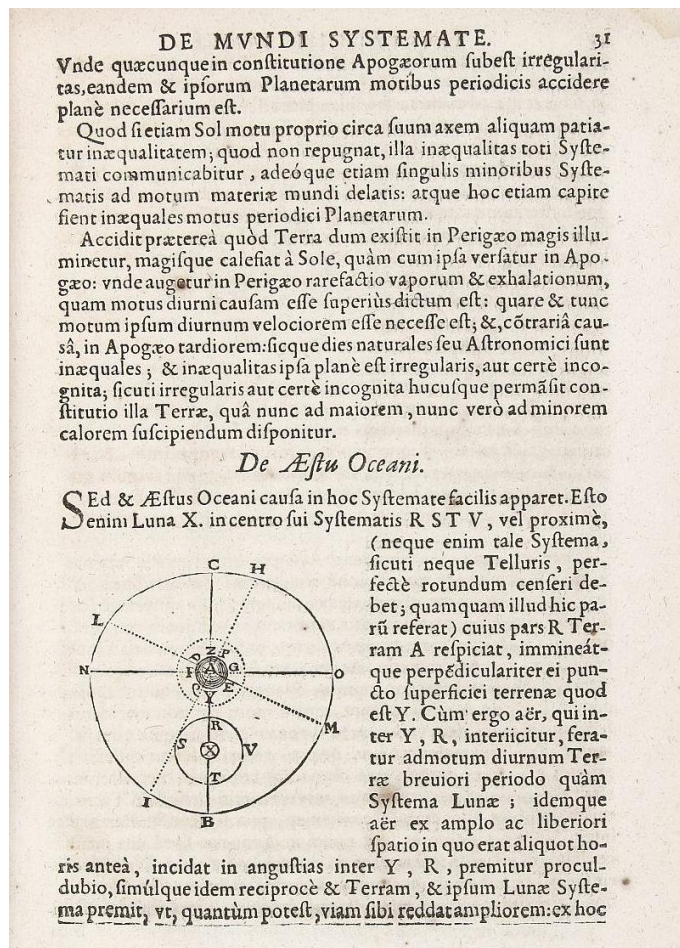
"The map is a copperplate edition, diameter about 18.5 cm, of an original drawing made by Rheita. It is essentially a full-Moon image with a very few craters included from observations made at other phases. The ray systems emanating from Tycho and other craters are very stylistically drawn, and bear little resemblance to reality. Indeed, those lettered H and V are non-existent. The small bright spots are almost entirely randomly placed." (Whitaker, p.47).

The Heliocentric Model of Aristarchus of Samos

18 MERSENNE, Marin. *Novarum observationum physico-mathematicarum fr. Marinii Mersenni tomus III. quibus accessit Aristarchus Samius de mundi systemate.* Paris: Antonii Bertier, 1647. 4to (230x171 mm). [32], 62, [2], 63-235, [3] pp. Woodcut vignette to title, several woodcut diagrams, headpieces and initials in text. Errata on leaves 2G3v and 2G4r; [2] pp. containing an index to Aristarchus inserted following p. 62. Divisional half-title page "*Aristarchii Samii De mundi systemate ... Adiectae sunt AE.P. de Roberual ... notae ... Editio secunda correctior*" on leaf 63r. 18th-c mottled calf with 5 raised bands gilt in compartments (extremities and boards rubbed, corners bumped and chipped, old shelf mark paper label to spine), red-dyed edges. Title page soiled and browned with erased stamp

(paper restored) and shelf number A.142.4 in ink, text only mildly toned throughout, small dampstaining to upper corner. A fine copy. (#001986) € 8600

Brunet III, 1662; Sotheran II, 11782; Honeyman 2217; Sotheby's Macclesfield Cat. V, 1374. - The very rare supplement in first edition to Mersenne's *Cogitata physico-mathematica* and *Universae geometriae mixtaeque mathematicae synopsis*, which form vols. 1 and 2 of the series published in 1644. This 3rd volume is a collection of essays concerning mechanics, pneumatics, hydrostatics, navigation, the techniques for establishing weights and measures and an examination of Aristarchus' heliocentric theory. As one of the most fascinating intellectual figures of the seventeenth century, Mersenne is well known for his relationships with many outstanding contemporary scholars as well as for his friendship with Descartes. Moreover, his own contributions to natural philosophy have an interest of their own. Mersenne worked on the main scientific questions debated in his time, such as the law of free fall, the principles of Galileo's mechanics, the law of refraction, the propagation of light, the vacuum problem, the hydrostatic paradox, and the Copernican hypothesis.



Aristarchus of Samos (c. 310 -- c. 230 BC) was an ancient Greek astronomer and mathematician who presented the first known heliocentric model that placed the Sun at the center of the known universe, with the Earth revolving around the Sun once a year and rotating about its axis once a day. He was influenced by the concept presented by Philolaus of Croton (c. 470 -- 385 BC) of a fire at the center of the universe, but Aristarchus identified the 'central fire' with the Sun and he put the other planets in their correct order of distance around the Sun. Like Anaxagoras before him, Aristarchus suspected that the stars were just other bodies like the Sun, albeit farther away from Earth. Often, his astronomical ideas were rejected in favor of the geocentric theories of Aristotle and Ptolemy. However, Nicolaus Copernicus knew about the possibility that Aristarchus had a 'moving Earth' theory, although it is unlikely that Copernicus was aware that it was a heliocentric theory (Wikisource).

Whereas the first two volumes of this series are fairly well represented in libraries, this third volume is of considerable rarity. Only one copy of this volume has appeared at auction in the past 30 years (the Macclesfield copy).

Putting Earth back at the Center of the Universe

19 RICCIOLI, Giambattista. *Almagestum novum astronomiam veterem novamque complectens observationibus aliorum et propriis.* Bologna: Heirs of V. Benatius, 1651. Volume one (all published) in 2 volumes, Folio (357 x 243 mm). [12], xlvii [1], 763 (i.e. 771) [1]; [6], xviii, 675 [1] pp. Engraved frontispiece by F. Curtus in each volume, engraved arms on dedication leaves, 2 fine engraved double-page lunar maps by Domenico Fontana after Francesco Maria Grimaldi, each mounted on a guard, numerous woodcut diagrams in text. Bound in uniform contemporary calf, spines with 5 raised bands, faint gilt-lettering and -tooling, boards with blind-tooled decorative border and ruling, red-dyed edges (hinges split but cords holding, some rubbing and light soiling). Text generally crisp and bright, very light dampstaining to blank margin of a few leaves, two clean tears in first frontispiece backed with paper on blank verso, worm-track in first 3 leaves of vol. II, brown stain at top inner margin of about a third of vol. II. Provenance: Peter and Margarete Braune (bookplate on front pastedown). A fine, clean copy. (#003207) € 19,500



