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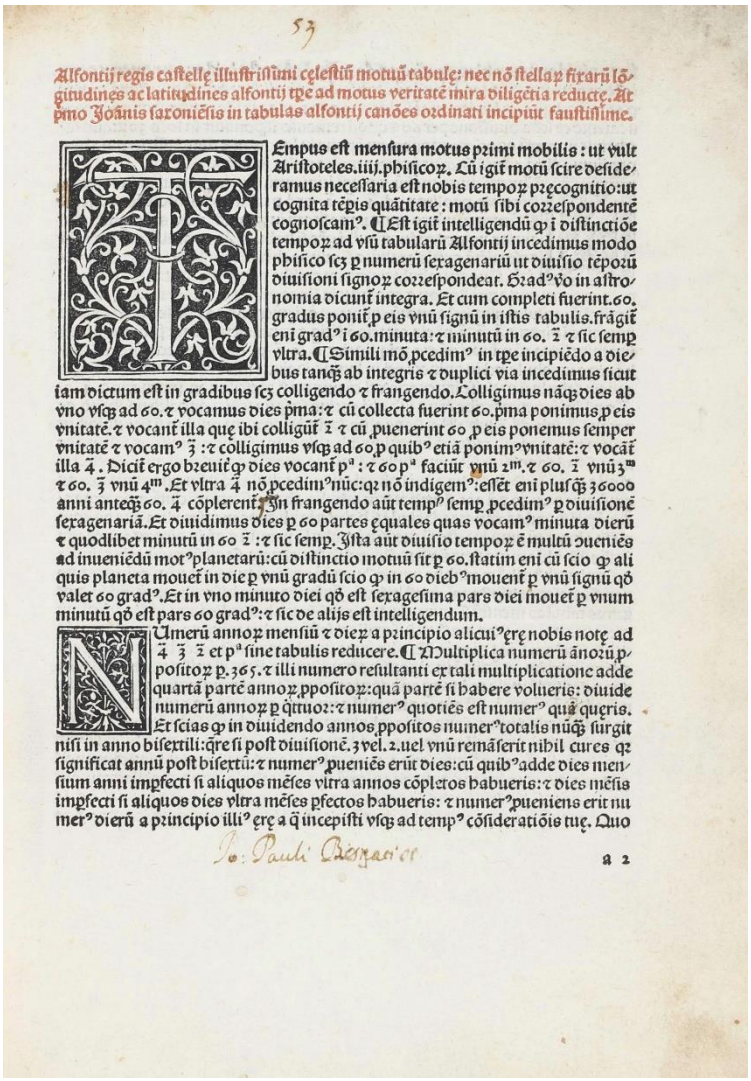
1 **ALFONSO X, King of Castile and Leon (ALFONSIUS)**. *Tabulae astronomicae* - Johannes DANCK (fl. first half 14th century). *Canones in tabulas Alphonsi*. [Venice:] Erhard Ratdolt, 4 July 1483. 4to (230 x 163 mm). 93 unfoliated leaves (of 94, bound without the initial blank). Collation: a-l^{8} m^{6} (-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-Zarquli 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

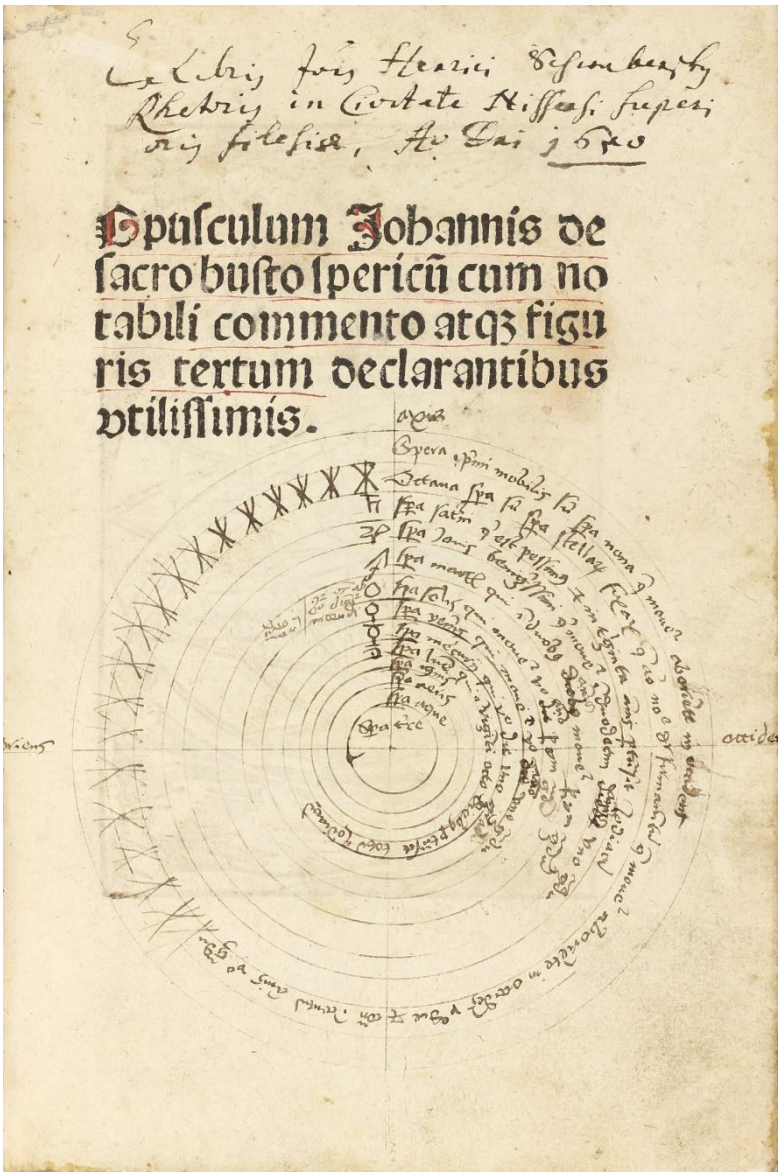
of Toledo). The resulting tables remained in general use until superseded by Kepler's *Tabulae Rudolphinae* in 1627." (Tomash & Williams).

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.

2 **SACROBOSCO, Johannes de**. *[Sphaera mundi, cum commento Wenceslai Fabri de Budweiss]. Opusculum Johannis de sacro busto sperícu[m] cum notabili commento atq[ue] figuris textum declarantibus utilissimis*. Leipzig: Wolfgang Stöckel, 1499. 4to (210 x 140 mm). 49 leaves (of 50, lacking I6, 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-C^{6} D^{4} E-G^{6} H^{4} I^{6} (-I6). Bound in later stiff vellum, later endpapers (some minor soiling of boards). Text little browned thoroughout, 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.

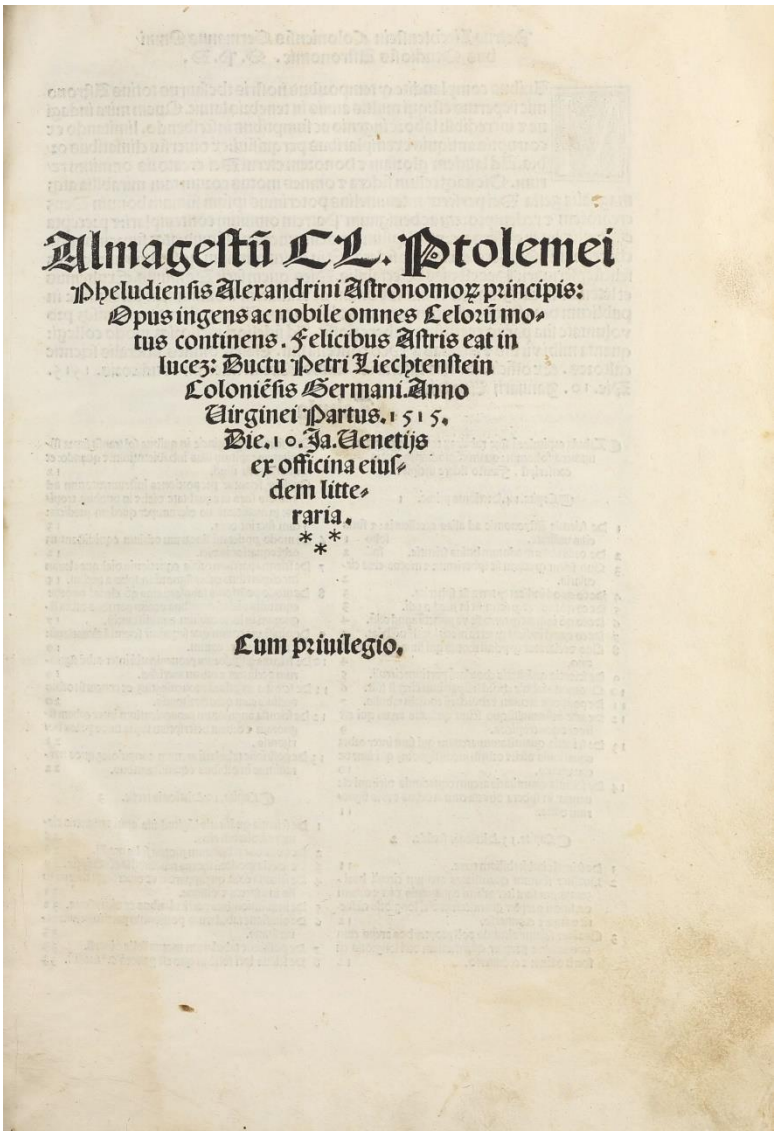
Refining Aristotle: The Ptolemaic Model of Defents and Epicycles

3 **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-z^6 A^6 B^8. 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. Ptolo. que in hoc volumine contentur hec sunt: Liber quadripartiti Ptolemei. Centiloquium eiusdem. Centiloquium Hermetis. . .* Venice: Ottaviano Scoto, 6 February 1519. [4], 140 leaves. Signatures: $2a^4$ A-Q^8 R-S^6. 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

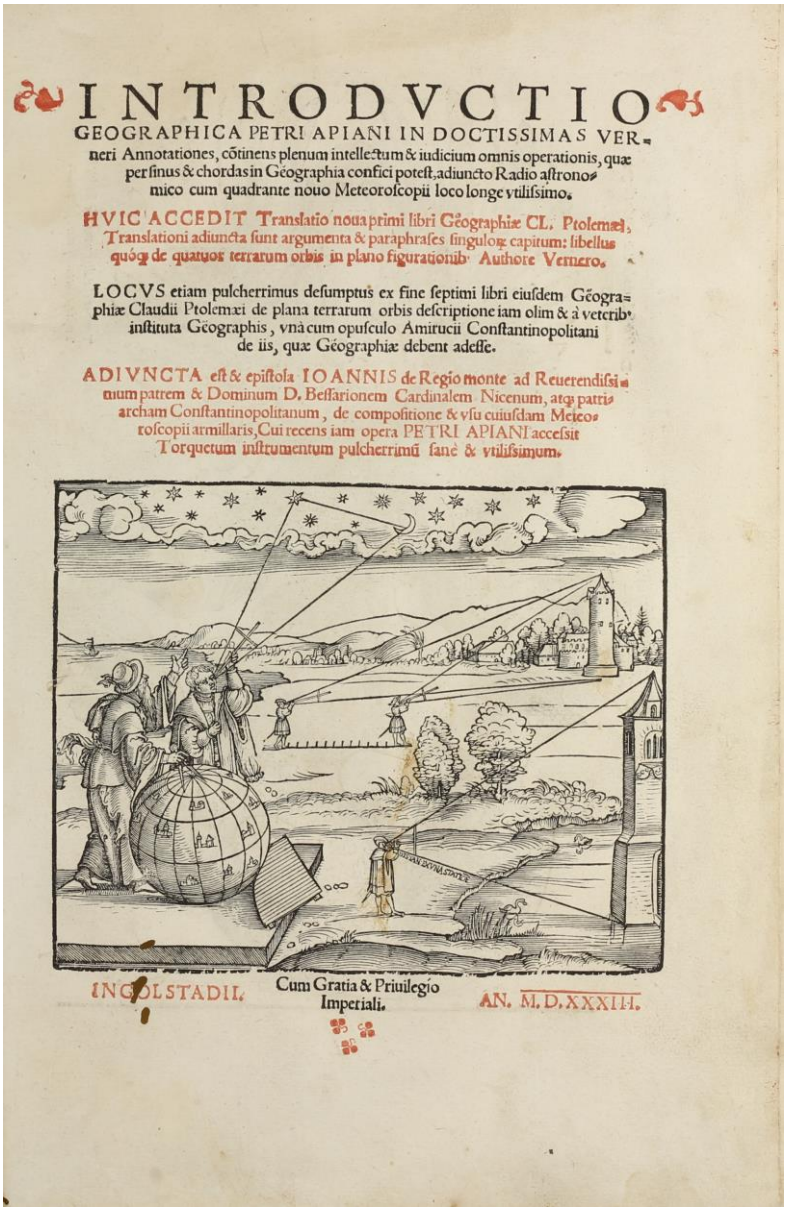
Copernican revolution, Kuhn therefore felt legitimized to talk about an Aristotelian-Ptolemaic 'paradigm' which Copernicus' *De revolutionibus* was to undermine." (Omodeo, Pietro Daniel and Tupikova, Irina (2016). *Cosmology and Epistemology: A Comparison between Aristotle's and Ptolemy's Approaches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


Almagestū CL. Ptolemei
Pheludiensis Alexandrini Astronomoꝝ principis:
Opus ingens ac nobile omnes Celoꝝ motus continens. Felicibus Astris eat in
lucez: Ductu Petri Liechtenstein
Coloniēsis Germani. Anno
Virginei Partus. 1515.
Die. 10. Ja. Venetijs
ex officina eiusdem litte-
raria.
***
Cum priuilegio.

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 *Αποτελεσματικα*, "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.

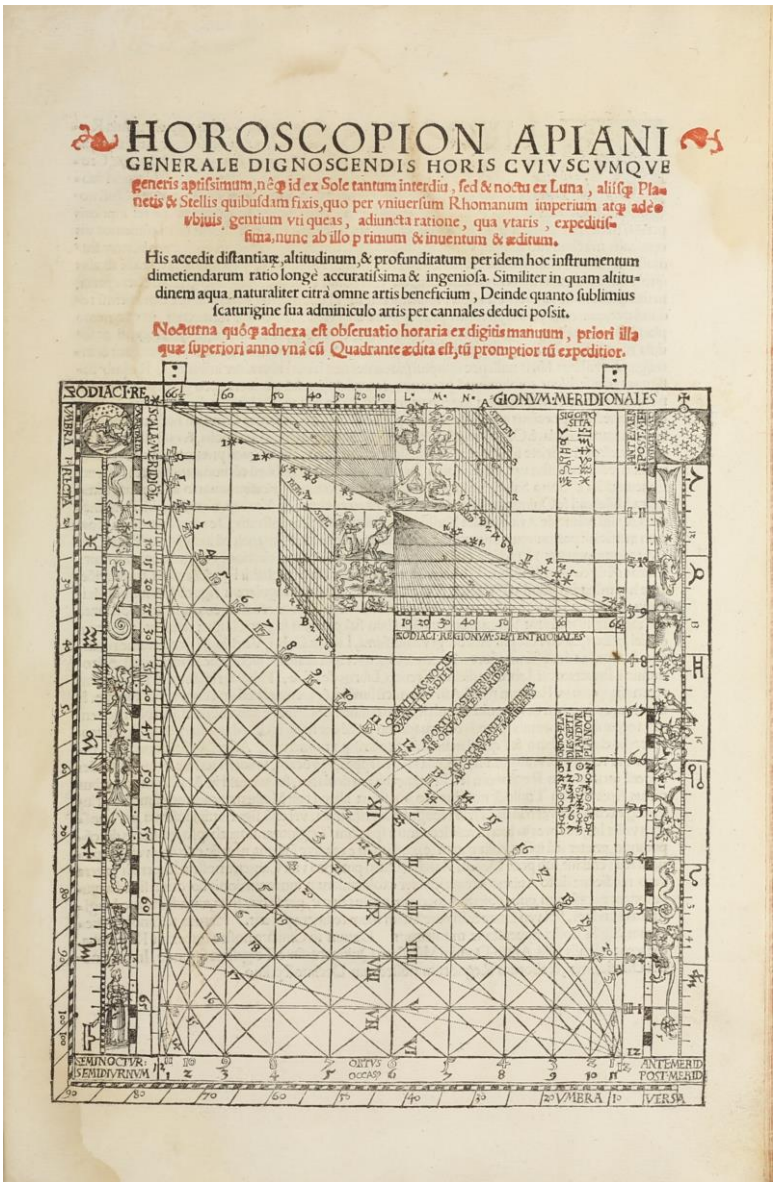
References: Adams P-2213; Houzeau & Lancaster 865; Stillwell 97; DSB XI, p. 196; Norman 1760 (for the 1528 edition).

