

From treasure to treasure

The St-Maurice abbey's conservation workshop exports its skills.

In 2023, the conservation workshop at Saint-Maurice Abbey (Valais, Switzerland) is collaborating on a European "COST Innovators Grant (IG)" project to disseminate portable, low-cost, minimally invasive analysis tools for heritage metals (<http://endlessmetal.portasap.eu/index.html>). One of these tools is called the Pleco® - an electrolytic pen, which the workshop developed in collaboration with HE-Arc Neuchâtel for cleaning tarnish from reliquaries in the abbey's treasury. The project is led by HE-Arc Professor Christian Degriigny, who brought his expertise in applied electrochemistry to the conservation of the shrine of St. Sigismund and his children (XIIth century), and later to the development of Pleco®. The COST project involves numerous exchanges, training courses and workshops throughout Europe. Neuchâtel, Ljubljana, Toulouse, Gdansk, Timisoara and Porto are just some of the places where these exciting exchanges take place.

The latest took place from May 16 to 17, 2023 at the Hungarian National Museum in Budapest, at the invitation of Balazs Lencz, Head of Conservation. The aim of these two days was to use Pleco® to analyze the corrosion products that develop on archaeological silver objects dating from the end of the Roman Empire (Ist to IVth centuries). Two silver hoards were involved: the Seuso treasure (<https://seuso.mnm.hu/en/#&chrp=13&sobj=0>) from the Hungarian National Museum, which appeared on the art market in 1980, and the Vinkovci treasure found during excavations in 2012 in Croatia (https://en.wikipedia.org/wiki/Vinkovci_Treasure).



Seuso hoard conserved in the Hungarian National Museum ©MNM

Christian Degriigny (HE-Arc CR) and Nataša Nemeček (National Museum of Slovenia) analyzed with Balazs Lencz the tarnishing of an ewer from the Seuso treasure, while Eva Menart (National Museum of Slovenia) and Romain Jeanneret (Abbaye de St-Maurice & HE-Arc) worked on a fragment of a dish from the Vinkovci treasure brought by Damir Doračić and Ivana Mlinarić from the Zagreb Archaeological Museum.



*Vinkovci Treasure with location of fragment no. 3 studied during the workshop in Budapest. Photo: D. Bota
©City Museum Vinkovci*

In the case of the Vinkovci treasure fragment, this is the first time the Pleco® has been used to analyze an archaeological corrosion layer. This alteration, composed mainly of chlorides, is known as "horn silver". Cleaning this thick layer of corrosion, which disfigures the surface of the metal, is complicated other than by mechanical means and chemical solutions such as ammonia. Damir's team continues to test new methods (laser abrasion and plasma), but for the moment, only mechanical cleaning with a scalpel and/or chemical cleaning with ammonia gives satisfactory results for revealing and preserving surface information. These treatments require great care in their execution to reveal the decorations, often located in the heart of the corrosion products.

The Pleco® was first tested on the reverse side of the fragment, on the periphery of a non-corroded zone, at the level of a thin layer of corrosion, then on thicker layers. The voltammetric plots clearly showed the reduction of silver chlorides:



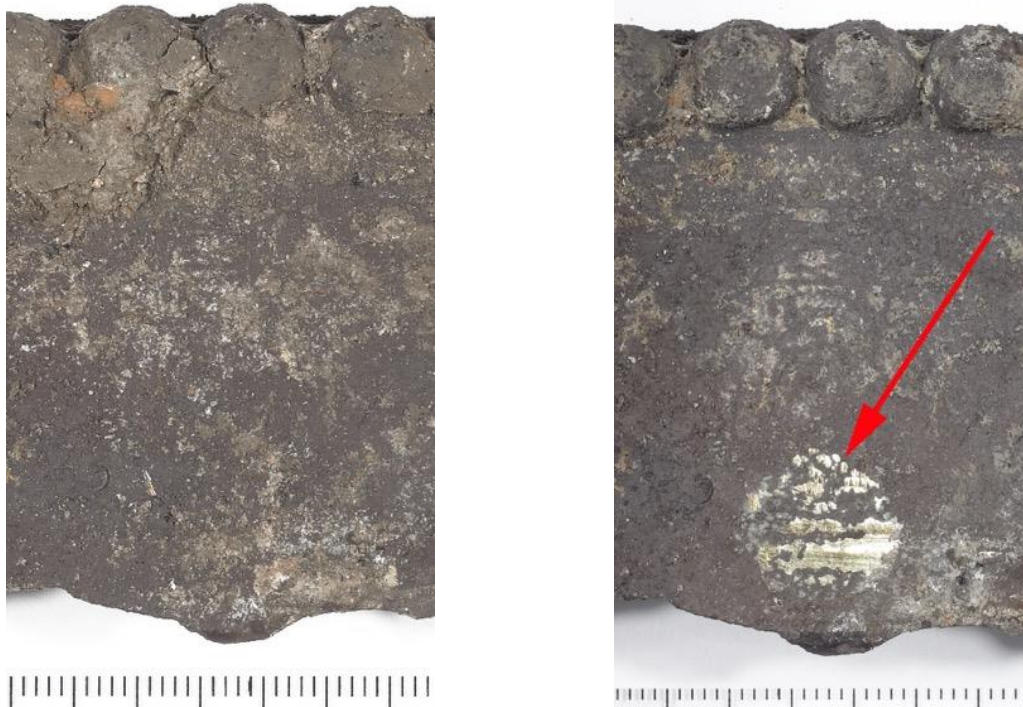
Set-up for analyzing corrosion products and their reduction with the Pleco® and a potentiostat. ©Eva Menart



Detail of fragment no. 3 after silver chloride reduction with Pleco®. ©Romain Jeanneret

These results are encouraging for slightly corroded surfaces. Naturally, thicker layers of corrosion are more difficult to reduce. It should be noted that the original surface to be restored and preserved lies within the corrosion. For a conservation treatment, the Pleco® may be suitable in combination with other cleaning methods. External layers of corrosion could be removed with a scalpel, then the Pleco® applied to reduce the remaining internal corrosion to metal, thus restoring the brightness of the silver.

A second test was carried out on the front of the fragment, where some areas are gilded, although now completely covered in silver corrosion. Here, the original surface is clearly defined by the gilding, which is a more favorable configuration for the Pleco®. On the strength of our experience with gilded silver objects from the treasury of the Abbey of St-Maurice, we can now reproduce the protocol by reducing the silver chlorides to metallic silver, then reoxidizing the reduced silver to reveal the gold. The results of these tests are promising since we were able to reduce and then detach the corrosion present on the surface of the gilding. However, this takes time, and for a 2cm square area, it takes around 4 hours. Due to lack of time, we were unable to complete the cleaning of one area, but the partial results are evident:



Detail view of fragment n°3 before/after partial cleaning of silver chlorides on a gilded surface (cleaning in progress). © Damir Doračić.

Given the number of objects in the Vinkovci treasure, the Pleco® does not appear to be a miracle solution and should not replace the traditional methods used until now. The tool can be a complementary, albeit time-consuming, method, especially in the case of gilded areas. In other cases, where smaller archaeological objects in gilded silver are concerned, the Pleco® seems to be a perfectly suitable alternative that should be explored and improved in the future.

Romain Jeanneret
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