

## RESTORING BLAEU'S GLOBES BY MODERN METHODS

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The famous Dutch Blaeu dynasty produced globes in the seventeenth century, which we can find all over Europe. In the Museum of the Zirc Abbey, there is a 68 cm diameter earth globe and its celestial pair too. These globes were in very poor state, so they had to be restored in 2008. After the restoration, we can see the globes in their original state in the Museum. Unfortunately, not every people can visit this museum. This is why the Department of Cartography and Geoinformatics at Eötvös Loránd University decided to take a photo series of the surface of the globes, and publish the globes on the Internet as virtual globes (Virtual Globes Museum: <http://vgm.elte.hu>). The high quality photos were georeferenced, re-projected, and then combined into a map in Platte-Carée projection. Then we made a VRML model and a map for Google Earth. Using the digital techniques made it possible that the globes can be studied by anyone. The terrestrial one was undated, and the family dedication was not indicated either on the globe at the time. Blaeu's earth globe reflects the world view around 1645/48. It was made according to the newest discoveries.

First, the authors analysed the borders of continents with Google Earth. The globe map was defined as a layer in the computer program. Using the rule option in this program lines can be drawn and used them for measuring on the Google Earth globe and on the layer.

After the examination the conclusions are the next. The accuracy of the globes was very good in their era. Comparing the borders of the old globe with the current borders, see several differences can be observed. The European coast is quite correct, but further away from Europe the distortion along the meridians is more than 10 degrees in some cases. Furthermore, some parts of the Earth were unknown: the coastlines of these areas were partially drawn and added with commentaries in small fancy tables. A good example is the Northeast Passage (now located between Asia and North America). Another example is Australia, which was first called New Hollandia because of the Dutch discoverers. California is shown as an island, but this information was correct on earlier globes.

The frame is fascinating as well. The parallel ring is richly decorated.

Blaeu's family also made celestial globes. The customer could order globes with extras like with gilded stars and baroque style illustrations. The map was printed from copperplate and painted manually. Analyzing the celestial globe, an interesting commentary from the author can be read. According to this note, the constellations were updated for 1640 so later users of the globe had to consider this. Stars are classified by brightness in six groups in a table. The constellations are represented by figures too. Next to this table, there is another list of the known planets. During the restoration, the broken clock ring was recovered.

We are planning to increase the number of digitized globes in the Virtual Globes Museum. Now we have almost one hundred globes, and the work will not stop: our vision is that all known Hungarian globes will have their virtual version.

The project is supported by the European Union and co-financed by the European Social Fund (grant agreement no. TAMOP 4.2.1/B-09/1/KMR-2010-0003)