4 **APIAN, Peter**. *Introductio geographica in Verneri annotationes*. Ingolstadt: (Peter) Apian, 1533. 88 unnumbered leaves. Signatures: A-E^4 a^4 b-c^6 d^8 e-h^6 i^8 k-l^6 (D3 missigned E3). Title printed in red and black and with large woodcut illustration, full-size woodcut coat of arms on verso, historiated woodcut initials, several woodcut diagrams and illustrations in text. Generally crisp and clean internally with light even browning, small worm holes in gatherings A-B, light dampstaining toward lower gutter, light brown staining at upper third from gathering l towards end. [Bound with:] **APIAN, Peter**. *Horoscopium generale dignoscendis horis cuiuscumque generis aptissimum*. Ingolstadt: (Peter) Apian, 1533. 20 unnumbered leaves. Signatures: A-E^4. Title printed in red and black and with large woodcut illustration, historiated woodcut initials, several woodcut diagrams and illustrations in text, single plate, duplicating the illustration on the title-page, tipped to gutter of final leaf of first work. Some damp- and brownstaining at inner margin which becomes stronger towards end (the final two leaves showing faint old mould spots, some softening of paper and slight surface abrasion affecting a few letters on final leaf recto). Two works in one volume. Folio (301 x 198 mm). Bound in 18th century three quarter vellum over colored paste paper, spine lettered in ink (boards soiled and rubbed, spine spotted, wear and bumping to corners and board edges, top of spine chipped, extremities rubbed, vellum over spine with a diagonal split), red-sprinkled edges, later endpapers. Still very good copy of two rare works by Apian. (#003414) € 12,000


INTRODVCTIO
GEOGRAPHICA PETRI APIANI IN DOCTISSIMAS VERneri Annotationes, cõtinens plenum intellectum & iudicium omnis operationis, quæ per sinus & chordas in Geographia confici potest, adiuncto Radio astronomico cum quadrante nouo Meteoroscopii loco longe vtilissimo.
HVIC ACCEDIT Translatio noua primi libri Geographiæ CL. Ptolemæi, Translationi adiuncta sunt argumenta & paraphrases singulorũ capitum: libellus quoq; de quatuor terrarum orbis in plano figurationib' Authore Vernero.
LOCVS etiam pulcherrimus desumptus ex fine septimi libri eiusdem Geographiæ Claudii Ptolemæi de plana terrarum orbis descriptione iam olim & à veteribꝰ instituta Geographis, vnà cum opusculo Amirucii Constantinopolitani de iis, quæ Geographiæ debent adesse.
ADIVNCTA est & epistola IOANNIS de Regiomonte ad Reuerendissimum patrem & Dominum D. Bessarionem Cardinalem Nicenum, atq; patriarcham Constantinopolitanum, de compositione & vsu cuiusdam Meteoroscopii armillaris, Cui recens iam opera PETRI APIANI accessit Torquetum instrumentum pulcherrimũ sanè & vtilissimum.
INGOLSTADII. Cum Gratia & Priuilegio Imperiali. AN. M.D.XXXIII.

I. FIRST EDITION (in the later published title edition, the place of printing and the year are missing on the title page) of Peter Apian's introduction to practical geometry and computational astronomy, dedicated to Johann Wilhelm von Laubenberg. The book contains, besides Johannes Werner's notes and Apian's upon them, a Latin translation of the first book of Ptolemy's *Geography*, a letter of Regiomontanus, and descriptions of three instruments invented by Apian himself, namely the "Radius astronomicus", the "Quadrans novus" (a height quadrant with various auxiliary divisions) and the "Torquetum" ("Turkish instrument"). Apian was a student of Johannes Werner in theoretical cartography. Werner's treatises, contained in Johannes Stabius' collection of writings on geography (1514), were "included almost unchanged in Apian's *Introductio geographica* (1533); Apian even used the proof sheets from the beginning of "*In eundem primum librum…argumenta*" to the end of "*Joannis de Regiomonte epistola…de compositione et usu cuiusdam meteoroscopii*," and admits in several places in his writings how much he had learned from Werner." (DSB, on Werner).

Of peculiar interest is the early description of the calculation of a sine table. Apian's "*Introductio geographica* (1533) contains both a sine table . . . and a description. The *Instrumentum sinuum seu primi mobilis* also contains a small table of arc sines, the earliest such table of which I am aware with clearly trigonometric intent." (G. van Brummelen, *The Doctrine of Triangles: A History of Modern Trigonometry*, Princeton University Press, 2021, p.12. "The first table of sines seems to have been printed in 1490, as part of



Regiomontanus' *Tabulae directionum profectionumque*. It was only 30 pages long and gave the sines for every minute and to a radius of 60000. According to Folkerts, this table was probably computed before 1463–1464 [36, p. 234]. Most of the tables published during the 16th century are ultimately based on this table or on other tables constructed by Regiomontanus. Next came Peter Apian (1495–1552) who published his *Introductio geographica* in 1533." (D. Roegel, *A reconstruction of the tables of Rheticus' Canon doctrinæ triangulorum (1551)*. [Research Report] 2010. inria-00543931, p.3).

Further references: VD 16, A 3090; Adams A 1294; Dodgson II, 385.3; Gunther 27 ff.; van Ortroy 101; Schottenloher, *Apian* 33; Zinner 1516; R. Gebhardt, *Rechenmeister und Cossisten der frühen Neuzeit*. TU Bergakademie Freiberg. Freiberg 1996, p.139).

II. FIRST AND ONLY EDITION of this little treatise on Apian's "horoscope", "an instrument not for astrological purposes, but for geodatic and chronometric purposes, which can be seen as an improvement of Peurbach's 'geometric square'" (Gunther). Among the woodcuts there are also some astronomical representations and illustrations for finger arithmetic.

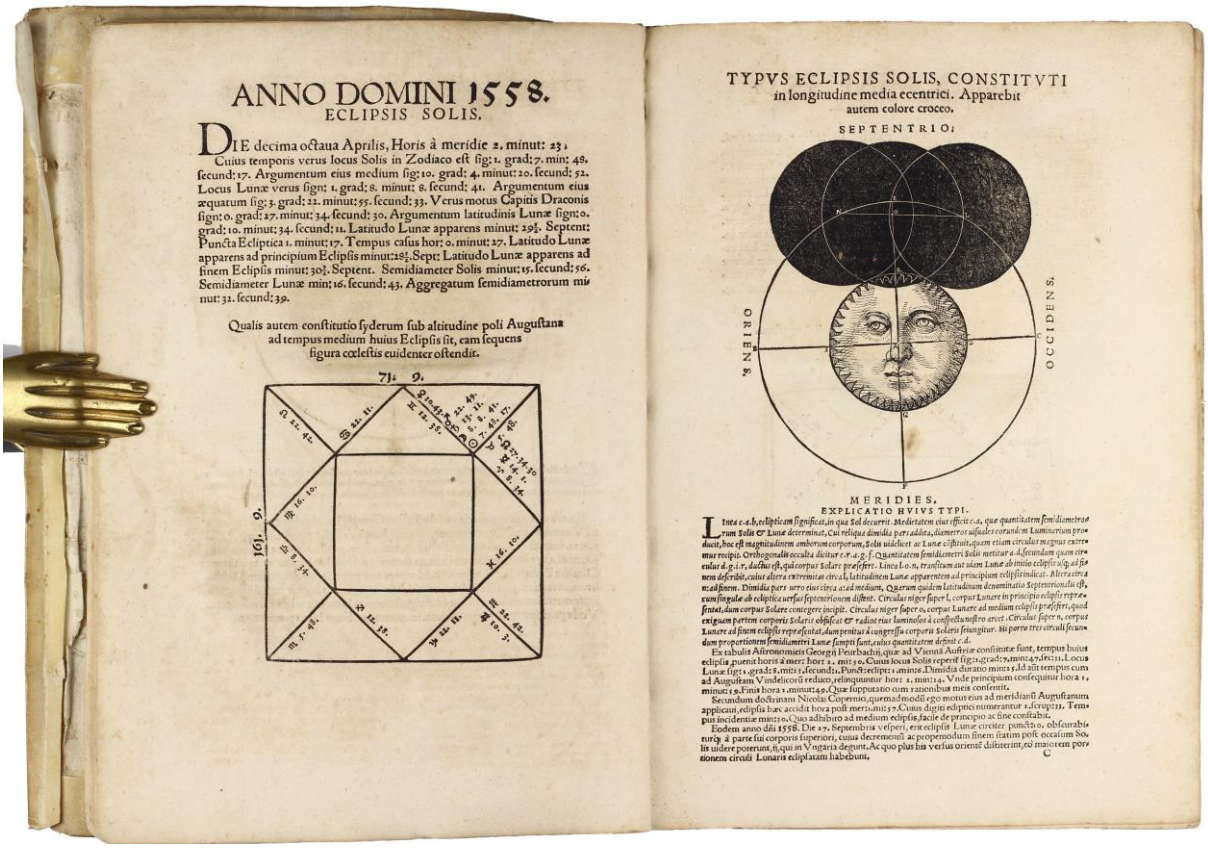
References: VD 16, A 3085; Adams A 1290; Gunther 40; van Ortroy 100; Dodgson II, 386.2; Schottenloher, *Apian* 37; Zinner 1512; Houzeau-L. I, 2395.

5 **LEOVITIUS, Cyprianus (LEOWITZ, Cyprian)**. *Eclipsium omnium Ab anno domini 1554 usque in annum Domini 1606. Accurata descriptio & pictura, ad meridianum Augustanum ita supputata, ut quibusuis alijs facilimè accommodari possit, una cum explicatione effectuum tam generalium quàm particularium pro cuiusque genesi*. Augsburg: Philipp Ulhart the elder, 1556. Two parts in one volume. Folio (316 x 221 mm). 88; 36 unnumbered leaves. Signatures: A-K^{6} L^{8} M-N^{6} O^{8} P-S^{6} T^{2}. Including blank leaf L8. Several woodcut illustrations and diagrams in text, woodcut initials. Contemporary limp vellum with yapp edges, spine lettered in manuscript, further ink inscription to upper cover: "Continens des eclipses de soleil et de la lune" (vellum browned, somewhat soiled and shrinked, bands unfixed from upper pastedown, no free endpapers). Little even browning of text, title leaf frayed at fore-edge and with small holes in blank margins well outside text area, ink smudges to leaf G1, minor worming at upper gutter of gathering L. Provenance: unidentified small collectors ink stamp on title verso. A handsome, unsophisticated copy. (#003440) € 6000

VERY RARE FIRST EDITION of the main work on celestial mechanics of the court mathematician and astronomer of Count Palatine Ottheinrich Cyprian Leowitz (lat. Cyprianus Leovitius; 1524-1574), who dedicated his work to the great Heidelberg prince. Leowitz came from a noble Bohemian family and devoted himself to the sciences. He only came into the light of history in 1552, when he published *'Tabulae directionum et profectionum clarissimi viri ac praestantissimi Joannis Regiomontani'* in Augsburg. Since he had noticed that both the Alphonsin and the Peurbach tables were incorrect by over half an hour, he published in 1557 in Augsburg his '*Ephemeridum novum atque insigne opus from 1556 ad annum 1606*. Likewise in Augsburg he published this forecast of all the eclipses falling in the years 1554-1606, with particular reference to the explanation of the first book of Moses. His astrological interpretation of the new star of 1572 is criticized and rejected in Tycho Brahe's *Progymnasmata*. (see ADB XVIII, 417f).

About half of the woodcuts are decorative depictions of the solar eclipses described with pretty figurative depictions of the sun and moon and stars etc., some with quite characteristic faces. There are also woodcut diagrams, and at the end with its own title "*Tabula quantitatis dierum recens a Cypriano Leovitio supputata*" with 3 full-page typographical tables. This is followed by the printer's note: "*Augustae Vindelicorum, Philippus Ulhardus in plata Templaria Divi Hudrichi, excudebat. Anno domini M.D.LVI. Mense Febrario*".

References: VD16 L 1261 (wrong collation: 78 ff). Adams L 519; Houzeau-Lancaster 12019; Poggendorf II, 1429; Zinner 2154 (wrong collation: 116 ff).


ANNO DOMINI 1558.
ECLIPSIS SOLIS.

DIE decima octaua Aprilis, Horis à meridie 2. minut: 23.
Cuius temporis verus locus Solis in Zodiaco est sig: 1. grad; 7. min: 48. secund; 17. Argumentum eius medium sig; 10. grad: 4. minut: 20. secund; 52. Locus Lunæ verus sign; 1. grad; 8. minut; 8. secund; 41. Argumentum eius æquatum sig; 3. grad; 22. minut; 55. secund; 33. Verus motus Capitis Draconis sign; 0. grad; 27. minut; 34. secund; 30. Argumentum latitudinis Lunæ sign; 0. grad; 10. minut; 34. secund; 11. Latitudo Lunæ apparens minut; 29. Septent: Puncta Ecliptica 1. minut; 17. Tempus casus hor; 0. minut; 27. Latitudo Lunæ apparens ad principium Eclipsis minut; 28. Sept; Latitudo Lunæ apparens ad finem Eclipsis minut; 30. Septent. Semidiameter Solis minut; 15. secund; 56. Semidiameter Lunæ min; 16. secund; 43. Aggregatum semidiametrorum minut: 32. secund; 39.

Qualis autem constitutio syderum sub altitudine poli Augustana ad tempus medium huius Eclipsis sit, eam sequens figura cœlestis euidenter ostendit.

TYPVS ECLIPSIS SOLIS, CONSTITVTI in longitudine media ecentrici. Apparebit autem colore croceo.

SEPTENTRIO.

ORIENS.

OCCIDENS.

MERIDIES.

EXPLICATIO HVIVS TYPI.

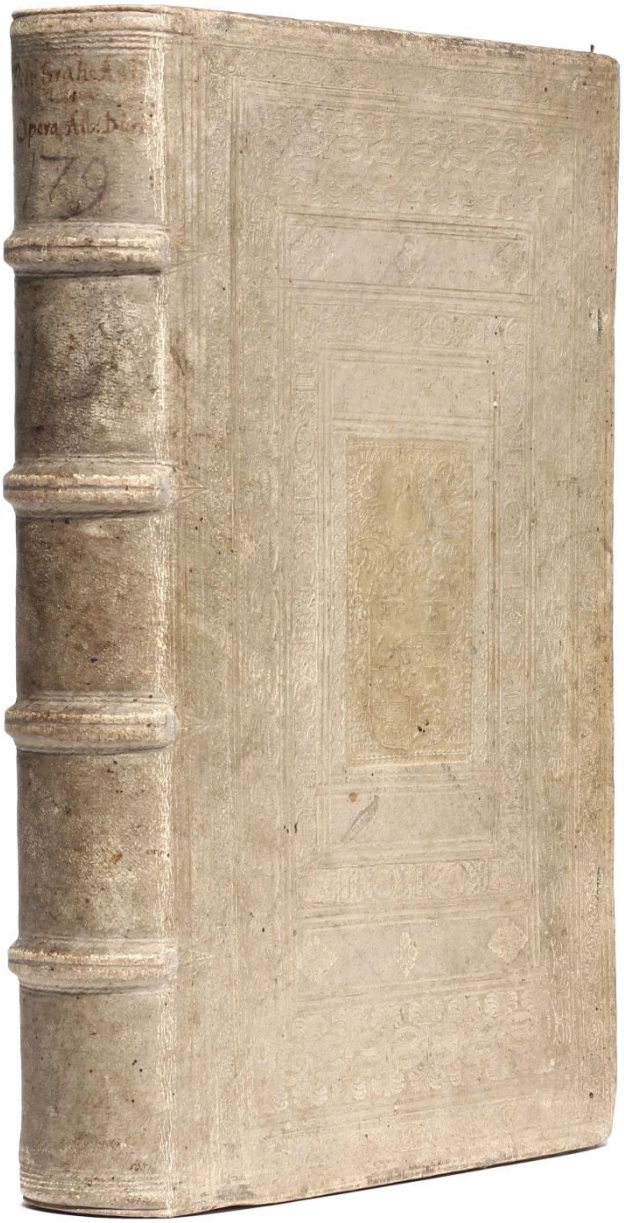
6 **BRAHE, Tycho**. *Astronomiae instauratae mechanica*. Nürnberg: L. Hulsius, 1602. Folio (311 x 194 mm). 54 unnumbered leaves, title with engraved portrait of the author, 6 large engravings and 23 woodcut illustrations in text, woodcut initials and tailpieces. Signatures:)::(⁴ A-E⁶ F⁴ G-H⁶ I⁴.

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 weitberhümbten 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. . .* Arnhem: 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 intials 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 Stellaeborg 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).



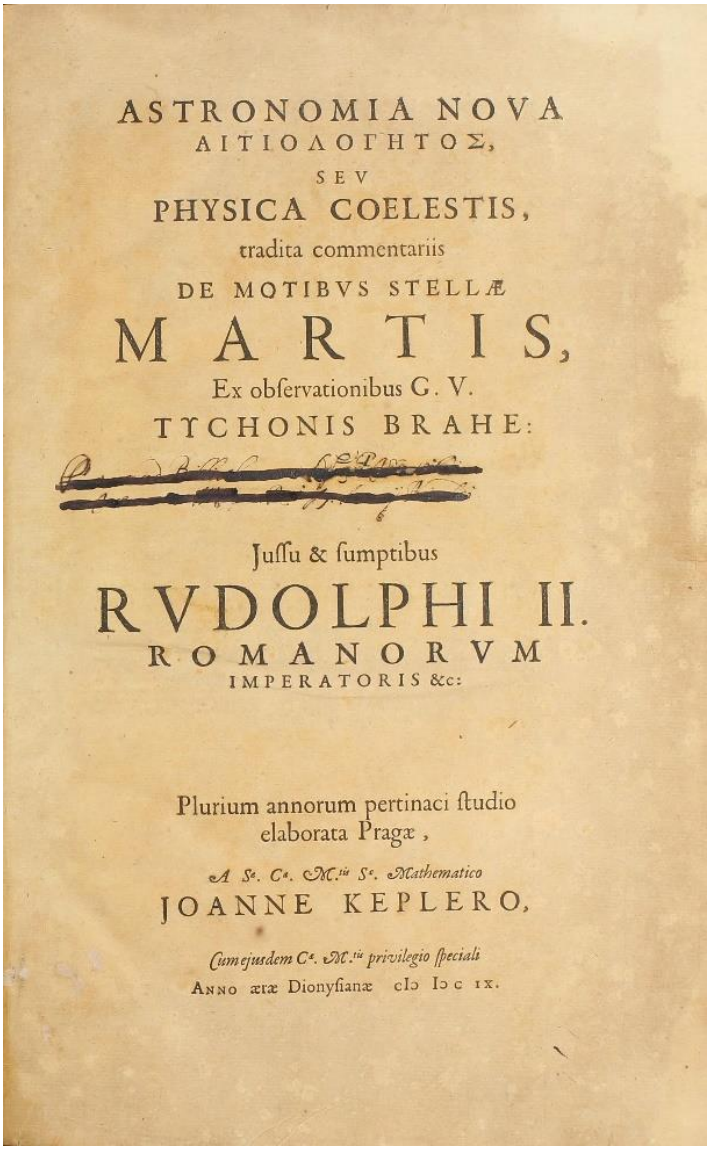
The Tychonic system is conceptually a geocentric model. Brahe admired aspects of Copernicus' heliocentric model, but felt that it had problems as concerned physics, astronomical observations of stars, and religion. He comments that "this innovation expertly and completely circumvents all that is superfluous 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.