Provenance: Peter and Margarete Braune (bookplate on front pastedown). A fine, clean copy. (#003207) € 19,500

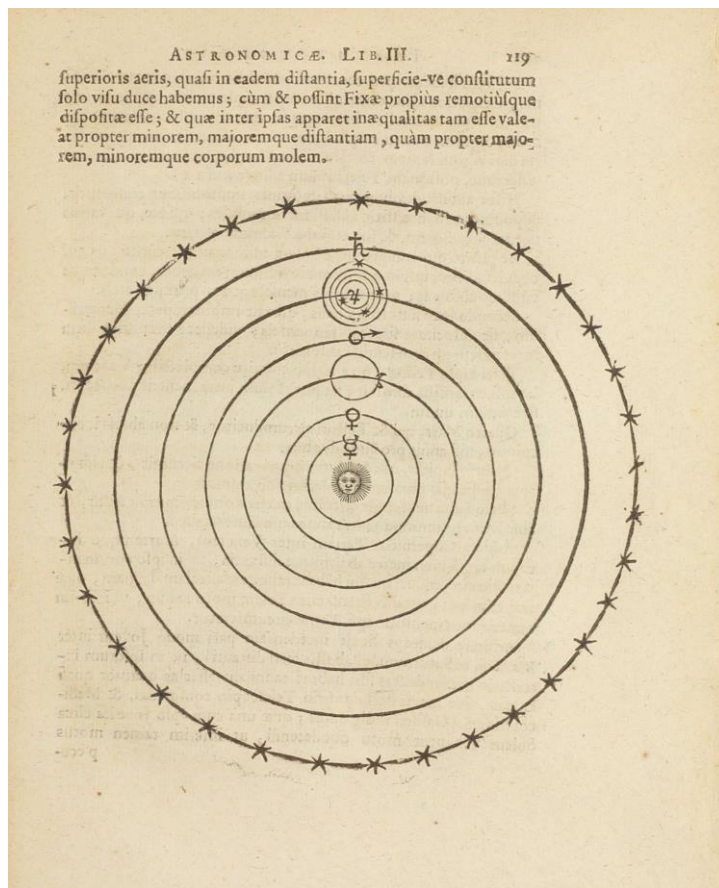
Linda Hall, *The face of the moon*, 7; Cinti 124; Riccardi I (2), 371; De Backer & Sommervogel VI:1798; Houzeau-L. 9223; Norman 1826. - FIRST EDITION of one of the most important anti-Copernican works and a reinterpretation of Tycho Brahe's geo-heliocentric system. The counter proposal of Riccioli reported here for the first time is a planetary system in which the Earth is back at the center of the universe and the Moon, the Sun, Jupiter and Saturn turn around it. Mercury and Venus turn around the Sun. Thus, the Earth and Sun are the centers of the celestial cinematic so that the orbits of the other planets must be described in relation to both of them. The quasi-oval, elliptical trajectories are achieved by means of the variation of the epicycle and of the oscillation of the eccentric. Riccioli named this 'epicicyles' system (epiciclycos).

"Riccioli's scientific career epitomized the conflict between the old astronomy and the new: as a Jesuit committed to church doctrine, Riccioli was among the

most vehement opponents of Copernican and Galilean theory, but as astronomer, Riccioli recognized that Copernican theory provided the simplest and best mathematical model of the solar system" (Norman). "Riccioli designed a series of experiments by which he hoped to disprove Galileo's conclusions, but instead he ratified them" (DSB). This work was the first to state that no water existed on the moon. "The Riccioli moon map is historically of great importance, since it provided the basis for the system of lunar nomenclature still in use. It is more properly referred to as the Riccioli/Grimaldi map, since the Jesuit optician Francesco Grimaldi was apparently responsible for the map itself, while fellow-Jesuit Riccioli invented the names (and wrote the book in which the map appeared). Thus the Sea of Tranquility (Mare Tranquillitatis) traversed by the Apollo astronauts acquired its name here, as Mare Tranquillitatis, as did such prominent lunar craters as Plato, Ptolemaeus, and Tycho" (Linda Hall, The face of the moon, 7).

Comparing the World Systems

20 GASSENDI, Pierre. *Institutio astronomica iuxta Hypotheses tam veterum quam Copernici & Tychonis: dictata Parisiis a Petro Gassendo [...] accedunt ejusdem varij tractatus astronomici, quorum catalogum pagina versa indicabit. Editio ultima paulò ante mortem authoris recognita. Aucta & emendata.* The Hague: Adrian Vlacq, 1656. 4to (220 x 165 mm). [12], 328, [8] pp. Title printed in red and black, engraved author's portrait bound-in facing first text page, numerous woodcut text diagrams (several full page), woodcut initials and headpieces, section title pages within pagination. All pages uncut. Signatures: *6 A-Z⁴ Aa-Tt⁴.

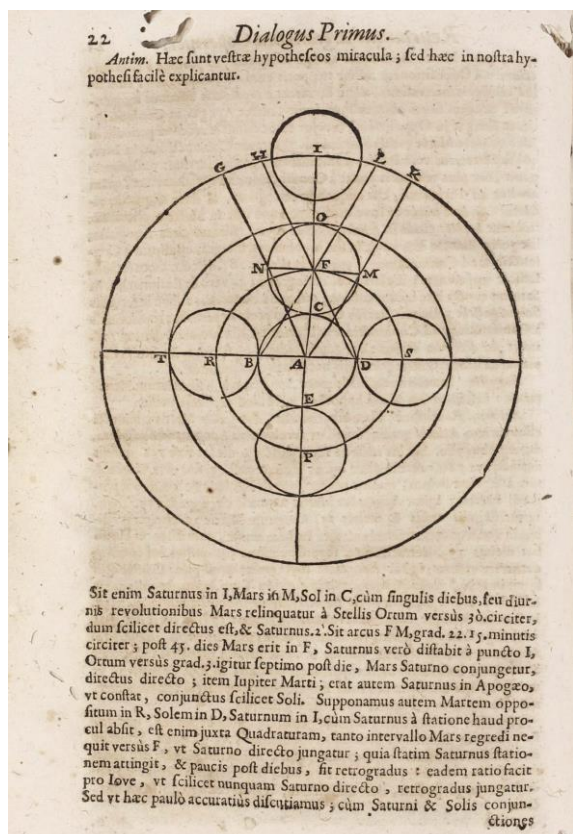


Contemporary carta rustica, hand-lettered spine label, untouched original endpapers (worming to upper spine affecting spine label, spotting and soiling). Text with even light browning, occasional minor spotting. Provenance: contemporary manuscript inscription to title and final leaf; Stephen White Collection. A fine, unsophisticated copy. (#003438) € 6500

Houzeau & Lancaster 9222. EXCEPTIONALLY RARE THIRD AND ENLARGED EDITION OF THIS IMPORTANT COLLECTION OF GASSENDI'S ASTRONOMICAL WRITINGS (second edition of the collection in this form and 3rd edition of the *Institutio Astronomica* overall). Gassendi's *Institutio astronomica*, first published in 1647, outlines the various competing models of the cosmos, notably the Ptolemaic, the Copernican, and the intermediate system invented by Tycho Brahe.

