

The 18th-century Prague. Josef Daniel Huber's "images" of the capital city of Bohemia

Eva Chodějovská¹ – Jiří Krejčí²

¹Institute of History, Academy of Sciences of the CR, Prague, Czech Republic

²Dpt. of Mapping and Cartography, Czech Technical University in Prague, Czech Republic

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1. Introduction

In 1769, Joseph Daniel Huber, a major of the Austrian army, presented Empress Maria Theresa with a manuscript plan of Prague which he had drawn from his own initiative, asking the Empress for the permission to print it. The plan was subsequently purchased for the imperial collections. Although Huber in fact never received the required permission, the Empress charged him to survey the city of Vienna. The ensuing plan *Scenographie oder Geometrisch Perspect. Abbildung der Kayl. Königl. Haupt und Residenz Stadt Wien in Oesterreich* was printed in 1778 for the first time, and it eventually became one of the most widespread "images" of Vienna during the late 18th century. On the other hand, the plan of Prague was cut into 12 sections of varying dimensions due to its large size and it remained almost unknown to public because it has been kept in Vienna since 1769 and has never been published as a whole.

The only research of the plan was carried out by Jan Hofman, who found it in the Austrian National Library (ÖNB) during his research stay in 1912. He concentrated on the topographic accuracy of Huber's perspective plan of Prague. The results were published in an extensive treatise (*Obraz barokní Prahy* [The Image of Baroque Prague]), but this "essential depiction of Baroque Prague", as Hofmann himself put it, has not received any attention since its 1944 publication. Jan Mokre then pursued Huber's professional biography; however, his thesis (1990) only remained in manuscript form. Books written by the heads of the ÖNB-Map Collection, F. Wawrik and J. Mokre, mention the plans as one of the most precious pieces preserved there.

2. Biography

Joseph Daniel Huber von Hubenthal was born in January 1730. He perhaps studied at the academic grammar school in Vienna, and in 1751 addressed the Military Chancellery Council for the approval to enrol at the Military Engineering Academy. The Academy was the oldest educational institution of its kind in Austria. It was established in 1717 upon the proposal of Eugene of Savoy and the decision of Charles VI, and was subordinated to the Military Chancellery Council. Great emphasis was laid on combining theory and practice and on regular trainings in the field. The attendants were assigned the following subjects: mathematics, arithmetic and geometry as the foundation, while the secondary subjects were fortress studies (*Festungsbaukunst*), geodesy, mechanics, statics, hydraulics and hydrostatics. Huber probably finished his studies in military engineering in the regular term of three years, i.e. prior to 1754. One of the works surviving from his studies is his map of Klagenfurt (1752). Huber then most probably joined the army, although there are no available documents to prove this assumption.

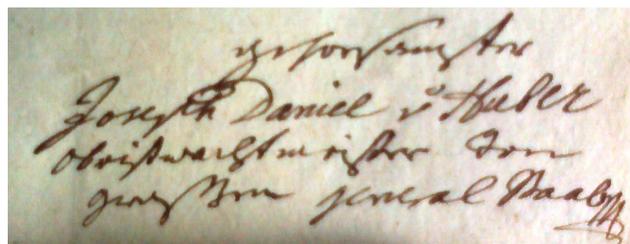
As proposed by Field Marshal Leopold Daun, the Austrian army was reformed in 1758 and the General Staff (*Generalstab*) was established. Huber served there with Brigadier General Count Johann Franz Anton Quasco, the so-called *Generalquartiermeister* of the 2nd army, and was subordinated to Field Marshal Daun. The staff of the main provider (*Generalquartiermeisterstab*) was responsible for providing the army with the most advantageous and the most comfortable positions and situations for camping and smooth movements on the basis of their precise knowledge of the landscape, roads and rivers. The *Generalquartiermeister* therefore ordered to precisely survey the landscape, roads and camps in sketches. The officers, however, were not sufficiently educated to fulfil this task and the trained engineers were mainly involved in fortresses. Every *Generalquartiermeister* thus held his own draughtsman whose duty was to draw everything what was necessary, including the movements of military units.

One of these draughtsmen was Huber, who is mentioned in the documents from 1758 as *Unter-* or *Oberleutnant*. His promotion to *Offizier*, however, remains unsupported with any evidence by the sources. We only know for certain that he was promoted to *Hauptmann* in 1759.

During the Seven Years' War between 1756 and 1763, Huber probably executed several maps, and was taken captive along with other ten Austrian officers by the Prussians in 1760. He was imprisoned somewhere in Silesia, but was later exchanged for a Prussian regimental sergeant major (1762).

In the following years, Huber worked in Saxony and Upper Silesia, surveying the cross-border area for the purposes of the Austrian army. He remained in the reduced *Generalstab* after concluding peace in February 1763.

