



The Conservation of Archaeological Leather from Tuva (Southern Siberia, I mill. BC)

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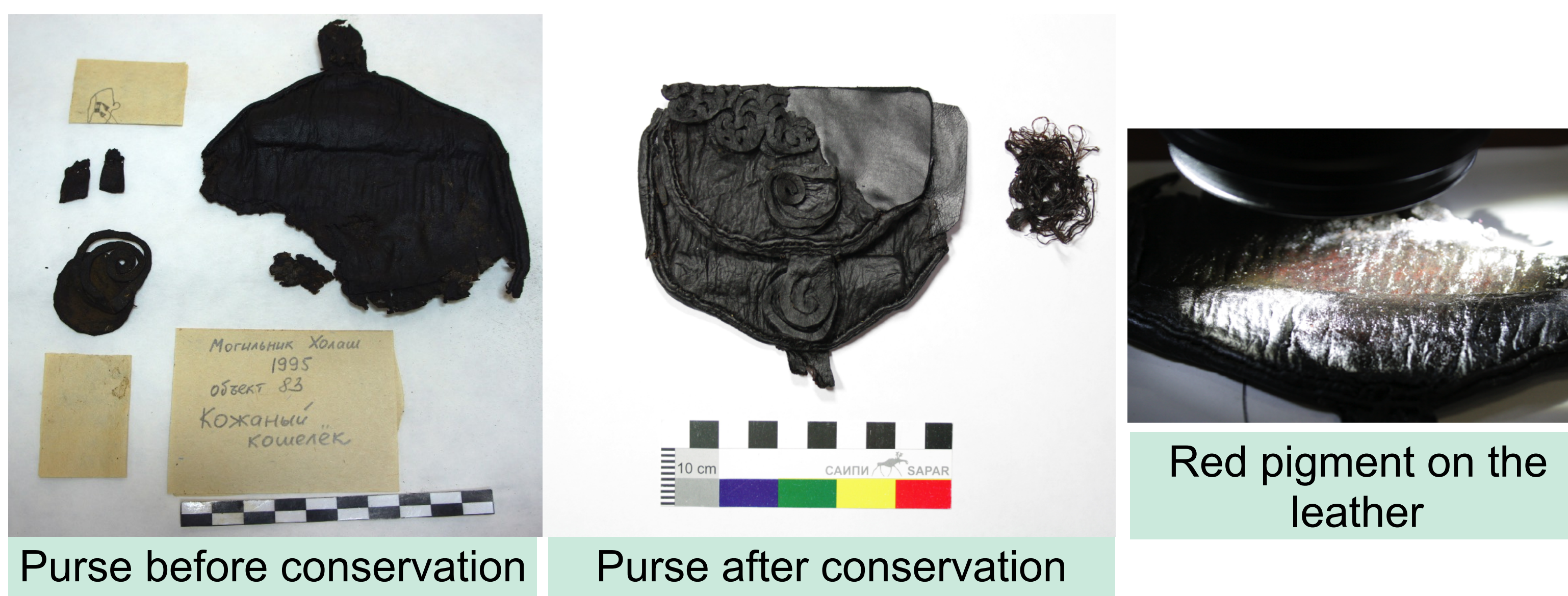


Introduction

This poster highlights a small part of larger research (about of some experience) in field conservation and restoration of leather items and the questions related to it. All materials come from burials of 8th– 2nd centuries B.C. and belong to the Scythian and Xiongnu epoch. Almost all of them come from the excavations of the Tuvian Archaeological Expedition of the Institute for the History of Material Culture RAS in Tuva (Southern Siberia). In most cases, the graves were looted in antiquity, and the safety of related equipment does not allow to directly interpret the purpose of certain items.

Conditions of preservation are different in each case: wet or dry soil; archaeological objects from museums collections (serious deformations of items and against the background of an unsuccessful previous restoration (dried out too rapidly)) or objects that have survived only due to the contact with items made from copper alloys.

