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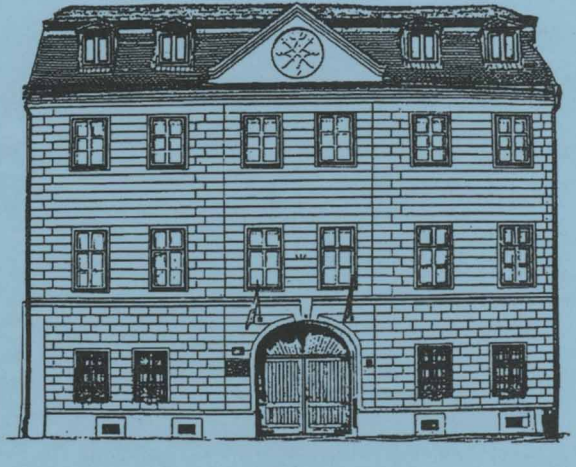

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BRUKENTHAL NATIONAL MUSEUM IN 2016: A CHRONICLE OF RESTORATION EXHIBITIONS AND EVENTS

Dana Roxana HRIB*

Abstract: *The present study is a synthetic presentation of Brukenthal National Museum's cultural offer in the field of restoration during 2016.*
Keywords: *Brukenthal National Museum, restoration, 2016.*

Rezumat**:** *Articolul de față constituie o prezentare sintetică a ofertei culturale a Muzeului Național Brukenthal în domeniul restaurării, pe parcursul anului 2016.*

Cuvinte-cheie: *Muzeul Național Brukenthal, restaurare, 2016.*

1. Permanent exhibitions[1]

_New permanent exhibitions at the 1st and 2nd Floors in Brukenthal Palace:

Project inside the 2017 Brukenthal Bicentennial program, the works at the 1st Floor in Brukenthal Palace developed a three-folded concept focused on the original Reception Rooms at the facade, rooms presenting the interior atmosphere in the late 18th c. and the early 19th c. and thematic rooms.

The project involved the participation of the restoration specialists from Brukenthal National Museum's Restoration Laboratories at all levels employed by the setting of the new exhibition, from conservation and restoration works to curatorial endeavor.

Initiated in 2015, the works to the new permanent exhibition at the 1st floor concluded in 2016[2].

Also endeavored during 2016, the refurbishment works for the "Masterpieces of the Brukenthal Collection" were completed at the 2nd floor of the palace, the selection of works being appropriated to the exhibition's thematic and enhanced from 23 paintings and one decorative item to 30 paintings, 2 bas-reliefs and 7 decorative items, all possible because of the restoration team involvement in supporting the project. The exhibition re-opened on February 25, 2017 together with the "Library Room" located at the 2nd floor as well.

New segment of the permanent exhibition, the library brought into the public attention newly restored furniture items along with a illustrative selection of books, characteristic for an 18th c. library.

2. Temporary exhibitions[3]

Result of a long and very elaborate process, the exhibitions presenting restored items from the Museum collection are special events. In 2016, Brukenthal National Museum's cultural agenda enjoyed the opening of such an exhibition as part of a larger project that met with a great appreciation from both the public and the specialists.

a. Exhibitions at the Museum's locations:

_For us time is measured in centuries (Brukenthal Palace, 1st floor & inner courtyard, 1.09 – 31.12): the exhibition was part of the Before 200 project. Excepting the books, Brukenthal National Museum preserves only few of founder Samuel von Brukenthal's personal belongings. Among them stands the pocket watch, a piece connecting the time of the 18th century and the time of the 21st century, like a bicentennial heart that keeps on beating.

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[1] The short descriptions of permanent exhibitions are selected from the texts given by the curators for public information.

[2] http://www.brukenthalmuseum.ro/europeana_en/etajI/index.htm

[3] The short descriptions of temporary exhibitions are selected from the texts given by the curators for public information.

From September 1st 2016, the watch could be admired as part of the permanent exhibition in Brukenthal Palace, being displayed in the north wing oriental room – a space that reopened to the public after more than half a century. Restored in 2012, Baron Samuel von Brukenthal's pocket watch is the symbol of year 2017; the item illustrates through its own functionality the vitality of the museum where it belongs, as shown by the media materials displayed inside the exhibition and in the inner courtyard of Brukenthal Palace.

_*Diocese of Tulcea's Treasure* (Casa Albastră/Blue House, Multimedia Hall, 28.07 – 1.10): the exhibition invited the public to find out more about a remarkable heritage of religious objects representative for the cultural and religious area of North Dobruja during the 18th,19th and the 20th centuries.

A project in partnership with Brukenthal National Museum, the exhibition involved conservation and restoration works in the benefit of the items of display, also presented on the informative plates, aiming at reinstating, among the national cultural values, the religious art from churches and monasteries in the area of Tulcea. In other words, the exhibition occasioned a deep reflection on the spiritual heritage left by our ancestors and the assumed responsibility in heritage preservation.

b. **Online exhibitions**:

_ *For us time is measured in centuries*

http://www.brukenthalmuseum.ro/virtuale/ceas/index_en.html

REFERENCES

Muzeul Național Brukenthal: Raport de Activitate 2016
http://www.brukenthalmuseum.ro/despre_noi/rapoarte.html

AIR POLLUTION IN MUSEUM BUILDINGS

Morten RYHL-SVENDSEN*

Abstract: *This paper reviews the main air pollutants relevant for preservation of cultural heritage objects. Air pollutants may originate from outdoor or indoor sources. Indoor sources include the emission of corrosive vapors from construction materials used for museum display settings. Air pollution may cause corrosion to some metal objects, or oxidize or cause acid hydrolysis in organic materials. Control methods include better shielding from outdoor climate, and test of indoor construction materials for their potential to emit harmful substances, before their use near susceptible museum objects.*
Keywords: *Air pollution, museum environment, corrosion, monitoring, display materials*

Rezumat: *Această lucrare trece în revistă principalii poluanți atmosferici relevanți pentru conservarea obiectelor de patrimoniu cultural. Poluanții atmosferici pot proveni din surse exterioare sau interioare. Sursele interioare includ emisiile de vapori corozivi din materiale utilizate pentru sistemele de etalare ale muzeului. Poluarea aerului poate provoca coroziunea unor obiecte metalice, poate oxida sau provoca hidroliza acidă în materialele organice. Metodele de control includ o protecție mai bună împotriva poluanților atmosferici, și testarea materialelor utilizate în interior, în scopul verificării potențialului lor de a emite substanțe dăunătoare, înainte de a fi utilizate în apropierea obiectelor muzeale sensibile,.*
Cuvinte-cheie: *Poluarea aerului, mediu muzeal, coroziune, monitorizare, materiale folosite la etalarea obiectelor*

Introduction

The effect of the indoor environment on museum objects has received much awareness from museum and conservation staff, in the course of the development of preventive conservation (see for example Caple 2011, 588, and Staniforth 2013, 426). Effects caused by incorrect relative humidity, temperature, and light exposure have been observed and described for at least the last one hundred years. However, for long time air pollution received much less attention. This is a bit odd, as the deterioration, which pollutants cause, sometimes can be just as destroying for a museum object as, for example, exposure to high light levels.

One reason for this could be that the effect of indoor air pollutants is not always visible. Some types of deterioration are easily recognized, such as metal corrosion. But other decay processes are more hidden and more difficult to detect, such as, for example, the loss of fiber strength in a material. And as a pollutant rarely is the sole factor in a deterioration process, but interacts with relative humidity, temperature, and even other pollution compounds, the decay mechanism can be rather complex.

Much of today's terminology and the approaches of air pollution control in museums were adapted from the human health and comfort field of science. While the technology from that field, such as monitoring methods, can be a useful tool, other approaches are not necessarily adaptable when dealing with the "health" of museum objects instead of humans. In opposition to people, museum objects are intended to last for a very long time, usually beyond centuries. And contrary to the human body, which, to a certain extent, will heal again if exposed to small doses of poisonous substances, materials in an object will just accumulate the deterioration caused by any attack, slowly decaying more and more. Therefore, in the large perspective, even small exposures to pollutants will have an effect, not unlike the accumulated fading

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of dyes when exposed to light.

What is air pollution?

Besides the main components nitrogen and oxygen, and moisture in varying amounts, air contains a long range of compounds emitted from either natural or man-made sources. These compounds can be gaseous, liquids or solids. Mostly these compounds are present in very low concentrations only, and are sometime referred to as "trace compounds".

Many compounds are generally recognized as pollutants from their ability to cause discomfort or harm the human body. It is a common assumption that pollutants which are harmful to people are also harmful to materials. However, although some overlap, the pollutants picture in museums is different. Summing up the central compounds, the key pollutants are few:

- Oxides of nitrogen, especially NO_2
- Ozone (O_3)
- Oxides of sulphur, especially SO_2
- Reduced sulphur gases, especially H_2S and COS
- Carboxylic acids, especially HCOOH and CH_3COOH
- Fine particles

Nitrogen oxides, sulphur oxides, and ozone, originte almost entirely from outdoors sources. Reduced sulphur gases may both have outdoor and indoor sources and carboxylic acids in any significant level are solely generated indoors. Fine particles may both have sources outdoors and indoors, however, the chemical composition of the particles may vary. Baer & Banks 1985, 9-20, and Brimblecombe 1990, 1-8, in their classical papers reviewed the composition of the museum atmosphere and its effect on materials.

Gaseous air pollutants

Gaseous air pollutants will attack materials by chemical reactions mainly via conversion into an acid (e.g. nitrogen dioxide is oxidized to nitric acid). Other pollutants attack materials directly by oxidation, for example ozone. The rate of pollution attack is, as other chemical reactions, dependent on temperature: the higher the temperature, the faster the reaction. Furthermore, chemical reactions such as hydrolysis are dependent on water, so the relative humidity of air does also influence the rate of deterioration. Finally, the decay rate is dependent on the amount of pollutants. The more pollutants, which are available to become deposited on an object, the faster the reaction. Some pollutants act in synergy, so that a mixture of the pollutants will create more harm than the sum of the decay each pollutant would cause individually.

Particles

Solid matter or liquid material may be suspended into air as small particles or droplets. As for the gaseous pollution, the sources can be nature or human activity. Such airborne material ranges from superfine particles with a diameter as low as 0.005 µm, to super coarse particles of 100-1000 µm diameter (which is visible to the eye). The division between "fine" and "coarse" particles is somewhat vague, but lay around 1 µm diameter.

Fine particles will be suspended in the air for a long time, whereas the coarse particles will be deposited on the ground or other horizontal surfaces much faster due to gravity. One example of fine particles is soot and other smoke components, while an example from the coarse end of the scale is textile fibers. The visible particles are often referred to as "dust". The main effect of particles on objects is soiling, which especially is a problem with fine particles. Due to their size they will deposit almost everywhere, and they may contain compounds, which will engage in chemical deterioration processes, e.g. sulphur, or salts. The coarse particles may also consist of harmful compounds, or have harmful gases adsorbed on the surface. However, another important problem, which arises from coarse particles, is a mechanical one. When objects become dusty, it gives a bad aesthetic appearance, which call for cleaning. With an increased cleaning rate there is a risk of an increased wear of the objects surface, either because of the dust being abrasive, or because of the cleaning method. Finally, dust may be a nutrient for microorganisms or pests. See Yoon & Brimblecombe 2001, 232-240, and Nazaroff *et al* 1993, 144, for a

further description of particulate pollution in museum environments.

Emission from materials

Materials used for construction or furniture may emit compounds to the air. Emission from materials can be divided into primary and secondary emission (Knudsen *et al* 1999). Primary emission consists of compounds given off as a new material is drying or curing (e.g., paint and glue). Secondary emission consists of compounds which originate from the material itself, or which are generated during the material's decomposition. One example of this is the off-gassing of aldehydes and acids from degrading wood-pulp paper. While primary emission is decreasing relatively fast, secondary emission will continue throughout the lifetime of the material, and may even increase over time. In a confined space made from polluting materials, the interior pollution concentration will increase to a level much higher than of the surrounding room air. An example of this could be display cabinets made from oak wood, which is known to release formic and acetic acid vapors in high amounts. In those situations, acetic acid concentrations in the order of 1000-times the ambient level are common (Grzywacz & Tennent 1994, 164-170).

Pollutants effect on materials

It is well recognized that ambient air pollution, in particular NO_2, SO_2 and O_3, entering cultural heritage collection areas will inevitably cause the decay of the artifacts; by acidification and/or oxidation of materials (see e.g., Tétreault 2003; Schieweck & Tunghammer 2014, 275). For organic materials, such as paper, air pollutants will cause color changes and embrittlement (Bégin et al 1999, 1-21; Strlic & Kolar 2005). Rubber and some plastics are prone to oxidation, which causes cracks and brittleness inside the material (Jaffe 1967, 375-378). Pigments and dyes will fade (Whitmore *et al* 1987, 45-58; Whitmore & Cass 1989, 85-97), and some metals will corrode (Graedel & McGill 1986, 1093-1100; Ankersmit *et al* 2005, 695-707).

Since the 1970s an increasing number of publications have reported on museum objects damaged by pollutants generated indoors (FitzHugh & Gettens 1971, 91-102; Agnew 1981, 3-9; Padfield *et al* 1982, 24-27; Tennent & Cannon 1993, 8-11; Gibson *et al* 1997a. 253–264; Hatchfield 2002, 203). For the great majority of the observations, construction materials in display cases or storage containers were the source of corrosive gases, especially carboxylic acids.