After the Seven Years' War, the Empress ruled to issue a detailed topographic survey of the entire monarchy in 1763 and the *Generalquartiermeisterstab* was established as an institution for the time of peace, designed to survey and describe the imperial territory. Huber took part in surveying of Bohemia. He is documented in Prague on 4 May 1763 and he probably stayed in the town as long as to 1769.

A photograph of a handwritten signature in cursive script on aged paper. The signature reads "Joseph Daniel Huber" and is followed by "Oberleutnant" and "von". The name "Joseph" is written in a larger, more prominent hand than the other words.

Joseph Daniel Huber's signature

In March 1768, Huber applied for a two-month vacation, probably in order to complete the plan of Prague – because in March of the following year, he wrote a letter to the office of the Bohemian Governor (*České gubernium*), asking for a financial support to publish the plan of Prague which he had composed. Having received a negative response, he submitted the given plan, along with the plea to publish and sell it, to Maria Theresa in April 1769. But even the furtherance of Huber's superior, General Lacy, did not suffice and the perspective plan of Prague eventually did not make it to print. Maria Theresa held it in her private library and allocated Huber the amount of 250 ducats from her private treasury, while 200 ducats were intended for Huber himself and 50 ducats for the draughtsmen. In January 1769, Huber was promoted to the rank of major. He was subsequently active in Vienna during the 1770s, working on its city plans. His life story from the following years remains unknown.

3. Joseph Daniel Huber, a cartographer

Huber took part in the I Military Survey of the Habsburg monarchy, whose initial stage was in progress in Bohemia between 1764 and 1767. He was thus also on business in Prague for a rather long period of time and could become familiar with the topography of the city situated on two banks of the Vltava River in a valley dominated by the Castle and composed in fact till 1784 of four independent towns: *Staré Město* (Old Town), *Nové Město* (New Town), *Malá Strana* (Lesser Town) and *Hradčany* with the Bohemian kings' castle. The main I Military Survey map was, however, executed in a scale of 1:28,800 and its street layout is therefore rather rough. It is hard to say if there were any other drafts and preparatory plans in a scale that would be more suitable for creating Huber's most important work: the above-mentioned perspective large-dimensional plan presented to the Empress. The only ground town plan by Huber that has survived to our day is a very detailed ground plan of the Prague towns in an approximate scale of 1:4,060. It is not really clear if it served as a basis for the perspective plan. Huber (and his draughtsman) employ the so-called "à la cavaliere" perspective (the isometric view) for the depiction of all the buildings. Perspective plans were usually called *scenographia* in the 18th century, while Huber uses the term *Plan im ortographischen Aufzug*. He also employed the identical method later, as he worked on his plan of Vienna.



Detail of Charles Bridge on the perspective plan

4. Analyses of the maps of Prague

We decided to use the following terms for the purpose of this paper: "planimetric plan" is used for the ground plan of the Prague towns in the scale of 1:4,060 (ÖNB, shelf-number: FKB P 67), and "perspective plan" stands for the large-dimensional plan of the Prague towns and its surroundings (ÖNB, shelf-number: K II 92). They are both kept in the Austrian National Library in Vienna in the Map Collection department.

Huber's plans of Prague exist merely in the form of manuscripts; the perspective plan is a black-and-white pen drawing and the only colour in the map face is the yellow delimitation of the Jewish settlement. The planimetric plan is executed as watercolour. No washing was used,

there are only hatched shadows, which proves that these plans – or at least the perspective plan – were to serve as a basis for an engraving.

