LES ENLUMINURES

Le Louvre des Antiquaires
2 Place du Palais-Royal
75001 Paris (France)
tel. +33 (0)1 42 60 15 58 • fax. +33 (0)1 40 15 00 25
info@lesenluminures.com

LES ENLUMINURES, LTD.

2970 North Lake Shore Drive
Chicago, IL 60657 (USA)
tel. +773 929 5986
fax. +773 528 3976
chicago@lesenluminures.com

Treatise on the Astrolabe Quadrant
In Latin, illustrated manuscript on paper
Southern Italy, c. 1500-25

28 folios on paper, watermark, eagle with crown, similar to Briquet 93, Florence 1529 and Naples 1529, modern foliation in pencil, bottom, outer corner recto (collation, i^{10} ii^{12} iii^{8} [-6, after f. 27 and -8, after f. 28, cancelled with no loss of text]), no catchwords or signatures, frame-ruled very lightly in lead with one horizontal rule full across at the top and single full-length vertical bounding lines (justification, 143-135 x 95-93 mm.), written above the top line in an elegant cursive humanistic script in twenty-nine to twenty-five long lines, red rubrics, one-line red initials within the line of text, referring to diagrams, blank spaces for 3- to 2-line initials, eight-line red initial partially infilled and on a square ground of fine spirals in text ink, f. 2; similar two-line red initial, f. 13v; six tables in red and black, eleven small illustrations and five large illustrations, described below, in excellent condition except for an irregularly shaped brown stain on every page, roughly one-third to one-half the page in size, text is legible throughout despite the stain. Bound in a limp vellum cover made from a bifolium from a Beneventan manuscript, described below; quires are stitched directly through the spine, and the turn-ins are also stitched down, in excellent condition apart from some staining, front and back covers, which does not obscure the text. Dimensions 207 x 145 mm.

This attractive manuscript of an unpublished text is evidently the unique copy of a treatise on the Astrolabe quadrant written in Southern Italy in the early sixteenth century. Copied in a minute, elegant humanistic cursive script, it is illustrated by remarkably detailed drawings, describing the uses of this astronomical instrument. The binding consists of a bifolium from a twelfth-century manuscript of Augustine's *Commentary on the Gospel of John* copied in Beneventan script—a previously unknown leaf in this fascinating script from Southern Italy.

PROVENANCE

1. Written in Southern Italy in the early years of the sixteenth century, as indicated by the script, watermark, and text; the table on f. 6 is designed for 1502, and the diagram on f. 16v is for November 14, 1501, and the same date is found as an example in the text on f. 19v; the watermark is listed in Briquet at Naples in 1529. An origin in southern Italy, indicated by the watermark, is also suggested by the Beneventan leaf used as the manuscript's binding, and the textual references to the "island of Diomedes," today known as the Isole Tremiti in Apuleia, in the Adriatic Sea off the coast of the Gargano peninsula; see ff. 7 and 10v; the tables on ff. 14-15v, are for the 45th latitude.

2. Remained in Italy into the modern era; clipping from a printed sales catalogue in Italian, inside front cover; f. 1v, "July 28, 1944"; f. 28v, "2402-615."

TEXT

[f. 1rv, blank] ff. 2-26v, *Spheram in plano ad astrolabii constructionem proicere, Astrolabiumque in quadrantem restringere*, incipit, "Celi motus speculatio per instram quae facta sunt …. Hec autem sunt quadrans, astrolabium et sphera. [margin in red: *Spheram in plano proiciere*] In plano A B super puncto C … ; f. 2v, diagram;

ff. 3-4, *Propositio secunda, [Q]vadrantis compositionem premittere*. incipit, "Super centro E describant circulos A, B, C, D … Exempla patet in hac figura."

f. 4, Table of symbols of the zodiac signs with their names in red;

f.4v, *Exemplum superioris canonis de facie quadrantis* [full-page drawing of a quadrant];

f. 5, incipit, "Modo pro situandis stellis fixis in quandrante …"; [two tables] *Tabula ascensionis signorum in sphere recta; Tabula stellarum fixarum;*

f. 5v, incipit, "Expelta itaque Qudrantis faciei figuratione ad dorsum ….," with a detailed illustration of the back of a quadrant below;

f. 6, *Tabula locorum solis verorum per singulos dies mensium que calculate sunt anno domini 1502 anno videlicet inter bisextiles;*

f. 6, *III, [T]erminorum significationes ac declarationes subiungere,* incipit, "Quia cognitio quid nominis presupponeneda …;

f. 9v, *Tabula Quantitatis dierum ac noctium;*

f. 10, *Tabula Quantitatis noctis per singulos dies latitudino 45;*

f. 13v, Table of Ascension signs in any latitude;

ff. 14rv, *Tabula Ascensionis Signorum in Latitudine 45;*

f. 15rv, *Tabula ascendentis ab ortu seu occasu solis in eadem latitudinem;*

f. 25rv, *XXXV [C]orporum Capacitates Concludere*, incipit, "Si corpus arca reperta … Exempla satis patent ex documentis superius dictis." *Expliciunt Canones vel operationes in operando quadrantem conposite et ordinate per Dominum <Mathe?> de Maro <fi … gog..?>. Ad laudem et Gloria omnipotentis dei. Telos*. [Text ends f. 25v; f. 26rv, diagrams; ff. 27-28v, blank].