The types of damage caused by carboxylic acids are, for example, metal corrosion: lead will corrode in a reaction with acetic acid and carbon dioxide in air, into lead carbonate. Metal corrosion from carboxylic acids has been reported from extended military storage (Rance and Cole 1958, 25) and storage of electronics (Farmer 1962, 326-328; Knotková-Čermákova & Vlčková 1971, 17-22). In museum collections, material damage has been observed to calcareous materials such as terra cotta, clay, and limestone (FitzHugh & Gettens 1971, 91-102; Gibson *et al* 1997a, 253–264; Gibson *et al* 1997b, 253-264), sea shells (Tennent & Baird 1985, 73-85), lead (Tennent & Cannon 1993, 8-11), and bronze (Tennent & Baird 1992, 39-47). Paper was shown to lose fibre strength after exposure to acetic acid in air, however, at high concentrations in laboratory tests (Dupont & Tétreault 2000, 201-210). Padfield *et al* 1982, 24-27, provided a broad list of real life examples of material damage due to indoor air pollution.

Self-polluting objects

Some heritage materials will, during their own deterioration processes, emit corrosive vapours, which will either re-attack the same material or other near-by objects. This is especially a problem for certain plastics, and is a well-known problem in archives. Examples of this are cellulose acetate, which gives off acetic acid as a break down product, or cellulose nitrate, which gives off nitrogen oxides. Plastics have been used extensively in the manufacture of photographic films and both the instability of some material as well as the deterioration products which are emitted are big problems in archives (Reilly 1993). Both types of plastics have also been used for producing other kinds of objects, such as buttons, combs, spectacle frames, etc., and are very common materials in contemporary museum collections (Quye & Williamson 1999, 152).

A special case of indoor air pollution is of objects which have been treated with biocides (Schieweck et al 2007, 3266-3275). While the objects may be well preserved, this poses – needless to say - a serious health risk for museum staff.

Carboxylic acids

Of the air pollutants generated indoors, carboxylic acids are the main group of compounds, which engage in material deterioration (Dupont & Tétreault 2000, 201-210; Gibson & Watts 2010, 172-178; Strlic *et al* 2011, 608-15). Key pollutants are acetic acid, released as a secondary emission from wood, and formic acid, released also from wood or being the product of the oxidation of formaldehyde (released from glue in furniture, paint, etc.). The sources are solely indoors. Emitted from furniture and construction materials, carboxylic acids are especially problematic in situations where the surface-to-volume area of the polluting materials is high, and where the air exchange rate is limited. Outdoors the compounds are present only in low trace concentration.

In a large study of 17 museums and galleries in the US (Stulik & Grzywacz 1992, 199-205; Grzywacz & Tennent 1994, 164-170) the concentration distribution of the carbonyl compounds formaldehyde, formic acid, acetaldehyde, and acetic acid, was mapped at almost 200 sites. Only in confined spaces, such as display cases and storage cabinets were concentrations found higher than 100 ppb. The concentration trend was (in increasing order):

galleries < storage areas < display cases ≤ storage cabinets

This reflects the general distribution of carbonyl compounds in museum buildings.

Monitoring

Two approaches are used for monitoring and control of the indoor air quality in museums: measuring the air quality in galleries and storage areas, and testing of materials before use near museum objects.

Measurements in air

The corrosivity of air can, in its most simple form, be monitored by placing sample metals in the environment in question, e.g. inside a display case. Small coupons of lead will, if they corrode, show that carbonyl compounds are present. Likewise silver coupons will, if they tarnish, reveal the presence of sulphuric compounds in the air.

The concentration of specific compounds in air can be measured by the use of so-called passive samplers. This type of sampler collects the air pollutants as they diffuse through a tube or membrane and is collected on a sorbing media. The sampler does not require electricity or other complicated installation when sampling, and can be forwarded and returned by post. Sampling time is typically a couple of weeks. The sampler must be returned to an analytical laboratory for analysis after sampling.

For detail on air pollution monitoring methods, see for example Rosenberg *et al* 2010, 115-146, and Grzywacz 2006, 176.

Material tests

For the testing of a construction material, before its use in display cases, etc., a much used test method in heritage science is the accelerated corrosion test (‘the Oddy test’). In this test, the monitors are small coupons of lead, copper, and silver. Materials are evaluated on their ability or not to emit vapors, which may corrode the metal coupons. Enclosed in separate test tubes, each with a material sample and some water for maintaining a high relative humidity, the coupons are exposed to the possible emission from the material sample for 28 days at 60°C. The material is then evaluated based on the corrosion it may cause on the coupons, compared to a ‘blind test’ coupon (Lee & Thickett 1996, 54). It is beyond the scope of this paper to review the subject of material test methods in detail, however, Hatchfield 2002, 203, provides an excellent review of this large and important issue.

Control methods

Outdoor pollutants

Outdoor air pollutants are mainly driven into building with the free exchange of air. Lowering the air exchange rate will lower the influx of the pollutants. Simple actions for doing so could include sealing of windows etc., or at least to introduce routines where windows are not to be opened during traffic rush hours. For buildings with long-time

residence of people, e.g. exhibition areas, the air quality requirements for human comfort must be taken into account if the ventilation exchange rate is lowered (Blades *et al* 2000, 27, Tétreault 2003; Hatchfield 2002, 203).

Multiple layers of shielding increase the protection of museum objects from outdoor pollutants, because each layer retards the infiltration rate. For example, display cases will provide a high degree of protection. However, the use of display cases demands a high level of control of indoor generated pollutants. A building structure of small, multiple rooms will help lowering the amount of infiltrating air pollutants, while the concentration will remain higher in a large room.

Air pollution is cumulative. Even short term exposures to air pollution will matter if the concentration is high. A few years in a leaky building may cause an ozone dosage higher than what will be caused by a whole century of storage at a well-controlled and clean environment.

Indoor generated pollutants

To avoid polluting sources is the key issue: It is always better to avoid air pollution in the first place than to be forced to make all sorts of mitigating arrangements later - with the possibility of losing objects in the meantime due to deterioration, or having to take on costly conservation treatments. Therefore a careful evaluation of all materials intended for storage or display of museum objects should always be carried out before use. This evaluation should be on ground of knowledge of the museum objects composition, their susceptibility, and the possible compounds one can expect the inquisitive construction material to give off. This can be backed up by tests like the accelerated corrosion test (Lee & Thickett 1996, 54). Literature offers a number of construction material guidelines with the basic do's and don'ts in regard to museum environment, and by following these one should be well prepared (Craddock 1992, 23-28; Tétreault 1992, 163-176; Tétreault 1994, 79-87; Hatchfield 2002, 203).

Wood and wooden boards are always the big problem in exhibition designs; being probably the most common house construction material it is every workman's first choice. Furthermore these types of materials are cheap, and easy to work into shape. It is complicated to find a good substitute; this is really the core problem in the majority of all museum interior designs. Here is a real challenge for museum exhibition architects!

Disclaimer

This paper originates from a talk given at the workshop "Metode alternative de combatere a biodegradării, reducerea poluării interne din muzee", held at Muzeul Național Brukenthal, Sibiu, 4-5 February 2016. It is largely based on the workshop presentation and on two previous review papers by the author (Ryhl-Svendsen 2001, 613-619; Ryhl-Svendsen 2005, 18-27).

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3. Measurement of carboxylic acids by passive samplers in a display case. From a Danish museum.
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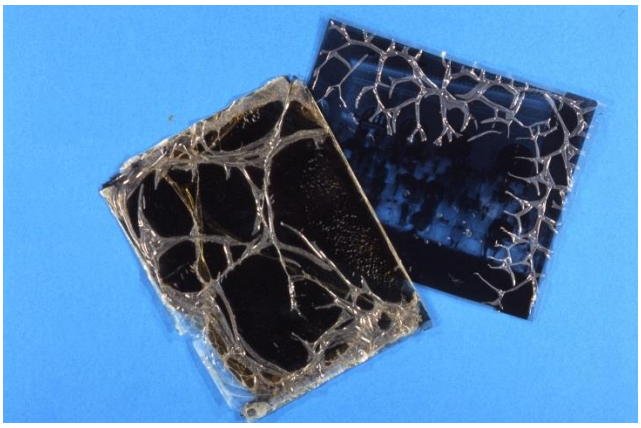
2. Degradarea unor negative fotografice din acetat de celuloză. În timpul procesului de deteriorare plasticul emană vaporii de acid acetic în cantități mari. Emisia de acid acetic este atât de mare, încât negativele s-au micşorat. Acidul acetic accelerează degradarea obiectelor printr-un proces autocatalitic.
3. Măsurarea acizilor carboxilici prin prelevatoare pasive aşezate într-o vitrină. De la un muzeu danez.
4. Tub de testare din sticlă cu un eșantion de material și un cupon metalic, pregătit pentru testul de coroziune accelerată (testul Oddy);

1. Corroded museum objects. Exhibition of gun bullets with white powdery lead corrosion due to corrosive vapours given off by the display case. From a Danish museum.



2. Decaying photographic negatives made from cellulose acetate. During the deterioration process, acetic acid vapours are being released from the decaying plastic in large amounts. The release of acetic acid is so high, that the sheet shrinks in size. The acetic acid accelerates the decay rate further, in an autocatalytic process.


3.


4.

3. Measurement of carboxylic acids by passive samplers in a display case. From a Danish museum.
4. Glass test tube with a material sample and a metal coupon, ready for the accelerated corrosion test ("Oddy test").

IMPLEMENTING AN INTEGRATED PEST MANAGEMENT (IPM) CONCEPT IN ROMANIAN MUSEUMS

Pascal QUERNER*

Abstract: *IPM is an important part of preventive conservation focusing on the reduction of pesticide application and prevention of pest infestations, for example by webbing clothes moths Tineola bisselliella, drugstore beetles Stegobium paniceum, common furniture beetles Anobium punctatum or different carpet beetles (Attagenus sp. and Anthrenus sp.) and thus preserve museum collections. This is achieved by sealing the entry points of buildings against the pests, adapting the (micro-) climate, maintaining high hygienic standards, quarantining new and incoming objects, and monitoring for pest infestations with traps and visual inspection. Today, after the prohibition of methyl bromide and limited use of hydrogen cyanide, the use of biocides is limited although not completely abandoned. Treatment methods are changing towards non-chemical methods like heating, freezing or anoxic treatments, mainly with nitrogen. Chemicals are used in emergencies when no other method can be applied. In this overview Integrated Pest Management (IPM), as it is applied in many collections and museum today, is described including a description and comparison of treatment methods. In the second part the step-by-step implementation in a museum, archive, library and historic building is discussed, examples are given and a list of references and recourses from the Internet, most of them available for free, are presented.*
Keywords: *IPM; museums; prevention; insect pests; rodents; implementation; concept*

Rezumat*: IPM este o parte importantă a conservării preventive, concentrându-se asupra reducerii aplicării pesticidelor și prevenirii infestărilor cu dăunători, de exemplu, molia de blănuri Tineola bisselliella, gândacul de drogherie Stegobium paniceum, cariul de mobilier Anobium punctatum sau diferitele specii de gândaci de covoare (Attagenus sp. Și Anthrenus sp.) și, astfel, să se păstreze colecțiile muzeale. Acest lucru se realizează prin etanșarea punctelor de intrare în clădire împotriva dăunătorilor, prin adaptarea (micro-) climatului, prin menținerea unor standarde igienice ridicate, prin punerea în carantină a obiectelor noi intrate și prin monitorizarea infestărilor dăunătorilor cu capcane și prin inspecția vizuală. Astăzi, după interzicerea bromurii de metil și utilizarea limitată a acidului cianhidric, utilizarea biocidelor este limitată, deși nu este complet abandonată. Metodele de tratament se modifică spre metode nechimice, cum ar fi încălzirea, înghețarea sau tratamentele anoxice, în principal cu azot. Produsele chimice sunt utilizate în situații de urgență, atunci când nu se poate aplica altă metodă. În această prezentare este descrisă gestionarea integrată a biodegradării (IPM), așa cum este aplicată în numeroasele colecții și muzee astăzi, incluzând descrierea și compararea metodelor de tratament. În cea de-a doua parte este prezentată implementarea acestora pas cu pas într-un muzeu, arhivă, bibliotecă și clădire istorică, exemple date și o listă de referințe și resurse pe Internet, cele mai multe dintre ele disponibile gratuit.*
Cuvinte-cheie: *IMP, muzee, preventiv, insecte, rozătoare, implementare, concept*

1. Introduction to IPM in museums

Integrated Pest Management in museums, libraries, archives and historic buildings is an important part of preventive conservation, focusing on the prevention of pest infestations, damage to valuable objects and the reduction of pesticide application. The concept of Integrated Pest Management (IPM) was developed in the 1950s in the food industry. Starting in the 1980s, it has been applied also in museums, mainly in the UK, USA, Canada and Australia. Today it is applied in more and more museums, including also smaller collections, regional museum in the countryside, open air museums and also in tropical countries. The most comprehensive book on IPM in museums is by

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Pinniger (2015). Other important sources of information for people working with IPM are the regular international conferences and the homepage www.museumpests.net.