4.1. Map content

4.1.1 The perspective plan

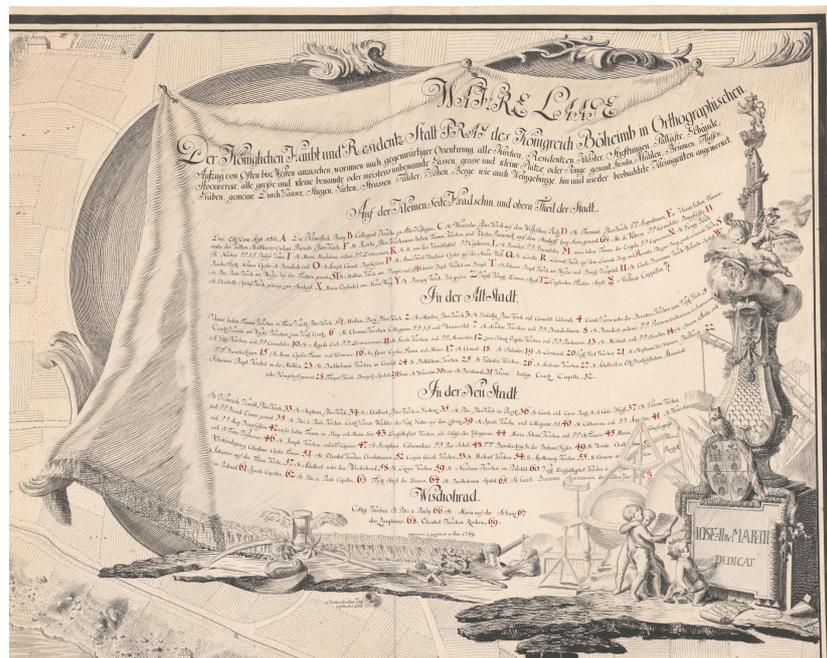
Huber's perspective plan, entitled *WAHRE LAAGE Der Königlichen haubt und Residentz Statt PRAG des Königreich Böhemb in Orthographischen Aufzug von Osten bis Westen anzusehen, worinnen nach gegenwärtiger Orientirung alle Kirchen, Residentzen, Klöster, Stieftungen, Palläste, Gebäude, Stockwercke, alle grosse und kleine benannte oder meistens unbenannte Gassen, grosse und kleine Plätze, oder Ringe genant, Insuln, Mühlen, Brünnen, Flüssen, Gräben, gemeine Durchhäuser, Stiegen, Gärten, Strassen, Fälder, Hohen Berge wie auch Weingebürge, hin und wieder beobachtete Kleinigkeiten angemerket* (in fact, the title of the map index), is with no doubts an immensely impressive view of Prague. It is a unique combination of an artistic interpretation of a town view, perspective geometry and planimetric bases. It brings a detailed and compact image of the city in the latter half of the 18th century. It depicts the four Prague towns, Vyšehrad fortress, villages (Smíchov, Bubny) in the suburbs, and the surrounding areas (what is, today, Karlín, Žižkov, Vinohrady and other neighbourhoods). The plan is north-west oriented (azimuth c. 328°) and the centre is close to the Coal Market (Uhelný trh) square. There are no coordinates displayed either on the map frame or anywhere else. The plan consists of 12 map sheets of irregular dimensions (the total dimension is 224 x 239 cm, the separate sheets were measured by J. Hofman and re-measured by the present authors. The respective results generally match, the average difference is 0.3 cm and the maximum one is 0.9 cm. The differences can either be Hofman's fault or are caused by the continuous 100-years paper shrinkage or both.

The map index was compiled very systematically and it includes a list of significant church object (solely Christian ones), divided according to the individual towns. There are objects identified in groups following alphabetical order and three special symbols in *Auf der Kleinen Seite, Hradschin und obern Theil der Stadt*, and by a single numerical sequence for all Prague towns in the case of *In der Alt Stadt, In der Neustadt* and *Wischohrad*.¹ All letters, numbers and symbols are in red.

The map is framed by a thick outer line and a thinner inner line. The cartouche with a full map title and the map index is situated in the upper-right corner. The cartouche verges with the parergon. Also depicted are the surveying instruments, heraldic symbols and three putti pointing to the dedication *IOSE-II [et] MAR-TH DEDICAT*. A slip of paper with the author's signature – *Josepus Daniel v. Huber. Obrist-Wacht: v. Grossen General-feld Staab* – is as if "light-heartedly" tossed below the dedication. Jan Hofman opines that this emblem can be read as the plan is a gift to Maria Theresa and Joseph II for which the author expects to be awarded. The plan is dated by the statement *aufgenommen u. gezeichnet im Jahr 1769*, situated under map index. A calligraphic Latin script was used; all the texts, both those in the index and in the map face, are in German. The map does not provide any graphic scale bar or map legend. And even though Huber himself signed his work, he does not give any information as to the draughtsman responsible for rendering the present buildings, human staffage and decoration. Surviving archive documents nevertheless inform us that the anonymous artist received the amount of 50 ducats from the Empress for his achievement. Hofman assumes that he must have been a skilled draughtsman and engraver, perhaps one of those who also worked on the Huber's plan of Vienna. Jan Mokre suggests that it could have

¹There is a special symbol for the *Nové Město* district.

been Gottfried Kurz, a soldier and skilled drawer who ... *sei dem Oberstwachmeister Huber vom General Staab als ein commandirter beizulassen* in April 1769.