Discussing the Theories of the Earth's Motion

21 FABRI, Honoré. *Dialogi physici in quibus de motu terrae disputatur, marini aestus nova causa proponitur, necnon aquarum & mercurii supra libellam elevatio examinatur.* Lyon: Christophe Fourmy, 1665. 4to (220 x 167 mm). [4], 218 (i.e. 228), [16] pp. Engraved device on title, woodcut initials, head- and tailpieces, numerous woodcut diagrams in text. Contemporary limp vellum with yapp edges, spine with faint contemporary handlettering, remnants of ties preserved, original endpapers (small worm holes near joints, little soiling of vellum). Text browned mainly within text block, heavy worming at beginning and slowly improving to gathering F, affecting some headline letters, further wormtrack



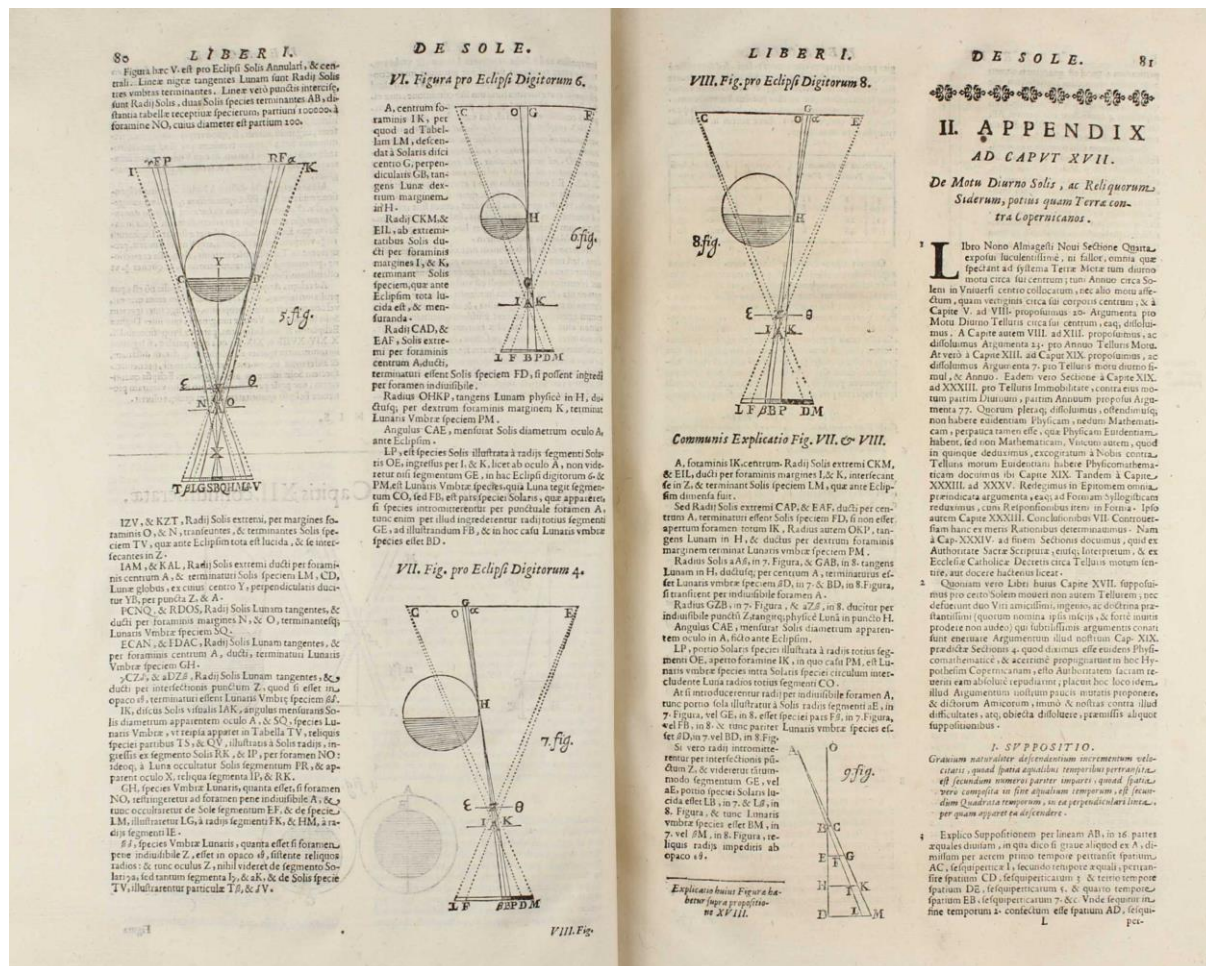
within textblock of leaves Z3-AA1, occasional minor spotting. Provenance: old illegible ink inscriptions on title; Peter and Margarete Braune. Except for the worming a neat copy in untouched original binding. (#003319) € 900

Carli-Favaro, *Bibliografia Galileiana 1568-1895*, p.294; Goldsmith F44; DSB IV, pp. 505-06. RARE FIRST EDITION of this 'dialogue' on Galileo and the Copernican theory in which Jesuit Fabri tackles the controversial question of the motion of the earth. "In 1660, with an anonymous work, Fabri opened the controversy with Huygens over Saturn's rings which, after five years and a great expenditure of energy, was decided in Huygen's favor . . . In the *Brevis annotatio* is a note that reads . . . 'If the proof (for the motion of the earth) is found, then there should be no difficulty in explaining that the relevant passages in the Bible must be interpreted in a more symbolic sense'. This statement . . . brought Fabri (as a member of the Holy Office) fifty days in prison . . . Yet this did not prevent the combative Jesuit from inserting into his *Dialogi physici* (1665) a chapter entitled '*De motu terrae*.' It was also in 1665 that Fabri discovered the Andromeda nebula, which he at first thought was a new comet." (DSB IV, p.506).

