doi:10.2533/chimia.2007.743 CHIMIA **2007**, *61*, No. 11

Highlights of Analytical Chemistry in Switzerland

Pigment Analysis on the 16th Century St. Gallen Globe

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Keywords: Cultural heritage · Non-destructive analysis · Pigments · St. Gallen globe · X-ray fluorescence

In 1712, the Zurich authorities removed a collection of precious manuscripts from the St. Gallen monastery, including a terrestrial and celestial globe of c. 1570, to keep them in their own city. As part of a settlement of the ensuing centuries-old dispute between the cantons of Zurich and St. Gallen, the parties agreed in 2006 that an identical copy of the richly painted globe should be created for future display in St. Gallen whilst the original should remain in Zurich.

This decision presented a welcome opportunity to investigate the materials and techniques used for the creation of this rare object. Analysis of the pigments on the painted surfaces of the globe formed an essential part of the research. In the analysis of valuable cultural heritage, the choice of techniques is usually restricted to those with minimal interference with the integrity of the object. In this particular case, taking samples for analysis had been ruled out.

Many traditional mineral pigments contain characteristic chemical elements, permitting their completely non-destructive identification *in situ* by qualitative X-ray fluorescence spectrometry. A portable Bruker AXS Artax spectrometer was used because conservation and security concerns did not allow the large, heavy and partially disassembled globe to be moved from the Collections Centre of the Swiss National Museums to an external laboratory. A 0.65 mm diameter collimator permitted the analysis of small painted details. Unlike most other XRF spectrometers, this particular instrument, designed specifically for use in museums, can be set up directly in front of an object, without using a vacuum chamber. A red laser points through the collimator towards the object and indicates precisely the spot to be analysed.

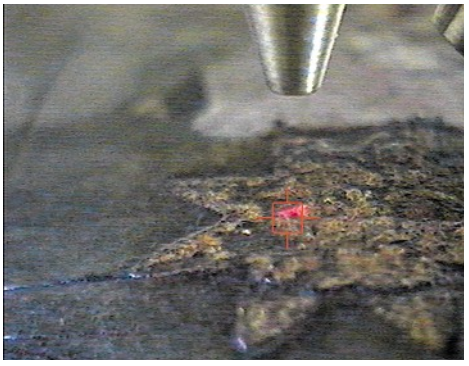
A series of analyses of the different colours, painted ornaments and letters led to the identification of the historic pigments used.

With the help of the results of this investigation, a true-to-the-original replica will be created, displaying the 'old' colours in a fresh appearance – as the globe most probably looked in 1570.

Received: September 20, 2007

Setting up the XRF spectrometer for analysis

The St. Gallen globe at the Swiss National Museum, Zurich



Focussing the X-ray beam on one of the gilded stars

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