

Topography of the creation of the Prague Astronomical Clock

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Abstract. Based on the edition of Prague city books in V.V.Tomek's series of books "Základy starého místopisu Pražského" [Foundations of the Old Prague Topography] [1] and verified with recent editions of the city books [2, 3] and manuscripts [4], the places of residence and work of the creators of the Prague astronomical clock were found and associated with the buildings, some of which have survived to the present day. In particular, the house of Mikuláš of Kadaň on Můstek and the site of the forge in Železná street, where the astronomical clock was probably built, were located. These findings have not previously been published.

Identified places and their attributes are represented as a GIS layer on the overlays of the current city plan and the plan of pre-Hussite Prague, which was an appendix to Tomek's aforementioned series of books[5].

This work also serves as proof of the concept of the "digital historical geography" methods to research historical sources, collect and organize the geospatial-related information, and present the research results in an attractive form for both the scientific and lay public. The outcome of this work will be used in the project "Medieval Settlements - the Core of European Cities. On the example of an interactive cartographic image of Prague".

Keywords

Prague astronomical clock, history of clockmaking, Mikuláš of Kadaň, digital historical geography.

1. Brief history of the founding of the Prague astronomical clock

On the basis of the *Zpráva o orloji staroměstském* [Report on the Old Town Astronomical Clock] from the year 1570 by Jan Táborský of Klokotská Hora (1500-1572)[7], who served as the Old Town clock-keeper, the author of the astronomical clock was considered to be the legendary

Master Hanuš¹, and its creation was dated around 1490. Later in 1681, Balbín in his *Miscellanea* [8] associated this Master Hanuš with the Master of the University of Prague. Hanuš's authorship was considered historically true until the early 1960s. At that time, Dr. Zdeněk Horský first attributed the authorship of the clock in accordance with Balbín's statement, to a certain university Master Hanuš whom he identified with the rector of the Prague University Jan Šindel. In 1962, Dr. Stanislav Macháček [9] discovered in the manuscript identified as a copy of Táborský's *Report* [6], a transcription of a letter of the Prague's Old Town mayor [Littera Mayor], which proves that the author of the clock is the clockmaker Mikuláš of Kadaň. Based on this Machacek's discovery, Horský modified his hypothesis, recognizing Mikuláš of Kadaň as the craftsman maker of the clockwork, but further insisting on the intellectual astronomical clock's authorship of Jan Šindel [10].

We also learn from the *Letter of the Mayor* that Mikuláš of Kadaň, extended and modified the clock that had already existed at the Old Town Hall and was made by a clockmaker called Master Albrecht or Albert, also referred to as "Magister horologii". Mikuláš's modifications were substantial; he added the *Spere* i.e., the astrolabe type dial, calendar and substantially improved the striking train by introducing 24-hours countwheel striking to replace the previous passing strike. Although he used the previous simpler clock, but by adding astronomical features, we can consider him the real creator of the Prague astronomical clock.

Another clock-keeper, the son-in-law of the said Albert, Martin of Uničov, also appears in the sources. We don't know anything else about his background, but he is mentioned as a clockmaker, and it is recorded that he inherited several houses from Albert. Whether he acted as a clock-keeper of the Prague astronomical clock is not clearly provable, but it is very probable.

In this study I do not elaborate details of the history and the development of Prague astronomical clock, but I focus only on the above mentioned personalities and their places of residence and work in Prague.

¹Hanuš is an archaic Czech familial form of the name Jan, similar to the German Hans, as a variant of the more formal Johann or Johannes.

2. Places associated with the early Prague astronomical clock period

Based on Tomek's books [1], and correlated with other above-mentioned sources, references to the persons of interest were sought, along with the places and events associated with them.

2.1. Mikuláš of Kadaň

The earliest record of Mikuláš of Kadaň is probably the following: In 1403 *Niclas serator de Cadano* buys a house in Spálená Street in the New Town. He is referred to as a locksmith (serator). All previous and subsequent owners are also locksmiths or other metalworkers; hence it was probably a workshop. He had another workshop at the Horse Market, today's Wenceslas Square.

From the *Letter of the Mayor* we know that Mikuláš was given for his work "a house next to the town gate where one goes to the New Town to the Horse Market". On the basis of a comparison of the entries in Tomek's "Foundations" [1] and for the tax records validated with the "Collections book" [3], I have concluded that it is the house No. 386/7 on Můstek, which, although rebuilt, is still standing today. The record in the *Heritage catalogue* states it is a corner Renaissance house with a classical façade built on Gothic foundations [12].

On the basis of the following entry in *Kniha Pamětní* [Book of Remembrance][4, p. 81]: *In 1419, on 1 April, Catherine, wife of Nicholas the horologist, confessed that she held 10 schocks of groschen for John of Kotbuz the goldsmith and promised to repay them on the 3rd May, saying that it was her husband's will*, the literature states that in 1419 Mikuláš of Kadaň died. However, this hypothesis cannot be accepted. The record speaks neither of a widow nor of a last will; on the contrary, it speaks of a wife and can be interpreted as Nicholas's will during his absence, not as proof of his death. We can find later tax payments paid by Mikuláš on his house on Můstek. In 1429 he paid taxes of 13 schocks, then another again in 1433. Therefore, he had to be alive and owned this house until at least 1433.