A Try to Re-establish Geocentrism

22 RICCIOLI, Giambattista. *Astronomiae reformatae. Tomo duo, quorum prior observations, hypotheses, et fundamenta tabularum. Posterior praecepta pro usu Tabularum Astronomicarum, et ipsas Tabulas Astronomicas CII continent.* Bologna: Ex Typographia Haeredis Victorij Benatij, 1665. Two parts in one volume. Folio (370 x 247 mm). [14], xii, 374 [2]; [8], 35 [1], 128 pp. Text printed in two columns, general title printed in red and black and with large engraved armorial device, woodcut device on each of both part titles, 2 fine engraved double-page lunar maps by Domenico Fontana after Francesco Maria Grimaldi, woodcut initials, head- and tailpieces, several woodcut diagrams (some full-page) within text, with blank leaf 3A4. Signatures: [pi]1 [cross]⁶ [paragraph]⁶ A-3A⁴, a⁴ A-T⁴ V⁶. Contemporary calf, spine with 5 raised bands, faint gilt-lettering and -tooling, boards with blind-tooled decorative border and ruling, red-dyed edges (hinges split but cords holding, some rubbing and light soiling). Text generally crisp and bright, one leaf with small burn spots, very light dampstaining towards upper corner of a few leaves, leaf 2M2 with torn upper corner not affecting text (paper flaw?), 22 leaves with wormtrack in blank fore-margin (just touching text field and affecting ruled border of 2 illustrations). Provenance: Peter and Margarete Braune (bookplate on front pastedown). A fine, clean and untouched copy. (#003208) € 8500

Norman 1827; Riccardi I (2); Houzeau-Lancaster 9230; Sommervogel VI, 1801 no. 9; DSB XI, p.411. RARE FIRST EDITION of this anti-Copernican work by a Jesuit astronomer which seeks to prove the immobility of the earth. "This work, which the author thought of as a third part of his *Almagestum Novum*, contains a valuable collection of observations. It is composed of a series of specialized treatises of the different bodies of the solar system and



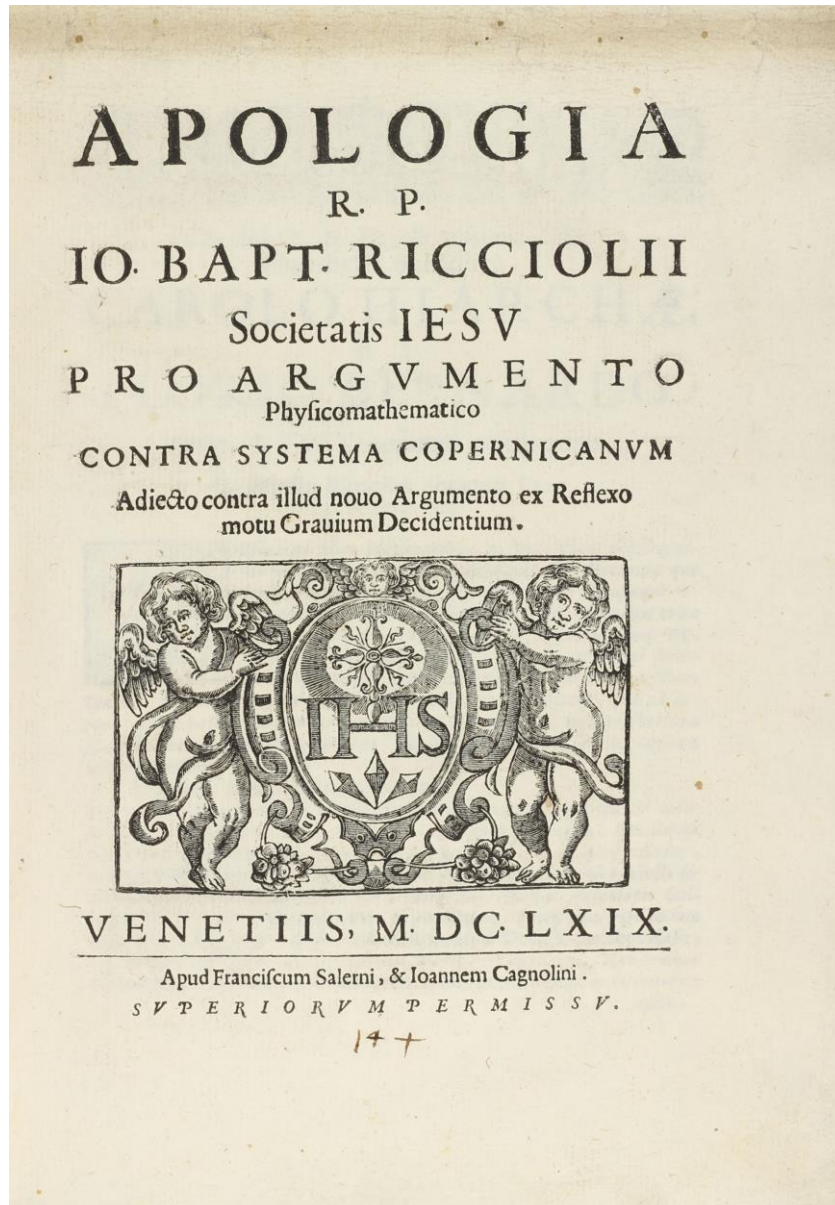
the fixed stars" (Houzeau-Lancaster). Riccioli noted the colored bands parallel to the equator of Jupiter and published his observations of the phases of Saturn. He knew of Huygen's *Systema Saturnium*, but disagreed with Huygen's ring theory. Most of the Tabular material in the second volume was the work of his student Francesco Maria Grimaldi" (Norman).

A Heresy to Believe in the Earth's Motion!

23 RICCIOLI, Giambattista. *Apologia ... pro argumento physicomathematico contra systema Copernicanum adiecto contra illud nouo argumento ex reflexo motu grauium decidentium.* Venice: Francisco Salerni & Johann Cagnolini, 1669. 4to (235 x 165 mm). [8], 106, [2] pp., including first blank leaf, errata on final leaf recto, title with printer's device, woodcut text diagrams, woodcut initials and headpiece. Signatures: [pi]⁴ A-M⁴ N⁶. Newly bound re-using old vellum (spotted and soiled). A few pages dust- and finger-soiled at blank margin, very minor pale spotting, but generally crisp and clean. A fine, wide-margined copy. (#003630) € 6,500

DSB XI, p. 411; Riccardi I/2, 374, 9 ("raro"). VERY RARE FIRST EDITION. "Following the Inquisition's condemnation of Galileo's astronomical theories, Riccioli became one of the most ardent opponents of the Copernican system, which he tried to refute in every way. "Fifteen years after the publication of the *Almagestum [Novum]* a violent

