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

Computistical Calendar; Prologue to PTOLEMY, *Almagest* (Latin translation of Gerard of Cremona)
In Latin, manuscript on paper
Italy, Tuscany?, c. 1475-1500

i (modern paper) + 8 + i folios on paper (watermark, Eagle, single head, possibly crowned, same type as Gravell Archive 158.1, 159.1, 165.1, Florence, 1508-9, Venice, 1495 and Florence, 1504-7), modern foliation in pencil (collation: one quire of eight leaves), written below the top line in a humanistic bookhand on thirty-four long lines, ruled in ink, with single full-length vertical bounding lines, calendar pages ruled in a grid with 19 vertical columns and 31 horizontal rows, with additional text above and below (justification text,167 x 95 mm.; calendar pages, 183 x 105-100 mm.), no catchwords or signatures, "Jesus," in red written in the top margin of each page, scribe used dull red, violet, olive green and black ink throughout: text, f. 1rv, written in red, with violet rubrics; columns of calendar copied in five contrasting colors (listed above); text, f. 8rv, with one-line initials, olive green, violet and dull red. Majuscules within text touched with pale yellow, f. 1 darkened and dirty on bottom, outer corners of most folios darkened through use, red ink in top margins especially, and on f. 1, has run slightly. In a modern limp vellum wrapper. Dimensions 204 x 146 mm.

An accomplished humanist scribe copied this small scientific manuscript that includes a calendar with information for calculating Easter and a complete record of the time of sunrise and the length of the day, together with the prologue to the classic work of astronomy, Ptolemy's *Almagest*, in the Latin translation by Gerard of Cremona. The contents point to its ownership by a Renaissance scholar with an interest in practical astronomy.

PROVENANCE

1. Written in Italy in the last quarter of the fifteenth century; the script and style of the decorative majuscules may suggest an origin in northern Italy, but Tuscany cannot be ruled out, since the manuscript is written on paper with a watermark of a type found in Florence and Venice from the last quarter of the fifteenth century (and into the early sixteenth century). We can imagine that its original owner, who may have copied it himself, or had it copied, was a Renaissance scholar interested in the practical application of astronomical knowledge.

TEXT

f. 1rv, *Descriptio subsequentis kalendarii.* "Ad huis infrascripte tabula siue kalendarii indagationem … nec computantur in ordine aliarum lunationem" [Ends top f. 1v, remainder blank];

ff. 2-7v [Calendar with computistical information, January-December] "Ianuarius habet dies 31. lune uero 30 …."

The manuscript begins with a detailed description of how to use the calendar. It is clear that this explanation was written for this particular manuscript; note, for example, that it accurately specifies that the Golden Number for the solemnities of the church, Lent, Easter, and Pentecost is copied in violet ink. The calendar that follows includes columns for the days of the month, the Golden Number, the Dominical or Sunday Letter, the *divisio mensis* (the days according to the Roman convention of Kalends, Nones and Ides), the signs of the Zodiac, the time of sunrise and the liturgical offices of terce, none and vespers in hours and minutes, concluding with the length of the day, in hours and minutes; the Golden Numbers for Lent, Easter, and Pentecost, and indications of the seasons, solstices, and equinoxes are also included. This calendar does not include saints' days or other feasts of the liturgical year.

The calendar thus provides basic information about each month of the year, including some of the information needed to calculate Easter. Easter is a movable feast, which is celebrated in the Western Church on the Sunday following the first full moon that falls on or after the vernal equinox. The calculation of the correct date of Easter represented a difficult challenge in the Middle Ages, since it depended upon reconciling the lunar and solar calendars. The Golden Numbers record the occurrence of the new moon and change each year in a nineteen-year cycle. The Dominical or Sunday Letters, which represent the days of the week, record all the Sundays in a given year.

This calendar also includes detailed information relevant to telling time each day. Throughout most of the Middle Ages, it was customary to divide each day and night into twelve hours, beginning with the first hour at sunrise, the sixth at mid-day, and the twelfth at sunset. Since the length of daylight varied according to the season, an hour was longer in the summer than in the winter, and these hours are usually known as "unequal hours" or "temporary hours." Astronomers, in contrast, divided the day into twenty-four equal "equinoctial" hours. At the vernal and autumnal equinoxes, day and night each had twelve hours.

This manuscript begins the day at midnight; sunrise ("Ortus solis") is at 12 on the vernal equinox, and the length of that day is 12 hours. As the days grow longer, sunrise is correspondingly earlier, until the summer solstice, June 15 (sunrise at 8.41, length of day 15.19). Sunrise then gradually becomes later (June 16, sunrise at 8.42), and the days grow shorter, until the autumn equinox, September 15, when sunrise is again at 12, and the length of the day 12 hours. The days then continue to shorten until the winter solstice.