Most vulnerable collections in museums

Insects do not infest all collections of objects in equal ways. Mostly natural history collections with large numbers of dried insects, usually stored in drawers, dry plant material in herbaria, stuffed animals, fur and skeleton specimens are at high risk. Large numbers of objects of these materials (very attractive as food for some pests) are stored close to each other and in dark areas (drawers). This helps the spread of infestations from one drawer or closet to the other. The second high-risk collections are ethnographic objects, which have similar materials as the natural history museums. Here also a large number of fur, feather, leather, plant materials or wood items are stored together. Many of these objects like pumpkin vessels or textiles are stained (with food, body oil, milk, blood, sweat or urine), which makes them even more attractive for the insects feeding on them.

Most historic furniture has some exit holes by *Anobium punctatum* (or other species) and also historic textiles often have some damage by moths or beetles. Historic and modern art museums also suffer from insect damage, but here it depends very much on the materials of the collection. But if art collections are well looked after, they can stay without pests for long periods of time. Libraries and archives are also collections of objects where large numbers of very similar materials are very close together. But only few insect species are feeding on paper and historic book bindings.

Insect pests, besides fungi and rodents, are responsible for substantial damages to museum objects, historic books and in buildings like palaces or historic houses. Insects like different wood-boring beetles (*Anobium punctatum*, *Hylotrupes bajulus*, *Lyctus* sp. or introduced species), the biscuit beetle (*Stegobium paniceum*), the cigarette beetle (*Lasiodera sericorne*), different Dermestides (like *Attagenus* sp., *Anthrnus* sp., *Dermestes* sp.), moths (like the webbing clothes moth *Tineola bisselliella*), Silverfish (*Lepisma saccharina*), grey silverfish (*Ctenolepimsa longicaudata*) and booklice (*Psecoptera)* can damage materials, objects or parts of the building (wooden attics or floors). They are the most common pests found in collections in central Europe, but most of them are distributed all over the world. In tropical countries termites, cockroaches and other insect species are also found and result in even higher damage of wood and paper or are a common annoyance in buildings. Historic buildings like castles, palaces or old museum buildings usually have resident populations of pests, found in shafts, unused chimneys, under wooden floors or behind wooden walls. Finding and getting rid of these pest populations is often very difficult and costly.

To prevent damage by pests and their introduction, a holistic concept is applied: this is achieved by sealing the building against pest entry, adapting the micro-climate (the cooler the indoor climate, the slower they develop and reproduce), maintaining high hygienic standards (cleaning is an important part of IPM to reduce food sources for pests), quarantining all new and incoming objects and monitoring pest infestations with traps. Further staff training is an important part of IPM and when an active infestation is found, non-chemical methods are preferred to prevent damage or contamination of the objects.

Information on IPM, the food requirements and biology of many important pests can be found in the cited literature in the references and on the following homepages:

http://museumpests.net (see pest fact sheets)

www.whatseatingyourcollection.com

http://insectes-nuisibles.cicrp.fr/en

This paper provides an overview of the IPM concept (as it is applied today in most large museum collections) and of different non-chemical treatment methods used. The aim of this paper is to assist museums in implementing an IPM concept and, in the second step, in deciding on the treatment most applicable for their particular pest problem and collection, as part of developing an IPM strategy appropriate for their institution.

2. Prevention of pests

- Sealing the building against pest entry.
- Adapting the micro-climate (the cooler the indoor climate, the slower they develop and reproduce).
- Maintaining high hygienic standards (cleaning is an important part of IPM to reduce food sources for pests) → good housekeeping.
- Quarantining all new and incoming objects.
- Monitor all locations with traps and maybe also visual inspection.

- Further staff training as an important part of IPM and when an active infestation is found.
- Designate an IPM coordinator responsible for making decisions and collecting all data.

3. Monitoring of insects in museums

Insect pest monitoring is an important part in IPM to detect pests, to be able to correctly identify the species involved and to locate the infested objects or problems within the building. All these aspects require a trained person, who is in charge of the IPM project, for the collection of data, coordination of treatments and setting priorities for future actions.

Mostly sticky blunder traps and pheromone lures (for webbing clothes moths for example) are used to collect the required data for the monitoring. Traps and results are visualised on floor maps of the building, which helps to find infested objects or locate problems related to the building. Also bait traps (larval food monitoring) and UV light traps are used to monitor insect activity. Besides trapping also visual inspection can be very useful to locate infestations, search for dead insect bodies close to the infested objects and relate other insect activity to problems of the building and climate.

4. Treatments against insect pests

Chemical methods

In the past, similar as in the food industry, chemical methods were the preferred method when an active infestation was discovered. Today, after prohibition of the use of methyl bromide and hydrogen cyanide, few museums in Europe still use pesticides against insect pests. Chemicals are only used in emergencies or when no other method is available. Fumigations with pyretroids are not 100% effective as they don't kill the eggs and larvae inside the materials and the surface of the material gets contaminated. The highly toxic sulfuryl fluoride gas can be used to treat whole buildings and also objects, but because of the strict regulations, it is costly and difficult to apply in the cities.

Non-chemical methods

Insect pests can be killed with different non-chemical methods, for example with low oxygen using nitrogen, argon, CO_2 or anoxia treatments in small bags. Physical treatments are achieved due to freezing, controlled heating, microwave radiation or gamma radiation of the objects. Still quite new and under development is the application of biological methods using parasitoid wasps, for example against biscuit beetles, webbing clothes moths or furniture beetles.

No single treatment method is perfect and the best method applied has to be selected depending on the time, financial resources, availability and type of pests and materials to treat. In Table 1 the most common non-chemical treatment methods are described and compared (methods known to be used in museums today).

5. Implementing an IPM concept

The first step when a museum wants to start an IPM concept is to collect all existing data on past infestation, treatments, companies providing services in the country and find a person within the institution that is motivated to be the IPM coordinator. He/she should try to get some basic training in identification of insect pests and IPM with the cited literature, homepages, and books and by exchanging information with colleagues abroad. Every 2-3 year there is an international IPM conference, which is also a good source of information and contacts. In the museum itself he/she can start with a monitoring in spring and select a few rooms to place traps and check them every 4-6 weeks; at the beginning it is good not to start with a too large area. The insects in the traps (pests and also visitors) can be identified with the help of a good microscope or hand lens. For this step, the most important part is to identify the PESTS correctly and differentiate them from spiders, other beetles and insects not damaging objects. Pest insects should be collected (a few individuals of each species) in a reference collection to compare with new occurring animals. Experts in entomology at the University, homepages in the Internet with pictures and books can help with the correct identification.

In a next step guidelines for the museum can be developed, how to handle infested objects, include the cleaning staff and building management in the IPM and get sufficient resources for monitoring, cleaning, treating and prevention measures.

6. Discussions

Knowing the pest species and their biology is an important part of IPM in museums, libraries, archives and historic buildings. A lot of information is available in books and the Internet, as most species are also important pests for the food industry (the biscuit beetle for example) and the store

product protection (for example the webbing clothes moths or tobacco beetle). Knowing the phenology and biology helps to search for infested objects, for problems connected to the building and to use this information against the pests. Regulating the humidity for example is the most efficient solution to stop the activity of furniture beetles, deathwatch beetle, most weevils feeding on wood, but also silverfish and related species. The results of the monitoring can also be used to argue for a better cleaning and housekeeping, for example if webbing clothes moths or carpet beetles are found in large numbers, but if only few and not infested textile objects are present in the store or exhibition space.

The experience of the last years has shown that normally a new pest species is transported into a collection with infested objects, and that rarely they fly into the building through open windows or doors. This is an important part of the prevention and having a good record of what pests are present in the collection helps to notice such changes.

The most abundant pest species are silverfishes, webbing clothes moths, carpet beetles and biscuit beetles. All are common museum pest species feeding on animal fur, textiles made with animal fibres, feathers or felt, only the biscuit beetle feeding mainly on starchy materials like bookbinding. Dust and dead flies are an important food source for many pests and should be avoided. Large historic buildings are often difficult to seal and remain susceptible to infestations; here long-term solutions are costly and difficult to achieve. Insect pests can be killed with low oxygen concentration (and dehydration), physical damage due to freezing or heating (destruction of individual cells or enzymes) or by parasitoids. No single treatment method is perfect and suitable for all object materials. The table illustrates that there is a variety of methods to choose from when planning an IPM strategy that avoids the use of chemicals. In order to accommodate the requirements for safe treatments for most object materials and variations of available resources such as time and finances it is favorable for a museum to have access to several methods.

Treatments with high or low temperatures are among the fastest, cheapest and relatively easy to use methods of pest control. For these reasons they are commonly used by natural history museums, ethnological and cultural history museums both, as a preventive measure for incoming material and to treat infested objects. Presently, the anoxia treatment is on one hand, expensive and time consuming with three to eight weeks turnover, but, on the other, it is the least damaging for a broad range of objects and materials.

Disclaimer

This paper is based on the talk given at the workshop “Metode alternative de combatere a biodegradării, reducerea poluării interne din muzee”, held at Muzeul Național Brukenthal, Sibiu, 4-5 February 2016.

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See also free downloads of the CCI Technical Bulletins:

TB 26 *Mould Prevention and Collection Recovery: Guidelines for Heritage Collections* (https://www.cci-icc.gc.ca/resources-ressources/publications/downloads/technicalbulletins/eng/TB26-MouldPrevention.pdf)

TB 15 *Solving Museum Insect Problems: Chemical Control* (http://publications.gc.ca/collections/collection_2016/pch/NM95-55-15-1992-eng.pdf)

TB 13 *Controlling Vertebrate Pests in Museums* (https://www.cci-icc.gc.ca/resources-ressources/publications/downloads/technicalbulletins/eng/TB13-ConntrollingVertebratePetsinMuseum.pdf)

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LIST OF ILLUSTRATIONS

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Method	Time for treatment	Time for handling	Equipment and relevant citations
Freezing -30ºC preferred	7 d	8 h - 2 d	Household freezer, freeze container or built-in freeze chamber; low costs for household freezer *** Risk of mechanical damage when handling cold brittle objects. Risk of damage to surface treated wood and composites with surface treated metal, fusty paper, and objects with tensions, like saddles, drums and mirrors.
Heating at +55ºC	24 h ***	0,5 d	Built in heating chamber, truck with heating chamber, heat bubble or solar tent. Risk of damages after heating for some keratin, teeth materials, lacquer (Urushi), low- melt adhesives, animal glue, Paraloid B 72, mother of pearl and fish skin. In solar tent: no control of RH and therefore high risk of damages due to drying of object materials.
Nitrogen chamber or bubble	3-5 w	1-2 d	Chamber or bubble to seal, nitrogen (bottles or generator), equipment to moisturize nitrogen and measure oxygen level. → Can be used for all materials ***.
Smaller bags with O_2 scavenger	3-5 w	0,5 d	Bags, heat-sealer, oxygen scavengers; → easy to use for museums to start ***, only for small objects
CO_2 bubble	3-5 w	1-2 d	Bubble, CO_2 bottles
Parasitoids	12 w	non	Release of parasitoid insects (wasps mostly) Each parasitoid is specific for one/few pest species only. Local and controlled application is possible.

Table 1: Methods of non-chemical insect pest treatments in museums (h = hours, d = days, w = weeks); *** highlight of specific advantage of certain methods.

JEWELRY BOX AND CIGARETTE CASE: DESCRIPTION, INVESTIGATION, RESTORATION

Ruxandra Ioana STROIA *
Polixenia Georgeta POPESCU **

Abstract: *The article presents the characteristics, the stages of conservation and restoration interventions and the preliminary investigation of these interventions for two composite cultural assets: a Jewelry Box and a Cigarette Case. The objects are part of the collections of the Museum of History 'Altemberger House' - the Brukenthal National Museum in Sibiu and are considered to be clothing accessories belonging to the Saxon port of the XVII-XIX centuries. To be promoted through exhibition, the two objects required conservation and restoration interventions in order to ensure their structural stability.*
Keywords: *composite cultural assets, Saxon fashion accessories, conservation and restoration, optical microscopy.*

Rezumat**:** *În articol sunt prezentate caracteristicile, etapele intervenţiilor de conservare și restaurare și investigaţia preliminară acestor intervenţii, pentru două bunuri culturale compozite: o casetă pentru bijuterii și un portţigaret. Obiectele fac parte din colecţiile Muzeului de Istorie 'Casa Altemberger'- Muzeul Naţional Brukenthal din Sibiu și sunt considerate accesorii vestimentare aparţinând portului săsesc din secolele XVII-XIX. Pentru a fi valorificate expoziţional cele două obiecte au necesitat intervenţii de conservare și restaurare pentru a li se asigurarea stabilitatea structurală.*
Cuvinte-cheie: *bunuri culturale compozite, accesorii de port săsesc, conservare și restaurare, microscopie optică.*

I. Introduction.

Cultural heritage items listed in the article: "Jewelry Box" with inventory number M 945 and "Cigarette Case" with inventory number M 1361, are composite cultural assets that were part of a lot of over one hundred objects were included in the itinerant exhibition titled "Saxon dresses and ornaments and their representation in the paintings of the period " (Teodorescu, Frîncu 2014). The exhibition was part of the project "Brukenthal Cultural Axes South East", initiated by the Brukenthal National Museum in Sibiu. In the exhibition were presented: clothing, accessories and jewelery: Saxon costumes, skirts, men's hats, a Borten (velvet cylinder on the head), hoods, scarves, shoes, boots, bags, fans, umbrellas, money bags, tobacco bags, cigarette cases, ballot papers, jewelry boxes, brooches, paffles and paffles breasts or Heftel made of gold and silver, earrings, rings, bracelets, necklaces, silver and silver pendants with precious and semiprecious stones, silver buttons and stitches, veil pins. The exhibition included twenty paintings from Transylvania from the 17th century until the beginning of the 19th century. The 19th century, belonging to the Romanian Art Gallery of the Brukenthal National Museum in Sibiu. The paintings presented in the exhibition ensured the connection between the costume and the clothing accessories and the exquisite ornaments, the paintings being represented by the periodic portraits of the Saxon patricians.