2.2. Albert

The figure of the horologist Albert emerges from the sources as a very wealthy man who not only made clocks and served as the Old Town clock-keeper, but probably also traded in iron, ran a spa and "dealt in real estate". We can find several records of his house sales and purchases, which we do not have space to analyse in detail here (however, they are presented in the interactive map). It is worth mentioning that in 1407 he sold the house, or rather the palace, for 400 schocks to Jobst Margrave of Moravia. This was a house ref-



Fig. 1. House No. 386/7 on Můstek, the house of Mikuláš of Kadaň mentioned in the Letter of the Mayor. (Photo by Author.)

ered by Tomek as No. 930, opposite to today's St. Nicholas church on the Old Town Square, that is no longer standing today. He also owned a spa on the bank of the Vltava River and another house on the Lesser Town, from the record of which we can deduce the date of his death.

2.3. Forge in Železná Street

Železná street [Iron Street] was in the 14th and 15th centuries a street, as the name suggests, on which craftsmen working with iron concentrated. The house no. 489 was owned from 1405 to 1417 by Albert, here referred to as "Albert eysner", i.e. the iron merchant, and as "Albet ferrator", i.e. the blacksmith. In 1417 the house passes to Mikuláš of Kadaň, who immediately sells it to hammer makers Hanus and Ulrich. Considering the location of the house on the "Iron Street" and taking into account the occupations of the owners, we can conclude that it was a forge. Since the names of both Albert and Mikuláš appear at this house, we can conclude that the two probably collaborated. Moreover, this forge is located not far from the Old Town Hall. We can therefore speculate that this is the birthplace of the Prague Astronomical Clock.

2.4. Martin of Uničov

As mentioned above, we do not have much information about Martin of Uničov, but the houses he owned have



Fig. 2. At a place of today's house number 489/12 in Železná Street stood a forge, where the Prague astronomical clock was probably made. (Photo by Author.)



Fig. 3. House No. 449/14 in Jilská Street which includes the former house of Jan Růže aka Master Hanuš. (Photo by Author.)

been identified, including the bathhouse which he probably inherited from Albert.

2.5. Jan Růže aka Master Hanuš

For the completeness I mention here also the house of Jan Růže which is already well known in the literature. The house *U Prstenů* in Jilská Street was bought for Hanuš by his brother Jakub, who was a parish priest at Church of St. Castulus [U Sv. Haštala].

According to the catalogue of the National Heritage Institute [13] the core of the house is a Romanesque tower building, preserved in its full height. The house was enlarged in the Gothic period, followed by Renaissance, Baroque and Classical reconstruction. The original Hanuš' house is therefore still a structural part of this building at Jilská street No. 449/14 (fig. 3).

3. Geospatial representation of the findings

3.1. Plan of Prague by Václav Vladivoj Tomek from 1892.

Václav Vladivoj Tomek (1818-1905) was a Czech historian and archivist famous for his respectful work *Základy starého místopisu pražského* [Foundations of the Old Prague Topography], which is an extensive five volumes edition of

manuscripts of medieval register books from the Prague City Archives, a substantial part of which was irretrievably lost in the fire of the Old Town Hall at the end of World War II and thus nowadays this Tomek's edition remains the only source. The work in its covers all historical Prague's towns during the second half of the 14th and beginning of the 15th centuries.

The detailed study of combined archival sources enabled to compile the history of individual houses including the change of their owners and tax payments. Each house is identified by house numbers as they were used in Tomek's time, followed by reports relating to the house, arranged by year, with the exact source in which the specific information was found - the name of the street, the house's emblem, the name of the house the house faced, the actual contents of the deed (mainly the names of the seller and buyer and the purchase price). The information is given in the language of the source, i.e. mostly in Latin with some German and Czech records. The individual volumes of Tomek's Topography were published between 1866 and 1875.

The books were supplemented with a historical plan of Prague based on Jütner's plan from 1816 but modified for individual selected periods based on the findings of the town's contemporary topography, including reconstructions of buildings and sites that have already disappeared. The buildings are given numbers on the plan corresponding to the identification of the buildings in the text.

3.2. Digitization of Tomek's plan and creation of an interactive descriptive layer

A digitized version of this plan prepared by the Institute of History of the Czech Academy of Sciences was used in this study. The digitized images were georeferenced using QGIS application as a layer on the OpenStreet base map.

The individual objects identified for the respective area of interest as a result of the research are marked in a separate GIS layer. They are accompanied by a corresponding legend including hyperlinks to other information sources and thus create an interactive cartographic image of Prague suitable for web presentation.



Fig. 4. Example of part of a digitised plan with a layer of the identified objects. House of Mikuláš of Kadaň highlighted. (Digitized image courtesy of the Institute of History of the CAS.)

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About Authors...

David KNESPL was born in Prague in 1965. He graduated from the Faculty of Nuclear Science and Physical Engineering, CTU in 1991. After graduation, he worked on computational models in radiobiology, but later moved completely into information technology. His long-standing deep interest in horology and the history of science and technology led him to doctoral studies and he is now working on his dissertation on the history of the Prague Astronomical Clock in the context of the history of clockmaking in the Czech lands. Thanks to his IT background, he also enjoys using digital humanities methods in his work, such as geospatial presentation of historical facts and 3D computer kinematic modelling of historical clocks, scientific instruments and other mechanical artefacts for digital preservation and presentation of cultural heritage.