The Re-conservation of Wet Archaeological Leather:

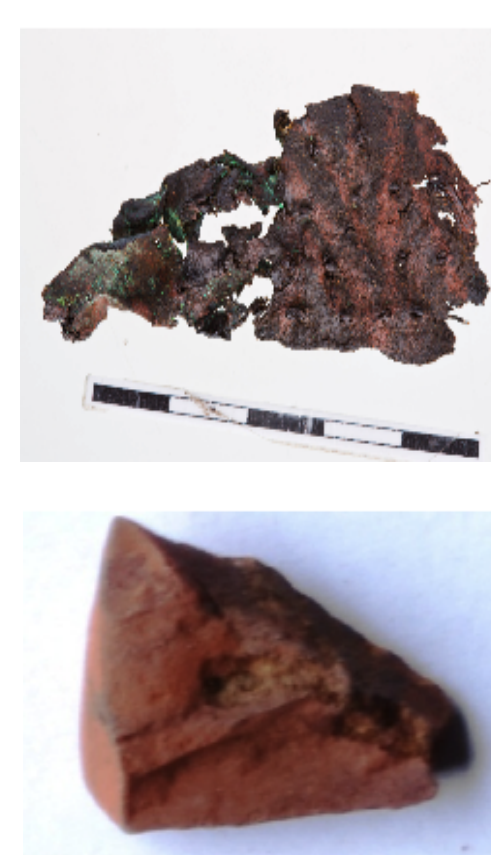


A leather wallet from b. 83, Holash burial ground (Semenov, 1997: 15-19, dated by 4th-3rd centuries B.C.) was conserved in 1995 with glycerin on water-alcohol solution and packed in a plastic bag, which made it impossible to conduct further research and even more so, to present it at the exhibition. In 2014 we started the process of reconservation: polyethylene glycol (PEG 400) — 25%, water-alcohol solution 3-4% Preventol R80, distilled water — 50%. The leather fragments were in closed containers for 4-6 weeks. Conducted daily checks of the processes of plastification, as appropriate (output glycerine), alternated solution. Then freeze-drying was carried out in the freezer for 5 weeks (vacuum sublimation). The replacement of the losses with the help of glue Lascaux 303HV only in those places where the edges could be destroyed in the future during transportation, etc. This work was carried out under the direct supervision of the restorer of the highest qualification N.P. Sinitsyna (The Grabar Art Conservation Centre).

