Touch the map and take a historic walk – Reviving cartographic heritage in the Danube Museum

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Abstract. This paper introduces the interactive cartographic interface developed specially for the presentation of an important cartographic heritage document on touch screen. The unique copy of the map, preserved in the Danube Museum (Esztergom, Hungary) can be explored by using a highly intuitive, graphic interface. To enhance user experience interaction allows the user to explore the map in an easy to use, informative context. Based on the 'walk' metaphor the user is allowed to navigate on the 19th century map in GE augmented environment.

Keywords. Cartographic heritage, Interactivity, Thematic map

1. Introduction

This paper introduces the novel application of touch-screen interactive cartographic interface in the presentation of cartographic heritage. The unique map, preserved in the Danube Museum (Esztergom, Hungary), is an important piece of cartographic heritage for several reasons (Török-Hillier, 2012). The 1833 map was constructed by an important hydrographic engineer working on the mapping of the river, was published by the society for a permanent bridge over the Danube, and the hand-coloured copy was most likely a presentation copy prepared by the author for his patron, count István Széchenyi. To make this piece accessible for the general public a special display was placed in the Danube Museum's new Showcase. When touching the screen the early map is not only presented for the visitor but the special applications give background information and invite for interactive exploration.

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2. An Important Historic Map

2.1. The first Hungarian 'Map'

The large size, detailed and elegant map, *'Ground and Hydrographic Map of the Free Cities of Buda and Pest*', was lithographed by its author, László Vörös, and was published with the support of the Bridge Builder's Union in 1833 in the city of Pest, Hungary.

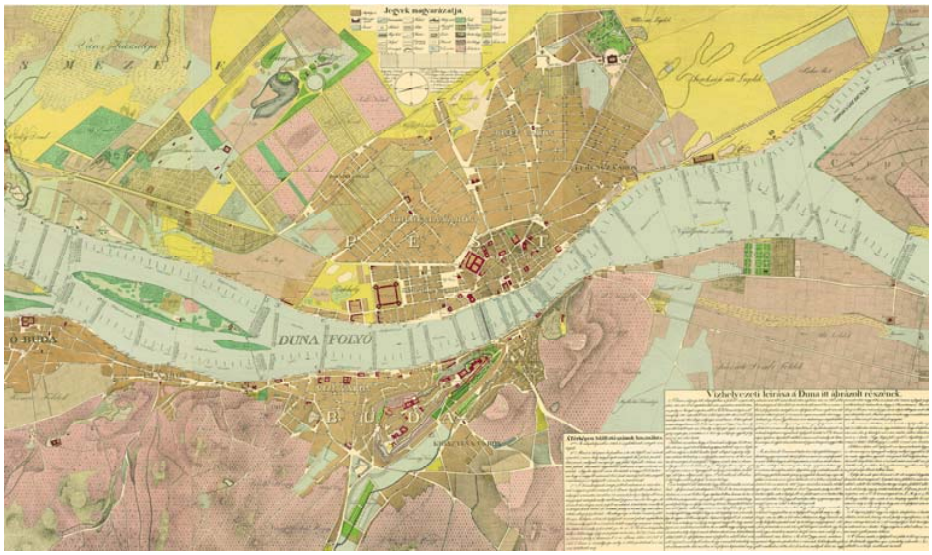

Figure 1. László Vörös' map of the Danube. '*Alap 's vízhelyzeti térképe Buda és Pest szabad királyi fő városainak*.' Pest, 1833. Litograph, handcoloured. Size: 1745 x 855 mm. (Courtesy Department of Cartography and Geoinformatics, Eötvös Loránd University, Budapest)

The building of a permanent bridge connecting Buda and Pest became part of the national development movement in Hungary, led by count István Széchenyi. The planning of *Chain Bridge* (1849), a symbol of the Hungarian capital, made mapping highly important for both the developers and supporters of the project. Engineer Vörös' rare thematic map is considered as a milestone in the history of Hungarian cartography, and is an important document of cartographic heritage.

This map of the Danube was the first cartographic work in Hungary which had the a newly coined Hungarian word, '*térkép*' (map), in its title. In other words, this was actually the first 'map' to be made in this country. The author included both '*ground plan*' and '*hydrographic*' as the subjects of his work, suggesting that he clearly realized his work is different from other urban plans or topographic maps of the city.