Detail of the cartouche and the paragon

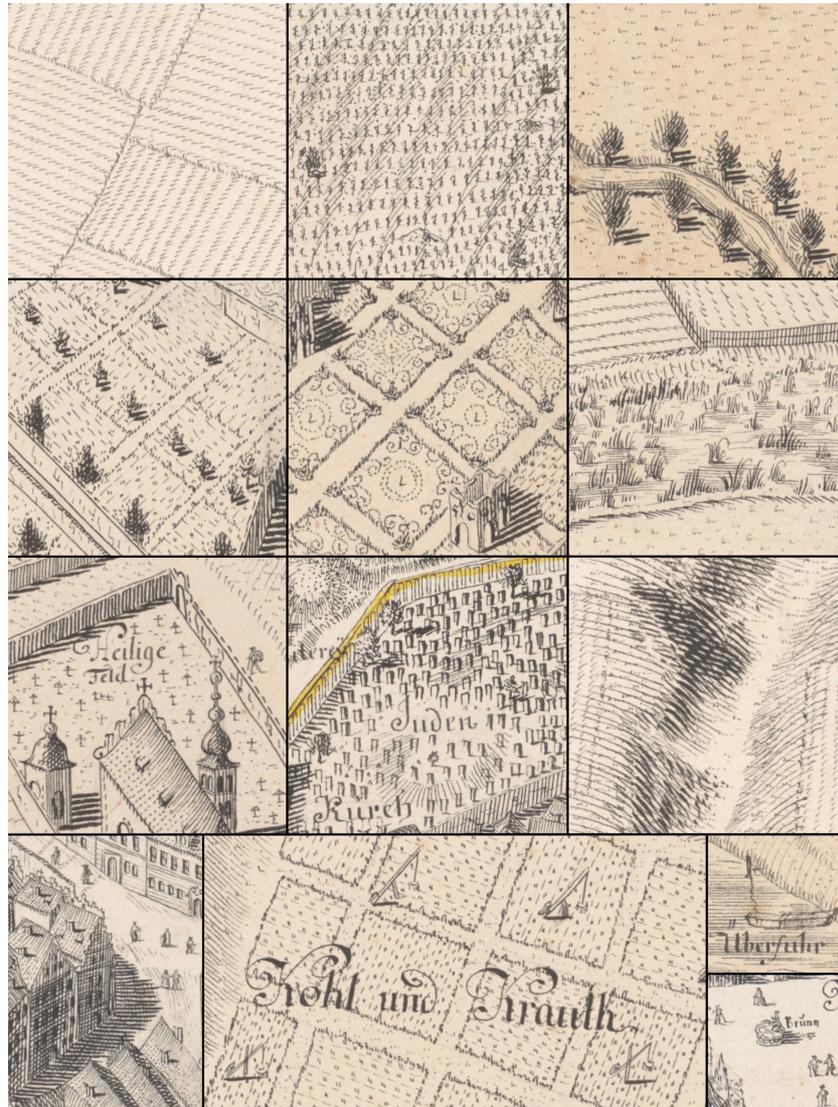
The plan depicts all the topographic objects of the Prague towns, employing the so-called “à la cavaliere” perspective (the isometric view). The basic material for this is the rectangular projection of all buildings onto the plane. Contrary to the usual perspective view, the rays of vision project in infinity – i.e., they are collateral and all objects are projected under the angle of 45°. The project is not only large-dimensional in width, which it is rather comparable to the above-mentioned Prague panoramas, but also in height due to the employed projection. It in fact looks like a plastic, three-dimensional plan, which is why it is today often compared to the famed three-dimensional model of Prague made of paper and wood by Antonín Langweil in 1837.²

The abundance of details and the high quality of execution testify to the draughtsman’s skill and sense of detail. The façades of the buildings and the attached yards and gardens are rendered to the utmost detail. Hofman, departing from the analyses of depictions of several buildings, assumes that Gottfried Kurz most probably sketched the city from different church towers and that he might have departed from the veduta by Folpertus Ouden Allen as well as from an earlier one, created by Phillip van der Bosche.

All featured buildings cast shadow according to southern (south-western) light exposure and so does the terrain, depicted with the use of hatching, where darker drawing in northern (north-eastern) slopes should evoke an effect of southern (south-western) light exposure. All squares, significant streets and roads leading from the Prague towns and gates in the fortification are briefly labelled. Prague’s fortification is pictured in full, which is a rather unique feature. The ferry routes are displayed using the ferryboat depiction and the label *Überfuhr*. Sacral buildings in the towns are either marked by capital lettering or numbered and are listed in the map index. Non-listed important objects are lettered. Most of the islands as

² See Kateřina Bečková, *Průvodce po Langweilově modelu Prahy*, Praha, Muzeum hlavního města Prahy, 1986 and *Langweilův model Prahy 1826–1837* [Langweil’s model of Prague], http://www.langweil.cz/index_en.php [cit. 20. 6. 2012].

well as the river Vltava (*Moldau Fluss*) are entitled. Other minor objects like fountains, guardhouses, mills, water-towers etc. are lettered as well.