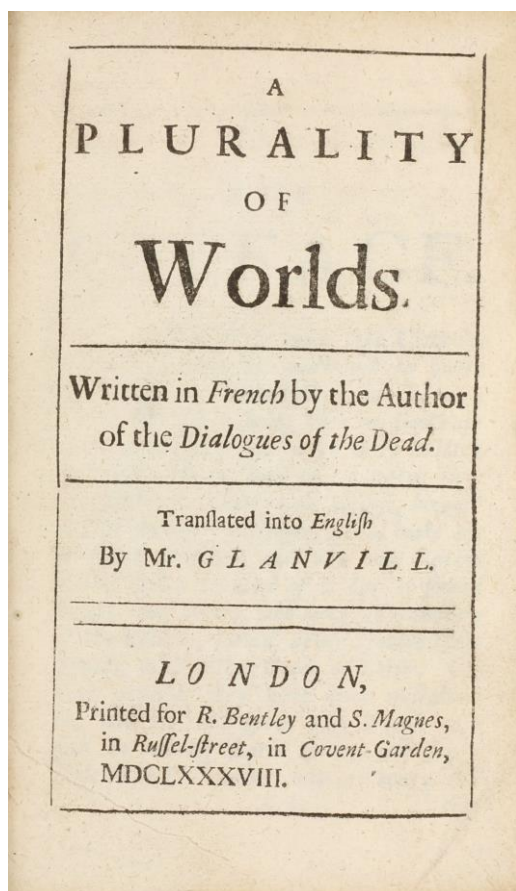
controversy erupted between Riccioli, Giovanni Alfonso Borelli, and Stefano degli Angeli over Riccioli's physico-mathematical argument against the motion of the earth, which gave birth to several treatises. Riccioli, attacked personally, reacted angrily, perceptibly hardening his conservative view of the heliocentric system. This is evident in his renewed discussion of the juridical value of the cardinals' decree. In 1665 Adrien Auzout claimed that some Jesuits, including Fabri, Grimaldi, and Riccioli, did not, contrary to the cardinals' decree, consider the earth's motion either absurd or false in philosophy. Riccioli retorted in his *Apologia pro argumento physicomathematico contra systema Copernicanum*, insisting that, as far as he and Grimaldi were concerned, Auzout's remarks were untrue: 'We say that it is false that either myself or Grimaldi have ever expressed the opinion that the motion of the earth and the stability of the sun are not absurd and false in philosophy.' The main intention of the cardinals, he was certain, was 'to condemn the opinion of the motion of the earth, and of the immobility of the sun, as



heretical, since it contradicts the Holy Scripture literally interpreted.' Thus, Riccioli went beyond the decree itself - and even beyond his former views - in considering the motion of the earth to be heretical, a position not taken by the cardinals. Riccioli further claimed that the condemnation of heliocentrism by the cardinals and by theologians more generally was absolute and not merely provisional or only for the time being [. . .], since the condemnation took it for granted that heliocentrism could never be proved." (M. Feingold, *Jesuit Science and the Republic of Letters*, MIT Press, 2003, p. 213).

Promoting General Acceptance of the Copernican System

24 **FONTENELLE, Bernard le Bovier de.** *A Plurality of Worlds. Written in French by the Author of the Dialogues of the Dead. Translated into English by Mr. Glanvill.* London: for R. Bentley and S.



Magnes, 1688. 8vo (157 x 97 mm). [12], 152 pp. Signatures: A⁶ B-K⁸ L⁴. E4 is a cancel leaf. Contemporary blind-tooled calf, neatly rebacked (minor wear to extremities and corners). Text with little even browning, minor dust-soiling to outer margins in places. Provenance: Mel(?) Baker (inscribed on front pastedown). A very good+ copy. (#003594) € 3,000

Wing F1416; Hodgson, p.399. - THE RARE FIRST ENGLISH EDITION and one of the first major works of the Age of Enlightenment. It was a very popular exposition of the general principles of astronomy and was influential in promoting the acceptance of the Copernican system in the early half of the eighteenth century. "Fontenelle's treatise ... marks a true watershed in the history of the idea of the plurality of worlds ... written in a language that the normal educated person could understand, and ... see the basic concepts of the new Copernican astronomy as supplemented by Descartes" (Steven J. Dick, *Plurality of Worlds*, p. 126).

Gravitational Force: Explaining Earth's Revolution around the Sun

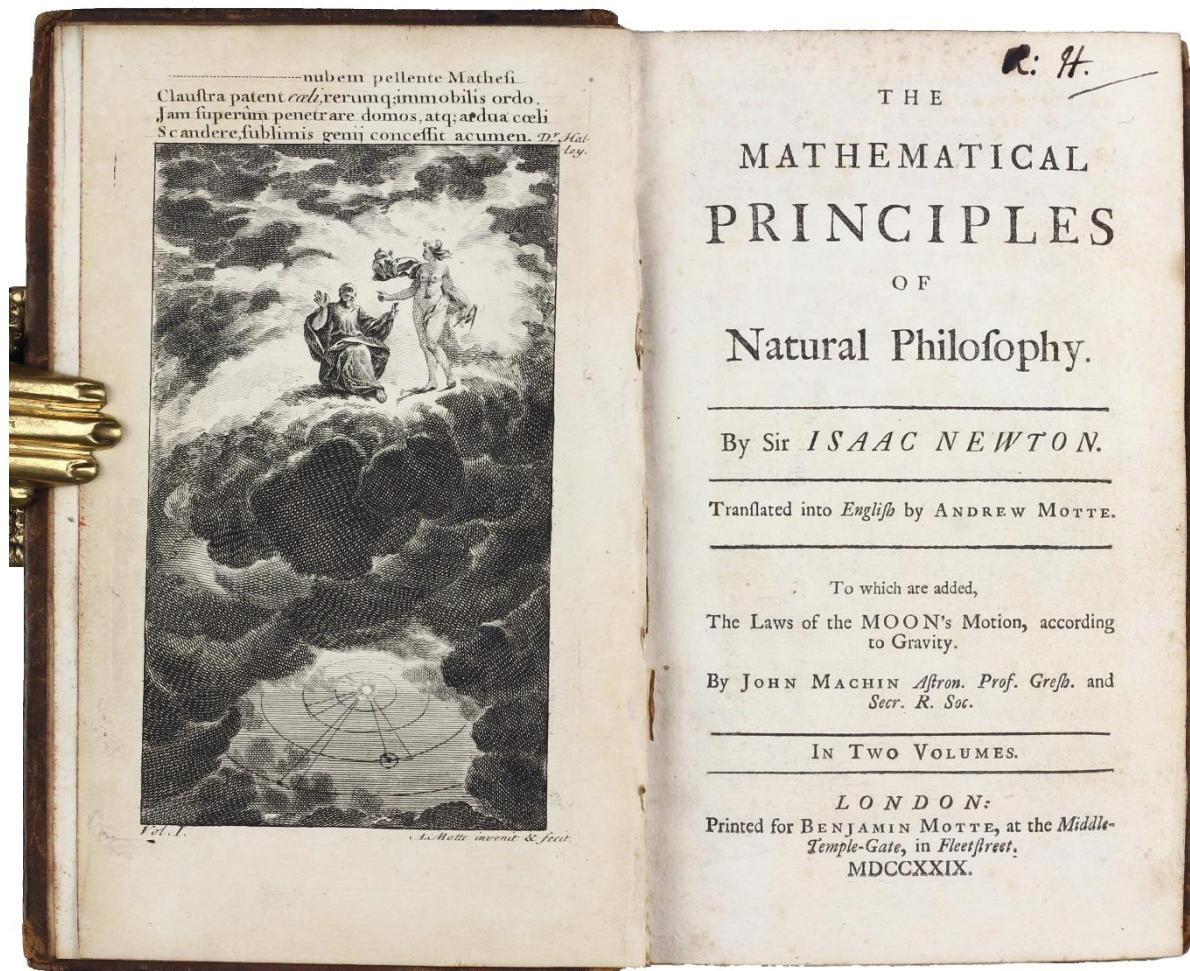
25 **NEWTON, Isaac.** *The Mathematical Principles of Natural Philosophy. Translated by Andrew Motte. To Which are Added, the Laws of the Moon's Motion, according to Gravity.* Two volumes. London: Benjamin Motte, 1729. Exceptional set in its original bindings, untouched internally and complete in every respect. 8vo (196 x 122 mm). Volume I with engraved frontispiece by A. Motte, [38], 320 pp. and with 25 folding engraved plates (numbered I to XXV, plate I of vol. II misbound here after p.16); volume II with engraved frontispiece by A. Motte, [2], 393, [13], viii, 71 [1] pp. and with 19 folding engraved plates (numbered I to XIX, pl. I misbound in vol. I), 3 unnumbered additional folding engraved plates bound after first leaf of index, and 2 folding tables. In all, there are 2 frontispieces, 47 plates, 2 tables and 3 head-pieces by Motte, as called for. Both volumes are uniformly bound in contemporary English calf and housed in a custom-made slipcase. Joints, spine-ends and board corners are expertly restored and a missing spine label to vol. I renewed (no rebacking, no previously detached boards, only repair of cracked joints with sound cords), red-sprinkled edges. There is gilt ruling and partly abraded floral decoration to spines as well as gilt ruling to boards. Internally, both volumes are crisp with only little occasional spotting and dust-soiling to outer margins, the frontispiece and title of vol. II is slightly stained at upper inner margin from paper slip formerly laid in, a clean tear to blank lower margin of leaf X7 in vol. I, plate III in vol. I slightly soiled and spotted. The leaves between pp. 16 and 33 of second part in vol. II are bound in wrong order. Otherwise, both volumes are in near fine condition, with full margins, and in its first bindings. Provenance: Binder's ticket to front pastedown of each volume: Thackray Bookseller, 51 Shude Hill, Manchester; contemporary owner inscription to front free endpaper of vol. I, 'Roger Hesketh', and his initials to title page of the same. (#003338) € 77,500