A New Astronomy - the Laws of Planetary Motion

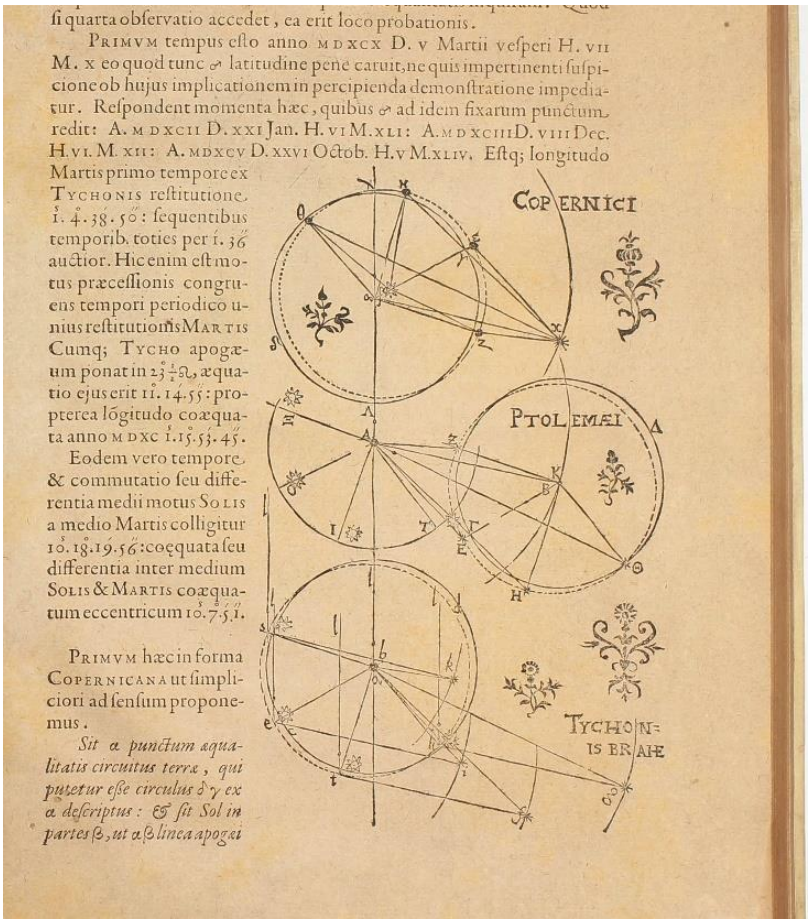
7 **KEPLER, Johannes**. *Astronomia nova ΑΙΤΙΟΛΟΓΗΤΟΣ, seu physica coelestis, tradita commentariis de motibus stellae Martis, ex observationibus G.V. Tychonis Brahe*. [Heidelberg]: [Gotthard Vögelin], 1609. Folio (388 x 250 mm). Work in five parts, each with separate half-title page, but continuous pagination 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-2D^6 2E^8 (π1 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.


ASTRONOMIA NOVA
AITIOΛOΓHTOΣ,
SEV
PHYSICA COELESTIS,
tradita commentariis
DE MOTIBVS STELLÆ
MARTIS,
Ex obſervationibus G. V.
TYCHONIS BRAHE:
Juſſu & ſumptibus
RVDOLPHI II.
ROMANORVM
IMPERATORIS &c:
Plurium annorum pertinaci ſtudio
elaborata Pragæ,
A Sæ. Cæ. Mtis Sæ. Mathematico
JOANNE KEPLERO,
Cum ejusdem Cæ. Mtis privilegio ſpeciali
Anno æræ Dionyſianæ cIↃ IↃ c ix.

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

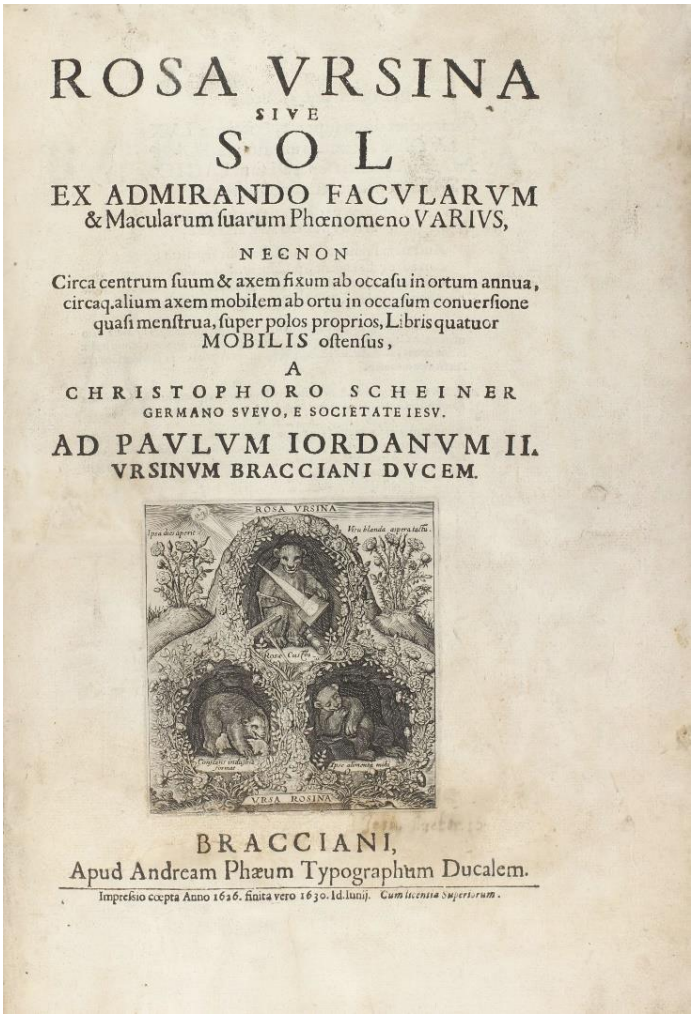


arrears. Although the size of the press run is not recorded, Kepler later stated that only "a few copies" had been printed (see Caspar, p. 55).

Johannes Kepler stands, with Galileo between Copernicus and Newton among the founders of modem 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.

8 **SCHEINER, Christoph**. *Rosa ursina sive Sol ex admirando facularum & macularum suarum phoenomeno varius ,... a Christophoro Scheiner Germano Sueuo, e Societate Iesu. Ad Paulum Iordannum 2. Ursinum Bracciani ducem*. Bracciano: apud Andream Phaeum, 1626-1630. Folio (380 x 265 mm). [40], 124 pp; 125-149 [i.e. 160] leaves; [4], 149-784, [38] pp. Signatures: π^4 a-b^6 c^4 A-E^6 F^4 G-R^6 2a-$2s^6$ $2t^4$ 2u-$2x^6$ $2y^4$ 3A-$4M^6$ (F4, R6, 4I6 blank). Main text in double columns. Imprimatur dated 1630. Additional engraved title, letterpress title with printer's device by M. Greuter, half-title with dedication and engraved portrait of Paolo Giordano Orsini, Duke of Bracciano on verso; numerous engraved text illustrations and diagrams, several full-page, woodcut initials, head- and tailpieces, errata leaf at end. Errors in pagination and foliation. 12 leaves following f.148 are all foliated 149. Contemporary full calf over thick boards, spine with ink lettered paper label, boards ruled in blind, red-dyed edges (binding restored). Very little browning, occasional minor pale dampstaining at outer blank margins, letterpress title soiled, full-page engraving on p.63 closely trimmed at head touching frame, occasional finger soiling, a few marginal paper repairs, p.555 with some ink retracing of flawed letterpress, blank fore-margin of leaf 4M3 trimmed by about 25 mm (far away from text block). Provenance: illegible, partly erased, old ownership inscription on title. A very good, tall, crisp, clean and unpressed copy printed on very strong paper. (#003625) € 65,000


ROSA VRSINA
SIVE
SOL
EX ADMIRANDO FACVLARVM
& Macularum ſuarum Phœnomeno VARIVS,
NEC NON
Circa centrum ſuum & axem fixum ab occaſu in ortum annua,
circaq. alium axem mobilem ab ortu in occaſum conuerſione
quaſi menſtrua, ſuper polos proprios, Libris quatuor
MOBILIS oſtenſus,
A
CHRISTOPHORO SCHEINER
GERMANO SVEVO, E SOCIETATE IESV.
AD PAVLVM IORDANVM II.
VRSINVM BRACCIANI DVCEM.
ROSA VRSINA
VRSA ROSINA
BRACCIANI,
Apud Andream Phæum Typographum Ducalem.
Impreſsio cœpta Anno 1626. finita vero 1630. Id. Iunij. Cum licentia Superiorum.

FIRST EDITION of this magnificient astronomical and optical work by Scheiner and the most sumptuously illustrated astronomical book of the first half of the 17th century, forming a summation of Scheiner's investigations of the sun. It was printed at the private press established by Paolo Giordano Orsini, Duke of Bracciano, and a patron of astronomy, at his castle. The fine copper engravings include images of sunspots, the first equatorially mounted telescope called a helioscope, and other optical instruments. The title, *Rosa Ursina*, honours Orsini's name, and bears are frequently incorporated into the book's decorative motifs.

In the *Rosa Ursina* Scheiner is expanding upon his researches into sunspots. In it he confirms his method and criticises Galileo for incorrectly calculating the inclination of the axis of rotation of the sunspots to the plane of the ecliptic. Scheiner first observed sunspots in March 1611 and had his discovery published pseudonymously the following year. This sparked a conflict with Galileo, who claimed priority of discovery when, in fact, their observations were made independently.

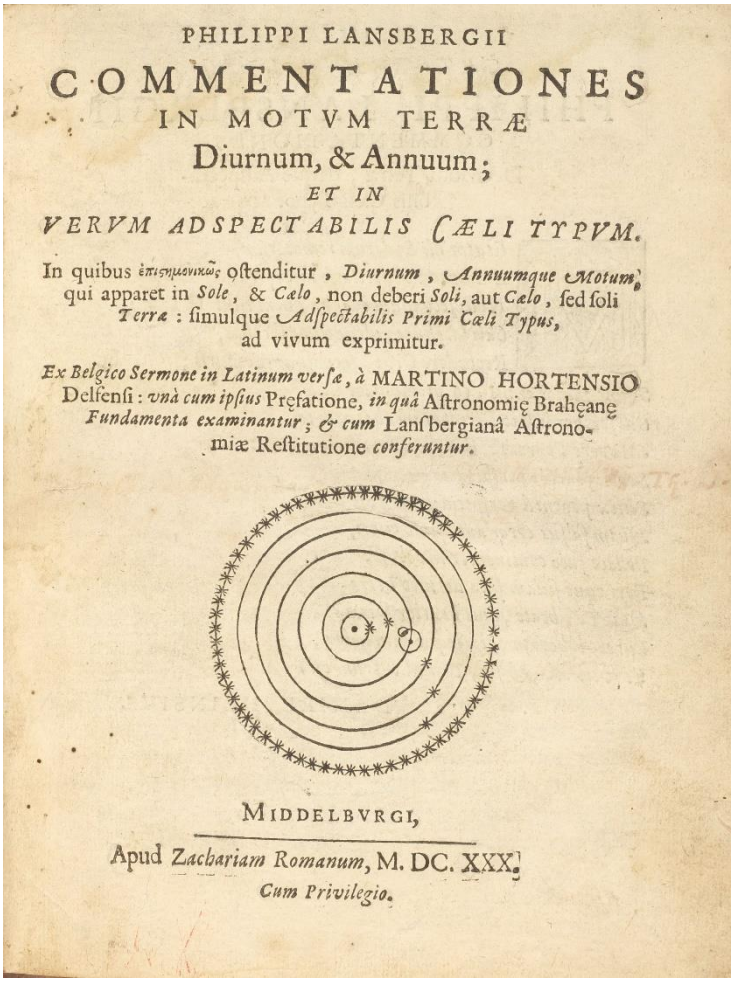
Rosa Ursina is devided into four books. The first discusses the priority question of the discovery of sunspots. Book two presents telescope designs, optical projection methods and the helioscope invented by Scheiner and compares the optics of the telescope with that of the human eye. In the third book, Scheiner's sunspot observations are tabulated, enriched with 70 engraved illustrations by David Widemann. Book four is devided into two parts, the first deals with solar phenomena such as sunspots and protuberances, the tilt of the sun's axis and its period of revolution of 27 days. The second part is a collection of quotations and passages from the Scriptures, Church Fathers and philosophers, all in support of Scheiner's firm geocentric worldview conforming with the Catholic doctrine at that time. (see Daxecker).

"We have already seen Galileo used a telescope as a compound lens for the projection of the sun within a darkened chamber when he was recording the motions of the sunspots. His great rival Christopher Scheiner devised a machina helioscopia according to the same principles for his own minutely detailed observations of sunspots. Scheiner's concern to understand the implications of such devises led him to make a telling series of

comparison between the human eye (natura) and the camera obscura (arte) when coupled with various combinations of lenses (natura cum arte) to produce upright and inverted images" (Kemp).

Literature and reference: DeBacker-Sommervogel VII, 738.8; Daumas, pp. 726-728; Cinti 79; DSB XII, pp. 151-152; King, *The History of the Telescope*, pp. 40-45; Honeyman 2781; Roller-Goodman II, 404; F. Daxecker, *The Main Work of Astronomer Christoph Scheiner SJ "Rosa Ursina sive Sol" - A summary*. In: Ber. nat.-med. Verein Innsbruck, Suppl. 13, p. 1, 1996; M. Kemp, *The Science of Art - Optical Themes in Western Art from Brunelleschi To Seurat*, Yale Univ. Press, 1992, p. 192-93.

9 **LANSBERGE, Johan Philip van**. *Commentationes in motum terrae diurnum, & annuum, 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-B^4 ***^{4} ^{2}A-F^4 G^2 H-L^4. [Bound with:] **FROMONDUS, Libertus**. *Vesta sive Ant-Aristarchi vindex, adversus Iac. 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-Y^4. 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, extremties 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 incription on first flyleaf). (#003572) € 4500


PHILIPPI LANSBERGII

COMMENTATIONES

IN MOTVM TERRÆ

Diurnum, & Annuum;

ET IN

VERVM ADSPECTABILIS CÆLI TYPVM.

In quibus ἐπιστημονικῶς oſtenditur, *Diurnum*, *Annuumque Motum*, qui apparet in *Sole*, & *Cælo*, non deberi *Soli*, aut *Cælo*, ſed ſoli *Terræ*: ſimulque *Adſpectabilis Primi Cæli Typus*, ad vivum exprimitur.

Ex Belgico Sermone in Latinum verſæ, à MARTINO HORTENSIO Delfenſi: *vnà cum ipſius* Prefatione, *in quâ* Aſtronomię Braheanę *Fundamenta examinantur; & cum* Lanſbergianâ Aſtronomiæ Reſtitutione *conferuntur.*

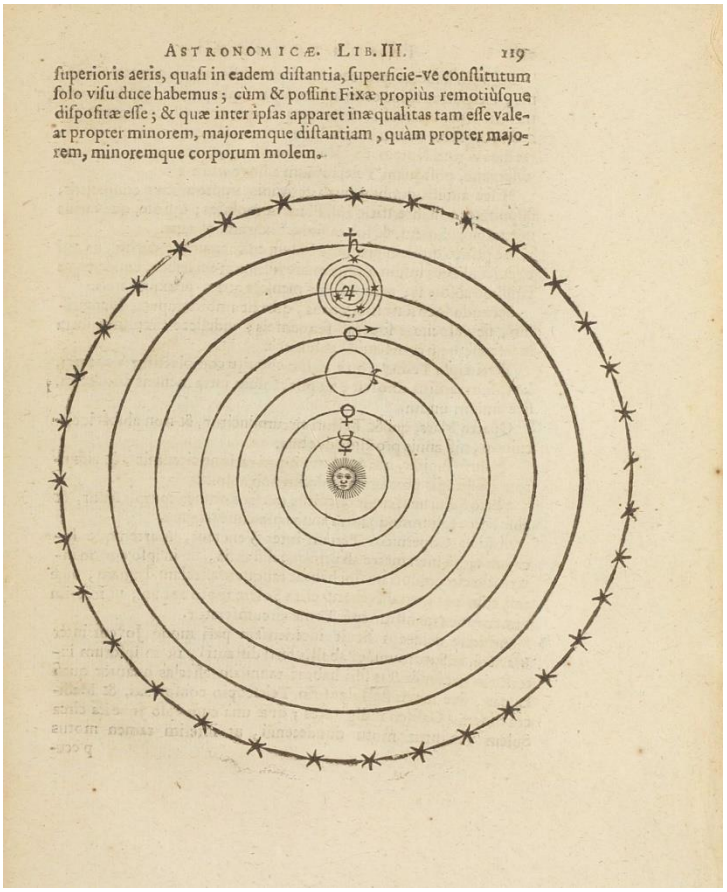
MIDDELBVRGI,

Apud Zachariam Romanum, M. DC. XXX.