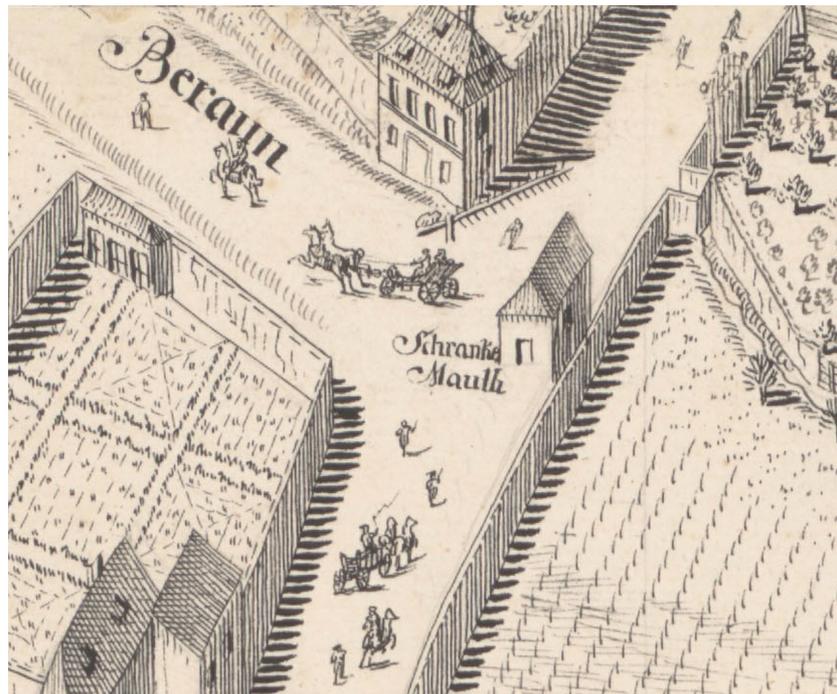


Examples of used symbology on the perspective plan

Huber as well as his draughtsman also paid great attention to the area surrounding the city. The test pit hollowed in the area of the Smíchov district stands as a sufficient proof that there is no reason to doubt the topographic preciseness of the plan as concerns the area outside the city walls. The suburb *villas* – important buildings outside the walls and selected rural estates – are marked as well. Also interesting is the description of planting of the individual fields, e.g. cabbage and cole (*Kohl und Krauth*). The depictions of some areas have the attributes of area symbols, especially vineyards, croplands, cemeteries, etc. It seems that the land description rather works with the map as with an artistically elaborated map sign instead of a detailed rendering of reality.

The work in general evokes the impression of a work of art not only due to the “south-west lighting” and the above-mentioned rich decorative components both in the parergon and the cartouche, but also due to the plentiful staffage. The figures, however, follow a specific, pre-designed purpose: to fill in and inhabit the empty spaces around the buildings, on the roads, and so on. Rendering of the landscape outside the city bulwarks is also remarkably thorough

and faithful: see, for example, the precise record of mending the roads outside the gate of the New Town.



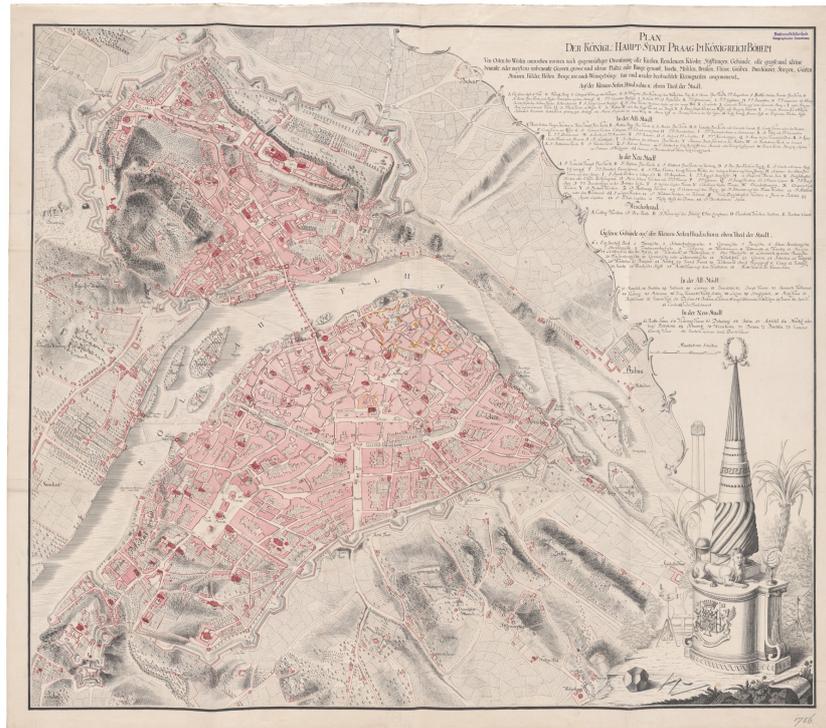
Detail of staffage

The plan was designed as a model for engraving, printing and representing the city of Prague in the eyes of the late-18th-century Europe. This, however, never happened and Huber's perspective plan as well as the other detailed plans of Prague dating back to the 18th century remained unknown to the majority of his contemporaries (plans by Václav Josef Veselý, Johann Christoph Müller, Josef Dietzler, and František Leonard Herget). Prague was thus seen through vedutas, still based on the 17th-century patterns set by Aegidius Sadeler, Philip van der Bosche or Václav Hollar. It seems that the panorama view by Folpertus Ouden Allen, who was a court painter to Emperor Leopold I, was less popular. In the first half of the 18th century, the works by Friedrich Bernhard Werner became very popular. Besides his views of the whole city, he turned his attention to the single public spaces and important buildings. This interest in depicting details instead the whole of the city remained characteristic of the entire 18th century.