II. A short history of Saxon clothing in Transylvania

The history of Saxon clothing implies a centuries-long foray into South-Transylvanian history, beginning in the fourteenth century. At that time the Saxon patricians were structured in a social class with political veil, a class of elites. The characteristic and at the same time the strength of the elite was heredity, so that wealth, political power and social influence were transmitted from

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generation to generation within a relatively closed corpus, based on matrimonial alliances, and in which it was extremely difficult to penetrate from the outside. Beginning with the 16th century, one of the visible elements of the social status in question became the patrician costume, characterized by luxury, not necessarily and opulence. The patrician costume was an elaborate costume with roots in the Germanic age of the Middle Ages, which featured elements of Renaissance inspiration and, later, the Baroque.

Beginning with the end of the seventeenth century when Transylvania became a province of the Habsburg Empire, imperial influence was felt, contributing essentially to weakening the supremacy of the Saxon patrician. The phenomenon determined by the Iosephine reform bundle generally occurred during the Enlightenment and the Transylvanian Baroque, with visible tendencies, especially at the end of the 18th century. In the Habsburg world a new social segment emerged, different from the old nobility of blood or the city patricity, the "nobility of function" or the "functional nobility" *Beamtenadel* (Ittu 2007, 14).

In general terms, the long-term result of the Habsburg House's absolutism - in a multiethnic world (both the Empire and Transylvania), with interculturality and, at the same time, plural-religious tendencies - constituted the creation of that nobleman of functions with a strong sense of the state with an ideology of the competence, as well as a remarkable capacity to create bridges between culture, politics and professional ethics. This social segment, different from the bourgeoisie of the Empire or the South-Transylvanian Saxon patrician, different from the old nobility, tended to control, over the course of several generations, not only the political careers but also the parallel paths, from the army to the diplomacy, Court and the Church (Vovelle 2000, 229).

Being in a vast political framework, such as that of an Empire with Vienna as a capital, a framework that involved the existence of both a central cultural core and local cultural focal points, inter-influenced, the Transylvanian population benefited from the effects of a such situations. One such example is the "Rules of the outfit and the bill of exchange issued by the Magistrate of Sibiu in 1752", which established for each social category what clothes and accessories had to wear and what materials could be made. The population was divided into nine categories and only the first one was exempt from regulation. Failure to comply with the regulation was sanctioned by fines (Teodorescu, Frîncu 2014).

III. Restoration and conservation of objects. Procedural steps.

Description of Objects.

The two objects on which conservation and restoration interventions were carried out: Jewelry Box (Inv. no. M 945) and Cigarette Case (Inv. no M1361) are true works of art that reflect the diversity of tastes and trends in fashion in that time. (Fig. 1)

The presented objects, created for the Saxon patrician of Transylvania, include different materials and techniques of making, in correlation with the evolution of the technologies of that period. They are made up of a set of materials: leather, wood, textiles, paper. The ornaments are made of colored beads and gilt leather that contributes to the spectacularity and beauty of the objects. The detailed description of each object is presented in the table in (Fig. 1**).**

Physico-chemical investigation. Examination by optical microscopy of objects.

The non-destructive study by optical microscopy of the surfaces of the investigated objects, preliminary conservation and restoration interventions, allowed the correct assessment of the conservation status, in particular the degradation of the support surfaces of the objects, the identification of some characteristics of their constituent materials and the sampling optimal, without affecting the integrity of objects, of very small samples (1-2 mm2) that were used to determine the “gren”(characteristic look of the upper tanned leather).

Optical microscopic examination was performed with a camera / video stereomicroscope at different magnifications (20-40x), the captured images (micrographs) being processed and used to observe the surface details of the analyzed objects. Optical microscopy study proved to be very useful because degradations were observed that were not visible by simply visual observation of the objects.

a. Identification the type of lather.

The identification of the skin type was made on the basis of the grenade, meaning the characteristic aspect of the tanned leathers by studying them at the microscope. The observed appearance was compared to the tanned leather samples provided by the leather restoration laboratory and the images available from the specialty literature (Chiriţă 1983, 62).

b. Results of optical microscopy examination of analyzed objects.

For each of the objects analyzed, were selected the most relevant aspects observed were selected following their optical microscopy examination:

Jewelry Box, Inv. no. M 945.

Optical microscopy examination allowed identification of the cassette support material as calfskin. It has also highlighted the aging and fragility of the textile support material of the object. (Fig. 2).

Cigarette Case, inv. no. M 1361. (Fig. 3)

The microscopic study allowed a much better view of ornament details (colored glass beads applied to the stamped wood holder), a relevant aspect for the piece's execution technique (Fig. 4). Degradations of the surface of the object were also found, consisting of small losses of the support material. (Fig. 5) The examination by optical microscopy allowed characterization of the constituent organic materials of the Cigarette Case, in microphotographs being visible details of the leather, on the basis of which the identification of the type of leather used for making the object was made as calfskin (Fig. 6). There have also been clearly observed details of how to decorate the skin with gold.

Restoration interventions.

The historical value of the objects presented is unquestionable, and in order to keep them for future generations, restoration interventions were needed to stop the processes of damage to the parts. The restoration was made taking into account the type of degradation, in correlation with the nature of the constituent materials of the objects and their execution technique, respecting the principle of minimal interventions.

Initially, cleaning tests were performed on the parts to determine the limit of intervention in the restoration. The interventions were dry cleansing with soft brushes, plastic gum and scalpel and wet cleaning by light buffing with cotton wool in a hydroalcoholic solution. Small adhesive reinforcements, filling and fixing of small textile and leather yarns from the closure area, and fixation of detached ornaments (colored beads of glass) have been performed. The paper in the stripped areas was glued with carboxy-methylcellulose, in the missing areas the filling of the losses were made with Japanese paper, followed by local pressures and chromatic integration.

The images of the restored pieces are presented in (Fig. 7)

IV. Conclusions and recommendations for optimal preservation of restored objects.

Active conservation and restoration interventions required particular attention due to the fact that the objects on which they intervened were composite cultural assets. The variety of materials in their composition required the application of a working methodology in which the interventions are simultaneous, correlated with the nature of the materials and with the typology of the degraded degradation.

For the storage and transportation under optimum conditions, custom boxes from neutral cartons were made.

In the verbal records of the restoration objects handed over to collector managers, the following conservation recommendations have been mentioned: the objects will be kept in storage in an optimal and stable microclimate.(UR 45-50%, T 18-20°C)

The pieces will be checked periodically, three months, by the conservator of the collection.

V. Materials and equipment used

The materials and substances used in the restoration interventions were: distilled water, ethyl alcohol, solvent and special abrasive materials for skin cleaning (of different fineness), starch based adhesive, carboxymethylcellulose, anionic detergent, filter paper, Japanese paper, nonwoven fabric, cotton and silk yarns, vegetal tanned leather.

The characteristics of the microscope used:

Leica S8 APO Stereomicroscope, equipped with a Leica DFC290 digital camera, equipped by the Chemical Investigation Laboratory of the Brukenthal National Museum in Sibiu.

VI. Acknowledgement

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LIST OF ILLUSTRATIONS

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7. Set of restored pieces - photo documentation before and after restoration

LISTA ILUSTRAŢIILOR

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5. Portţigaret- detalii ale suportului din piele. Microfotografii 40x
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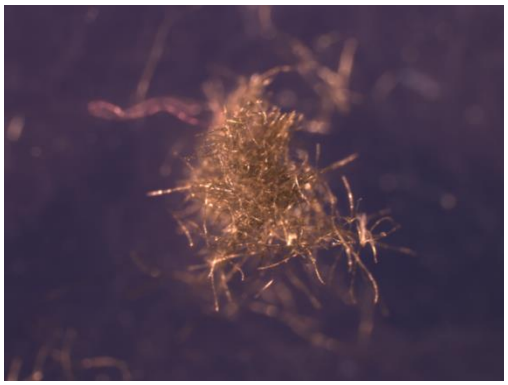
7. Ansamblul pieselor restaurate – documentaţie foto înainte și după restaurare

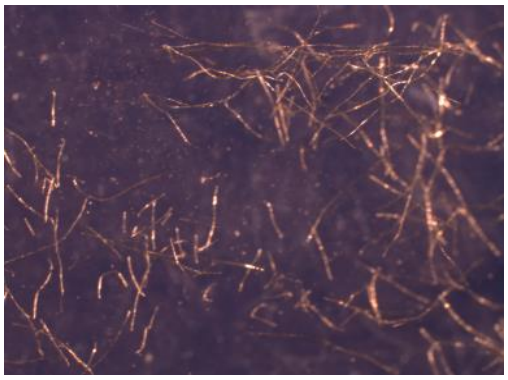
Current number	Name	Dating	Technique, dimensions, materials.
1.	Jewelry Box Inv. no. M 945  The wooden Jewelry Box is clothed in leather and the interior is padded with green velvet. The cover is ornamented with floral motifs. One can see the initials SA and the year 1684. The inside of the lid is padded with pink silk, and the inside has six spaces to fit the jewels. On the outside, the sides and the back of the box are ornamented with geometric motifs.	1687	- Technique: the object is hand tailored and manufactured - Dimensions: 88/65/43 mm - Materials: - vegetal tanned leather and pointed with floral motifs on the lid and with geometrical motifs on the sides and bottom of the box - fabric cloth knot (silk) - connecting velvet fabric (silk) - wood - metal closure (iron) - the base of the box has gilding marks
2.	Cigarette Case Inv. no. M1361  The ornaments of the cigarette case are made on leather, in relief, with floral, golden motifs, and by applying colored beads to the stamped wood holder (a black anchor with a multicolored cornet appears on the face and a multicolored landscape on the other side).	Sec. XIX	- Technique: the object is hand tailored and manufactured - Dimensions: 131/96/27 mm - Materials: - bone and bovine leather - lime and dyed lime wood - colored glass beads - cardboard - cotton yarn

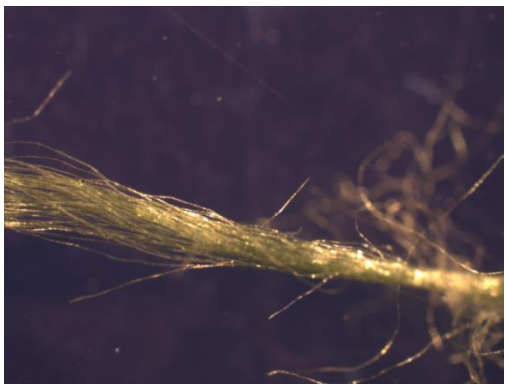
1. Table with detailed description of restored objects