Cum Privilegio.

Poggendoff 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 aerdt-kloot* (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).

10 **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-Z^4 Aa-Tt^4. 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


ASTRONOMICÆ. LIB. III. 119

ſuperioris aeris, quaſi in eadem diſtantia, ſuperficie-ve conſtitutum ſolo viſu duce habemus; cùm & poſſint Fixæ propiùs remotiùſque diſpoſitæ eſſe; & quæ inter ipſas apparet inæqualitas tam eſſe valeat propter minorem, majoremque diſtantiam, quàm propter majorem, minoremque corporum molem.

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.

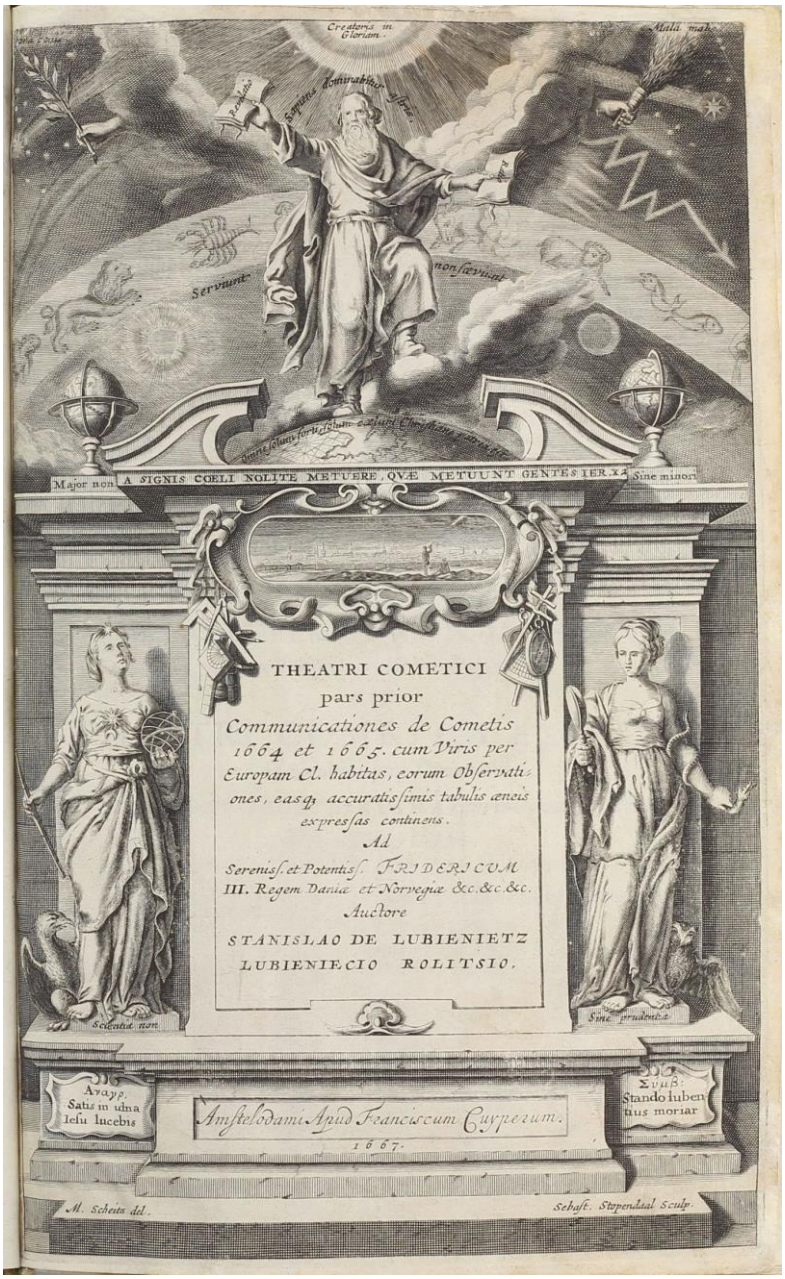
11 **CELLARIUS, Andreas**. *Haemisphaerium stellatum boreale antiquum*. Amsterdam: J. Janssonius, 1660-1661. c. 460 x 545 mm. Engraved map, hand-colored and heightened in gold, from the celestial atlas *Harmonia macrocosmica* (plate 24). Without the publisher's note and the plate number in the engraved plate, which were added to the maps of the second edition in 1708 by Schenk and Valk. Small restored tear next to lower end of centerfold and small restored tear in the upper left margin of the illustration. Matted and framed under UV-protective glass, sealed. The map clean and bright. (#003480) € 2900

Koeman VI, Cel1-24; Warner, *Sky explored*, p.53, 1A. RARE FIRST EDITION of Cellarius' celestial map of the constellations of the Northern Hemisphere showing the stars as seen from the earth. Cellarius is best known for his magnus opus *Harmonia Macrocosmica* which was first issued in 1660 by Jan Jansson as a supplement to Jansson's *Atlas Novus*. The atlas, consists of a series of Celestial Charts, was intended as part of a two-volume treatise on cosmography, which however was never issued.

12 **CELLARIUS, Andreas**. *Haemisphaerium stellatum australe antiquum*. Amsterdam: J. Janssonius, 1660-1661. c. 460 x 545 mm. Engraved map, hand-colored and heightened in gold, from the celestial atlas *Harmonia macrocosmica* (plate 27). Without the publisher's note and the plate number in the engraved plate, which were added to the maps of the second edition in 1708 by Schenk and Valk. Two small restored tears to upper margin, centerfold skillfully restored in places. Matted and framed under UV-protective glass, sealed. The map clean and bright. (#003481) € 2900

Koeman VI, Cel1-27; Warner, *Sky explored*, p.53, 1B. RARE FIRST EDITION of Cellarius' celestial map of the constellations of the Southern Hemisphere Hemisphere showing the stars as seen from the earth. Cellarius is best known for his magnus opus *Harmonia Macrocosmica* which was first issued in 1660 by Jan Jansson as a supplement to Jansson's *Atlas Novus*. The atlas, consists of a series of Celestial Charts, was intended as part of a two-volume treatise on cosmography, which however was never issued.

13 **LUBIENIECKI, Stanislaw**. *Theatrum cometicum, duabus partibus constans, quarum altera frequenti senatu philosophico conspicua, cometas anni 1664 & 1665 variis virorum per Europam clariss / Historia cometarum, a diluvio usque ad praesentem annum vulgaris epoche a Christo nato 1665 decurrentem*. Amsterdam: F. Cuyper, 1666-68. Three parts in one volume including Appendix to part II. Folio (322 x 201 mm). [24], 1-888, [2], 889-966, [6]; [12], 464; [6], 78, [2] pp. With 3 engraved title pages, letterpress title with woodcut device to each part, half title to part II only as called for, engraved portrait of the author by Visscher in part I, another of Johann Ernst Rautenstein (1623-1666) by Sommeren in part III; woodcut initials and tailpieces, 1 woodcut text diagram, 81 engraved plates, of which 5 folding, and 28 double-page and mounted on stubs (57 sheets of plates in part I and 24 in part II). Signatures: *^{6} **^{4} A-6F^{4} 6G-6H^{2}; A^{4} (-A2 +*4) B-3H^{4} 3I^{6} 3K-3M^{4}; pi^{2} A-K^{4} *^{2} (-*2). Unnumbered leaf *1 "Appendix Partis Posterioris" bound in front of engraved title of part III, blank leaf *2 not included, unnumbered and unsigned text leaf bound-in between p. 888 and 889 of part I; unnumbered leaf 6H2 "Addenda imperfecto errorum to part I bound at end of part I. Original contemporary blind-stamped and blind-ruled Dutch vellum (rebacked, boards sonewhat bowed, little soiled and spotted, ties mostly gone). Text and plates only very little browned, few pages with very light, small dampstain to blank upper margin, a few short tears well outside text area, single brown spot to p. 355 of part I. In all very crisp and clean throughout. Provenance: From the library of the Grafschaft von Velen at castle of Raesfeld, Westfalia (ink inscription on first letterpress title and dated October 6, 1717); Jerzy Leskowicz (bookplate to front pastedown and blind stamp to first letterpress title). Our copy conforms in collation with that in Koninklijke Bibliotheek in Amsterdam except for the inserted text leaf between p.888 and 889 which is missing in the copy in Amsterdam. (#003509) € 36,000



VERY RARE FIRST EDITION of this monumental work on comets and the observation of their trajectory, from the Flood to the year 1665. The first part contains a series of thirty-eight reports of observations on the trajectory of the famous comet of 1664-1665, based on the author's correspondence with Jan Heweliusz, Otto von Guericke, Gaspar Schott and several other European scholars. The second part offers a chronology of 415 observations of comets made between 2312 B.C and 1665 A.D. The third is an appendix devoted to the meaning of comets. The numerous illustrations includes a title-frontispiece engraved by Sebastiaen Stopendael after Matthias Scheits, which is repeated at the head of each volume, a portrait of the author engraved by Lambert Visscher, a portrait of Rautenstein by Matthias van Sommeren in the third part, and 83 astronomical diagrams and illustrations engraved on 81 plates by Stopendael, Gerritsz, Gerardi, Veenhuysen, etc. "Since each map represents the observation of a different astronomer, taken together they illustrate the variety of cartographic traditions popular during the 17th century" (Warner). Coming

from a noble family in Raków, Stanisław Lubieniecki (1623-1675) was an astronomer, historian and pastor of the Socinian community of Czarkowy. After the Swedish invasion of Poland, he was constantly under attack from the Lutheran clergy, as "Polish Brother", and had to place himself under the protection of Frederick III of Denmark, in Hamburg, where he remained until his death.

References: Brunet, III, 1194; Graesse, IV, 270; Honeyman 2052; Estreicher XXI, 433; Poggendorff I, 1508; Thorndike VIII, 336; Warner, *Sky explored* 164.

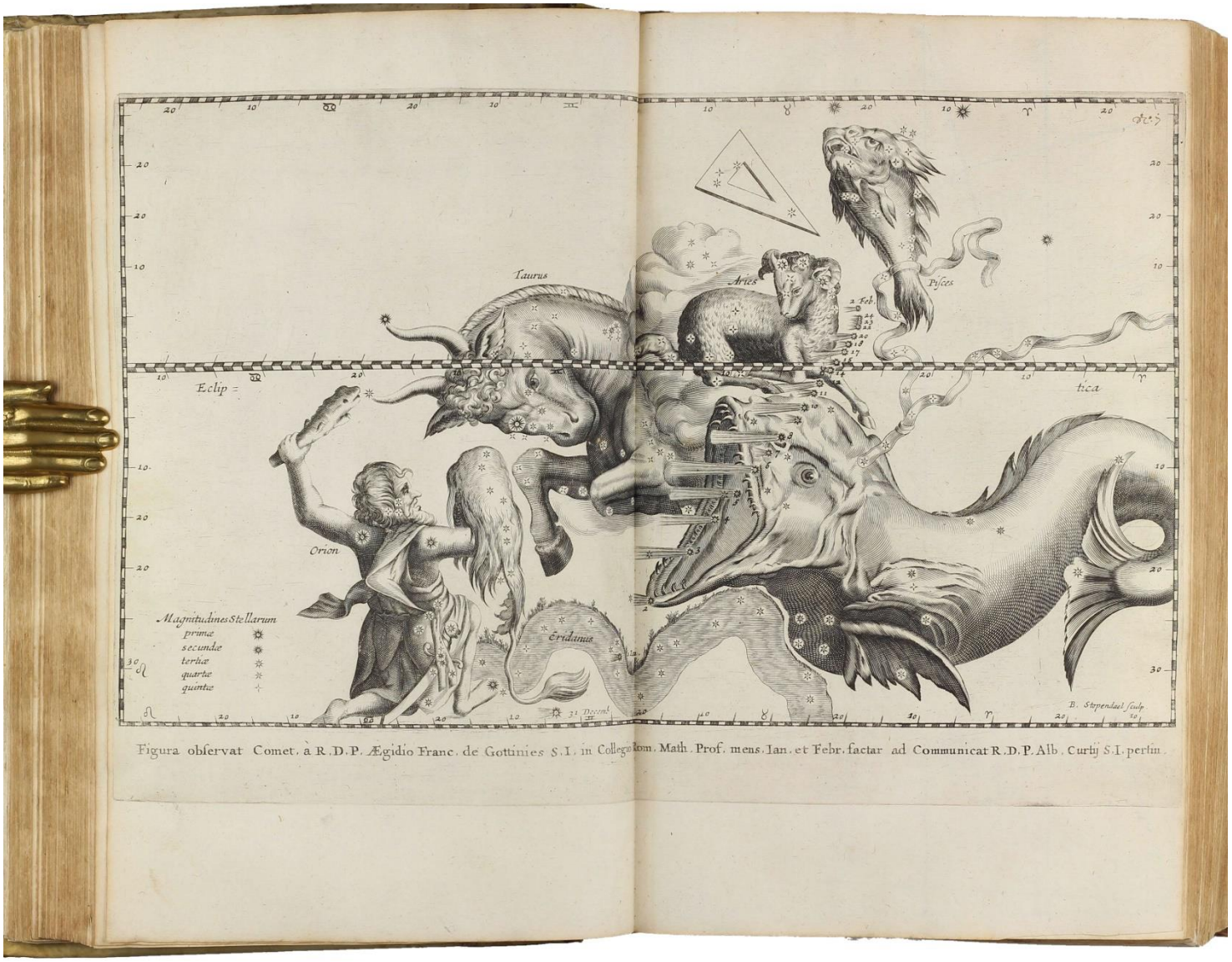
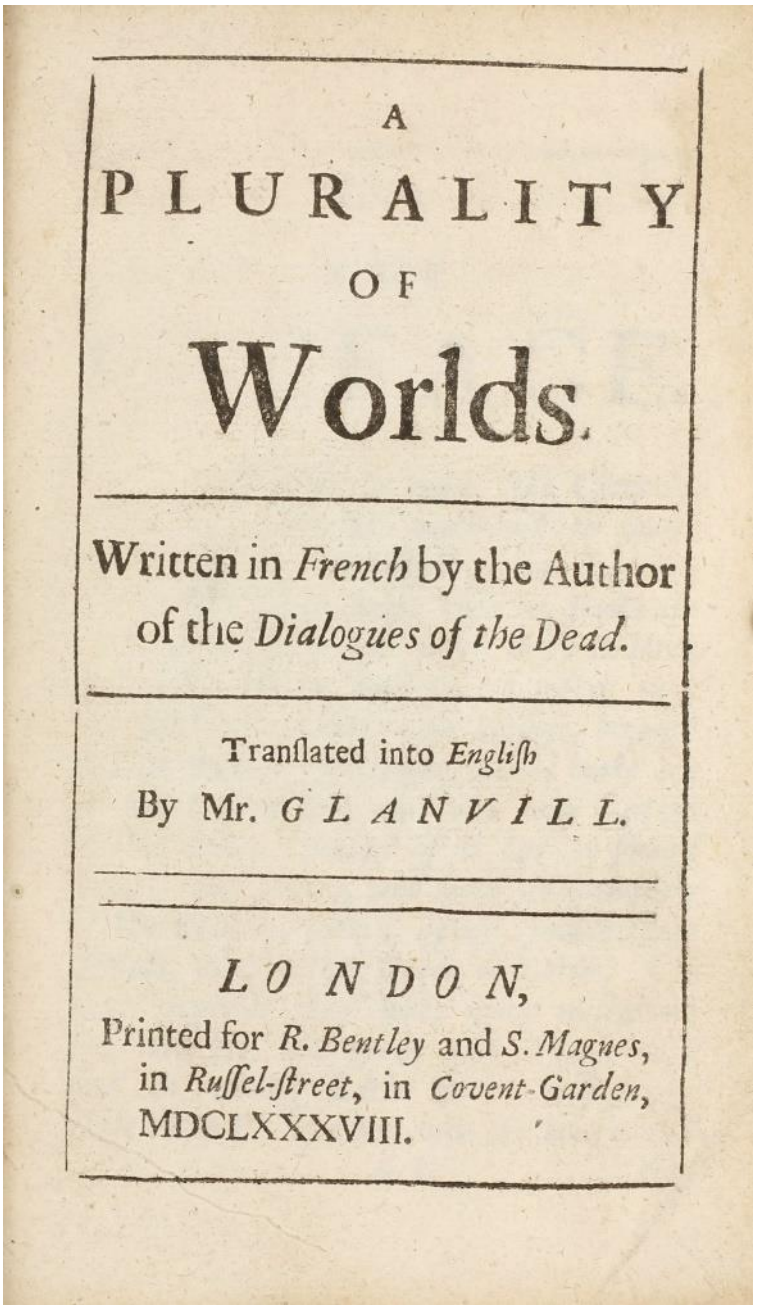


Figura observat Comet. à R.D.P. Ægidio Franc. de Gottinies S.I. in Collegio Com. Math. Prof. mens. Ian. et Febr. factar ad Communicat R.D.P. Alb. Curtij S.I. pertin.

14 **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: A^6 B-K^8 L^4. E4 is a cancel leaf. Contemporary blind-tooled calf, neatly reabacked (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



A
PLURALITY
OF
Worlds.