4.1.2. The planimetric plan

Huber's planimetric plan, entitled *PLAN DER KÖNIGL. HAUPT STADT PRAG IM KÖNGREICH BÖHEIM*, is not dated. The map depicts the Prague towns, Vyšehrad fortress, villages (Smíchov, Bubny) in the suburbs and the surrounding areas (what is, today, Karlín, Žižkov, Vinohrady and other neighbourhoods). The plan is north-west oriented (azimuth c. 320°) with its centre close to the Old Town Square. There are no coordinates displayed on the map frame or anywhere else. The dimensions are 110 x 96 cm, the material is silk mounted on paper. The map frame consists of a thin inner line and a thick outer line. The map face covers circa two-thirds of the map layout. The cartouche and parergon are on the right side, while the full title of the map is situated in the upper-right corner. The map index, which is depicted under the title, includes a list of significant church objects (again solely Christian ones), divided according to the individual towns (*Auf der Kleinen Seiten, Hradschin; Alt Stadt; Neu Stadt, Wischohrad*) and a list of important buildings. Church objects are identified

by in groups following alphabetical order starting with A for each town, important buildings are identified by a single numerical sequence for all the towns. A graphic scale bar of 500 military steps, subdivided to 100 steps (the first one to 50 steps), bearing the caption *Masstab von Schritten*, is below the map index. There are surveying instruments below an antique-style column decorated with a coat of arms with a devisa MERITIS ARGENTUR HONORES. Jan Mokre identified the coat of arms as belonging to the Count Lacy,³ president of the *Hofkriegsrat*. He was in charge of the I Military Survey and was Huber's superior. The parergon is situated bottom right. The text and the parergon are separated from the map face by a decorative line. The author's signature, *augenomen v. Huber. Obrist Wachtmeister*, is close to map frame.



The planimetric plan

The planimetric plan displays all the important topographic objects of the Prague towns. Buildings and blocks of buildings are rendered in pink outlined with red. Sacral buildings are marked by red cross-hatching. Synagogues are in yellow and the Jewish settlement is delimited by a yellow line. Yards and gardens are displayed in detail with many variations. The Prague's fortification is fully displayed. The plan also uses several area symbols: two types of cropland, grassland, vineyard and other unspecified land types. Symbol of a tree marks wooded areas, alleys as well as solitary trees. Passages running through blocks of buildings are also present. Ferry routes symbolized by dotted line are completed by a symbol of a ferryboat. The common point symbols are: fountain, well, cross, and millwheel. These symbols are identical with those used in the maps of the I Military Survey.

Terrain is depicted by hatching whose higher density indicates northern (north-eastern) slopes according to the southern (south-western) light exposure.

All map inscriptions are in German. City squares, important streets, roads leading out of the individual towns and the fortification gates bear captions. Sacral and other important

³*Siebmacher's grosses Wappenbuch*, vol. 26, Nürnberg 1918, p. 257-258 and Tab. 133.

buildings in the towns are either lettered by capitals and numbers or texts in case they are not listed in the map index. Each ford is described as *Durchfahrt* and each ferry stands for *Überfuhr*. Most of the islands are entitled and the only lettered stream is the river Vltava (*Moldau Flus*). Other minor objects as, for example, fountains and guardhouses are lettered as well. Suburb villages, important objects as mills, water-towers and significant buildings outside the walls and selected rural estates are also inscribed.



Examples of used symbology on the planimetric plan

4.2. Reconstruction of the overall image of the perspective plan

As mentioned above, we arranged the digital images of the perspective plan onto 12 map sheets of irregular dimensions. They were mounted on pasteboard and digitized by the Picture Archives and Picture Archives and Graphics Department of the Austrian National Library (*Bildarchiv der Österreichischen Nationalbibliothek*) in 400DPI resolution and 24bit colour depth, and saved in non-compressed TIFF files including the colour profile. A reconstruction of the overall map image was a necessary step for the following cartometric analysis and online visualization. It was done by merging 12 map sheets into a single seamless map. A usual procedure would be employing a projective transform of particular map sheet image to the map frame corners. This is, however, possible only if either the corner coordinates or the real dimensions of the map frame are known. There is nevertheless another option – georeferencing the particular sheets, using control points represented by the topographic content of the map, followed by the interpolation of the position of the shared sheet corners. In the case of the perspective plan, the situation was far more complicated. The overall map was cut very irregularly, not a single map sheet has a frame, and even identifying the sheet corners was sometimes tricky. We therefore decided to employ a different method. The map sheets were matched using congruent transform (translation and rotation) which fully preserves the map geometry. The ends of the continuous lines on the edges of the adjacent

sheets served as control points instead of the corners of the map sheets. The given procedure resulted in establishing the rough matrix of 12 map sheets. There were significant gaps or overlaps among the sheets due to the varying paper shrinkage and deflection of edges. Moreover, the perspective style of the map construction asked for continuous map drawing. Thus another set of non-residual transform (Jung's transform allowing full alignment in control points) was therefore applied. The resulting image was exported to a grid in PNG format. The volume of data of the grid in full resolution was over 1GB, and hence the copies in lower resolution in JPG format were exported as well.