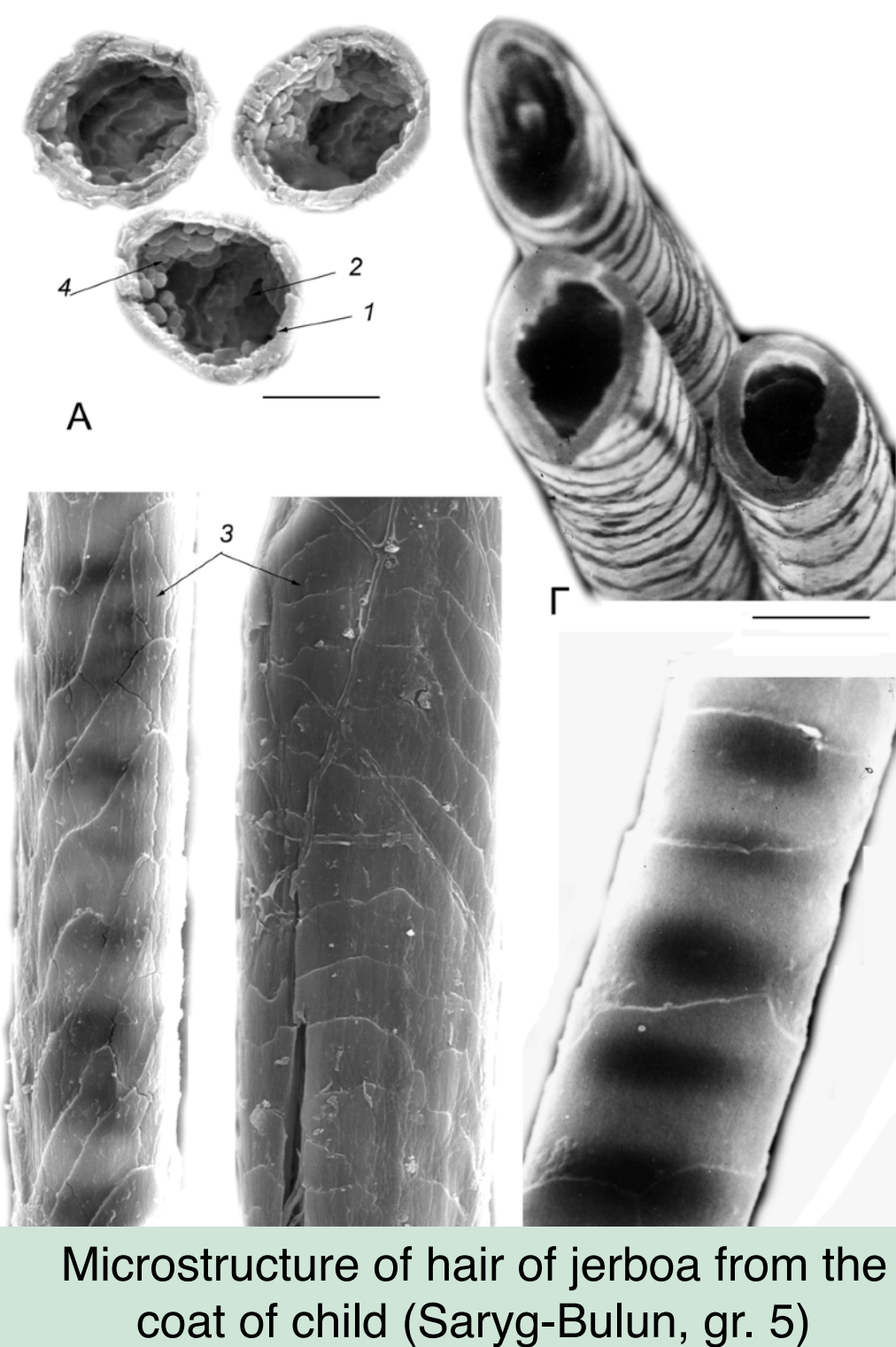
In the process of restoration of the previously restored leather purse from the Holash 83, it became clear that thin leather substrates under carved appliques covered with red paint, as well as the entire lower part of the product on the front side. X-ray fluorescence analysis was performed using the Tornado M4 spectrometer (Bruker) which confirmed the presence of pigment Fe₂SO₄ (iron oxide, hematite, ochre). Many other products from leather of the Scythian time on the territory of Tuva, the ancient masters covered with red ochre: belts, bags, amulets, scabbards for knives.

Analysis

Episodic accumulation of fur fragments (presumably: fur coats), mostly preserved due to contact with copper alloy items, allowed to study using scanning electron microscopy (the Institute of ecology and evolution RAS). There was hair from seven fur samples from Scythian time barrows from the territory of Central Tuva. As a result of the comparative morphological and statistical analysis of the tested hair fragments' microstructure, it was found that the hair of the sample from the burial site of Kosh-Pei I (b. 2) belonged to the hare L. Timidus (hare); samples from the burial grounds Sulug-Hem I (b. 2), Sausken 3 (b. 11) and Sipuchii Yar — Przewalskii horse; hair samples from burial sites in the valley of the river Eerbek (Eki-Ottug 1 (b. 5) and Bai-Dag 6 (b. 6)) is similar to the mix of hair of Przewalski's horses, the extinct horse E. lenensis and of the Bashkir breed. Hair samples from the coat - burial Saryg-Bulun (grave 5) identified as belonging to the rodent — representative of the family of jerboa (Dipodidae) (Chernova, Busova, 2016).