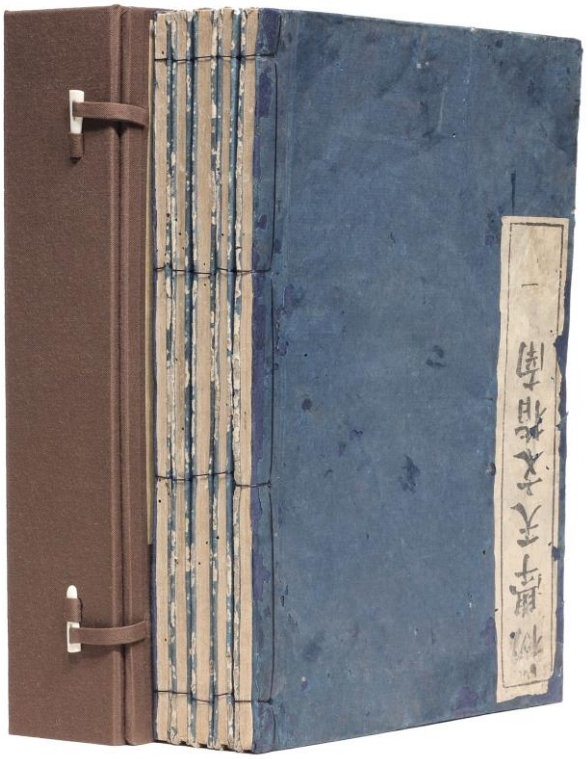
Written in *French* by the Author
of the *Dialogues of the Dead.*

Tranſlated into *Engliſh*
By Mr. *GLANVILL.*

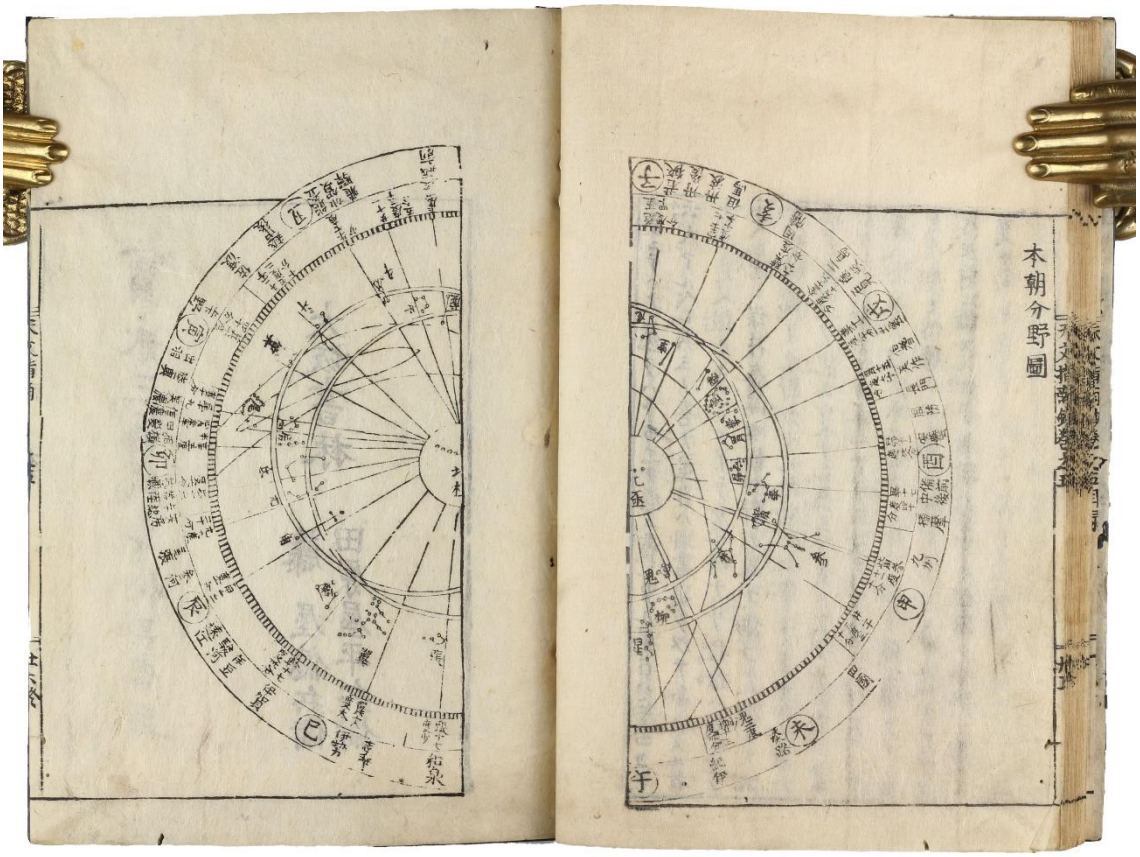
LONDON,
Printed for *R. Bentley* and *S. Magnes,*
in *Ruſſel-ſtreet,* in *Covent-Garden,*
MDCLXXXVIII.

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).

15 **BABA, Nobutake**. 初學天文指南鈔. *Shogaku tenmon shinanshō [Introduction to the Study of Astronomy]*. 5 Volumes. Ōsaka: Narui Mohē, Hōei 3 (= 1706). (260 x 185 mm). With 44 (18 full-page) woodcuts. Caption title. Within single border, text in 12 vertical lines. Xylographically printed and stack-folded double leaves in Japanese stitched bindings. Blue original wrappers with xylographic title label, protected in chemise with toggle catches (some closed wormholes, stitching renewed, little soiled and rubbed). Internally little browned and spotted, few waterstains, wormholes occasionally affecting letters of text. Provenance: Red ownership seal on first leaf recto of each volume. (#003597) € 12,500

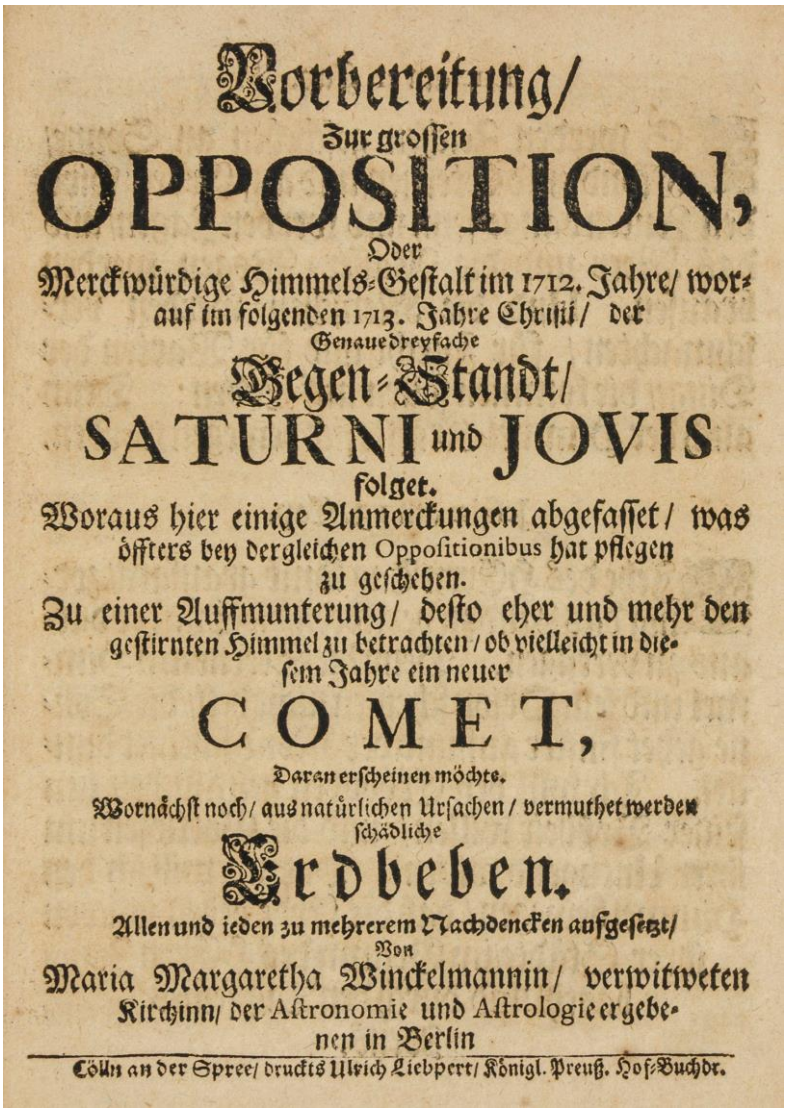


Kraft V, 497; Smith-Mikami 166 with illustr. no. 34. VERY RARE FIRST EDITION, AND ONE OF THE EARLIEST WORKS ON ASTRONOMY PRINTED IN JAPAN. "A well-known work on astronomy, that exerted no little influence at this period" (Smith-Mikami). Towards the end of the 17th century, astronomical works by the Jesuits and their Chinese students came to Japan from China. At that time, the local interest in astronomy was increased by the import of modern astronomical instruments from the Netherlands. Baba (d. 1715) had no knowledge of the heliocentric worldview; his work is strongly influenced by You Yi's "Tianjing huowen", published in China around 1675, and by neo-Confucianism. The illustrations mainly show constellations and astronomical instruments, a map of the world is particularly noteworthy, a simplified copy based on the second edition of Matteo Ricci's map published in Nanking in 1600, of which no copy has survived. In 1720, the eighth Shogun, Tokugawa Yoshimune, rescinded a prohibition on Chinese books containing European science that had been in force in Japan since 1630. Thereafter, the ban pertained only to books concerning Christianity or written by Christians.



By one of the earliest women astronomers and the first to have discovered a comet

16 **KIRCH, Maria Margaretha [geb. WINCKELMANN]**. *Vorbereitung, zur grossen Opposition, oder merckwürdige Himmels-Gestalt im 1712. Jahre, worauf im folgenden 1713. Jahre Christi, der Genaudreyfache Gegen-Standt, Saturni und Jovis folget. Woraus hier einige Anmerckungen abgefasset, was öffters bey dergleichen Oppositionibus hat pflegen zu geschehen. Zu einer Auffmunterung, desto eher und mehr den gestirnten Himmel zu betrachten, ob vielleicht in diesem Jahre ein neuer Comet, daran erscheinen möchte; Wornächst noch, aus natürlichen Ursachen, vermuthet werden schädliche Erdbeben. Allen und ieden zu mehrerem Nachdencken aufgesetzt, von Maria Margaretha Winckelmannin, verwitweten Kirchinn, der Astronomie und Astrologie ergebenen in Berlin*. Cölln an der Spree (Berlin): Ulrich Liebpert, Königl. Preuss. Hof-Buchdruckerei, 1712. 4to (212 x 167 mm). 24 pp., 1 folding engraved plate, woodcut initials and headpieces. Signatures: A-C^4. Near contemporary simple paper wrappers (dust soiled, minor edge chipping and fraying). Text somewhat browned and spotted, minor marginal dust-soiling to title and final page. (#003470) € 14,500


Vorbereitung/
Zur groſſen
OPPOSITION,
Oder
Merckwürdige Himmels-Gestalt im 1712. Jahre/ worauf im folgenden 1713. Jahre Christi/ der
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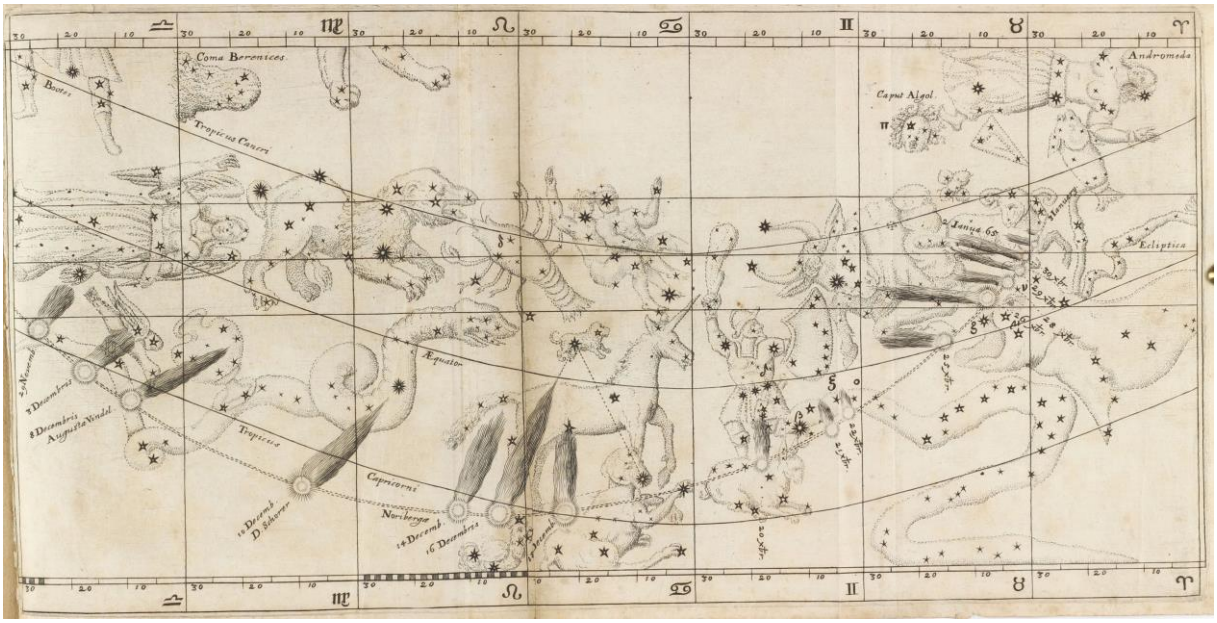
Daran erscheinen möchte.
Wornächst noch/ aus natürlichen Ursachen/ vermuthet werden schädliche
Erdbeben.
Allen und ieden zu mehrerem Nachdencken aufgesetzt/
Von
Maria Margaretha Winckelmannin/ verwitweten Kirchinn/ der Astronomie und Astrologie ergebenen in Berlin
Cölln an der Spree/ druckts Ulrich Liebpert/ Königl. Preuß. Hof-Buchdr.

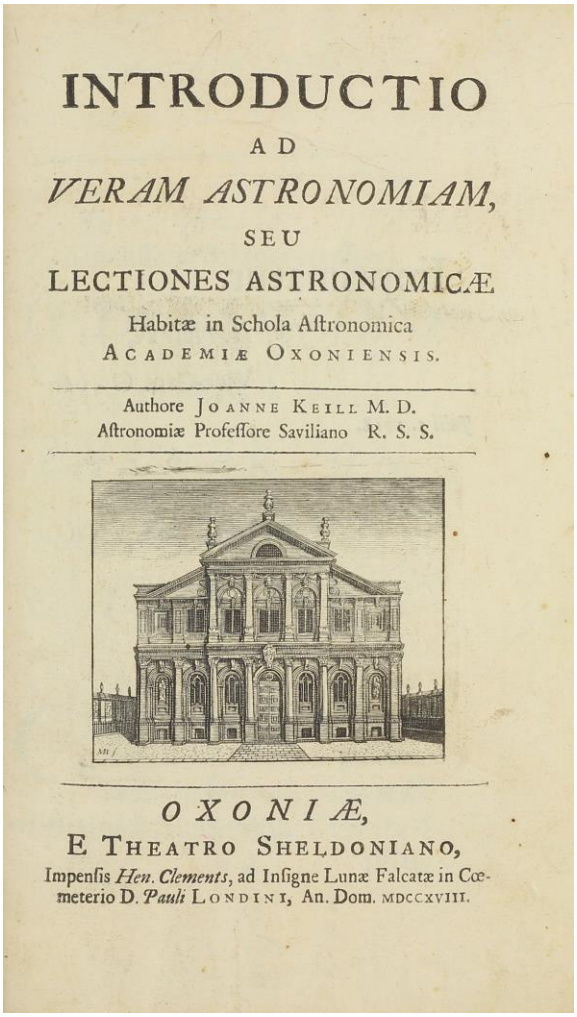
EXCEPTIONALLY RARE AND ONLY EDITION of the first known women astronomer who discovered a comet (comet C/1702 H1). Maria Margaretha Kirch (born Winkelmann) was the youngest of three daughters of the Lutheran pastor Matthias Winkelmann (+1682) and the book and cloth merchant's daughter Maria Töllner (+1683). The father is said to have awakened and promoted her interest in astronomy . . . Presumably as a servant, Maria Margaretha joined the household of the peasant astronomer Christoph Arnold and friend of Justinus Töllner, where she acquired basic knowledge and experience in the field of astronomical observations and where she met her future husband, the widowed astronomer and calendar maker Gottfried Kirch. Kirch gave Arnold lessons in astronomy and made observations with him. In May 1692 she married Gottfried Kirch, whom she supported with the observations and calculations . . . Maria Margaretha Kirch discovered the comet of 1702, making it the first woman to discover a comet. She also made observations on the variable star Mira Ceti. The discovery of the comet had been published by her husband, but in the year of his death Kirch referred to his wife's achievement in an academic pamphlet. Encouraged by this, she applied to succeed her husband at the Academy of Sciences, but after a long-lasting deliberation, her petition was rejected by the Executive Council in 1712 because of her gender. Gottfried Leibniz, the president of the Academy at that time was alone in supporting her petition. In 1712 she published about the upcoming great conjunction of Jupiter and Saturn, a well-received pamphlet in which she also predicted a new comet. Kirch continued her astronomical research at the observatory of Baron von Krosigk until his death in 1714. During this time she compiled astronomical calendars for the cities of Wroclaw and Nuremberg and published other observations. From 1716 she was allowed to work again at the Academy of Sciences this time as assistant to her son Christfried Kirch, but in the following year she was banned from the academy's premises due to her scientific expertise. She died a few years later. (Source: Wikipedia).

This treatise is of exceptional rarity. OCLC locates but four copies worldwide: two in Germany (Univ. Bibl. Münster, Deutsches Museum München), one in the U.K. (NLS Edinburgh), and one in the USA (Duke Univ. Durham).

