Biographical Encyclopedia of Astronomers

Alcuin

Born near York, England, circa 735

Died Tours, (Indre-et-Loire), France, 19 May 804

Alcuin, a universal scholar, educator, and key counselor of Charlemagne, is best known for his astronomical studies and observations, which led to the Carolingian reform of the calendar.

Of noble Anglo-Saxon lineage, Alcuin was educated at York's cathedral school by students of the Venerable Bede, as well as Colgu from Ireland. He taught at this school from 765 and became its head in 778. While acquiring books on the Continent, he met Charlemagne in Parma in 781. The Frankish king, having heard of Alcuin's learning and teaching abilities, invited him to lead his palace school at Aachen

Moving to Francia in 782, Alcuin became Charlemagne's key counselor for science, education, and church matters. He taught the King, his family, and the Frankish nobles, reforming the Palace school according to the Anglo-Saxon principle of the seven liberal arts. Alcuin instigated the Admonitio generalis of 789, now considered instrumental for the Carolingian renewal of education.

Alcuin produced many didactic writings and probably also the oldest collection of mathematical problems in Latin. He is best known for his verses and his large corpus of letters, written mainly after 796, when he became abbot of Saint Martin's in Tours. The correspondence between Alcuin and Charlemagne (54 letters) includes nine letters on astronomy and calendrical reckoning, called "computus" (letters 126, 143, 144, 145, 148, 149, 155, 170, and 171 in the Epistolae); six such letters are lost.

It was long assumed that Alcuin was the author of four short anonymous writings: *Ratio de luna, De bissexto, De saltu lunae*, and *Calculatio Albini magistri*, but recent research indicates that only the first (circa 798) was certainly his. The *Calculatio* of 776 is based on an Irish text of 675 and provides easy instructions to determine the months and weekdays of the Easter full moon

Dating the movable feast of Easter (the first Sunday after the first full moon in spring) was the chief computistic problem of the Middle Ages. This was in fact a complex problem related to the 19-year lunar cycle and the 28-year solar cycle, comprising a 532-year Easter cycle. The full moon dates fall on the same days of the months after 19 years, the weekdays after 4 times 7 years, due to the intercalated day

The most important astronomical-computistic contribution of Alcuin concerned the "moon-leap" or *saltus lunae*. Estimating a lunar month of 29 or 30 days, the 19-year cycle would have 6.726 lunar days, although 19 solar years (of 365 days) would have 6.935 solar days. To reconcile the difference, 7 lunar months of 30 days were intercalated (6.935 lunar days), requiring the removal of the supernumerary day at the end of the 19-year cycle

In his letter 126 (797), Alcuin opted for the *saltus lunae* on November 25, following Roman tradition. But Charlemagne's new counselors wanted to follow Alexandrian tradition, starting the legal year on September 1 and fixing the *saltus* on July 30. Alcuin was irritated and in

letter 145 (798) called his competitors *aegyptiaci pueri*, "Egyptian Boys," and challenged them with five questions on the calculation of the lunar cycles. Alcuin also promised Charlemagne that he would write up his own treatise on the *saltus lunae*, but it is lost

In letter 148, Alcuin calculated when the Sun entered each of the 12 signs of the zodiac to explain why a solar day must be intercalated every four years (the *bissextus*). In letter 149, Alcuin reported the reappearance of Mars, after the Sun had concealed it, on July 18, 798, at the time he reobserved Sirius. This observation found its way into the Court Annals, which subsequently reported eclipses of the Sun and the Moon, and other notable planetary configurations.

Charlemagne wanted Alcuin to interpret the reappearance of Mars as a good omen for his Saxon campaign, but in letter 155, Alcuin rejected this and gave a different but erroneous explanation: that Mars had remained stationary for one year in the zodiacal sign of Cancer and was not visible along with Cancer

Charlemagne had also asked Alcuin to calculate when the Moon entered each of the 12 signs of the zodiac. These calculations are found in *Ratio de luna*, forming an appendix to a later letter by Alcuin. It brings the course of the Moon into mathematical correspondence with that of the Sun, using the formula "9 lunar hours = 5 solar days."

In letter 170 (799), Charlemagne inquired why the Moon on 18 March did not yet have the appearance of a waxing half-moon in the zodiacal position 7° of Gemini. In letter 171, Alcuin calls Charlemagne's calculations on Moon and bissextus a "perfection of my own calculations." But this is not identical to the anonymous *De Bissexto*, which stems from the same author as *De saltu lunae.*

Charlemagne commissioned Alcuin, as the expert on the computus (probably in 789), to write a standard work, resulting in his Libellus annalis, which is lost except for the dedication verses. But three Carolingian manuals on the computus have survived:

1. The short *Annalis libellus* of 793, probably not identical with Alcuin's *Libellus annalis*.

2. The first compendium on calendrical reckoning, the seven-book computus written at the Court in 809–812, called *Aachen Encyclopedia*.

3. The three-book *computus* of 818, assembled at Salzburg

The mediocre *Annalis libellus*, containing Alcuin's *Calculatio*, prescribes the Roman *saltus* in November; however, it also refers to Alexandrian tradition. But the "Aachen Encyclopedia," probably edited by Adalhard of Corbie and sponsored by Charlemagne, and including Alcuin's tracts Calculatio and Ratio de luna, is the most important Carolingian contribution to the computus; it does not take sides between Alexandrian and Roman reckoning. The three-book computus, assembled by Arno of Salzburg, encompasses the full Roman tradition propagated by Alcuin in the form of a perpetual lunar cycle calendar

Alcuin's astronomical observations of the Moon, Sirius, and especially Mars and its "vanishing," initiated systematic astronomical recording at the Frankish Court. His teachings inspired Charlemagne's scholars to detailed study of planetary motions in a geocentric system that led to new astronomical diagrams visualizing Plinian planetary theory. In sum, Alcuin's research and teaching made the Carolingian reform of the calendar possible, standardizing calendrical reckoning and chronology for the next three centuries.

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Alternate names

Alchvine

Ealhwine

Flaccus Albinus

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