

Analysis of the Original Copperplate Engravings of the Müller's Map of Bohemia

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The Müller's map of Bohemia is outstanding masterpiece of our cartography. It is the largest map of Bohemia created in "one-man cartography era". Johann Cristoph Müller created his hand made map in 1720 in the scale 1:132,000. The map was engraved on 25 copper plates by Michael Kauffer and finished in 1722. The map was analyzed by professor Kuchař [1] and recently by Krejčí and Cajthaml [3].

The main topic of this research of the Müller's map of Bohemia is to determine the original dimensions of the map sheets. For a long time, the Müller's map of Bohemia was not analyzed in this way. Dimensions of the map are frequently cited from the famous work of professor Kuchař [1]. After 50 years we would like to confirm or refine these values. In [1] we can find following numbers: each of 25 map sheets has 557 mm by 473 mm, the whole map has 2822 mm by 2403 mm.

The first step of our research was to find original copperplate engravings of the map. They are stored in the National Technical Museum in Prague within the geodetic collection founded by František Fiala in 1910. Original copper plates are accessible only in the study room for research purposes. As every map sheet has clear rectangular frame we decided to measure all 4 sides of this rectangle. Width and height of every rectangle were measured in the middle also. Original copper plates are notably flexed and so 2 people were necessary for measurement; one for flatten the plate, the other one for measurement. We decided to use drafting triangular tools, commonly used within construction of analogue cadastral maps. The accuracy of this instrument in length measurement is about 0.1 mm.

Complete tables with measured values are included in the diploma thesis of J. Malimánková [2]. There are no significant differences between the length of the upper and lower or left and right side of the map sheets. We expect that map sheets should have been perfectly rectangular and small differences are caused by the imprecision of engraver. Values measured in the middle of every map sheet didn't show any distortion of the frame. Final values were computed as averages of measurement in one direction (e.g. upper and lower) for every map sheet. As the final values differ from each other maximally by 2.5 mm we also computed final averages for the whole map. These averages are important for later merging of map sheets images together.

Width of map sheets varies between 558.2 mm (sheet no. 23) and 560.1 mm (sheet no. 10). Average width of one map sheet is 559.2 mm. Height of map sheets varies between 471.2 mm (sheet no. 16) and 473.7 mm (sheet no. 2). Average height of one map sheet is 473.1 mm. If we compare final average values 559.2 mm by 473.1 mm with early published 557 mm by 473 mm [1], there is significant difference of 2 mm in the width of the map.

Beside measurement of the original copper plates, original prints of the map were measured. Apparently there existed many original prints of the Müller's map of Bohemia. Unfortunately maps were occasionally damaged or are in private property. Two original sets of the map are stored in the National Technical Museum. Other interesting original prints can be found in The Institute of History of Academy of Sciences of the Czech Republic or in the Central Archives of Surveying, Mapping and Cadastre in Prague. Some of these original prints were measured as well. Tables with results can be found in [2]. When we compared determined dimensions of the copper plates with determined dimensions of the prints, there were evident differences. The original prints from 18th century were shrunked dramatically. The prints made from the original copper plates at the beginning of 20th century are shrunked as well, but not too much. In the dimensions determined on the prints we found values occasionally incorrectly cited in literature.

Determined average dimensions of the original copperplate engravings of the Müller's map of Bohemia were used after creation of the full vector data model of the map [4]. Vectorized data were transformed into these dimensions and now we have the vector data model reflecting the original image without any distortion. This precise vector data model will be analyzed in GIS software. It is mentionable that the data model contains over 15 000 point features, that can be used for georeferencing the map into some well-defined coordinate system. Then the model might be distributed via internet and could be used as a GIS layer using web map services. Beside this research we would like to make similar measurements on the Müller's map of Moravia.

References:

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