Babson 20; Norman 1587; PMM 161 (1st Lat. ed.); Wallis 23. - FIRST EDITION IN ENGLISH OF NEWTON'S "PRINCIPIA", widely regarded to be the greatest work in the history of science.

Motte's translation is highly regarded, and subsequent scholars have made revisions and corrections to the later editions, rather than undertake a new translation themselves. The first edition of Newton's *Principia* was in Latin, published in 1687. Two further London editions followed, in 1713 and 1726, in addition to a 1714 Amsterdam edition, before the revolutionary work (which Einstein described as "perhaps the greatest intellectual stride it has ever been granted for any man to make") became available to a wider lay audience with this handsomely printed English translation by Motte. It contains John Machin's attempt to rectify Newton's lunar theory, *The Laws of the Moon's Motion, according to Gravity*, here added to the end of the second volume. Motte's translation of Newton's *System of the World* occupies page 200 on in the second volume.

The Copernican idea that the Earth moves as a planet required a thorough revision of physics. Galileo undertook this task in his *Discourse on Two New Sciences*, published 80 years after Copernicus. With a mathematical description of the law of universal gravitation, Newton in this book unified the terrestrial physics of Galileo with the celestial mechanics of Kepler's laws. The development of science from Copernicus to Newton then became recognized as a 'Scientific Revolution,' a complete overthrow of Aristotelian physics and cosmology.

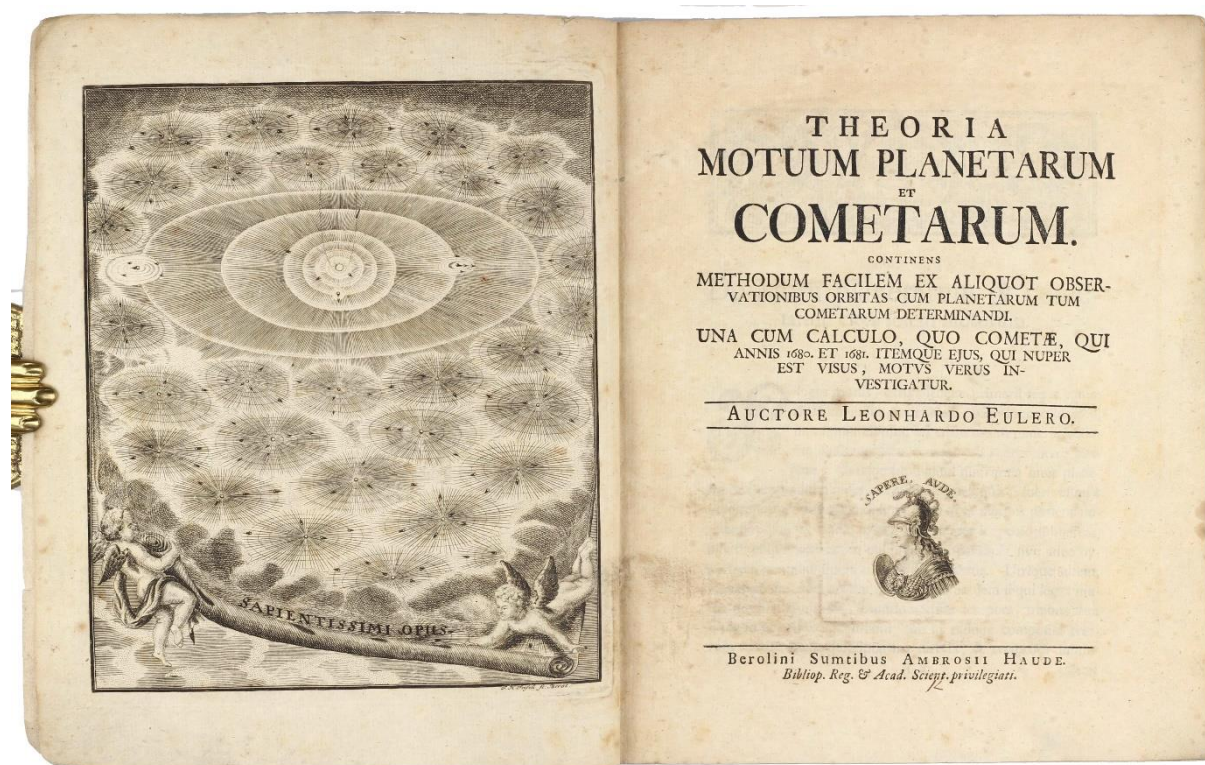
Because the book saw wide circulation and is of enduring interest, with commensurately heavy use, copies as fresh as this in contemporary bindings are of genuine rarity.