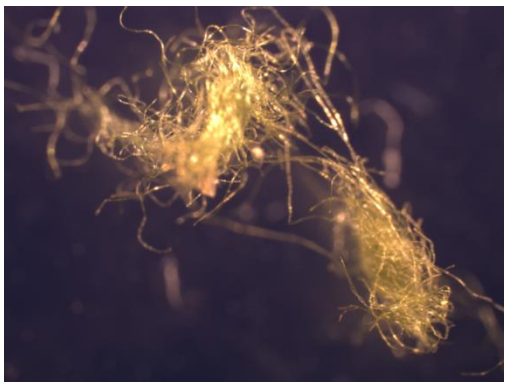
The Jewelry Box

Inv. no. M 945

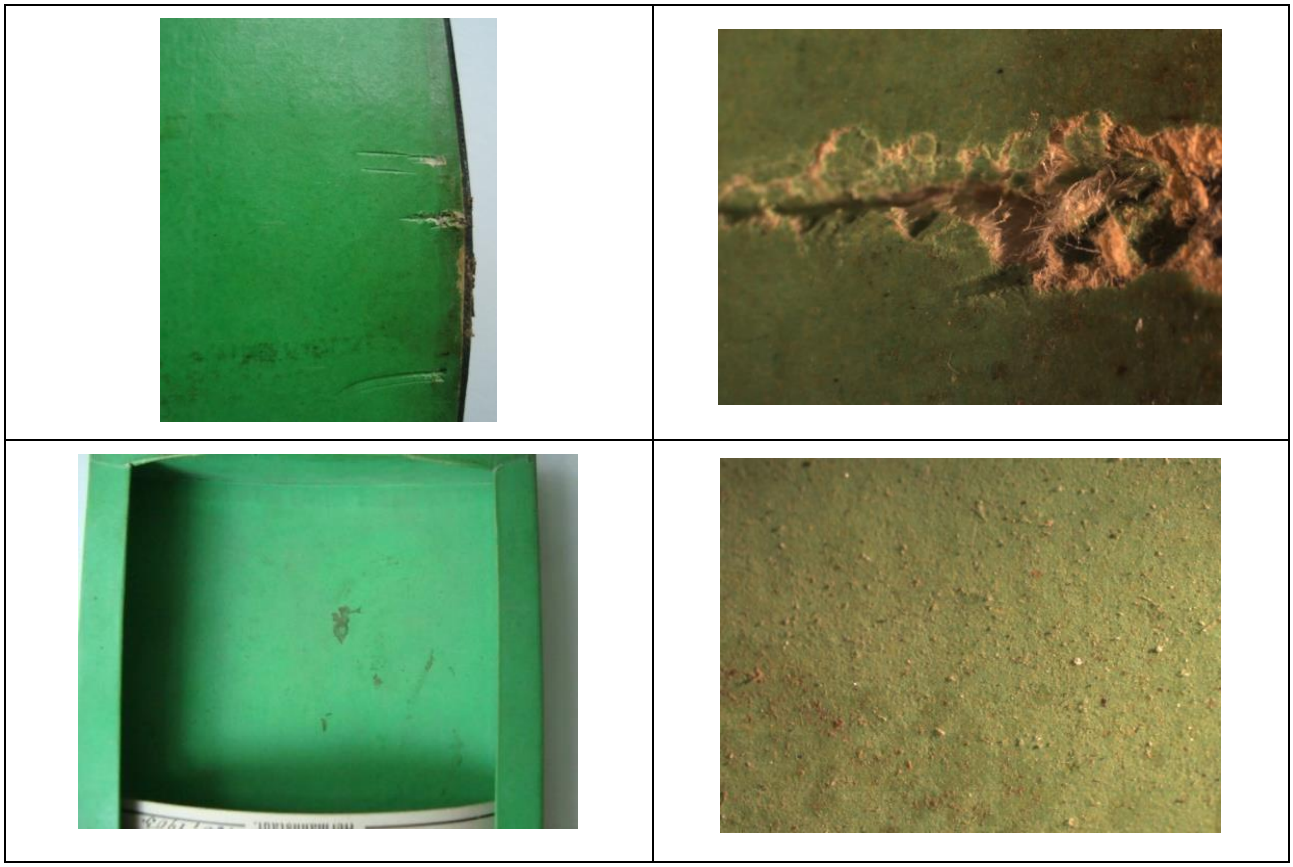




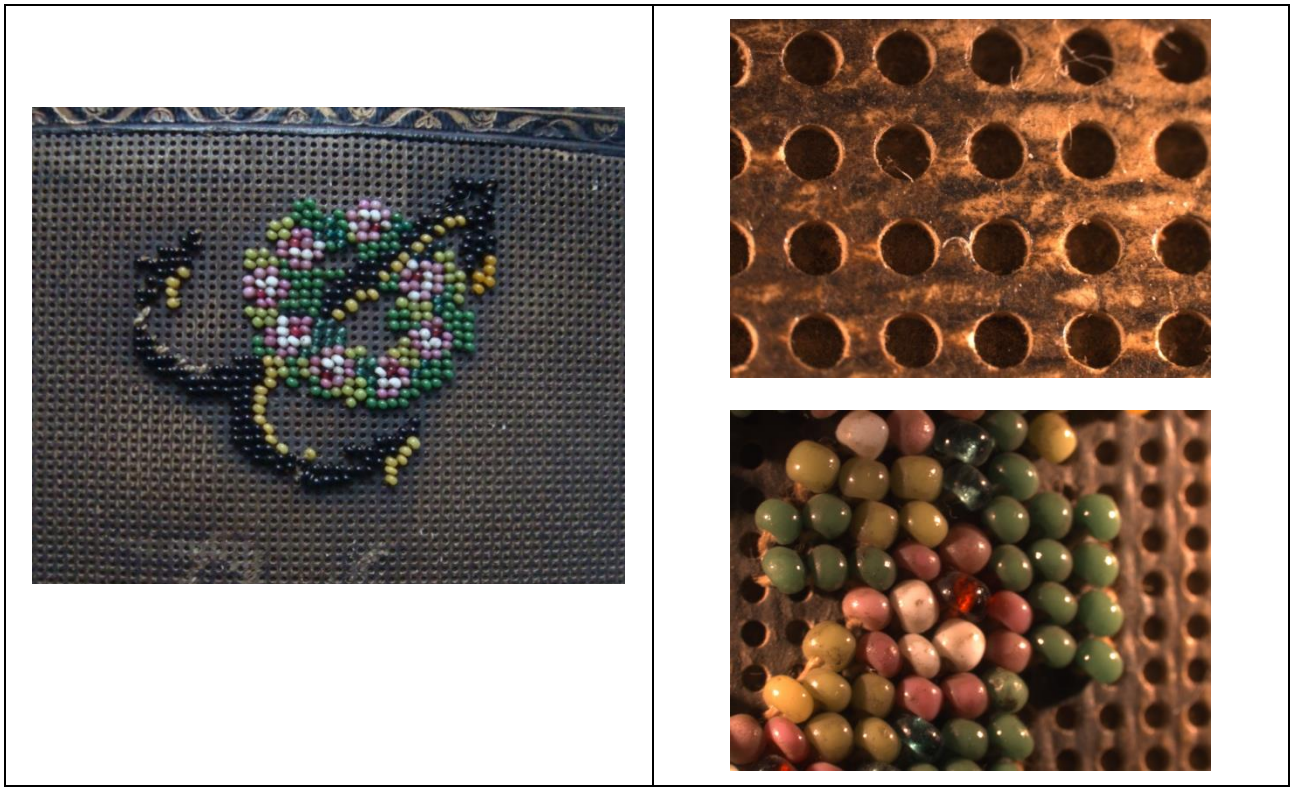




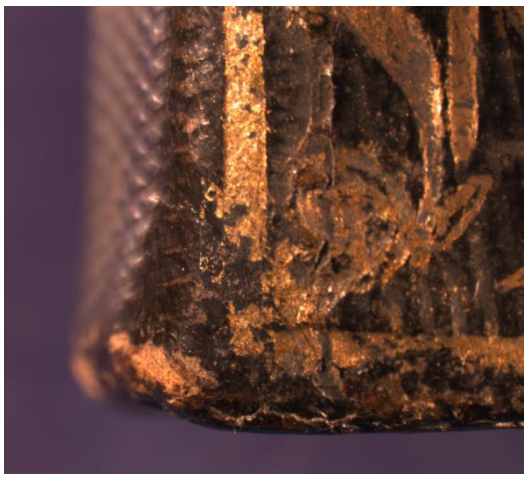
2. Jewelery Box - details of the textile support (silk). Microphotographs (40x)



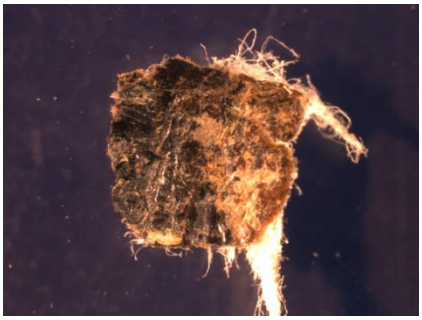
3. Cigarette Case - details of the interior of the box and of the constituent materials (cardboard). Microphotographs (40x)

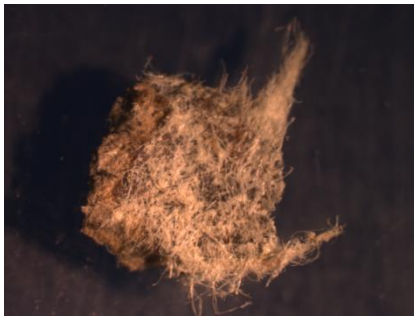


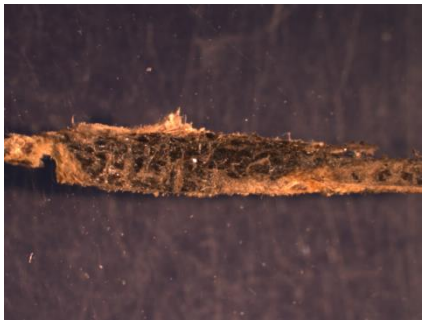
4. Cigarette Case - details of the interior of the box and of the constituent materials (beads). Microphotographs (40x)

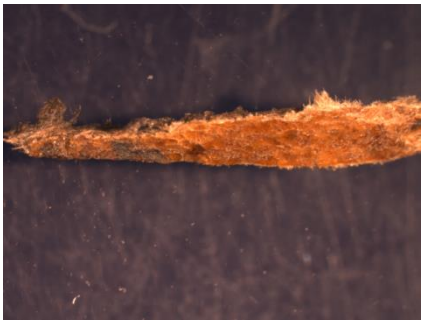


5. Cigarette Case - details of the leather stand. Microphotographs (40x)









6**.** Cigarette Case - details of the leather stand, highlighting the grenade that allowed the identification of the type of skin used to make the object (calfskin). Microphotographs (40x) of samples 1 and 2 (obverse and reverse).

Object	Before restoration	After restoration
Jewelry Box Inv. no. M 945		
Cigarette Case Inv. no. M1361	 	

7. Set of restored pieces - photo documentation before and after restoration

ASPECTS REGARDING THE CONSERVATION STATE OF SOME ENGLISH PRINTS FROM THE COLLECTION OF BARON SAMUEL VON BRUKENTHAL

Cristina MIHU*
Laura COLTOFEAN**

Abstract: *Baron Samuel von Brukenthal (1721-1803), governor of the Grand Principality of Transylvania, was a passionate collector with an encyclopedic vision. His collections were formed in the second half of the 18th century with the purpose of educating and delighting. They included paintings, books, prints, maps, coins, antiquities and even minerals. This article presents and discusses the conservation state of five English prints made by Scottish engraver Robert Strange, that are part of Samuel von Brukenthal's collection. These artworks were included in the exhibition "Masterpieces from Baron Samuel von Brukenthal's prints collection", that was organized within the special program of events planned for the 200th anniversary of the Brukenthal Museum.*
Keywords: *Samuel von Brukenthal, masterpiece, English prints, state of conservation, Robert Strange*

Rezumat**:** *Baronul Samuel von Brukenthal (1721-1803), guvernator al Marelui Principat al Transilvaniei, a fost un colecționar pasionat, cu o viziune enciclopedică. Colecțiile sale, constituite în a doua jumătate a secolului al XVIII-lea cu scopul de a instrui și delecta, includeau tablouri, cărți, stampe, hărți, monede, antichități, dar și minerale. Scopul acestui articol este de a prezenta și discuta starea de conservare a cinci gravuri englezești realizate de gravorul scoțian Robert Strange, care fac parte din colecția de stampe a lui Samuel von Brukenthal. Acestea au fost incluse în expoziția „Capodopere din colecția de stampe a baronului Samuel von Brukenthal", organizată în cadrul programului special de evenimente dedicate aniversării a 200 de ani de la deschiderea Muzeului Brukenthal.*
Cuvinte-cheie: *Samuel von Brukenthal, capodopere, stampe englezești, stare de conservare, Robert Strange*

Introduction

Baron Samuel von Brukenthal (1721-1803), governor of the Grand Principality of Transylvania between 1777 and 1787, was a passionate collector with an encyclopedic vision. His collections were formed in the second half of the 18th century with the purpose of educating and delighting. They included paintings, books, prints, maps, coins, antiquities and even minerals. Samuel von Brukenthal's art collection consisted of works that belonged to various European schools of painting. This was completed with a collection of prints which, according to the surviving documents, was created during the Baron's stay in Vienna. Through multiplication, prints allowed access to works of art that collectors did not manage to buy and possess because of financial reasons or the rarity of a certain painting. Therefore, prints ensured the circulation and spread of cultural and visual information. At the same time, they played a major role in the artistic education of the time.

Samuel von Brukenthal purchased most of his engravings from the Viennese market, and his first acquisitions date from the 1770s (Ordeanu 2008, 34-35). In the "Brukenthal House Archive" there is even a manuscript list bearing the title "Inventory of the newest engravings brought from Vienna"[1] which, according to the watermark of the document, seems to date at least from 1783 (Ordeanu 2008, 40). In 1786, the Baron acquired several prints (probably around 50) for 40 florins (Ordeanu 2008, 38). As a comparison, he paid 50.40 florins

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[1] The original title of the document is "Verzeichnis der neuren von Wien gebrachten Kupferstiche". The document can be found in the library of the Brukenthal National Museum, under the following number: Ms. 102, f. 35-36.

for his portrait painted by Joseph Hickel in 1771 (Ordeanu 2008, 34).

In 2017, the Brukenthal National Museum celebrates 200 years since its opening to the public in 1817. For this occasion, a complex anniversary program has been designed, with a cultural agenda that includes a great variety of events, such as exhibitions, conferences, and educational activities (more information at: http://www.brukenthalmuseum.ro/pdf/Agenda2017.pdf). One of the events in this agenda is the exhibition "Masterpieces from Baron Samuel von Brukenthal's prints collection", that was opened from 28 September to 26 November 2017, in the Cabinet of Prints and Drawings within the Brukenthal Palace. This exhibition is the result of a successful collaboration between restoration experts, conservators and curators of the Brukenthal National Museum.

As suggested by its title, the event presented a selection of the most valuable and interesting works from Samuel von Brukenthal's prints collection. The exhibition comprised several original engravings and especially reproductive and interpretative engravings after great artists of the Renaissance and Baroque, such as Raphael, Tintoretto, Correggio, Titian, Caravaggio, Annibale Carracci, Guido Reni, Peter Paul Rubens, Antoon van Dyck and Jacob Jordaens. The displayed prints were made between the 16th and 18th centuries by Flemish and Dutch, Italian, French, German and Austrian, as well as English master engravers. Thus, the exhibition included renowned printmakers, such as Albrecht Dürer, Hendrick Goltzius, Aegidius Sadeler, Nicolaes de Bruyn, Schelte à Bolswert, Marcantonio Raimondi, Agostino Carracci, Claude Mellan, Gérard Edelinck, Andreas and Joseph Schmutzer, Robert Strange, and others.

