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## Restoration of a Unique Hungarian Medieval Codex Based on Results of Recent International Research and on a New Restoration Technique

### Abstract

The Apor codex is very important for the Hungarian cultural heritage for several reasons. It is one of the very first examples of Hungarian linguistic records and its binding is one of the few still existing original Hungarian renaissance book-bindings. The codex is named after its first known owner, baron Péter Apor. The manuscript had been copied and bound in the late 15<sup>th</sup>, early 16<sup>th</sup> century and belonged to the Premontre nuns. The codex is currently kept at Sepsiszentgyörgy (Romania), in the Székely National Museum. Its restoration was accomplished for the exhibition of “Hungarian linguistic records from the beginnings until the early 16<sup>th</sup> century” held in the National Széchényi Library, Budapest, Hungary in 2009.

The restoration work took approximately one year and was performed in the Restoration Laboratory of the Library, in the framework of an international agreement between Romania and Hungary with the support of the Balassi Institute, Budapest, Hungary.

The restoration was necessary essentially due to iron gall ink corrosion, a self-sustaining process that may completely destroy paper. The first step of this process is the appearance of a brown halo adjacent to the ink, then ink bleeds through the paper and paper becomes fragile underneath the ink leading to the eventual loss of text. Iron gall ink corrosion is a consequence of free iron ions present in the writing medium as a result of inappropriate ink preparation. As the codex had been copied by several persons using several different ink mixtures, all phases of ink corrosion were present in the book. The main goal of the restoration was to stop this process.

Additionally to ink corrosion the manuscript had been damaged by use and seriously mutilated as well. Moreover, the codex was damaged by water, causing mould stains and the decay of the binding medium of the ink causing ink loss. In addition, due to missing pages the body of the book collapsed, the spine became distorted and the boards warped leading to additional damage and tension. Besides stopping iron gall ink corrosion missing pages had to be replaced in order to restore the original size of the codex.

It is important to note that prior to treatment, the binding technique could be observed and documented during disbinding. The original binding of the codex was unaltered. Its detailed documentation contributes significantly to our understanding of Hungarian renaissance bookbinding techniques.

The treatment of iron gall ink corrosion was based on results of recent international research. The main goal was to neutralize the excess of iron sulphate that had been added during ink preparation. Optimal treatment consisted of a combined calcium phytate and calcium hydrogen carbonate-based neutralisation of the excess iron, and this was confirmed by repeated measurements of free iron ions. In addition, this treatment leads to the neutralization of excessive acidity as well. At this step pages were digitised for easy access and further research of this precious object.

Filling in the pages presented a complex problem. Two types of paper damage were present. Due to usage, paper was missing at the spine area, corners, and edges; this could be efficiently filled by the proven method of leaf-casting. The other type of damage was due to ink corrosion that consisted of small cracks and splits, or rather small losses of paper located only to written areas. Paper under ink was rather fragile, even in regions where cracks were not yet observable and in these regions new cracks could appear upon manipulation. Due to the importance of this codex, it was imperative to avoid methods that would cover the text.

Completing the missing areas was done manually, in two steps. In the first step, larger areas at the corners, edges and mutilated areas were filled in by manual leaf-casting. This was followed by gelatine sizing that not only reinforced the paper, but, according to recent research, also contributes to maintain iron ions in a chelated form. Drying of the

sheets was followed by manual filling the losses using fibres obtained from manually cast ink-coloured or native paper. These fibres were deposited with the help of two fine brushes following the ink line. In order to see latent splits and cracks, this work was done on a light table.

After filling the missing sections, the definitive order of pages was established with the help of an expert. Original techniques were respected during the restoration of the binding, and, in order to maintain functionality of the book, severely weakened sewing supports and headbands were replaced. Elements not incorporated are now kept alongside the restored codex for further research.

The restoration and conservation of this unique book illustrates the importance of the incorporation of the results of new research in the field, in parallel with traditional meticulous manual work.