Although the time of sunrise and the length of the day are based on "equinoctial" hours, the times of terce, none and vespers are not simply assigned an unvarying time each day. Instead, the time for these services is adjusted to allow for the amount of daylight. On March 15 (the spring

equinox), terce is at 14.30, two and half hours after sunrise, none is at 18, three and a half hours later, and vespers is at 23.29. On December 11, in contrast, terce is at 17.17 (two hours and two minutes after sunrise), none is two hours and twenty-three minutes later, and vespers follows at 22.2.

ff. 8rv, *Vita ptholomei pheludiani mathematici.* "Quidam princes nomine albugnase in libro suo quem scientiam electionem et verborum nominavit pulcritudinem dixit quod hic ptholomeus fuit … mortuus est anno vite suo 78." *Hec sunt de disciplinis et sapientiis phtholomei huius*. "Conveniens est intelligenti pro deo uerecundari … Quidam rex inuitauit phtholomeum ad prandium … non dulcescunt."

"The Almagest" was the most important classical treatise on mathematical astronomy. Claudius Ptolemy wrote it in Greek around A.D. 150. "Almagest" is the Latin form of its Arabic title; its title in Greek was simply the *Mathematika Syntaxis.* Ptolemy's work superseded all earlier treatises on the subject, and it remained the most important treatise on mathematical astronomy until Copernicus wrote *De revolutionibus orbium celestium* ("*On the Orbits of the Celestial Bodies*") in the early sixteenth century. Using a geocentric model of the universe, the treatise discusses spherical astronomy, solar, lunar, and planetary theory, eclipses, and the fixed stars. Practical topics treated include the length of the day, the determination of latitude, the shadows cast by the gnomon (the fixed vertical rod of sun-dials), the length of the year, and the motion of the moon.

It was not until the twelfth century that "The Almagest" became known in the Latin West, when translations were made from its Arabic and Greek versions. The most important of these, which survives in many manuscripts, is the translation made in about 1175 in Toledo by Gerard of Cremona (1114-87), a prolific translator of ancient texts from the Arabic. Gerard, it is said, went to Spain in search of the *Almagest,* and stayed out of pity to help supply the Latin world with many of the works they were missing. Gerard's translation was first printed in Venice by Petrus Liechtenstein in 1511. Another anonymous translation was done in Sicily in c. 1160 directly from the Greek.

The present manuscript includes only the short account of Ptolemy's life and a summary of his thought from Gerard's translation. There are only two copies of the *Almagest* recorded in the United States (see Bond and Faye, p. 21 and De Ricci, p. 49). Nonetheless, the text is not particularly rare; note the numerous copies recorded in the Schoenberg Database.

LITERATURE

Blackburn, Bonnie and Leofranc Holford-Strevens. *The Oxford Companion to the Year*, Oxford, Oxford University Press, 2005.

d'Alverny, Marie-Thérèse. "Translations and Translators," in *Renaissance and Renewal in the Twelfth Century*, eds. Robert Benson and Giles Constable, Cambridge, Massachusetts, Harvard University Press, 1982, pp. 421-462.

Haskins, Charles Homer. *The Renaissance of the Twelfth Century*, Cambridge, Massachusetts, Harvard University Press, 1927.

Humphrey, Christ. "Time and Urban Culture in Late Medieval England," in *Time in the Medieval World*, eds. C. Humphrey and W.M Omrod, Woodbridge, Suffolk, Boydell and Brewer, 2001, pp. 105-117.

Kunitzsch, Paul. *Der Almagest. Die Syntaxis Mathematica des Claudius Ptoemäus in arabisch-lateinischer Überlieferlung*, Wiesbaden, Otto Harrassowitz, 1974.

Moreton, Jennifer. "Before Grosseteste: Roger of Hereford and Calendar Reform in Eleventh- and Twelfth-Century England," *Isis* 86/4 (1995), pp. 562-586.

Murray, James. "The Easter Table Annals of Missenden Abbey: An Annotated Text," *Mediaeval Studies* 46 (1984), pp. 476-486.

Richards, E. G. *Mapping Time. The Calendar and its History*, Oxford, Oxford University Press, 1998.

Thorndike, Lynn. "Computus," *Speculum* 29/3 (1954), pp. 223-238.

Toomer, G. J. ed. and tr. *Ptolemy's Almagest*, Princeton, NJ, Princeton University Press, 1998.

ONLINE RESOURCES

On the Almagest, see:
Almagest Ephemeris Calculator, Bibliography:
http://www.phys.uu.nl/~vgent/astro/almagestephemeris.htm - bibliography

Ptolemy, Almagest, tr. Gerard of Cremona; online copy of 1511 edition:
http://www.univie.ac.at/hwastro/rare/1515_ptolemae.htm

"Greek Mathematics and Its Modern Heirs" in Rome Reborn: The Vatican Library and Renaissance Culture; Exhibit at the Library of Congress, January 8, 1993 – 30 April 1993:
http://www.ibiblio.org/expo/vatican.exhibit/exhibit/d-mathematics/Greek_math.html

On Medieval Calendars, and the Reckoning of Time, see:
The Calendar of the Saint Alban's Psalter:
http://www.abdn.ac.uk/~lib399/english/essays/calendar.shtml

"A History of the Western Calendar," by Karl Hagen
http://www.polysyllabic.com/?q=calhistory

Medieval calendar tools by O. Lieberknecht
http://www.lieberknecht.de/~prg/calendar.htm

Medieval calendar calculator:
http://www.wallandbinkley.com/mcc/mcc_main.html

Sundials:
http://www.members.aon.at/sundials/gnomone

Watermarks: Thomas L. Gravell Watermark Archive:
http://wiz2.cath.vt.edu:8200/