

# Astronomy in medieval Prague

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Astronomy ranked among the *septem artes liberales* which achieved high level at the University of Prague already soon after its foundation by the Emperor Charles IV in 1348. Astronomy was taught at the artistic faculty and was thus an obligatory introduction to later study either at faculty of medicine, laws or theology. There were studied treatises by ancient authors – Ptolemy, Euclid, Aristotle, Boëthius, Macrobius; Arabic authors and commentators – Alkabitius, Albategnius, Alfraganus, Hally, Masha'allah, Thabit ibn Qurra, as well as Christian authors and translators – Gerard of Cremona, Iohannes Campanus of Novara, Iohannes de Sacrobosco, Iohannes de Lineriis and others. The treatises were devoted to different aspects of astrology, mathematics and geometry, theoretical astronomy but also to the construction and use of astronomical instruments. Especially the understanding of quadrant and astrolabe belonged to general education and these instruments were also widely used in practice.

Emperor Charles IV used a subtle cosmological symbolics to point out the uniqueness of the royal majesty, as it can be seen in his architecture (e.g. on the Old Town Tower of Charles' Bridge). He also highly esteemed scholars like Master Claretus de Solentia (Bartholomaeus of Chlumec, c. 1320–1370), who composed a didactic work *Astronomicus* in the form of leonine hexameter on Charles' order in about 1350.

The Czech King Wenceslas IV inherited from his father Charles IV a deep interest in sciences, especially in the astronomy: his collection of astronomical manuscripts is well known (cf. so called 'astronomical codices of Wenceslas IV', preserved in Viennese Österreichisches National Bibliothek and in National Library in Munich). In one of them can be seen also the first known portrait of some otherwise poorly known Czech court astronomer, called Těříško in Old Czech language; probably he was astronomer of the King Wenceslas IV.

At the beginning of the 15th century, Masters Cristannus of Prachatic and Johannes Andreae called Šindel were very influential astronomers in Prague University (their impact on Johannes von Gmunden, the predecessor of Viennese astronomical school, is known now). Cristannus' *Construction and Use of the astrolabe* was published (Křišťan z Prachatic, Stavba a Užití astrolábu. – Cristannus de Prachaticz, Composition and Use of the Astrolabe. Edd. A. Hadravová and P. Hadrava. Praha, Filosofia 2001. – With English summary). It is proved, that just these Cristannus' texts written in 1407 on the basis of Pseudo-Masha'allah's treatises were published as the first famous incunabulum on astrolabe in Perugia 1478.

It was scarcely a mere chance that only three years later, in 1410 (as it was established by Zdeněk Horský), another fellow of the Charles University, Master Iohannes Šindel together with the clockmaker Nicolaus of Kadaň finished the famous Astronomical Clock of Prague, which is in fact a clock-driven astrolabe. Iohannes Šindel worked not only in Prague, but also in Germany, in Nuremberg, and especially in Vienna and Klosterneuburg near Vienna, together with Iohannes von Gmunden, with whom he is sometimes confused. Šindel wrote a treatise on an eclipse instrument, based on *Albion* by Richard of Wallingford. At present, we are preparing for publication critical edition of Šindel's treatise with computer reconstruction of his instrument. Practically the same figure we can find in the treatise *Opera mathematica* by Johannes Schöner, the well known publisher of the works of many astronomers, like Regiomontanus, Walther and others. Schöner's treatise *Opera mathematica* was published at Nuremberg in 1551 and 1561, this is more than a century after Šindel, and its description is obviously developed from Šindel's words.

An interesting evidence about another presently unknown Šindel's work yields a short treatise by Tycho Brahe *On the obliquity of the ecliptic*. In this text Tycho compared Šindel's measurements of altitude of the Sun in Prague University in summer solstice and autumn equinox 1416. We do not have the original Šindel's manuscript and we do not know technical details about Šindel's instruments. Anyway, the observational results show, that Šindel was probably equipped with quite capable instruments, because already Tycho found that Šindel's measurements were more precise than his own (A. Hadravová – P. Hadrava: *Tycho Brahe and Iohannes Šindel*. In: "Tycho Brahe and Prague: Crossroads of European Science". Edd. J. R. Christianson, A. Hadravová, P. Hadrava, and M. Šolc. Acta Historica Astronomiae, Vol. 16. Frankfurt am Main, Harri Deutsch Verlag 2002, pp. 237–247).

We would like to note that development of astronomy at Prague University was not limited to a national context. Medieval universities were universal not only by the extension of the field of teaching, but also by the international origine of students, lecturers and texts which were read. Texts of Prague scholars influenced their followers in other universities abroad. Our aim is to contribute by editions of such texts to reconstruction of the picture of the medieval astronomy as a whole.