

# **Development of photography, electrotyping and photomechanical reproduction processes in Austria**

## **Introduction:**

At the end of the 1830s, two pioneering techniques were developed that are of great importance for today's society, industry and art: electrotyping (Jacobi, 1840) and photography (Daguerre, 1839). Both techniques also aroused great interest in Vienna among an interdisciplinary circle of people, academics, merchants, craftsmen and artists. By exchanging ideas and making their knowledge and resources available to each other, they were able to advance both techniques and achieve great success in the further development of electrotyping and photography. Despite these significant historical achievements, the actual production of early daguerreotypes and early electrotypes in Vienna received little scientific attention.

Historical sources confirm that one of the first two etching processes for the print reproduction of daguerreotypes was developed in Vienna by Joseph Berres (Anonymus, 1840; Berres, 1840, 1841; Jürgens et al., 2018). Moreover, the etched daguerreotypes were often duplicated by electrochemical deposition, which for the first time in history allowed unlimited print runs. Due to insufficient sharpness and depth of etching, printing plates of photographic origin were often reworked by an engraver. The prints themselves were sometimes subsequently coloured by hand, making the identification of these first photomechanical prints a challenge.

The interdisciplinary combination of natural sciences, photographic history, photochemistry, electrochemistry, conservation and artistic research in the Heritage Science project PHELETYPIA (Ljubic Tobisch, Artaker and Kautek, 2023) is intended to contribute to a better understanding of the properties of the early Viennese daguerreotypes and their transfer to electrolytic printing plates for further photomechanical reproduction.

## **Material / Data:**

Detailed research and comparisons of more than 30 daguerreotypes and photomechanical prints from Austrian and foreign collections enable a comprehensive examination of these pioneering methods from the early 1840s. By examining the objects from different periods and in different states of preservation, conclusions can be drawn not only about their methodological and chemical preparation steps but also about their ageing and degradation stages. The project concentrates on the recording, evaluation, documentation and scientific research of originals from museum and private collections in Austria and the countries of the former Habsburg Monarchy, as there was a lively exchange of knowledge and experience within the empire in the mid-19th century.

## **Methodology:**

Through surface diagnostics, the surface morphology and chemistry, as well as the presence or absence of certain characteristic elements and possible process variations, reveal information about the manufacturing process (Barger and White, 2000) and the accuracy of image transfer to another medium. Only non-destructive and non-contact analytical methods such as digital optical microscopy, scanning electron microscopy including electron-

dispersed X-ray spectroscopy (SEM/EDX), micro X-ray fluorescence analysis ( $\mu$ -XRF) and Fourier transform infrared spectrometry (FTIR) were used for studying the originals.

## Results and Conclusions:

The research focuses on the daguerreotype techniques developed in Vienna as well as the etching processes applied on daguerreotypes, the transfer of images by electrochemical deposition into more robust electrotyping printing plates and the further production of prints for the graphic arts. A detailed image analysis, comparison and interpretation of more than 30 daguerreotypes, electrotypes, print matrices and paper prints were undertaken. The gained information provides the missing cornerstones for the understanding of early Austrian electrotyping and photographic history.

An important focus of this project is also the determination of signs of ageing and considerations for long-term preservation. Glass-induced contact corrosion and other kinds of corrosion, mould, as well as loss or alteration of image particles were studied in detail to provide a comprehensive database for the further identification of daguerreotypes and their damage phenomena. Particular attention was paid to existing and possible future conservation measures to slow down deterioration and prevent damage by creating optimal conditions for preservation.

## Discussion:

This highly multi- and interdisciplinary research project aims to compile and disseminate data to international researchers in the fields of early photography and photomechanical reproduction processes. This will facilitate a better and more precise understanding and differentiation of these processes, both within and outside Austria.

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