The exhibition included five sections: 1. Dutch and Flemish prints; 2. Italian prints; 3. French prints; 4. German and Austrian prints; 5. English prints. The fifth section presented five splendid engravings made by Scottish engraver Robert Strange (1721-1792), that are considered to be some of the most representative for his virtuosity and work. In addition to this, they were also highly appreciated by his contemporaries. These prints are the following: 1. Belisarius (inventory number – IV 50; Fig. 1); 2. Venus Attired by the Graces (inv. no. – IV 39; Fig. 2); 3. The Judgement of Hercules (inv. no. – IV 47; Fig. 3); 4. The Death of Dido (inv. no. – IV 44; Fig. 4); 5. Abraham Giving Up the Handmaid Hagar (inv. no. – IV 41; Fig. 5). The aim of this article is to present several aspects concerning the state of conservation of these five works of art.

The conservation state of the prints

1. Belisarius

In this engraving made after the painting by Salvator Rosa, Belisarius, the Byzantine general, is portrayed as a blind beggar, dressed in rags and wearing parts of his armor. He is begging in front of a ruined temple. In the background, behind fallen masonry elements (bas-relief carved stones) and a broken tree, three men are observing him. The thoroughly studied composition was transposed on the metal plate (506 mm x 350 mm) and carefully incised combining etching with the dry point technique. In etching, the needle does not scratch the metal plate itself, but the varnish that covers it. This allows the drawing of more free and cursive lines. In addition to this, the incisions are not produced with a sharp tool. They are actually the result of the chemical action of the nitric acid which creates irregular and sharp lines that give the print an easy and pictorial appearance (Maltese 1973, 187). The nitric acid (HNO_3), known since antiquity as *aqua fortis*, was usually used for its highly corrosive power. In the case of dry point, the process of incision implies the use of a hard needle that creates slightly raised, ragged and rough edge lines through the metal plate. Etching creates clear, sharp lines that contrast with the softer, velvety lines of the dry point. According to researcher Maria Ordeanu, Robert Strange "has adapted his way of engraving to Salvator Rosa's style. The quality of each element of the composition is finely translated through a network of varied lines, designed to reproduce as accurately as possible the whole atmosphere of the painting" (Ordeanu 2008, 166).

The high quality laid paper used for printing the artwork measures 685 x 500 mm, and has a quite uniform thickness of 0.3 mm. In the 18th century, paper was composed of cellulose, and it also included additives of vegetable or animal glues, as well as small traces of alkali from the lime, used in the pulp making process. Carmen Crespo and Vicente Viñas state that "cellulose is an organic substance consisting of one large molecule made up of smaller molecules of sugar, each of which is divided into two molecules of glucose. The cellulose molecule forms a long chain and the union of several such chains produces a fiber. The glucose molecule in turn is made up of six carbon atoms in a chain. Each carbon atom combines with atoms of oxygen and hydrogen (hydroxyls) into rings made up of five carbon atoms and one oxygen atom each. The water molecules incorporated in the pulp

during the paper-making process form semi-chemical bonds with the hydroxyls, serving as bridges between the molecules of adjacent cellulose molecules (hydrogen bridges) and hence strengthening their long chains" (Crespo, Viñas 1985, 4). For this print, black printing ink was used. This consists of pigments mixed with a varnish that transfers the coloring matter to the paper. Traditional printing inks were oil-based, more greasy and gelatinous than writing inks, thus allowing a better adherence to the printing surfaces. In the past, printing ink was obtained from boiled, thinned and purified linseed oils. The first such inks were especially based on walnut oil. Today, however, they are mostly prepared using synthetic resins (Crespo, 1985, 16).

The degradation of the print was moderate, except some age related handling and housing issues. The work showed minor signs of surface dirt, and traces of staining and grime embedded into the support. The paper had darkened considerably, especially around the platemark. This degradation was more visible on the back of the print, also darkening the chain lines (Fig. 8). This shift in color may occur as a result of the contact with poor quality materials and exposure to improper environmental conditions over time. The migration of acidic components caused the paper to become slightly brittle. Folds and crease were pronounced in the corners, especially on the right side of the paper support. On the peripheral area of the lower edge, the print had suffered from an 18 mm tear. Upon close inspection, numerous smaller tears were visible on the upper part of the right margin. The print also showed signs of minor cockling, and a slight overall structural deformation of the support.

2. Venus Attired by the Graces

The print was made after Guido Reni's mythological painting "Venus Attired by the Graces" which was inspired by Homer's writings. Venus, the goddess of love, is depicted seminude, with the Three Graces, Cupid and a putto. She is sitting on the left, while the Graces are attiring her. One of the Graces is standing at her feet and ties her sandal. Another fastens her bracelet, while the third laces a tiara on her head. Robert Strange creates a dramatic contrast between the dark drapery shadows in the background and the pale skin of the characters. In describing this print, Maria Ordeanu states that the artist used all his virtuosity. He mastered engraving and payed attention to the smallest details. This is the reason why his technique was the most suitable for the ecclesiastical manner of Guido Reni (Ordeanu 2008, 168).

The print measures 510 x 383 mm, and was made in 1759, using accurate incisions of engraving and delicate details of dry point printed on an inherently strong laid paper. Robert Strange combines the elegant and graceful lines of the figures with strong naturalistic details and textures in the background. The artwork showed signs of soiling and staining, caused by solid particles, greasy substances, oxidation products, flyspecks, old adhesives and foxing. A gradual deterioration of the paper could be seen. The sheet was heavily yellowed and darkened in the proximity of the edges. The shift in color was more visible on the right edge because of improper storage conditions over time. The brittle and acidic paper had some slight distortion. The print had suffered a great number of peripheral damage: local abrasions, creases and folds, tears and minor losses of the paper support. Improper previous restoration treatments were also observable. Most tears had been previously repaired, using only adhesives that caused stains on the paper support. Due to the normal aging of materials, the adhesive lost its consolidation power (Fig. 10).

3. The Judgement of Hercules

The moral theme of the allegorical painting "The Judgement of Hercules", attired to Nicolas Poussin, is told in Xenophon's "Memorabilia". Hercules, a demi-god, known for his physical strength, stands at a crossover road, to contemplate his future life. He has to choose between the two opposite destinies which life can reserve, represented by Kakia and Arete. Arete, representing virtue, is leading him to glory through the hardest path. On the other hand, Kakia, symbolizing vice, offers him the easier path, a road with worldly pleasures, leading him to immorality. Hercules chooses the hard path to glory, because nothing good is granted without some effort. He is depicted standing in the center, vigorous and naked, crowned with a laurel wreath, with a lion pelt over his arm, and resting on his club. He is flanked by the two female figures representing Vice and Virtue. Vice is portrayed as a beautiful woman with flowers in her hair and her gown falling from shoulder. She is pointing toward the earth, with Cupid at her feet, offering flowers to Hercules. Virtue stands simply dressed, pointing up to heaven. Hercules looks towards Virtue knowing which path he should choose. The background differs – on the side of Vice there is an idyllic, sunny valley, full of trees

and flowers, while the side of Virtue is cloudy, with a steep rocky landscape. This work was made by Robert Strange as a pendant for "Venus Attired by the Graces" (Ordeanu 2008, 168). It combines etching with dry point for the finishing touch. The print measures 508 x 383 mm, dates from 1759, and is signed on the lower right. The engraving was printed on good quality laid paper. Trying to keep up with the competition and the growing demand, paper mills started to imprint their paper with watermark. This was a way of insuring the buyer about the quality of their product. In the case of the print that we discuss, the watermark and the pattern of closely spaced, crossing lines can be seen when the paper is held up to light (Fig. 6).

Beside the process of natural aging, the print suffered from moderate surface dirt and grime, due to dust, atmospheric pollution or disintegration of the paper. The entire surface presented staining and foxing. Peter van der Most explains that "foxing is a phenomenon that can occur spontaneously over time. Foxing is classified as chemical damage because it is currently understood to be chemically induced. It is not clear what degree of damage foxing can inflict on an object" (van der Most et alii 2010, 46). The paper suffered a major shift in color, presenting an overall darkening. This brown discoloration, more visible in the marginal area, was developed over time and caused by the oxidation of the cellulose in contact with highly acidic materials. Due to natural aging and high acidity, the paper became slightly brittle. The surface of the print presented minor signs of abrasion. The corners were extremely fragile, with creases and folds. Numerous small tears and creases, damaging the edges of the paper, were also caused by improper handling.

4. The Death of Dido

The scene painted by Guercino was an illustration of the heroic poem "Aeneid", written by the ancient Roman poet Virgil. Dido, queen of Carthage, was abandoned by the Trojan hero Aeneas who went to search for a new kingdom. She decides to kill herself on a pyre built to burn her faithless lover's possessions. The scene is theatrical: in the center, Dido is lying on a wooden pyre, richly dressed and with a sword piercing her chest. Her tunic is opened revealing her breast, and her hair is undone. All around, her servants mourn her death, while her sister opens her arms in a sign of crucial pain. The depiction of the most dramatic moments of the story, with the characters' different expressions, was deliberately chosen by the artist to prove his talent. Above, in the background, Cupid is flying away. Down the coast, men ride toward the ship of Aeneas which sets up to leave the port. On the left, on a rocky landscape, Dido's palace is pictured.

In 1761, Robert Strange visited the Spada Palace (Palazzo Spada) in Rome. He was very impressed by Guercino's painting and started making sanguine sketches, so refined in details that almost looked like paintings. The print in the collection of the Brukenthal National Museum measures 575 x 730 mm, and was made in Paris, in 1776, on a quality laid paper imprinted with watermarks and countermarks (Fig. 7). The composition, enclosed in a decorative frame, is remarkable not only for its stage-designing, but also for the artist's ability to portray the various expressions of grief, the precise rendering of the textures and the finely-detailed work of the costumes. In this work, Robert Strange demonstrated once again his engraving skillfulness. He reproduced the intensity of the moment in his characteristic style, combining a perfect etching technique with dry point finishing, so refined that it gives the impression of burin work.

The print was in a poor state of conservation. Besides natural aging, the paper accumulated dirt and grime. Foxing, different types of staining, flyspeck and deposits of old adhesives were embedded in the surface. An overall discoloration was slightly visible along the edges, probably caused by acidic framing materials or light exposure over time. The paper was also slightly brittle. Small abrasions, creasing, cockling and marginal tears were observable (Fig. 9). Most of the tears had been previously repaired with adhesive on the back of the paper and are now partially detached. The paper suffered a diagonal and a median folding which led to planar deformation.

5. Abraham Giving Up the Handmaid Hagar

This is a scene painted by Guercino and inspired from the Book of Genesis. Sarah, the wife of Abraham, was old and barren. Thus, she gave Hagar, their Egyptian slave, to Abraham, in order to bear them a son, Ishmael. After Hagar became pregnant with Ishmael, tension between her and Sarah arose. They were cast out after Sarah gave birth to Isaac, her first and only child with Abraham. In the discussed print, in a frieze-like arrangement, Abraham, wearing a turban and rich cloak, is sending away Hagar and her son Ishmael, raising one hand in a gesture of rejection, and pointing with the other hand at the boy, who turns weeping to his mother. In the background, Sarah, wearing an elaborately decorated gown, is pictured turning her back on what is happening. The scene

and its message are depicted with clarity and simplicity. After working for several years, in 1767 Robert Strange made this print in an enclosed frame which renders more depth to the composition and also has a decorative role. All these prove the artist's craftsmanship (Ordeanu 2008, 175).

Beside natural aging and slightly chemical deteriorations, the print has a good state of conservation. It was restored in 2013 by Iulia-Maria Pascu, in the paper restoration laboratory of Brukenthal National Museum. The procedures were carried out under a code of ethics that includes making repairs that are reversible and conducting them with minimum interventions, as well as using only suitable materials. The treatment was minimal and consisted of the following: reducing the soiling from the paper using dry methods; consolidating the small marginal tears with Japanese tissue and carboxymethyl cellulose (CMC), as well as flattening the paper support to regain its planarity.

Preparing the prints for the exhibition

The other four prints were subjected to similar restoration treatments conducted several months before the exhibition by Iulia-Maria Pascu who is an expert in the conservation and restoration of artworks on paper. The photographs in this article were taken in the same laboratory by photographer Alexandru Olănescu, in order to document the degradations. The materials (e.g., the cardboard for the passe-partout, the photo corners) used for mounting and framing the artworks have been designed to meet the highest preservation standards, thus creating a protective envelope for the prints. As pointed out by Marjorie Shelley, works of art on paper are among the most vulnerable objects, as they are "readily damaged by mishandling, excessive light, fluctuation and extremes of temperature and humidity, and the materials with which they come in contact" (Shelley 1987, 31). Special measures were taken to prevent and diminish external causes of alteration, which can occur due to normal, natural or everyday events like mechanical, environmental, and chemical decay. The used matting materials are acid-free, and the prints are affixed with acid-free corner pockets. Framing practices are reversible, so that the adhesives and other materials can be safely removed, with no alteration to the prints. The frames were enclosed in special cases designed for works of art on paper. This offered them further protection against the ingress of dust, theft and touching. The exhibition room has no natural lighting. The lighting level is low and the microclimate conditions are optimal.