References: Poggendorff I, 1258; DSB VII, 373f; Londa Schiebinger, *Maria Winkelmann at the Berlin Academy: A Turning point for women in science*; in: ISIS 78 (1987), pp. 174-200; Emily Winterburn, 6 women who changed astronomy and spaceflight, BBC SkyatNight Magazine, Immediate Media Company Ltd 2021 (online resource).



17 **KEILL, John**. *Introductio Ad Veram Astronomiam seu Lectiones Astronomicae Habitae in Schola Astronomica Acadamiae*. Oxford: Hen. Clements, 1718. 8vo (205 x 124 mm). [8], xv [1], 495 [1] pp., engraved title vignette, dedication and preface, 2 folding engraved plates of the moon by M. Burghers, woodcut diagrams in text, several full-page. Contemporary calf, spine with gilt lettered morocco label and rich gilt decoration, sprinkled edges, marbled pastedowns, lower edge partly uncut (boards heavily scratched, joints at spine ends wormed and partly cracked, extremities worn). Text somewhat browned troughout, occasional minor foxing. Provenance: Speyer & Peters, Buchhandlung (sticker to front pastedown). Very good copy in untouched binding. (#003457) € 1200



INTRODUCTIO
AD
VERAM ASTRONOMIAM,
SEU
LECTIONES ASTRONOMICÆ
Habitæ in Schola Aſtronomica
ACADEMIÆ OXONIENSIS.

Authore JOANNE KEILL M. D.
Aſtronomiæ Profeſſore Saviliano R. S. S.

OXONIÆ,
E THEATRO SHELDONIANO,
Impenſis *Hen. Clements*, ad Inſigne Lunæ Falcatæ in Cœmeterio D. *Pauli* LONDINI, An. Dom. MDCCXVIII.

DSB VII, 275-76; Houzeau & Lancaster 9244; Roller-Goodman II, 28; Wallis 103.17; Whitaker, p.89; Brown, *Astronomical Atlases* 195. FIRST EDITION of Keill's lectures as Savillian Professor of Astronomy at Oxford. "His work was later translated into English at the request of the Duchess of Chandos. Partly because of its skillful popularization and spirited defense of Newton in his priority dispute with Leibnitz, the English version was reprinted several times during the eighteenth century, well after Keill's own death in 1721. It appears to have been a standard reference for students and educated lay people as late as 1750 and was translated into several European languages, including French, German, and Dutch . . . Keill's book contained a simplified version of Hevelius' map P (with the Riccioli/Grimaldi nomenclature imposed upon it). Keill added to it a new name, Flamsteedius, located in the southwest quadrant. This was apparently done while John Flamsteed . . . was still alive." (Scott L. Montgomery, *The Moon & the Western Imagination*, p. 206).

18 *De Montibus Lunaribus.*

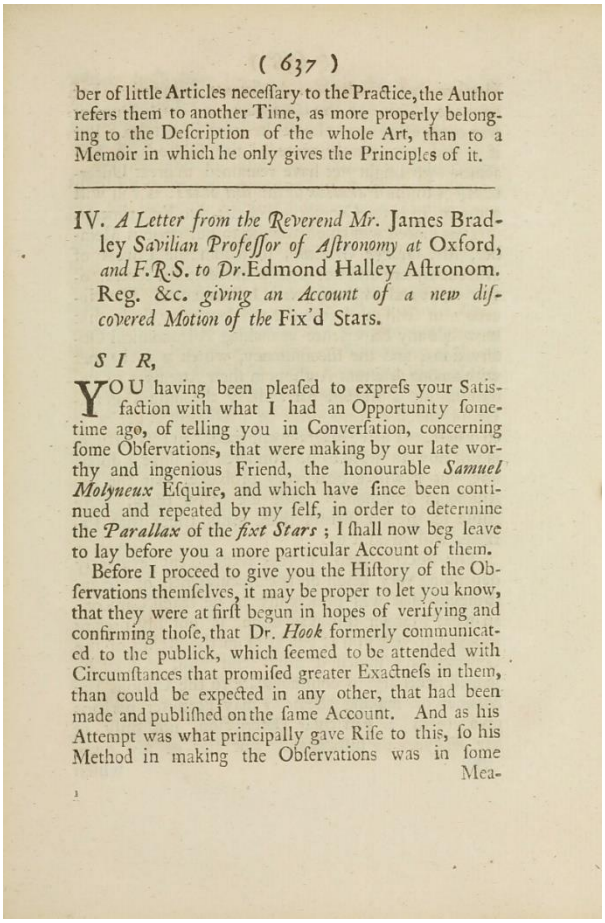
Teleſcopia) accurate depinxerunt Aſtronom
Selenographi Florentius Langrenus, Joann
Hevelius, Maria Grimaldus & Ricciolus;
ſplendentes quoque partes annotaverunt,
quo melius diſtinguantur iis nomina impoſu
runt. Langrenus & Ricciolus regiones Lu
res inter Philoſophos alioſque inſignes vi
diſtribuerunt. quælibetque pars nomen celeb
cujuſdam philoſophi, vel Mathematici, accep
At Hevelius veritus, ne de diviſione agrorum
lites inter philoſophos orirentur; Ditiones L
nares ab omnibus eripuit, & Geographica
ſtræ Telluris nomina in Lunam tranſtulit,
habito ad figuram aut ſitum reſpectu.

LECTI

Introductio ad veram Aſtronomiam pag. 118.

18 **BRADLEY, James**. *A Letter from the Reverend Mr. James Bradley Savilian Professor of Astronomy at Oxford, and F.R.S. to Dr. Edmond Halley Astronom. Reg. &c. Giving an Account of a New Discovered Motion of the Fix'd Stars*. In: Philosophical Transactions of the Royal Society of London for 1727-28, vol. 35, no. 406, pp. 637-661. London: Printed for W. Innys, 1729. Entire volume offered: [6], 293-661 [1] pp., including general title, drop titles for individual numbers, content leaves outside pagination, and 14 engraved folding plates. Contemporary panelled calf (spine rebacked, extremities worn, corners heavily scuffed. Text and plates somewhat browned, dust-soiled (some pages stronger), occasional spotting, the general title creased, some creasing, dog-earing elsewhere, 2 leaves after title detached. Provenance: John Waterhouse Halifax, Halifax Literary & Philosophical Society (bookplates to front pastedown). (#003426) € 8000

Sparrow 28; Evans 21. FIRST EDITION of the letter by James Bradley about the discovery of the aberration of light. "The explanation of the phenomenon placed Bradly among the great astronomers of the 18th century" (Evans).



(637)

ber of little Articles neceſſary to the Practice, the Author refers them to another Time, as more properly belonging to the Deſcription of the whole Art, than to a Memoir in which he only gives the Principles of it.

IV. *A Letter from the Reverend Mr.* James Bradley *Savilian Profeſſor of Aſtronomy at* Oxford, *and F.R.S. to Dr.* Edmond Halley Aſtronom. Reg. &c. *giving an Account of a new diſcovered Motion of the* Fix'd Stars.

SIR,

YOU having been pleaſed to expreſs your Satisfaction with what I had an Opportunity ſometime ago, of telling you in Converſation, concerning ſome Obſervations, that were making by our late worthy and ingenious Friend, the honourable *Samuel Molyneux* Eſquire, and which have ſince been continued and repeated by my ſelf, in order to determine the *Parallax* of the *fixt Stars*; I ſhall now beg leave to lay before you a more particular Account of them.

Before I proceed to give you the Hiſtory of the Obſervations themſelves, it may be proper to let you know, that they were at firſt begun in hopes of verifying and confirming thoſe, that Dr. *Hook* formerly communicated to the publick, which ſeemed to be attended with Circumſtances that promiſed greater Exactneſs in them, than could be expected in any other, that had been made and publiſhed on the ſame Account. And as his Attempt was what principally gave Riſe to this, ſo his Method in making the Obſervations was in ſome Mea-

Bradly is best known for two fundamental discoveries in astronomy, the aberration of light, and the nutation of the Earth's axis. Delambre says: "It is to these two discoveries by Bradley that we owe the exactness of modern astronomy. ... This double service assures to their discoverer the most distinguished place (after Hipparchus and Kepler) above the greatest astronomers of all ages and all countries." (J.B.J. Delambre *Histoire de l'astronomie au dix-huitième siècle*, 1827, p. 413).

Bradley worked with Samuel Molyneux until Molyneux's death in 1728, trying to measure the parallax of Gamma Draconis. "If the Copernican theory was correct it ought to be possible to observe an annual parallax of the stars. In fact within the last three decades of the seventeenth century a number of striking observations had revived the interest in parallaxes. At the time of [Bradley's] voyage to Uraniborg (begun in 1671) Jean Picard noticed annual variations in the position of the polar star extending to nearly 40", but - and this is very remarkable - after having studied them he concluded that they could not be explained either by refraction or by parallax. A few years later, in 1674, Robert Hooke made similar observations and lacking Picard's prudence and method, he thought they were parallactic effects. Flamsteed made many observations between 1689 and 1697, and explained them in the same way as Hooke. However in 1699, J. Cassini proved that the parallax would produce very different effects. A similar demonstration was given by E. Manfredi, but neither of them suggested the true explanation. Bradley's success was due not only to his excellent instrumental means, to his own perfect experimental technique, but as well to his thoroughness and persistence. In that he was almost the opposite of Hooke [. . .] who took part in almost every scientific controversy of his time but hardly ever succeeded in achieving anything of great importance because he did not carry his investigations deeply enough and never reached the bedrock of any problem. Bradley is one of the best examples of the 'classical' type of scientists as opposed to the 'romantic' type. His thoughts were deep rather than brilliant and they matured but very slowly; he was anxious to improve his observations to the limit of his experimental possibilities and he succeeded in doing so; moreover he was all the time trying to improve the instruments themselves and to detect and measure their errors. Being inhibited by an extraordinary fear of error he published very little. [. . .] With regard to the aberration, [. . .] Bradley did not simply discover it but that his determination of it was, considering his instrumental means, extremely accurate. He concluded that the maximum aberration was included between 40" or 41" [. . .]; the value of the constant of aberration accepted to-day is 20" 47 (that is 40" 94 for the whole axis). He deduced from this value the speed of light, and found that the sunlight would reach us in 8 m. 13 sec. (our present estimate is 8 m. 19 sec.)" (Bradley, James, Edmond Halley, and George Sarton. *Discovery of the Aberration of Light*. In: Isis 16, no. 2 (1931), pp. 233–65).

19 **YOU YI.** 天經或問.*Tenkei wakumon* [Chinese: *Tianjing huowen = Some questions about Astronomy*]. 3 volumes in classical Chinese (方密之先生鑑定 / 閩中游子六輯著 / 天経或問 / 書林大集堂梓) and 1 Appendix volume by **Nishikawa SEIKYU** in Japanese. 大略天學名目鈔 : 天經或問附. Tairyaku tengaku myōmokushō. Tenkei wakumon furoku. Mixed edition: Vol. 2 and 3: Nihonbashi, Edo Shōyōken, Yorozuya Seibē, Kyōhō 15 [1730]; Vol. 1: Edo Sūzanbō, Kobayashi (Suharaya) Shinbē, Kyōhō 15 [1730]; Dates, locations and printer's names from colophon for the first 3 vols. Vol. 2 and 3: single-line border on all four sides, no vertical guide lines, no 'fishtails' at the center of the folio; 9 columns of 24 characters each per page. Book size ca. 265-275 x 175 mm. Xylographically printed on folded sheets of native paper, with 19 (10 double-page) astronomical illustrations and maps. Original brown wrappers with 3 (of 4; 1 chipped with loss) xylographic title-slips (some worming, staining and soiling, stronger to appendix, partly reinforced, stitching renewed). Printed paper with minor browning and some spotting or minor waterstaining in places, some marginal worming, occasionally affecting the text and causing some loss at inner margins of first few leaves. Provenance: red seal to mikaeshi or first leaves. (#003600) € 35,000

EXCEEDINGLY RARE FIRST EDITION, first issue of vols. 2 and 3, third issue of vol. 1, of the classical Chinese textbook of astronomy printed in Japan. No copy of the Chinese original edition of c.1672 has obviously survived. According to Hiraoka, vol. 2 and 3 belong to designated Group A, vol. 1 to group C. The Appendix vol. 4 cannot be assigned to any of the yet known groups A to H (Hiraoka, p. 97). Of the first issue (Qing printed edition, group A) only two copies (referred to as the 'Dajitang edition' after the publisher shown inside the cover) are known to exist in Japanese libraries, one (defective with missing parts) in the Cabinet Library of the National Archives of Japan and the other in the Library of the Faculty of Education, Shiga University).

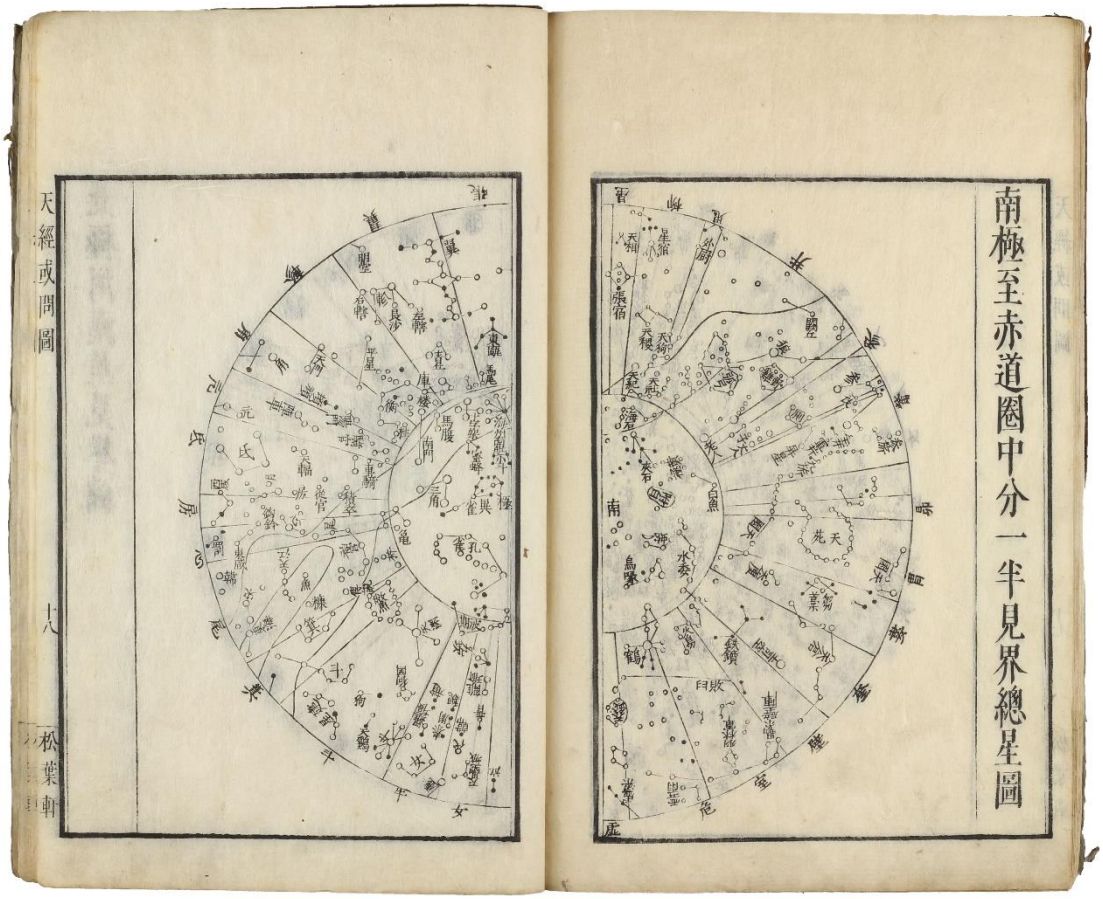
The work was edited and supplemented by an extensive appendix with explanations in Japanese by Nishikawa Seikyū (1693-1756). In his presentation, You already takes into account the Western astronomy brought to China by Matteo Ricci, Adam Schall von Bell, Ferdinand Verbiest and other Jesuits, which came to Japan for the first time this way. His work had a significant influence on the development of Japanese astronomy, particularly Shibukawa Harumi. "In his references to Western theory, Harumi based his information exclusively on *T'ien-ching huo-wen*, by Yu I . . . Harumi was especially impressed by its clear explanation, using a geometrical model of eclipses, which he had never found in Chinese calendrical writings" (DSB). The many illustrations in this work include celestial maps, a simplified version of the famous world map by Matteo Ricci and a beautiful double-page map of China at the beginning of the Qing Dynasty.