In 1832 it was apparently acceptable to both the maker and the public to include rich *hydrographic* content in a *general* or reference map. It should be observed that in the case of this map of Pest-Buda, the additional, special content, the representation of the Danube, did not cause many graphic problems. The thematic information appeared in the river, which could be left almost blank on contemporary urban maps. Vörös simply used this free graphic space to include the vast amount of hydrographic data he collected as a civilian engineer working on the Mapping of *the Danube (Danubius-Mappatio)*. The two content layers of the 1833 map were *spatially* separated, so visual hierarchy was not a design problem for the author

In the collection of the Danube Museum in Esztergom, Hungary there is a remarkably well preserved, original copy, It was acquired from the Hydrographical Institute in the 1860s, but its provenance is unknown. It is in the director's office, because the large map is in a late 20th century frame. We could inspect the copy when it was removed from the frame and found evidence for its historical importance. The author's blind stamp was discovered by Török and we have good reason to think it could be coloured by the map's author. Moreover, circumstantial evidence suggests, a letter in the Museum's collection, that this map could be a presentation copy to count Széchenyi, the patron of the cartographer (Török-Hillier 2014)

2.2. The Map Maker

László Vörös studied at the *Institutum Geometricum et Hydrotechnicum*, the world first university level civil engineering institute founded in 1782. Already as a university student he worked as surveyor, engineer, engraver and map maker for the 'Danube Mapping Project' from 1828.

Systematic survey of the waters in Hungary started as a late *Enlightenment* project in the early 19th century, and hydrographic maps were produced by a generation of civil engineers, including Vörös. The mapping of the river's section between the cities of Buda and Pest (today Budapest) became a priority task for the regular floods, threatening the developing and expanding sister-cities. Vörös was commissioned to construct a detailed and accurate map from the available topographic and hydrographic data. For personal controversies, however, he left the project and in the end he drafted and published his map privately.

3. Cartographic Heritage: Protection and Presentation

At first sight the wall map looks like a city map, but a closer looks reveals the abundance of thematic cartographic information of the work. The inter-

pretation of this rich data content is very difficult for the modern reader. This historical map produced by a specific, hydrographic mapping mode, which can not be fully understood in the customary topographic paradigm.

We put the map into its contemporary technical, cultural and social contexts to make its numeric data meaningful. The interactive exploration of the map, the visualization of the spatio-temporal database for the modern reader requires modern *geoinformation technology* **and** the *expertise of the historian of cartography*.

For museum pedagogical purposes interactive visualizations are especially important. But scholarly visualizations, developed for experts, can not be used directly for the general public, in our case groups of schoolchildren. This is why we developed a special*, touch screen-optimized* application interface for the expected visitors.

Figure 2 The historic map as graphic interface. The icons on the map surface are placed an significant content elements: e.g. the name of the map maker is linked to the thematic section on a short biography and a portrait. (Authors' image.)

The general overview of the historical map was used not only as background image, but it was actually developed a *graphic interface* for the 'Explore' function. We placed icons near to the most interesting features of the map. When clicking on them the visitor can read a short explanation and see additional textual, as well as pictorial information.

These thematic sections were selected:

- *The firs 'map' in Hungary*
- *The map maker: László Vörös*
- *Flood, flood!*
- *Heights and depths…*
- *Bridge over the Danube*
- *Key to the map's legend*

The short but informative text introduces 19th century hydrographic survey, the threat of icy floods, and explains the meaning of the numeric data on the map.

After the general introduction users may select among the menu items: *'Explore', 'Old Pest-Buda'* or *'Virtual Walk'* options.

Clicking on **'Explore'** opens a zoomable map in a new window, and make the visitor able to study its content in minute details. The Flash-based 'Old Pest Buda' application allows the user to compare the historic map image with a modern satellite image.

Figure 3 Screenshot from the application ‚Old Pest-Buda': the old map's content can be compared with the modern satellite image. (Authors' image.)

The third visualization option is based on the familiar *GoogleEarth* technology, and puts the three-dimensional historic map into the readers' modern world. By turning on the 'buildings' 3D layer on GE, visitors can easily recognize familiar buildings in Budapest. They may surprise to see how

these are placed on the old map: e.g. the House of Parliament is under water, because the building is partly in the former river bed! The interactivity with this application's familiar interface may result in a memorable historic walk in Budapest and on an important 19th century map.

Figure 4 ‚**Take a historic walk'**: the interactive application shows 3D buildings of modern Budapest (*Google Earth*) on the base of the 1833 map. Note the *House of the Parliament* in the past riverbed. (Authors' image.)

As a future development of this project, one possibility is the inclusion of interactive educational games. This installation in the Danube Museum may give the authors also a possibility to extend their cognitive lab experiments and collect data about actual map use.

4. Conclusion

The presentation of a highly important and significant cartographic object with cultural values in the Danube Museum resulted in the interactive, virtual exhibition of a unique copy of the complex map of Pest and Buda from 1833. The special applications we developed for the touch screen make potential users able to explore the map's rich content, learn more about the past of hydrographical surveys and mapping, and take a historic walk in the early 19th century Pest and Buda.

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