Conclusions

During the selection of the artworks for the exhibition "Masterpieces from Baron Samuel von Brukenthal's prints collection", the state of conservation of each print was carefully examined. Several problems were identified, but special measures have been proposed and taken in order to prevent the evolution of the damages, as well as to ensure the best conditions for exhibiting the prints.

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LIST OF ILLUSTRATIONS

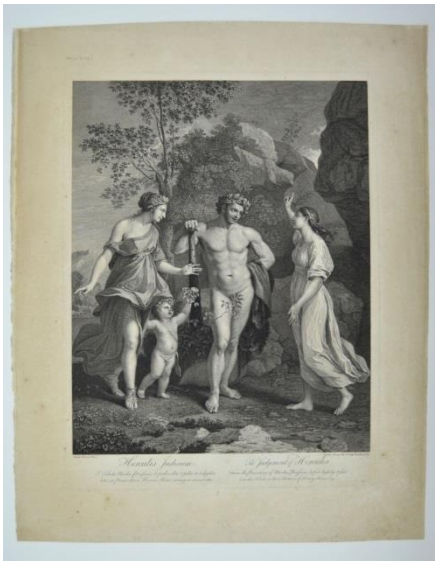
1. Belisarius (inv. no. – IV 50);
2. Venus Attired by the Graces (inv. no. – IV 39);
3. The Judgement of Hercules (inv. no. – IV 47);
4. The Death of Dido (inv. no. – IV 44);
5. Abraham Giving up the Handmaid Hagar (inv. no. – IV 41);
6. Watermark;
7. Watermark and countermark;
8. Chemical deteriorations;
9. Mechanical deteriorations;
10. Previous interventions.

LISTA ILUSTRAŢIILOR

1. Belisarius (nr. inv. – IV 50);
2. Venus împodobită de Grații (nr. inv. – IV 39);
3. Judecata lui Hercules (nr. inv. – IV 47);
4. Moartea Didonei (nr. inv. – IV 44);
5. Abraham și Agar (nr. inv. – IV 41);
6. Filigran;
7. Filigran secundar şi principal;
8. Degradări chimice;
9. Degradări mecanice;
10. Intervenţii anterioare.

1. Belisarius (inv. no. – IV 50)

2. Venus Attired by the Graces (inv. no. – IV 39)

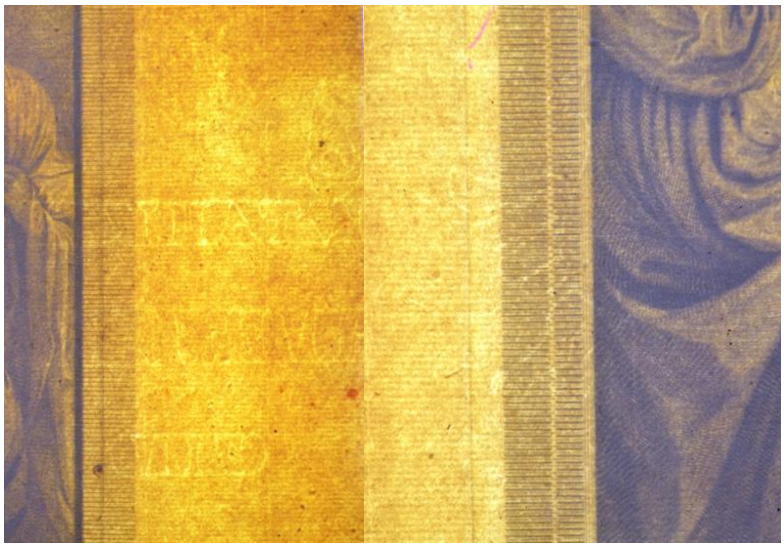


3. The Judgement of Hercules (inv. no. – IV 47)

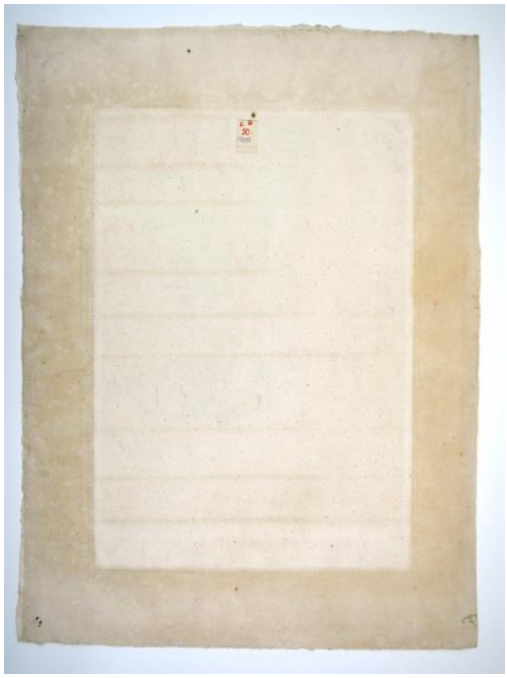
4. The Death of Dido (inv. no. – IV 44)

5. Abraham Giving Up the Handmaid Hagar (inv. no. – IV 41)

6. Watermark

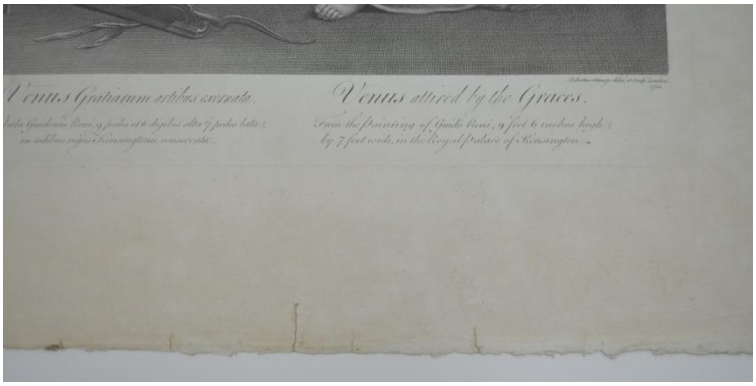


7. Watermark and countermark



8. Chemical degradations

9. Mechanical deteriorations



10. Previous interventions

CABINET OF CURIOSITIES AT THE BRUKENTHAL NATIONAL MUSEUM: DATA ON THE RESTORATION OF NATURAL SCIENCE OBJECTS (1)

Maria Iulia SASU*

Abstract: *The article presents case studies related to the restoration works on some specimens, parts of different collections of the Natural History Museum of Sibiu. The specimens considered in this study required restoration works, as they were selected for exhibition at the Cabinet of Curiosities, organized on the occasion of the Bicentenary of the Brukenthal National Museum. This paper is focused on the preservation status of the specimens and presents a summary of the restoration works done for this target.*
Keywords: *natural history, collections, palaeontology, zoology, naturalization, restoration.*

Rezumat: *În cele de față sunt expuse studii de caz legate de lucrările de restaurare a unor exemplare care fac parte din diferitele colecții ale Muzeului de Istorie Naturală din Sibiu. Specimenele considerate în acest studiu au necesitat lucrări de restaurare, fiind selectate pentru expoziție la Cabinetul de Curiozități, realizate cu ocazia Bicentenarului Muzeului Național Brukenthal. Această lucrare se axează pe starea de conservare a specimenelor și prezintă o sinteză a lucrărilor de restaurare efectuate în acest sens.*
Cuvinte-cheie: *istorie naturală, colecții, paleontologie, zoologie, naturalizare, restaurare.*

Introduction

The Museum of Natural History is a department of the Brukenthal National Museum, occurred after the nationalization by the Romanian State (1949) of the cultural patrimony once belonging to the Transylvanian Society of Natural Sciences, former owner of the museum. This department, from an organizational point of view, includes in fact three museums: the Museum of Natural History, the Museum of Hunting Arms and Trophies 'August von Spiess' and the Museum of Pharmacy History. The patrimony of the Museum is very diverse and includes various collections of natural sciences – mineralogy, petrography, palaeontology, zoology, entomology, malacology, botany, hunting and pharmacy.

This paper presents aspects related to the restoration and conservation of the specimens that will be exposed in the basic exhibition of the Brukenthal National Museum, namely in the Cabinet of Curiosities.

Ever since the Renaissance and then the Enlightenment, Cabinets of Curiosities have emerged as attractions for the rich people as a way of boast of wealth, but also as a desire for knowledge and education. These Cabinets played an important role both in the development of the sciences, and later through their transformation into formal institutions – museums or private collections.

Such Cabinets were also recorded in Transylvania, at the court of the governor Samuel von Brukenthal (Schuller 1969, 283-284). In this manner, Baron Brukenthal exhibited the outstanding pieces of his collections. Nowadays, based on this historical heritage, in the process of reorganizing the Brukenthal Palace, a Cabinet of Curiosities was built up, focusing on the theme of curiosity - special objects, not encountered on a regular basis. Because the period in which these Cabinets appeared was the time of the great geographical discoveries, leading to discoveries of 'strange' animals, the present concept includes specimens related to natural sciences.

Since the founding of the Transylvanian Society of Natural Sciences in Sibiu (Siebenburgischer Verein fur Naturwissenchaften zu Hermannstadt) in 1849 and later the appearance of the Museum of Natural History (1895), the main concern of the

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Society's members was to create collections (Ciobanu 2010, 9).

The Enlightenment, Linnaeus's research and beyond, convinced the Transylvanian Saxon intellectuals to have concerns in the field of natural sciences, regardless of their basic occupations. Their research, sometimes in economic terms - if we are talking about minerals and plants - but especially scientific, of knowledge, naturally were accompanied with pieces of the natural sciences, which in time were constituted in collections. In the 18th century, in Sibiu there were already collectors famous in Western Europe - Baron Samuel von Brukenthal is an example in this respect.

Regarding the collections of natural sciences, some of them have been established since the years leading up to the founding of the Society and have experienced spectacular qualitative but above all, quantitative grows. But these increases raised space challenges. Prior to the appearance of the Museum (1895), the Society did not have its own space, which always necessitated the change of storage spaces (related to cost, space size etc.). Thus, the collections of the Museum were moved in nine successive offices (Ciobanu *et al.* 2014). To them all, if one adds the two World Wars, the communist nationalization etc., one gets an overall picture of the 'stress' suffered by these collections, from their foundation to present. All these moving - the change of locations and the ways of storage (Ciobanu, Stoica 2008, 32), also affected the conservation status of the items which, for the most part are made by organic materials and therefore, are less stable to microclimate changes, the attack of various harmful microorganisms and the human intervention – briefly, they are among the most sensitive materials to the degradation factors that can act on cultural goods in museums.

Materials and Methods

In order to be exposed, there have been selected pieces belonging to various collections, naturalized or preserved by diverse specific techniques, made up of different materials, which rise different challenges of restoration - they will be described for each type of collection, as follows:

1. The Palaeontological Collection – skeletal elements that have been conserved by fossilization;

2. The Mineralogical Collection – samples;

3. The Zoology Collection – animals preserved by drying or wet preparations techniques (preserved in liquids);

4. The Hunting Collection – collections of antlers prepared by boiling and drying, naturalized preparations, important from a didactic, biological point of view.

The palaeontological material is interesting because the way of fossilization, the morphology of the organism, the specific geological evolution, the way of life of the animal, all those have marked the fossil pieces as a museum object. Significant exhibits from the museum collections were selected namely skeletal parts of large herbivores: a woolly mammoth molar, a complete humerus and a fragmentary skull of a woolly rhinoceros, coming from the quaternary deposits of Transylvania. These fossils occurred by mineralization, i.e. by partial or total replacement of the original chemical compounds that constituted the skeletal parts of the organisms by more stable mineral products created by burial of bones and teeth, after death (Ciobanu, Stoica 2008, 33). In other words, an organic substance becomes impregnated or completely transformed into inorganic compounds.

From the Mineralogy Collection, a series of mineral specimens have been selected. Herein, it will be presented two types of samples which belong to different systematic groups.

With regard to the zoology sector of the exhibition, pieces prepared by different methods belonging to the Zoology Collection (Reptiles) and the collection of the Museum of Hunting 'August von Spiess' were chosen for display.

In order to be exhibited, the specimens have been examined in terms of their conservation status. After that, they were subjected to restoration works, so they could meet, where necessary, the level of "health" required by legislation and the aesthetic aspects necessary for displayed objects.

The level of deterioration of the objects to be displayed was evaluated within the laboratory and Diagnostic Sheets and Proposals for Conservation – Restoration Intervention were drawn – recording the state of conservation (material, technique, structure), investigations and measurements (dimensions, humidity, cleaning tests, etc.), diagnosis (forms, localizations, causes, mechanisms), proposals for interventions and recommendations.

A brief description of the conservation status of the pieces that entered the restoration laboratory and were subjected to the macroscopic visual investigations will be presented in this respect. The following instruments were used: magnifying glass, measuring instruments such as ruler, measuring tape for large objects, digital cameras (Nikon

D5300, Canon PowerShot SX30IS). Within the Museum, the conservator has made "Conservation Sheets" (Fișe de conservare) and museum specialists in their field made "Analytical Record Sheets" (Fișe de evidență analitică – F.A.E.), which will be attached to the "Restoration Files" (Dosare de restaurare) of the pieces. A summary of the proposals for interventions for each piece and various aspects encountered during their restoration is presented in Tabale 1. The numbering is in the Systematic order described below.