"*Tianjing huowen* was first printed in Edo in 1730 by the publisher Shōyōken Yorozuya Seibē 松葉軒萬屋清兵衛 with Nishikawa Seikyū, a Japanese astronomer, editing the text and supplying kunten. Scholars have previously noted four different variants of this book, each with a different colophon, but all are considered part of the same edition. [Hiraoka] [. . .] has identified four more versions of the printed text with hitherto unreported colophons, necessitating a comparison of the eight versions to establish their order of appearance. [He] divides the 67 printed copies of this work now preserved in Japan, China and South Korea into eight groups labelled A to H in presumed printing order." [. . .] All of the copies [. . .] were printed from the Shōyōken's original blocks. All have the name 'Shōyōken' in their block center, and it is unlikely that the publisher name would have been retained if new blocks had been created using kabusebori or similar techniques. Even more important evidence is provided by the gaps in the outside borders [. . .] Comparing these gaps is known to be an effective way of distinguishing whether similar-looking editions were printed from the same blocks or not. These gaps result from damage to the blocks themselves, meaning that copies with the same gaps are from the same edition, and the more gaps a copy has, the later in the printing run it was produced. In early modern Japan, gaps in the text itself were amended with techniques like ireki 入木 in which a smaller piece of wood was embedded in the original block, but gaps in

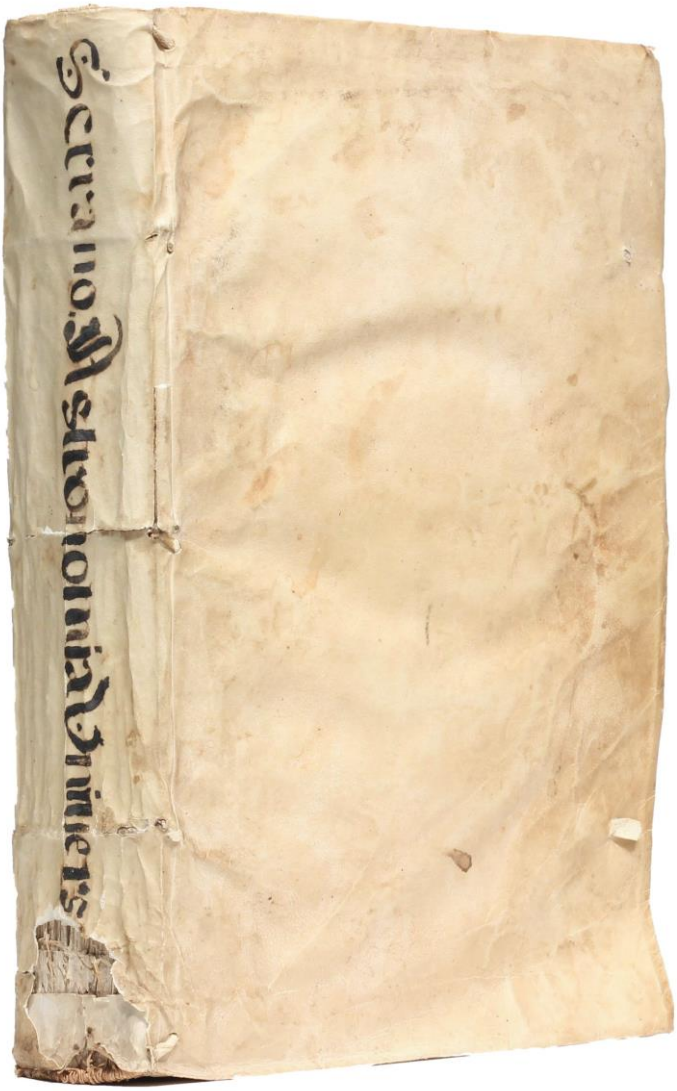
the outer border did not affect the legibility of the text and were therefore often left unamended [. . .] Group A's colophon and inside cover note states that the book was printed in 1730 by Shōyōken Yorozuya Seibē. Given that the 'Shōyōken' in the block center survives in all other copies, this group must have been the original (first) Japanese printed edition. The colophon information and border gaps evolve steadily through the series of groups, from A to B to C and so on; note in particular that gaps observed in an earlier group are never absent from later groups." (Hiraoka, p. 98). Vol. 1 of this set belong to designated group C. "Published by Sūzanbō Kobayashi (Suharaya) Shinbē 嵩山房小林新兵衛, also based in Nihonbashi. The inside cover and colophon are the same as Group B, except with the publisher name updated. Many copies have covers of thin, plain light brown paper. It seems that Sūzanbō obtained the blocks for Tianjing huowen from Wakanaya along with the blocks for Irie's commentary: Sūzanbō also printed Irie's commentary, and its colophon is the same as the Wakanaya printing with the publisher name recarved to 'Rights purchased by Sūzanbō Kobayashi Shinbē' (嵩山房 / 小林新兵衛求版)."

"The *Tianjing huowen* brought to Japan about 1672-79, combined ancient Chinese theories of the natural philosopher Zhu Xi (1130-1200), and the recent philosophical opinions of Fang Yizhi (1611-71) with knowledge that had been obtained from the Jesuits [. . .] Of particular importance was its illustration of the stars around the South Pole, which had not been shown on previous celestial maps; the book therefore provided the Japanese with their first knowledge of such stars" (Miyajima p. 585). The original Chinese first edition of c. 1672 does not seem to have survived, with the earliest extant Japanese edition of 1730 surviving in only a few copies. The work escaped censorship and was allowed to be imported into Japan "because of its purely astronomical nature [. . .] During the Tokugawa period everyone with an interest in astronomy read it" (Nakayama p. 101). The highly influential Jesuits, Matteo Ricci and Ferdinand Verbiest, who introduced western knowledge of cartography and astronomy to China, are specifically mentioned in the text and the maps in the present example are entirely based on their work. The terrestrial maps are of particular interest: four separate maps form a double-hemisphere world map, including a southern hemisphere with a very distinctively-shaped Australia joined to a southern continent.

Literature: Miyajima Kazuhiko, *Japanese Celestial Cartography before the Meiji Period'*, p. 584 ff. (in: *History of Cartography*, vol. 2, no. 2); DSB XII, 404 & XV, 733; Nakayama, *A history of Japanese astronomy* (Cambridge MA, 1969), pp. 101-104. FUNG, KW. *You Yi and his Tianjing huowen Qian hou ji.* In: The 7th International Conference on the History of Science in China, Shenzhen University, Shenzhen, China, 16-20 January 1996, 15 pp.; HIRAOKA, Ryuji. *Printed Editions and Manuscripts of Tianjing Huowen*. In: Historia Scientiarum, Vol. 29-1, 2019.



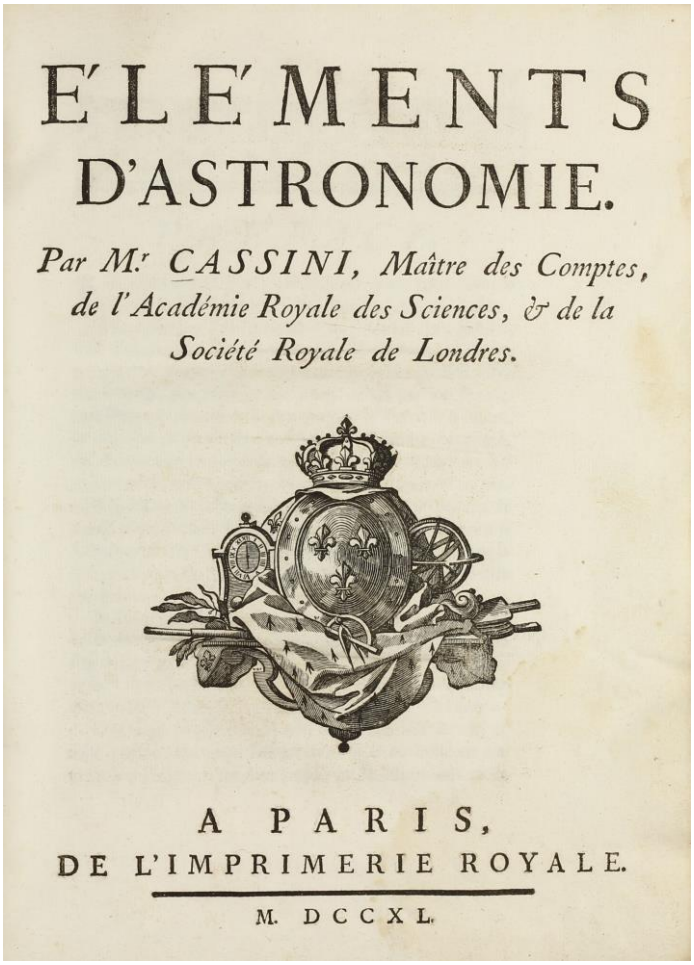
20 **SERRANO, Gonzalo Antonio**. *Astronomia universal theorica, y practica, conforme a la doctrina de antiguos y modernos astronomos, con methodo facil . . . : Tomo primero, contiene toda la doctrina del primer mobil y explica las direcciones astronomicas . . . y sus calculos con todas las tablas necesarias ; [-Tomo segundo, de la astronomia universal comprehende ocho tratados].* Cordoba: for the author by Pedro Arias de la Vega and Domingo Acosta, 1735. Two parts in one volume. [56], lxxxxv, 442, [204] pp., woodcut initials, head- and tailpieces, woodcut diagrams, letterpress tables, title to second part, general index at end. Signatures: §-14§², ¶-24¶², A-F⁴, G⁸, I-Z², Aa-Zz², Aaa-Zzz², Aaaa-Zzzz², Aaaaa-Llll2, A-Z², Aa-Zz², Aaa-Eee². [Bound with:] **SERRANO, Gonzalo Antonio**. *Geometria selecta, theorica, y practica, con methodo sylogistico mui especial, para facilitar la inteligencia, y demonstracion de los theoremas, y problemas mas excelentes, y utiles para astronomos, cosmographos, geometras, arquitectos, ingenieros pilotos, y otros artifices*. Cordoba: printed for the author at la calle del Cistèr, 1736. [6], 56 pp., including half-title, preliminary leaf of introduction, woodcut initials and diagrams. Signatures: [pi]2, A-C⁴, D-L². Two works bound in one. Folio (301 x 205 mm). Contemporary limp vellum, ink-lettered spine (vellum over spine chipped at foot, laces gone, vellum soiled and spotted). Text bright and crisp with only very minor occasional spotting. In first work 3 bifolios G3-8 of Gregorian calendar detached and bifolio F2-3 working loose and slightly frayed at fore-margin, in second work final page somewhat soiled, light pale dampstaining to lower corner of a few leaves. Provenance: contemporary inscription on title-page (partly erased) from Antequera (Malaga); Fr. Diego of the Discalced Trinitarians, inscription on title-page verso dated 1746. A very good, unsophisticated copy. (#003635) € 2500



FIRST EDITION. Serrano, a Cordovan physician and mathematician, set up his own print shop to produce his books, which was active between 1730 and 1758. The first work is a survey of astronomy and astrology, with a preliminary section containing an alphabetical listing of astronomers through history. The final leaf of the first part indicates the contents of a planned second volume, which was never published. The second work is based on Euclid's Elements. Both works are often found together.

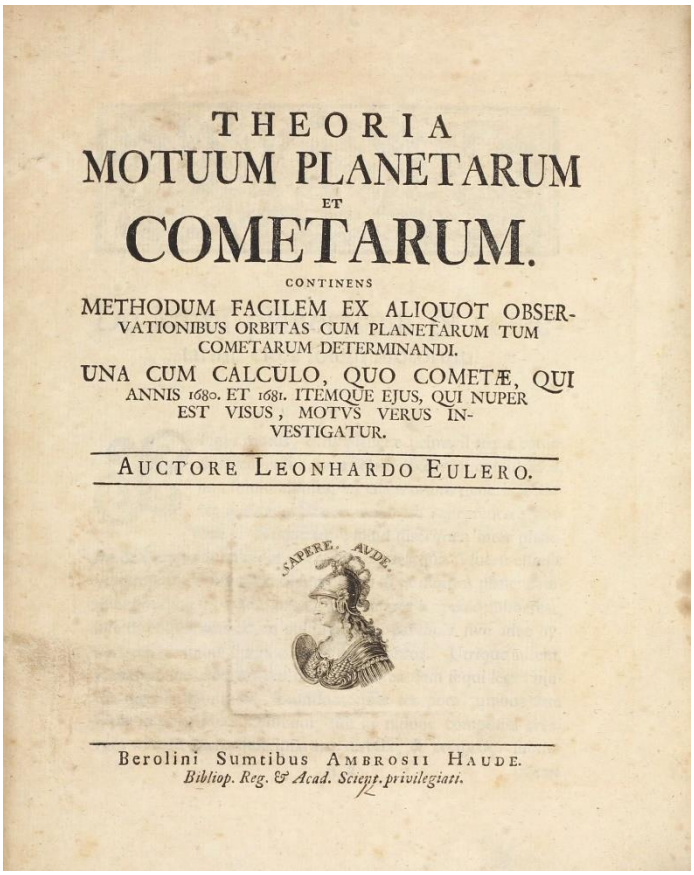
References: I. Houzeau & Lancaster 9250; I+II: Palau 310340.

21 **CASSINI, Jacques**. *Éléments d'astronomie*. Paris: Imprimerie Royale, 1740. xvi, [12], 643 [1] pp., title with woodcut device, woodcut initials, head- and tailpieces, a few woodcutr diagrams in text, 21 folding engraved plates. **CASSINI, Jacques**. *Tables astronomiques du soleil, de la lune, des planetes, des étoiles fixes, et des satellites de Jupiter et de Saturne*. Paris: Imprimerie Royale, 1740. Two parts in one volume. xiv, [6], 120, 222, [2] pp., large engraved headpiece and initial on p. [1], 5 folding engraved plates and errata leaf bound at end, woodcut text diagrams in first part. 4to (251 x 188 mm). Uniformly bound in contemporary French sprinkled calf, spine with gilt-lettered spine labels and gilt decoration, red-sprinkled edges, original marbled endpapers (boards rubbed and stained, some wear to extremities). Text and plates clean and bright with only very little age-toning and occasional minor spotting, light dampstaining at lower corner of preliminary leaves in vol. I and a few leaves in vol. II, ink annotation in vol. I. A very good set. (#003456) € 2200


ELEMENTS
D'ASTRONOMIE.
Par M.r CASSINI, Maître des Comptes, de l'Académie Royale des Sciences, & de la Société Royale de Londres.
A PARIS,
DE L'IMPRIMERIE ROYALE.
M. DCCXL.

Houzeau-Lancaster 12793 and 9251; Macclesfield 492-493; Poggendorff I, 390; DSB III, p.105. - FIRST EDITIONS of Cassini's manual of astronomy and his collection of astronomical tables. Son of the astronomer Gian Domenico Cassini, Jacques Cassini's areas of interest leaned towards the study of planets and their satellites. While his observations yielded some important results, his biases as a Copernican and Cartesian, but not a Newtonian, considerably lessened their theoretical value. Jacques Cassini also published numerous papers in the Histoire de l'Académie des sciences, to which he had been admitted as a student in 1694 and where he succeeded his father as a pensionnaire in 1712. In the late 1690s he travelled to England, where he met Newton, Halley and Flamsteed and was admitted to the Royal Society.

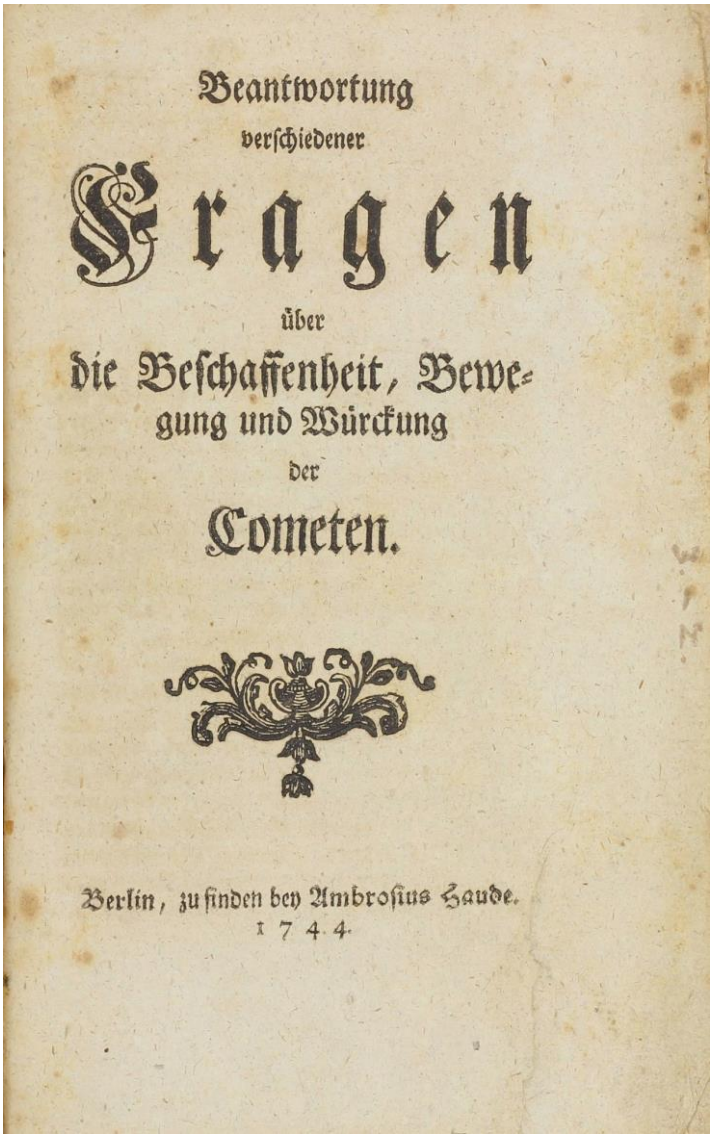
22 **EULER, Leonhard.** *Theoria motuum planetarum et cometarum. Continens methodum facilem... orbitas cum planetarum cum cometarum determinandi, una cum calculo, quo cometae, qui annis 1680 et 1681... motus verus investigatur*. Berlin: Ambrosius Haude, 1744. 4to (228 x 188 mm). [3] 4-187 (i.e. 186) 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


THEORIA
MOTUUM PLANETARUM
ET
COMETARUM.
CONTINENS
METHODUM FACILEM EX ALIQUOT OBSERVATIONIBUS ORBITAS CUM PLANETARUM TUM COMETARUM DETERMINANDI.
UNA CUM CALCULO, QUO COMETÆ, QUI ANNIS 1680. ET 1681. ITEMQUE EJUS, QUI NUPER EST VISUS, MOTUS VERUS INVESTIGATUR.
AUCTORE LEONHARDO EULERO.
SAPERE AUDE.
Berolini Sumtibus AMBROSII HAUDE.
Bibliop. Reg. & Acad. Scient. privilegiati.