Calculating the Sun Orbits of Celestial Bodies

26 EULER, Leonhard. *Theoria motuum planetarum et cometarum. Continens methodum facilem... orbitas cum planetarum cum cometarum determinandi, una cum calculo, quo cometæ, qui annis 1680 et 1681... motus verus investigatur.* Berlin: Ambrosius Haude, 1744. 4to (228 x 188 mm). [3] 4-187 (i.e. 186) pp., engraved frontispiece by F.H. Fritsch, engraved device on title, woodcut head- and tailpieces, 4 folding engraved plates bound at end; bound without the cancel leaf A4 as in most copies. 18th century marbled paper wrappers (minor rubbind to extremities, short tear at head of lower wrapper). Minor mostly marginal spotting and browning. Very good, wide-margined copy. (#003340) € 3000

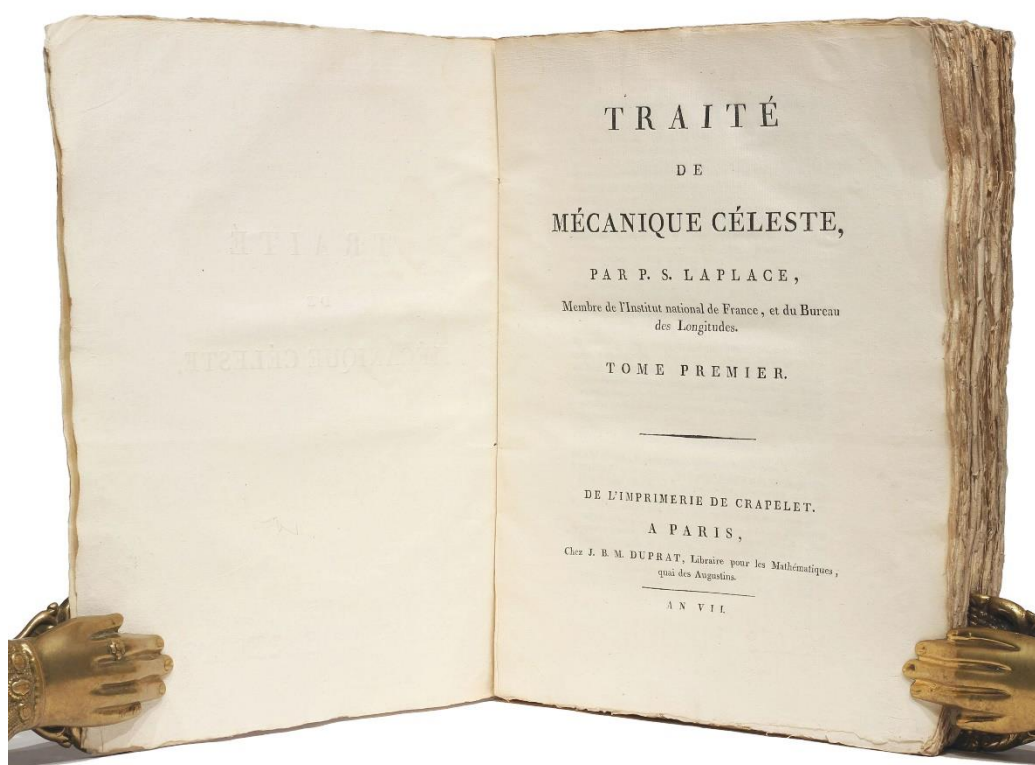
FIRST EDITION OF EULER'S FIRST TREATISE ON ASTRONOMY and "a fundamental work on calculation of orbits" (DSB). Leonhard Euler (1707-1783) drew up lunar tables in 1744, clearly already studying gravitational attraction in the Earth, Moon and Sun system. In his "*Theoria*" he calculates the orbits of planets and comets, later refined by Lagrange. "With regard to the theory of perturbed motion of celestial bodies, Euler formulated the perturbation theory in general terms so that it can be used to solve the mathematical problem of dynamic models and particular problems of theoretical astronomy . . . He gave an extensive mathematical treatment of the problem of improving approximations of orbits within the framework of the two-body problem and taking perturbations into account. In his *Theoria motuum planetarum et cometarum* . . . Euler gave a complete mathematical treatment of the two-body problem consisting of a planet and the Sun." (Debnath). References: Houzeau/Lancaster 11948; Honeyman 1063; Eneström "Euler" 66; DSB IV, p.471; Roller-G. I, 375; Debnath, *The Legacy of Leonhard Euler*, p.364.



A Fundamental Work on Celestial Mechanics

27 LAPLACE, Pierre Simon. *Traité de mécanique céleste*. 5 volumes and 4 supplements of the first edition plus 2 volumes of the second edition of part 1 and 2, all in the original wrappers as issued. Paris: Crapelet for Duprat, An VII [1799] (vol. I-II), Crapelet for Duprat, An XI-1802 (vol. III), Courcier, An XIII-1805 (vol. IV), Bachelier, 1825 (i.e., 1823-1827) (vol. V). Bachelier, 1829 (2nd edition, vol. I-II). 4to (270 x 215 mm). Half-title to each volume, vol. III with "*Supplément au Traité de mécanique céleste ...présenté au Bureau des Longitudes, le 17 août 1808*" (pp. 1-24) bound at end; vol. IV with folding engraved plate and two supplements, "*Supplément au dixième livre du Traité de mécanique céleste. Sur l'action capillaire*" (pp. [2], 1-65); and *Supplément à la théorie de l'action capillaire* (pp. 1-78), one unnumbered leaf with "*Table des matières*" on recto and the "*errata*" on verso bound at end; vol. V with "*Supplément au 5e volume du Traité de mécanique céleste. . .*" dated 1827 (pp. [2], 1-35) bound at end. Vol. V without the section titles as usual (not included in this issue). All volumes in the original pink mottled wrappers with original printed spine labels (additional hand-lettered shelf-mark labels to vols. III-V), all pages uncut, vols. I and II of first edition mostly unopened, housed in a custom-made slip-case (spines mostly sun-faded, chipping and wear to spines, spine ends and extremities, wrappers partially torn with some loss). A few pages in vols. III-V little browned, occasional minor spotting, light occasional dampstaining mostly to blank margin of few gatherings, but in all very crisp and clean. Provenance: from a French private collection. A very fine set in original condition, rarely found that complete as here with all the supplements present. (#003346) € 26,000

Dibner, *Heralds of Science* 14; Grolier/Horblit 63; PMM 252; Sparrow, *Milestones of Science* 125; Norman 1277; Roberts-Trent, p.197. LAPLACE'S FUNDAMENTAL WORK ON CELESTIAL MECHANICS. FIRST EDITIONS OF ALL PARTS, with the first two volumes I and II in FIRST STATE (without the added Berlin imprint). Also included here is the second edition of volumes I and II, which are reprints of the first edition shortly issued after the final vol. V appeared. With these, all French separate editions of the *Traité* are represented in our set in unsophisticated state.