4.3. Cartometric analyses

The main aim of this stage of research was to specify the scale of the map. There are several methods to do so. The easiest way is to simply convert the text scale description. Such a scale definition, however, is totally missing in Huber's plans.

Another frequently used method is based on measuring the graphic scale of a map. We applied it in the case of the planimetric plan. It contains the graphic scale of 500 military steps, subdivided to 100 steps, while the first subdivision depicted has 50 steps. It is unfortunately very difficult to define the exact dimension of a military step. Our calculation departed from the most probable size of one military step, i.e. 0.759 m. All subdivision lines and their combinations were frequently measured. This method then served to count the resulting average map scale value of 1:4,087. This method was influenced by a linear distortion of the paper in one direction. There is no graphic map scale depicted on the perspective plan.

Yet another typical method employed in specifying the map scale departs from measuring the distances between points well-indicated in the topographical content of the map, represented by the corners of important buildings (and usually also used as control points). More than 7000 distances in various directions were used for defining the map scale. Two sets of distances were used in the case of the perspective plan: the set measured on the merged plan and the set measured on the separate map sheets. There was no significant difference between both sets. Moreover, no systematic errors as to the directions were found. These measurements resulted in determining the average value of the map scale as 1:1,729 in the case of the perspective plan and 1:4,502 in the case of the planimetric plan.

The scale was determined also by using MapAnalyst software. Using the Helmert transformation the scale was specified as 1:1,696 for the perspective plan and 1:4,337 for the planimetric plan.

Defining the projection used in the case of these maps is very complicated. The map does not contain any lines of geographical grid or points with coordinates. Moreover, distance distortions of the projection are trivial due to its extent, the depicted area and map scale, and no projection thus could be defined. Because Huber participated in the works on the I Military Survey, it is very probable that his plans of Prague were based on the data surveyed for this purpose. It has been proved that the I Military Survey had no geodetic base and was mostly surveyed via the "à la vue" method. In exceptional cases, a plane table was used for urbanized or military areas, where the map sheet in the standard scale of 1:28,800 was complemented by a map in the double scale of 1:14,400. The parerga to Huber's plans of Prague allow us to see probably the instruments he had employed. The ascertained geometric qualities of Huber's plans lead to the conclusion that he employed the graphic mapping method, but there are no historical sources to prove this.

An analysis proved that the planimetric plan and other later plans of Prague have not only the same orientation and extent, but also have lots of identically depicted areas. One of them

is a plan of Prague by Georg Adam Zürner (died in 1809). The authors might have the same pattern, or, more probable, Zürner copied Huber's planimetric plan. This is a completely new finding which indicates that Huber's planimetric plan had to be stored on a different place from the perspective one and somehow accessible.

4.4. Georeferencing

Georeferencing of old maps provides new ways for their research and comparing and their visualization. It is rather appropriate to use either the known map frame corner coordinates or the lines of the geographical grid for this purpose. Huber's maps, however, totally lack this kind of information. The authors thus employed the method of georeferencing which departs from the network of identical (control) points. The control points are the well-recognizable corners of important buildings which have survived up to the present day. A set of control points was then established, taking its sustainability for both plans into account. The control points were selected very careful especially in the case of the perspective plan, because the perspective view has blocked out most of the north-oriented street lines. Coordinates in the current S-JTSK (Czech national grid) were measured with the help of the cadastral map, connected via WMS. Sets of 85 identical points were used for the transformation to the S-JTSK. The character of the map drawing made us choose similarity transformation (translation, rotation and scaling) with the Least Square Method adjustment. This transformation fully retains the geometry and it does not warp the image, which would be very inconvenient especially in the case of the perspective plan. The standard error of position of the transform has resulted in 143.2 m for the perspective plan and 99.6 m for the planimetric plan. If we consider the overall surveyed situation, the planimetric plan is more accurate even despite its smaller scale. Furthermore, perspective views can lead to more severe position errors of drawing.