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; Enestrom "Euler" 66; DSB IV, p.471; Roller-G. I, 375; Debnath, *The Legacy of Leonhard Euler*, p.364.

23 **EULER, Leonhard; WIEDEBURG, J. B.; KIRCH, Margaretha**. I. [**EULER, Leonhard**]. *Beantwortung verschiedener Fragen über die Beschaffenheit, Bewegung und Würckung der Cometen. - Fortgesetzte Beantwortung der Fragen über die Beschaffenheit, Bewegung und Würkung der Cometen*. Two parts in one volume. Berlin: Ambrosius Haude, 1744. 56; 92, [2] pp., including woodcut device to each title, woodcut initials, head- and tailpieces, errata leaf and 3 folding engraved plates bound at end. [Bound before:] II. **WIEDEBURG, J. B**. *Astronomisches Bedenken ueber die Frage Ob der bevorstehende Untergang der Welt natürliger Weise entstehen ins besondere durch Annäherung eines Cometen zur Erden werde befördert werden . . . Nebst einer vollständigen Nachricht des Cometen welcher vom December des 1743sten Jahres an noch jetzo erscheinet*. Jena: Johann Adam Melchior, 1744. [22], 200 pp. Engraved frontispiece showing constellation and comet trajectory as of January 3, woodcut initials, head- and tailpieces. 8vo (187 x 125 mm). Original paper wrappers, pages uncut at bottom and fore-edge (cover paper partially split and chipped at joints and spine ends, paper soiled and creased). Text and plates somewhat browned and dust-soiled at outer margins, occasional minor spotting mostly to margins, the first folding plate frayed at fore-edge. Provenance: Bibliothek des Ärztlichen Vereins zu Lübeck (ink stamp to first title), Stadtbibliothek Lübeck (stamps to inner front cover and first title verso). Very good, unsophisticated copy. (#003459) € 5500

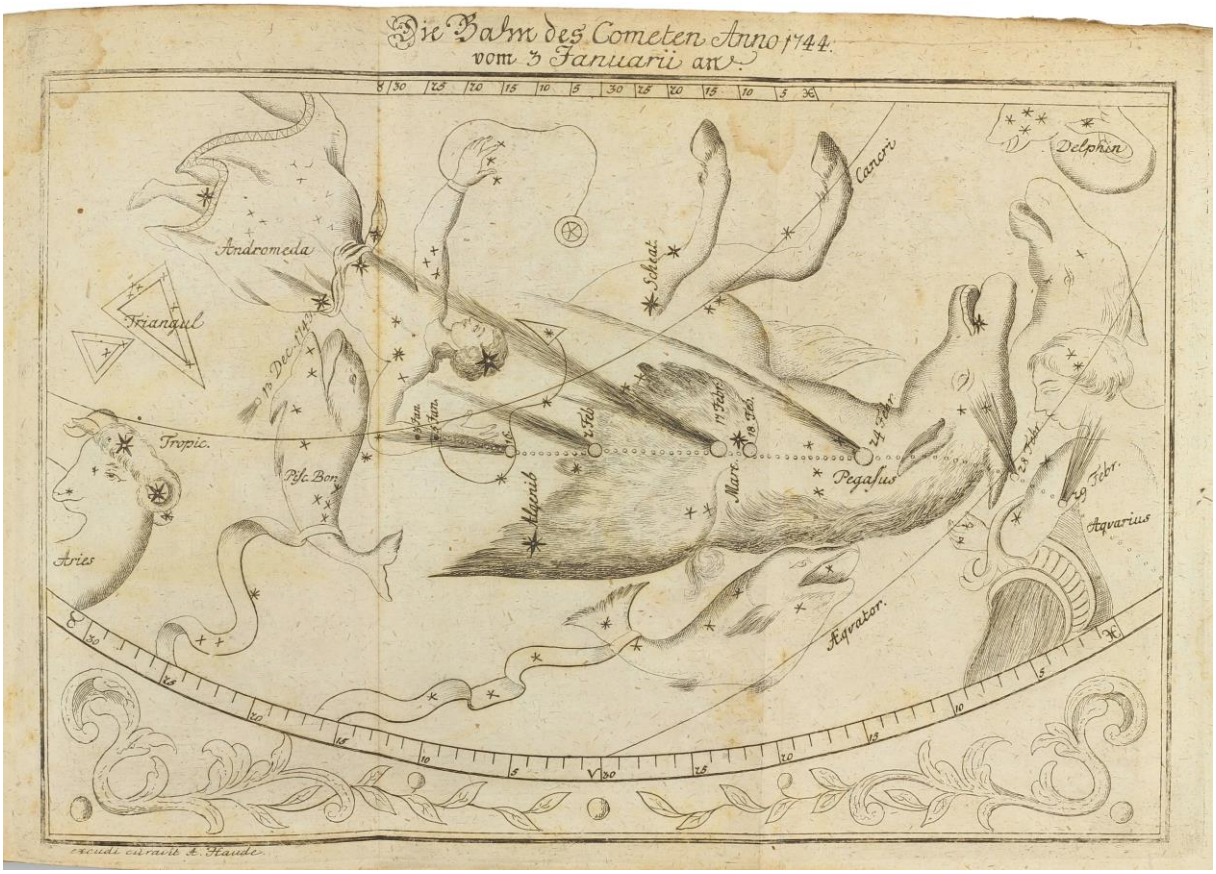
I. Brüning, *Bibliographie der Kometenliteratur*, 1675 (without having seen it); Eneström 67 and 68. - EXCEPTIONALLY RARE FIRST EDITION, anonymously published by Euler on the occasion of the appearance of the great comet of 1744 (Comet C / 1743 X1, Klinkenberg-Chéseaux), which at that time could be observed with the naked eye. In this tract Euler describes all the aspects of comets of contemporary interest. "In particular, he distinguishes comets from fixed stars on the basis of their respective appearances in a telescope. He also argues that the Earth must have been similar to a comet at the time of its creation. Euler says that observation alone is not enough to determine whether the solid of a comet rotates, and that the tail of a comet is a great collection of dust particles that are driven from the core of the comet by the sun's rays and are then gathered together behind the comet where they reflect sunlight. He urges extreme caution in attributing the appearance of comets to the wrath of God and argues that even though comets can cause perturbations in the Earth's orbit, none have come close enough to do so; moreover, none ever will because, if this were to happen, there might be a flood or a destruction of the Earth, and the Bible says that this will not happen." (Euler Archive - All Works. 67 online resources, based on Eric Aiton's introduction to *Opera Omnia* Series II, Volume 31.)


Beantwortung
verschiedener
Fragen
über
die Beschaffenheit, Bewe-
gung und Würckung
der
Cometen.
Berlin, zu finden bey Ambrosius Haude.
1744.

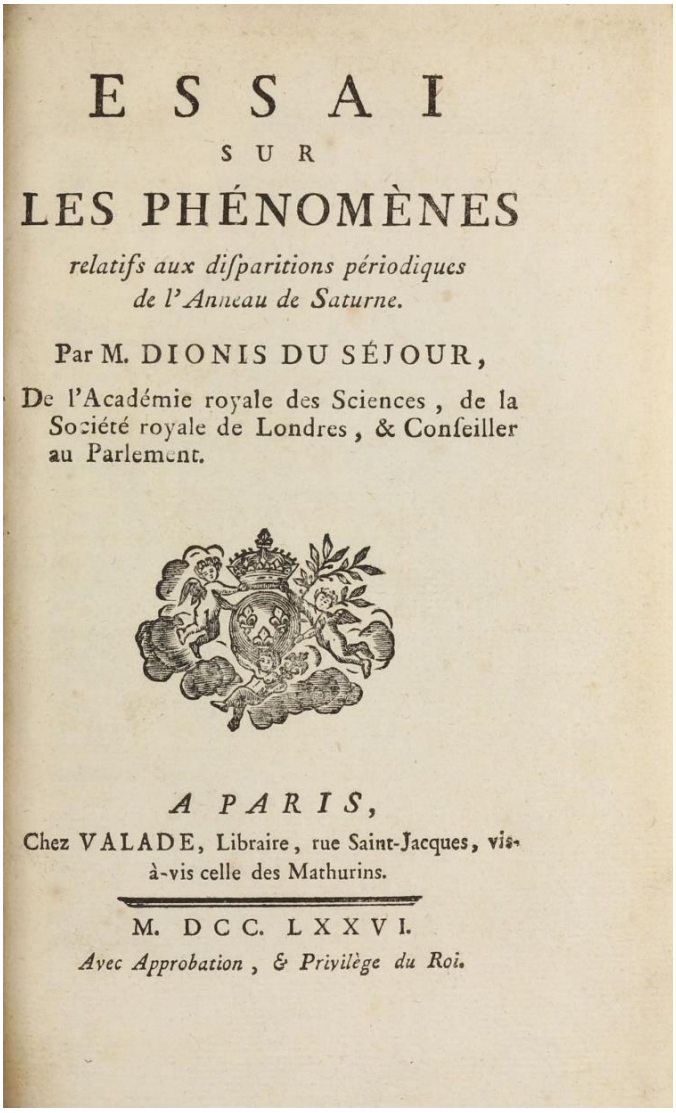
At the end of the second part, among other things (pp. 71-84): "Folgende cometische Observationes sind von einem geschickten Frauenzimmer gemacht, welche dem Verleger ohngefähr zu Händen gekommen (etc.)" (The following comet observations have been made by a skilful woman, which the publisher almost came across). It is the first print of the comet observations by Margaretha Kirch, a daughter of the astronomers Gottfried Kirch and Maria Margaretha Kirch, who first saw the comet on January 3rd. The engraved plates depict the comet's orbit from January 3rd (with figurative constellations) and diagrams based on observations made on March 5th and 7th.

II. Brüning, *Bibliographie der Kometenliteratur*, 1705. - RARE SECOND EDITION published in the year of the first edition. In addition, Melchior published a new and expanded edition.

The spectacular comet of 1744 was observed during 1743 and 1744. It was discovered independently in late November 1743 by Jan de Munck and in December by Dirk Klinkenberg and Jean-Philippe de Chéseaux. The comet became visible with the naked eye for several months in 1744 and displayed dramatic and unusual effects in the sky. Its absolute magnitude of 0.5 was the sixth highest in recorded history. Its apparent magnitude may have reached as high as -7, leading it to be classified among what are called the "Great Comets". This comet is noted especially for developing a 'fan' of six tails after reaching its perihelion. On March 9, Chéseaux was the last known observer of the comet in the northern hemisphere, but it remained visible until April 22 in the southern hemisphere. Among those who saw the comet was the thirteen-year-old Charles Messier, on whom it had a profound and inspirational effect. He went on to become a significant figure in astronomy, and later discovered many comets during his observations. Euler itself, stimulated by the appearance of the great comet of 1744 developed new methods to determine the orbits of planets and comets resulting in his first major astronomical publication in book form, the *Theoria motuum planetarum et cometarum* of 1744, in which he mathematically treats the "two-body problem" (the problem of determining the motion of two spherical bodies under their mutual gravitational attraction).



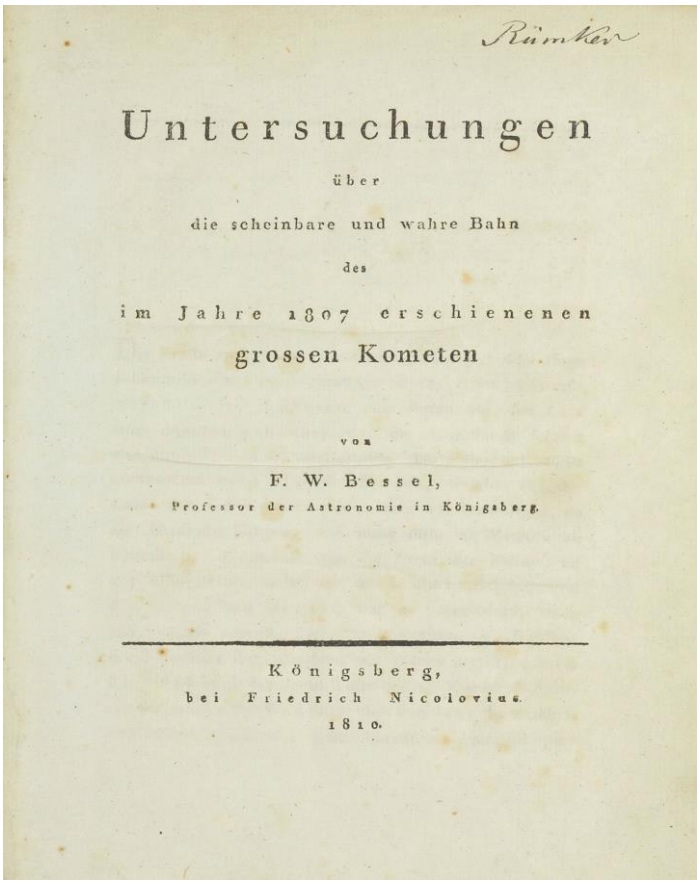
24 **DIONIS DE SEJOUR, Achille Pierre**. *Essai sur les phénomènes relatifs aux disparitions périodiques de l'anneau de Saturne*. Paris: Valade (de l'imprimerie de Gueffier), 1776. 8vo (197 x 124 mm). [4], xxxii, 444 pp. Including half-title, title with printer's device, woodcut head- and tailpiece, 1 folding engraved plate bound at end. Late 19th century half calf, dark-blue marbled boards, spine decorated and lettered in gilt, yellow-dyed edges, new endpapers. Text little browned, few gatherings a bit stronger, occasional minor spotting. A very good copy. (#003598) € 2800



ESSAI
SUR
LES PHÉNOMÈNES
relatifs aux disparitions périodiques de l'Anneau de Saturne.
Par M. DIONIS DU SÉJOUR,
De l'Académie royale des Sciences, de la Société royale de Londres, & Conseiller au Parlement.
A PARIS,
Chez VALADE, Libraire, rue Saint-Jacques, vis-à-vis celle des Mathurins.
M. DCC. LXXVI.
Avec Approbation, & Privilège du Roi.

Roller-G. 325; DSB IV, 107 f.; Poggendorff I, 574. RARE FIRST EDITION of this monograph on the periodic disappearances of Saturn's ring by Dionis de Sejour. "From 1764 to 1783 he wrote a series of important memoirs on the application of the most recent analytic methods to the study of the principal astronomical phenomena (eclipses, occultations, reductions of observations, determination of planetary orbits, etc.) . . . All these works are dominated by an obvious concern for rigor and by a great familiarity with analytical methods . . . their reexamination in the light of present possibilities of calculation would certainly be fruitful" (DSB). Voltaire, in a letter of compliments to the author, writes: "il est bien beau que de petits animaux de 5 pieds et demi aient enfin calculé des phénomènes si étonnants, à trois cent trente millions de lieues de chez eux" (it is very beautiful that small animals of five and a half feet have finally calculated such astonishing phenomena, three hundred and thirty million leagues from home). (Correspondence, 1821, p.216).

25 **BESSEL, Friedrich Wilhelm**. *Untersuchungen über die scheinbare und wahre Bahn des im Jahre 1807 erschienenen grossen Kometen*. Königsberg: Nicolovius, 1810. 4to (225 x 180 mm). vi, 72 (i.e. 82), [2] pp., including errata leaf at end. Printed on blue paper. Bound in 19th century marbled paper card, gilt-lettered paper spine label (paper chipped ant spine ends, extremities rubbed, corners scuffed). Little age-toning, minor scattered foxing. Provenance: Georg Rümker; Hamburger Sternwarte (bookplate to front pastedown marked duplicate). (#003458) € 2400


Rümker

Untersuchungen

über

die scheinbare und wahre Bahn

des

im Jahre 1807 erschienenen

grossen Kometen

von

F. W. Bessel,

Professor der Astronomie in Königsberg.

Königsberg,

bei Friedrich Nicolovius.

1810.

Poggendorff I, 176; DSB II, 97ff. - RARE FIRST EDITION of Bessel's investigation of the orbit of the comet of 1807 and his first individual publication shorty after he became professor in Königsberg and director of the observatory there. Bessel followed the comet's orbit until the perturbations of the known planets had ceased to be sensible. "According to Piazzi [the comet] was first noticed by an Augustine monk at Castro Giovanni in Sicily on September 9, but the first regular observation was made on 22nd of the same month by Thulis at Marseilles. From this time the comet's positions were determined at every opportunity by Bessel, Olbers, Oriani, and others until the end of February, 1808, and on the 18th of the following month Wisniewsky, favoured by a very acute vision and the clear skies of St. Petersburg, observed the comet again, and succeeded in fixing its position until the 27th. In consequence of a notification from Olbers, that with powerful telescopes there might be a possibility of observing the comet again as the earth overtook it to some extent in October and November of the same year, Bessel, then working with Schroeter at Lilienthal, closely examined its track with reflectors of 15 and 20 feet focal length, and on November 9 did succeed in finding an extremely faint nebulosity near the computed place of the comet, which he could not find subsequently, but as the position differed 12' from that assigned by an orbit which he considered very exact, he came to the conclusion that the object he observed was not the comet of 1807, but another one which happened to be in the vicinity, and which was not seen elsewhere. The discussion of the six months' observations of the comet appears in the masterly treatise to which we have referred, viz., 'Untersuchungen über die scheinbare und wahre Bahn des im Jahre 1807 erschienen grossen Kometen,' published at Königsberg in 1810. The method of determining the perturbations of a comet due to planetary attraction, which is detailed in this memoir, was long practised by the German astronomers in similar cases." (R. S. Newall et al., *The Comet*. In: Nature 24, 1881, p.197-201).

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