The earliest known description of an Astrolabe quadrant--an astrolabe reduced to a quarter circle, or quadrant, with no moving parts--was in 1288 by the Jewish astronomer Jacob ben Mahir ibn

Tibbon (c. 1236-1304), more widely known by his Latin name of Prophatius or Profacius Judaeus. The instrument was known as the *quadrans novus* (the new quadrant) to differentiate it from the traditional quadrant or *quadrans vetus* (old quadrant). This type of quadrant was less expensive than an Astrolabe, but it could still be used to perform most of an Astrolabe's functions, including the measurement of altitude, latitudes, and longitudes, and the time of the day and night.

The earliest treatise on the Astrolabe quadrant was written in Hebrew by Profacius; a Latin translation of this work appeared by 1290 by Aremengaud Blasii. Later treatises include the fourteenth-century treatises by Pierre de St. Omer, an anonymous treatise written in 1316, Andaló di Negro, and Eligerus de Gondersleuven, and the treatise by Jean de Gmunden at the beginning of the fifteenth century. In addition to these works, discussed by Emmanuel Poulle (1964, pp. 148-167, and 182-214), the Jordanus databank lists numerous manuscripts with texts on the Quadrant, some of which may be relevant to the Astrolabe quadrant. The text of this manuscript has not been identified in Jordanus, or in other available sources. It seems very likely therefore that the present manuscript is a unique text of a treatise written at the beginning of the sixteenth century in southern Italy. The extent to which it is dependent on other treatises on the Astrolabe quadrant deserves further study. Although the author of the treatise is mentioned in the explicit at the end of the manuscript on f. 25v, Dominus <Mathe?> de Maro (perhaps from Andalusia in Spain?), the first part of his name is doubtful since it appears to have been erased and rewritten.

ILLUSTRATIONS

The tables and the illustrative diagrams in this manuscript are meticulously copied. Especially remarkable are the elegant and extremely detailed drawings of the quadrant on ff. 4v and 5v. The first drawing, showing the front of the instrument, even includes the head of the astronomer using the instrument on the facing page:

f. 2v, large circular diagram (illustrating the relationship between the astrolabe circle and quadrant?);

f. 4, signs of the zodiac, with names in red and symbols;

f. 4v, full page drawing of a quadrant;

f. 5v, large drawing of the reverse side of a quadrant;

f. 16v, small square diagram, "1501, Die 14 novembris ….";

f. 21v, small drawing of tower and shadows;

f. 23v, small drawing of tower;

ff. 24v-25, geometric examples of circles, types of triangles, and a square;

f. 25rv, five diagrams showing 180 degrees of a circle: *Oriens*, *Occidens*, *Planiteis*, blank and *Meridies*.

BINDING

A Bifolium from a manuscript copied in Beneventan script is used as the binding of this manuscript; it is a clear, rounded version of the script known as the Bari type, probably dating from c. 1100-1150, from a manuscript from Southern Italy of Augustine, *In Iohannis evangelium tractatus,* printed Migne, *Patrologia Latina*, volume 35, and Brepols, *Library of Latin Texts*, A (LLT A) CL tract 278.

One bifolium, ruled in blind, now with two columns of thirty-four lines (trimmed, justification ca. 280-272 x ca. 173 mm.), majuscules within the text are highlighted in red, or in red and green. Dimensions now approximately 288 x 195 mm., including turn-ins, with the top and column b, trimmed on the front cover, and the top and column a trimmed on the back cover; width of columns, 90-85 mm.

back cover, turn-in, incipit "//sanctus quia ad patrem uado … et gaudium uestrum nemo// [Migne, PL 35: column 1893, section 1- column 1894, section 2; Brepols LLT – A CL 278, tract 101, par 1, line 19-par 3, line 1].

Front cover, turn in, incipit, [intelli]//gendum uidetur esse difficilius … in caelo sedentem christum// [Migned PL 35: column 1894, section 3- column 1894, section 4; Brepols, tract 101, par 3, line 7-par 4, line 14]; column b (fragments only), incipit, "//autem uidebo … [ui]demus nunc per" [Migne, PL 35: column 1894, section 5-column 1895, section 5; Brepols, par 5, line 1-par 5, line 16].

Beneventan script is a strikingly beautiful, highly calligraphic script that developed from late-Roman cursive. Unlike most of the so-called "national" scripts, it was not replaced by Carolingian minuscule, but survived in Southern Italy from the mid-eighth century into the thirteenth century, and in some centers, until middle of the sixteenth century. It takes its name from the former Duchy of Benevento and was used throughout southern Italy and Dalmatia, especially at Beneventum, Bari, and Monte Cassio (see Loew, as cited below).

Although there are many extant leaves and fragments of this text reported in the works of Loew and Brown (cited below), this bifolium does not appear to be listed, and it has not proven possible to identify related leaves. The folio now Matera, Archivio Diocesano, 35, from the beginning a the twelfth century in Bari type script, formerly used as a cover of a register for the year 1577, and measuring 309 x 211 (260 x 177) mm. in two columns, 33 lines, seems close enough to be a possible candidate, but others cannot be ruled out without actual comparisons (see Brown, 1994, p. 322).

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ONLINE RESOURCES

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http://jordanus.ign.uni-muenchen.de/

Overview of Astrolabe Principles:
http://www.astrolabes.org/
http://www.astrolabes.org/history.htm

On the Nocturlabe and the Astrolabe:
http://www.louisg.net/mesure_temps3.htm

The Astrolabe Quadrant:
http://www.astrolabes.org/quadrant.htm

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http://www.mhs.ox.ac.uk/epact/article.php?ArticleID=14

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http://web.uni-frankfurt.de/fb13/ign/instrument-catalogue.html

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