4.5. Visualisation

Presenting the two complete plans has been the most essential aim of our research since the very beginning. Huber's perspective plan of Prague did not bring Prague to fame in the period of its origination as its author would have wished, and it had to wait for its discovery as long as to the early 20th century. It took yet more time to publish it (Zdeněk Wirth, Jan Hofman), but the public was introduced to merely some parts or to the whole as divided into pieces. The plan, however, presents a very rare and precious image of Prague during the late Baroque period, i.e. as a city which was of enormous significance both from the aspect of architecture and the built-up areas and urban development. Moreover, far too many books focusing on Baroque Prague, published throughout the 20th century, totally omit it. The planimetric plan was reprinted only once and in a rather small dimension. Our work brings the very first opportunity to present the two plans as wholes and in the entirety, carefully visualized on the map portal and, last but not least, accessible to the widest public for free.

The best method of making the maps accessible to the public is their internet visualization. There are several ways of visualizing a digitized map. The basic condition is the existence of spatial localization. Maps which are not georeferenced can be presented as simple raster images inside html pages, but this is only suitable in the case of old maps. Full-image data can be visualized in a raster-image viewer which allows for quick display of large-raster data. We found the Zoomify application immensely effective in this respect. This flash-based application can work very fast even with large amounts of data. The data are cut into small tiles in many resolution layers, and the flash application can process the tiles swiftly.

Georeferenced maps can be attached to Web Mapping Application as, for example, Google Maps and Google Earth. And there is yet another venue: to create a specialized map portal

focusing on a specific map collection, period, territory, institution, etc. The authors have been running a map portal of old maps and plans of Prague since 2010. The portal originated in a straight connection with *The Historical Town's Atlas of the Czech Republic*. It is based on the UMN MapServer application and its JavaScript interface (using OpenLayers, GeoExt, MapFish, Proj4 and other libraries). The map portal makes for easy comparing the raster data and other geographic (raster or vector) information, such as cadastral maps, orthophotos, boundaries, reconstruction maps, and the like. Vedutas, photos and textual data can also be attached. Old maps can moreover be distributed via the Web Map Services, which allow for connecting them with desktop GIS application.

We have published Huber's plans in two versions: the non-georeferenced plans are in the Zoomify application and the georeferenced maps use the mapserver. Although matching the map objects is rather rough due to the precision and character of the maps as well as due to the methods employed, it still allows for comfortable visual comparison in medium transparent format.

The two plans are accessible on the website of the Web Map Portal of *The Historical Town's Atlas of the Czech Republic – Prague*: <http://towns.hiu.cas.cz/huber/>.

5. Conclusion

There are two plans of Prague (one planimetric and one perspective) which can ultimately be attributed to J. D. Huber, and we can claim with equal certainty that his colleague-draughtsman was responsible for executing the latter. Alas, very little is known about his education and biography, which may reveal new and important information as to the origins of the perspective plan and links between the two plans. In any case, Huber definitely was a skilled engineer and cartographer, and he was the crucial driving force behind the origination of the two plans. Taking the identification of the elements featured in parerga and the information found in the archive sources into account, we can opine that the planimetric plan is of earlier origin than the perspective one. It was probably created within the works on the I Military Survey. The authors of the paper, on the other hand, must strictly oppose Jan Hofman's conclusion proposing that the enlarged planimetric plan served as an explicit model to the perspective plan. Our research of the geometric relations and the process of comparing the map content and the present symbols make us assume that there might have been yet another ground plan, some partial plans and/or additional measurements carried by the draughtsman who executed the perspective plan to make it serve as a model. The present map symbols and the map content, however, indicate very close connections between the two surviving plans. On the other hand, it seems very probable that Huber's planimetric plan served as a model for later plans of Prague.

Huber was free to employ all the lessons learned during his works on the I Military Survey maps. It is, however, surprising that not a single piece of his knowledge was reflected in any of the surviving or known plans of Prague as a pattern. He apparently did not depart from any of the (surviving) plans of Prague as a model. We nevertheless think that there were earlier plans, executed for military purposes, available at that time: the partial preparatory plans ensuing from the works on the I Military Survey, and the plan by Johann Christoph Müller. (Alas, this very important plan is today lost, but the co-author of this treatise believes to have recently discovered some copies of this plan.)

Shall we, now claim that Huber was unlucky because his perspective plan of Prague, which consumed so much of his energy, has never been printed and thus remained unknown? Not really. For the Empress knew very well that Prague was a strategic point of her empire and its city walls thus had to be strictly confidential, this is why the detailed plan of Prague was ruled

out of print. Maria Theresa nevertheless did charge the skilled cartographer and his draughtsman with surveying her capital and her main residence, Vienna. The manuscript version was completed in 1773, and the *Scenographie oder geometrische perspektivische Abbildung der k. k. Haupt und Residenzstadt Wien* was printed five years later. The Austrian National Library today cherishes it as one of its most valuable items, and some copies are part of several map collections in Central Europe and beyond. It seems that Huber's dreams have come true.

The next step of our research will be comparing Huber's plans of Prague and his plans of Vienna.

6. Bibliography and sources

The analyses were done using following software:

Adobe Photoshop, ESRI ArcGIS, Gepro Kokeš, MapAnalyst, MathWorks MatLab and MS Office

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