Published over a period of 27 years, Laplace's monumental work codified and developed the theories and achievements of Newton, Euler, d'Alembert and his contemporary Lagrange. In the tradition of Newton's *Principia*, Laplace "applied his analytical mathematical theories to celestial bodies and concluded that the apparent changes in the motion of planets and their satellites are changes of long periods, and that the solar system is in all probability very stable" (Dibner 14). Newton remained uncertain with respect to the continuity of our solar system. In this work, Laplace also offered explanations unsolved by his predecessors and contemporaries. He "offered a brilliant explanation of the secular inequalities of the mean motion of the moon

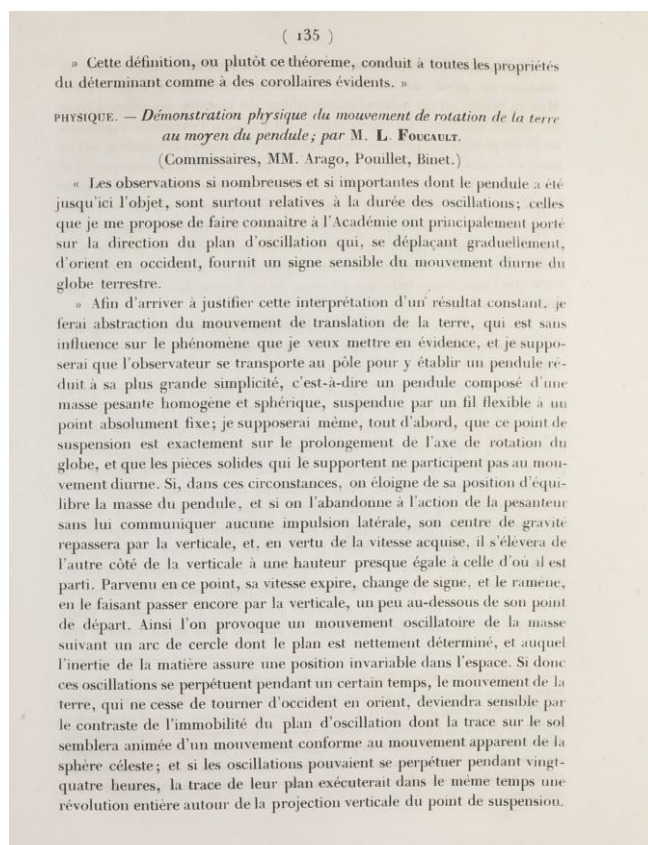
about the earth - a problem which Euler and Lagrange had failed to solve. He proved that these irregularities are connected with certain solar actions and changes in the orbit of the earth. He also investigated the theory of the tides and calculated from them the mass of the moon" (PMM 252). The first four volumes of the work appeared from 1799 through 1805, and contain the laws of mechanics for their application to the motions and figures of the heavenly bodies. The final parts of the fourth volume and the entire fifth volume really constitute a separate work and contain important material on physics not already included in the original sequence.

Only few volumes of the *traité* have survived in original wrappers and complete sets are of utmost rarity. The Haskell Norman set for example had the first 4 volumes in original wrappers but vol. V rebound in modern quarter morocco (see his sale at Christie's 1998, lot 597, sold at \$16,100).

Finally Proving Earth's Rotation

28 **FOUCAULT, Jean Bernard Leon.** *Démonstration physique du mouvement de rotation de la terre au moy.* In: *Comptes Rendus Hebdomadaires des Seances de l'Academie des Sciences* **32**, Paris, Bachelier, 1851. 4to. (266 x 216 mm); pp. 135-138 (entire volume: 1010 pages). New endpapers. Library stamp of Universitätsbibliothek Paderborn and some additional library markings on the lower margin of page 2. Pages 959 to 1010 (index according to author and topic) in facsimile. Modern cloth with gilt-embossed spine. (#001723) € 2,800

PMM 330 (offprint), Dibner 17, Norman 818 (offprint). - THE FIRST MECHANICAL DEMONSTRATION OF THE EARTH'S ROTATION. FIRST EDITION, RARE. To postulate astronomical behaviour is one order of thought, to prove its demonstration is of quite another order. The rotation of the earth had been accepted since Copernicus but it remained for Foucault to demonstrate it. He suspended an iron ball pendulum from the dome of the Pantheon in Paris, set it swinging and chartered its constantly rotating angular shift and proved it to rotate completely in one day." (Dibner, Bern. Heralds of Science 17). Although the rotation of the earth had been accepted since Copernicus, it was Foucault who first demonstrated it by experiment."His early experiments were private, but



Louis Napoleon (later Napoleon III) became so interested that he arranged for them to be repeated publicly. This was a splendid affair which took place in the Pantheon in 1851 before a fashionable audience. A heavy ball was suspended from the dome on a wire 220 feet long; beneath the ball was a table 12 feet in diameter covered with sand on which the ball would leave a mark. This is known as 'Foucault's pendulum'. It soon became apparent that the plane in which the pendulum was swinging moved in a clockwise direction and in about thirty-two hours the plane of vibration had completed a full circuit... The audience in the Pantheon was greatly impressed; some ladies fainted with excitement, while other spectators maintained that they could feel the earth move beneath them" (PMM 330). "Continuing to experiment on the mechanics of the earth's rotation, Foucault in 1852 invented the gyroscope, which, he showed, gave a clearer demonstration than the pendulum of the earth's rotation and had the property, similar to that of the magnetic needle, of maintaining a fixed direction. Foucault's pendulum and gyroscope had more than a popular significance (which continues to this day). First, they stimulated the development of theoretical mechanics, making

relative motion and the theories of the pendulum and the gyroscope standard topics for study and investigation. Second, prior to Foucault's demonstrations, the study of those motions on the earth's surface in which the deflecting force of rotation plays a prominent part (especially winds and ocean currents) was dominated by unphysical notions of how this force acted. Foucault's demonstrations and the theoretical treatments they inspired showed conclusively that this deflecting force acts in all horizontal directions, thus providing the sound physical insight on which Buys Ballot, Ferrel, Ulrich Vettin, and others could build" (Dictionary of Scientific Biography V, p. 86).

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