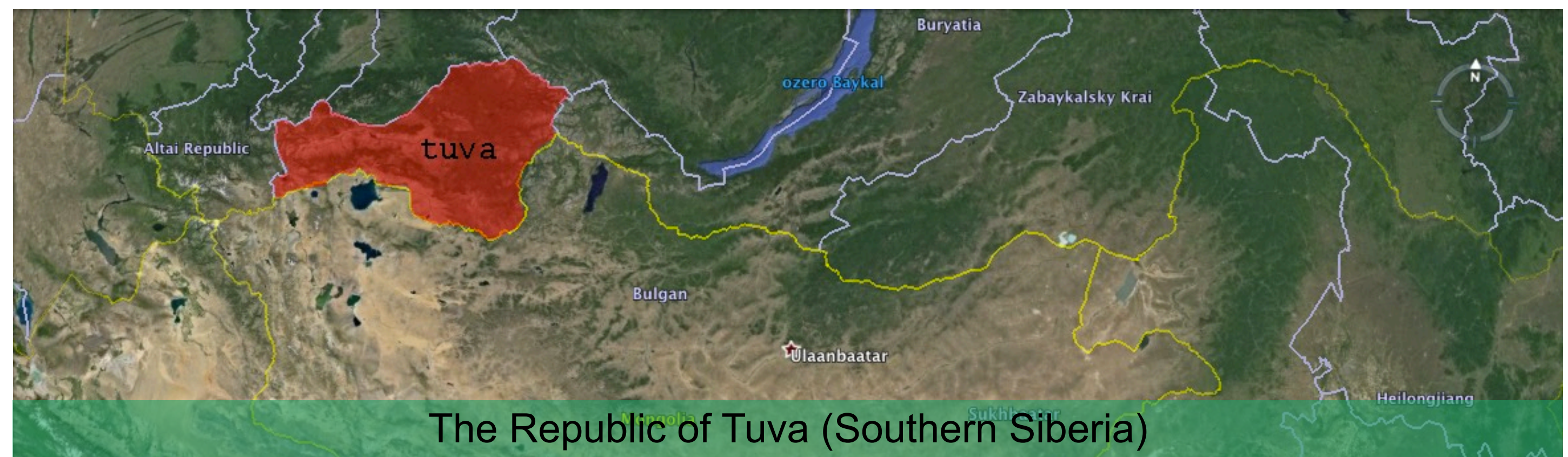


Using of X-ray diffraction analysis will help us to know more exact information about identifying composition of coatings and deposits of pigments. For example, on leather sword sheath from the site Niya was found cinnabar HgS as pigment (A.E. Kramell et al., 2016).



Microstructure of hair of jerboa from the coat of child (Saryg-Bulun, gr. 5)

Working conditions on site:



T max (daily) = 40-45° C
T min (night) = -7-13° C
Humidity vary during the day from 20 % to 80 %



The Conservation of Dry Archaeological Leather:



The leather headgear of a child mummy (burial 5, Saryg - Bulun) with a spiral ornament on slim light skin (Semenov, Kilunovskaya, 1990: 41-43). It was quite deformed, with multiple losses. It was decided to use the method of remote humidification. After a few days, the object had become flexible and had a form. In order not to lose moisture outside the desiccator again, a special dressing based on beeswax was used. In most cases, with the help of remote moisture and minimal intervention it is possible to reshape deformation and strengthen the subject. The replacement of the losses was done with the help of glue Lascaux 303HV and japan tissue (it's not finished yet).

The Leather and Items Made from Copper Alloys

The biggest difficulty of our work is the other majority of items, which is a whole group of archaeological leather items that are fragmentarily preserved in burials. These fragments have been preserved by contact with products made of copper alloys — daggers, knives, axes, arrows, belt buckles. This skin has lost its plasticity and retains its shape only because there was a gradual replacement of organic parts with copper chlorides. Trying to remove copper is dangerous because the whole object can collapse.