The Palaeontological Collection

The selected piece is a woolly mammoth molar M3 *Mammuthus primigenius* – coeval in the Late Pleistocene with the woolly rhino, it was a large mammal and it could reach a weight of 9 tons (Ciobanu 2010, 103). The woolly mammoth is a species occurred in Middle Pleistocene in Asia, from the steppe mammoth *M. trogontherii* (Lister, Sher 2015). In Romania, it was recorded in several localities (e.g. in Apostol 1969), but the majority of localities are with rather poor stratigraphy. But, in regions with localities with better stratigraphy like southeastern Transylvania, it is obvious that the oldest woolly mammoths occurred in Riss/Saale (Rădulescu, Samson 1985). In this inner Carpathian area, in Mindel/Elster, only the steppe mammoth was still present. In Romania, the woolly mammoth became extinct at the end of Pleistocene, although in Asia the species survived late in Holocene: it vanished 3000-4000 years ago, in Wrangel Island, with last populations with dwarfing tendencies (Stuart *et al* 2004).

The piece (Tab. 1, 1.a, Tab. 2, 3 A-C) comes from Hosman, has a length of 43 cm, a width of 9.8 cm and a maximum height of 14.5 cm. The molar is composed of a series of blades of dentin covered by thick enamel and joined by resistant cement, transversally trended (Grossu 1967, 659). The external cement is unstable, exposes numerous shallow cracks and gaps, mobile fragments. Obvious chemical degradation is observed due to the presence of fine grey dust areas. The old label is preserved, contains information for identifying the specimen, the place in old German name of the locality and date of collection: "*Elephas primigenius* Blum., M3, Holzmengen, 1905".

Woolly rhinoceros fossil skull *Coelodonta antiquitatis* – only the skull roof is preserved (Tab. 1, 1.b, Tab. 2, 1 A-E); it has 75 cm in length and 30 cm in maximum width, the jaw and the lacrimal bones are not preserved. The bone is strongly cracked and has numerous material gaps. The specimen originates from the locality Țapu, Micăsasa from Sibiu county and still keeps the original label with the old German name of the locality (Abtsdorf). The specimen was collected by Ludwig Bertleff (Phleps 1926, 140). There is evidence of a previous restoration: showing substrate traces, the piece was partially cleaned and was assembled by using a strong wire reinforcement which is corroded, and by mounting of some wooden spacers to give the shape the natural anatomy as close as possible; an adhesive has been used for joining, which currently does not perform its function and has dark colour in relation to the bone, being visible on the edges of the cracks and impregnated in the material of the skull. The piece presents chemical degradation evidenced by fragility, grinding and exfoliation of the bone. Due to the previous restoration method, as well as under the influence of both internal and external degradation factors (storage conditions with humidity and temperature oscillations) there is a noticeable difference of deformation of the bone in the joining zones.

Another exhibited piece is a woolly rhino right humerus. *Coelodonta antiquitatis* was an herbivore animal that lived in Quaternary in Eurasia, from the late Pliocene until the late Holocene and was a typical representatives of Pleistocene megafauna. Also called the Ice Age or 'glaciation era', this period was mainly characterized by an excessively cold climate, similar with today's climate in the tundra regions (however, in inter-glacial times, the climate was mild and even warmer than nowadays, for large areas of Europe; such intervals were not convenient for the woolly rhinoceros). The animals had specific adaptations: large bodies covered by thick fur, typical dentition (lophodont and hypsodont, Codrea 2000, 5) for a vegetarian diet.

In Romania, the oldest woolly rhinoceros are reported since Mindel/Elster (Rădulescu, Samson 1985) in southeastern Transylvania, in localities as Araci-Carieră, Araci-Fântâna Fagului, Ghidfalău-1, Sf. Gheorghe-Cariere Sud. Later, the number of localities that yielded this species is considerable, but the majority of finds refer only to scattered teeth and bones, with poor stratigraphy (Codrea 2005). The discoveries from Romania are in accord with the evolutionary pattern proposed by Guérin (1980), with two succesive sub-species. In our country there is no evidence about the survival of this species in Holocene.

The length of the bone (Tab. 1, 1.c., Tab. 2, 2 A-C) is 50 cm and the maximum width is 23 cm. The piece is in relatively good conservation status, it's crossed by has numerous shallow small cracks, significant being a deep crack of approx. 20 cm in

length. It presents early-stage chemical degradation and gaps in the epiphyseal areas, the colour is faded.

The Mineralogical Collection

Calcite is a calcium carbonate devoid of crystallization water, belonging to the Carbonate group and can occur in a wide variety of crystal shapes and colours, depending on the nature of the associated impurities: colourless or white, yellow, pink, brown, grey. It is a relatively soft mineral, defines value 3 on the Mohs scale of hardness (Ianovici *et al* 1979, 771), which makes it quite vulnerable to environmental changes and mechanical aggressions.

Mineral samples are well preserved, slight dust deposits are visible. On one piece there is an area where the crystal disintegrates in the basal part. The sample is part of the Brukenthal Collection (Tab. 1, 2.a., Tab. 2, 4 A-C).

Quartz belongs to the group of Silicates - it is one of the most widespread minerals in the earth's crust, which crystallizes in the trigonal system. It has various genesis (Ianovici *et al* 1979, 638). From an optical point of view, it can easily be confused with calcite, but one of the major differences between the two is the hardness, the quartz has the hardness 7, which makes it susceptible to being processed as a semiprecious stone. The piece has dust deposits (Tab. 1, 2.b., Tab. 2, 5 A). The piece is part of the Society's Collection.

The Zoology Collection

The spur-thighed tortoise or Greek tortoise *Testudo graeca ibera* - the carapace (dorsal) is 18.5 cm long and 14 cm wide, it has a dark yellowish colour with brownish spots that outline the scutes in an irregular pattern. The marginal scutes are slightly bent upward on the dorsal area, the colour is yellow-mustard with fewer brown spots in the coastal area. Plastron (ventral) is flat, yellowish-waxed with three brown spots on the side plates. An original label from 1928 is kept – provides information about the catch site and dating. The preservation status of the piece is good - preserved in the form of a dry preparation, bilaterally exhibiting detachable scutes on the coastal area and a gap of about 40% of a scute on the left. Inside there are traces of epidermis and dirt, dust (Tab. 1, 3.a., Tab. 2, 6 A-B).

Grass snake *Natrix (Tropidon) natrix* - The specimen comes from Sibiu and entered in the collection as a donation by the naturalist Dr. Daniel Czekelius (1857-1937) from Sibiu in October 1897. The piece keeps the original label with the name of the species, the collection site, the year, manually written by Moritz von Kimakowicz, one of the first taxidermists of the Museum of Natural History. The piece (Tab. 1, 3.b., Tab. 2, 8 A-C) displayed on a white glass plate is preserved as a liquid preparation, placed in a cylindrical jar 40 cm high, 7 cm in diameter and 1 litter in volume. The jar has a glass cap and it is sealed with wax that is dirty and dark brown. The specimen is in good conservative condition, mobile in the jar and shows traces of adhesive in the head area, on the abdomen, being previously fixed by gluing to the support plate. The colour is blurred due to the conservation method. The liquid is yellowed, turbid and has deposits that significantly reduce the visibility of the preparation.

The European roe deer trophy *Capreolus capreolus* (Tab. 1, 3.c., Tab. 2, Fig.10 A-C) – was collected by shooting in 1930, preserved by boiling and drying, is part of the Society's Collection. The bone is dark, with traces of fat on the outside as well as on the inside, dust and dirt. The brown-yellowish trophy is slightly pearled, the rosettes around the poles are protruding, the right pole has two shafts with obvious and glazed peaks, and it has an anomaly in the left front cylinder, which consists in the simultaneous development of two stubs with obvious peaks. The piece is mounted with screws on a wood-carved support, for wall-mounting, dark-brown painted, with scratches, missing part on the right side of the leaf-shaped ornament; at the base of the support are written the place and date of capture, which are partially deleted.

The Hunting Collection

Leopard tortoise *Stigmochelys pardalis* (Tab. 1, 4.a., Tab. 2, 7 A-D) – an endemic species for arid steppe areas in Africa, was collected and determined by August von Spiess. The carapace has a length of 33.7 cm and a width of 22.5 cm, it was prepared by drying, and it has a yellowish colour with black spots, a leopard-like pattern, with pyramidal shaped dermal plaques, the neural scutes being more prominent. The plastron is flat, coloured in pale yellow with rare stains, showing mobile scutes and missing parts due to insect bites on a 20% area. Inside there are pieces of detached epidermis and adhering dirt. On the dorsal side there is a lack of a marginal scutes (left posterior), bites and holes of insects on small surfaces. The piece was film-coated, probably during the preparation, but it has areas where the film is missing or has incrustations, the colour is modified or is com-

pletely covered with dust. The Ventral anterior side has retained a wire passing through epiplastron, part of the track history - probably in the past the piece was designed for wall exposure.

White-tailed eagle *Haliaeetus albicilla* – "one of the most common and widespread eagles in our country" (Linția 1954, Ciochia 1992, 130) - the piece (Tab. 1, 4.b., Tab. 2, 9 A-C) was collected by shooting from the Zăvoi River and determined by August von Spiess. The trophy consists of the bird's tarsus, has a length of 11 cm and is not dressed in feathers only on the higher third. In the upper part is mounted a wooden support for candles, painted in dark colour, decorated by hand-sculpting with leaf shapes. The naturalized piece is a dry preparation with brown feathers and black-coloured claws, a yellow-erased epidermis due to dust deposits and aging of the constitutive material. The piece has holes of entry of the insect pests at 7 cm from the base and missing feathers, easily detachable feathers, due to the conservation method used.

European roe deer trophy *Capreolus capreolus* – originated from the Cindrel Mountains, collected by shooting in 1905 and determined by August von Spiess. In the Cervidae family, the antler is developed from a dermal bone, welded to a frontal bone incision (Pop 1962, 22); the preparation was obtained by boiling and drying. The trophy is brownish-yellow with slightly pearled, with protruding rosettes around the pole, mounted with screws on a hand-carved wooden frame, varnished in wenge hue, for wall mounting. The right pole has two rays with sharp and flat peak, and the straight one has only the previous radius. At the bottom there is a gap in the cranial bone. At the base of the support are marked the date and the place of collection, which are partially deleted. On the verso, the support contains the original manuscript label (Tab. 1, 4.c., Tab. 2, 11 B) with the trophy story.

European roe deer skull *Capreolus capreolus* (Tab.1, 4.d) – juvenile male, collected by shooting from a forest area of the Lotrului Mountains (1617 m) and determined by Emil Witting in 1921. The specimen is also called spear or lancer because it has simple and unbranched horns. The trophy is brownish-yellow, slightly pearled, with little protruding rosettes. The skull lacks the mandible, some of the nasal bones, 3 pairs of molars on the upper jaw, and shows traces of fat and dirt, not mounted on the support. Characteristic of the trophy is the left pole that has opposite growth from the right one, which is grown in the normal sense and has a sharp peak, resulting in a growth anomaly highlighted by the large opening (29 cm) between the apexes of the two rods.

Results and Discussion

Although traces of the existence of insects were found (inside the shell of leopard tortoise, on the inner part of the bones of antler trophies and at the white-tailed eagle trophy), no active attack was found on any of the pieces that entered the restoration laboratory.

During conservation and restoration interventions, each piece underwent different treatments, not one was identical to the other, even if some of the constituent materials are the same. This fact is due to different collection periods, to different collections, and different treatments applied in the past to each piece, both during preparation and previous restorations. All these were related to the materials and methods available to the laboratory of the Museum of Natural History, as well as to each collector who contributed to the improvement of collections with museum or didactic-documentary material. In Table. 2 are displayed photos before and after restoration, interspersed with detail photos during restoration operations.

Restoration interventions and various active conservation operations can be endangered if existing storage spaces may not provide a constant microclimate environment. Some objects are stored in old cupboards that are not watertight and cannot protect against dust and pests of biological nature, especially when it comes to organic preparations.

A particular problem for the restoration of natural history specimens is the lack of previous restoration documentation - no documents have been found to prove the operations to which these pieces have been subjected in the past.

Prior to packaging and shipment to the exhibition, the parts were kept in the laboratory for a while under observation to mark any problems that may arise after restoration as a result of removing them from the balance they had created in storages. No notable events were observed in the context of no variations in temperature and humidity. Careful microclimatic control in exposure rooms with a temperature not exceeding 20°C and relative humidity of air in the room at 45-65% without oscillations is recommended. In order to protect the parts, it is advisable to keep them in tightly closed glass showcases in order to protect them from dust, pests (Dermestidae – skin beetles or leather beetles, moths, woodworms, mould, etc.). With regard to exposure mode, it is recommended to use supports to ensure the parts are stable and in a com-

plete resting position during exposure, devoid of tensions.

Conclusions

The pieces that make up collections of natural science museums from Sibiu are of a great diversity like structure and typology, including the objects prepared in various forms - naturalized, dry and wet preparations, fossilized pieces, mineralogical samples, etc. The restoration of the aforementioned led to exploitation and preservation of objects under optimal conditions, in accordance with the current legislation, in order to be preserved and to transmit this heritage to the next generations.

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LIST OF ILLUSTRATIONS

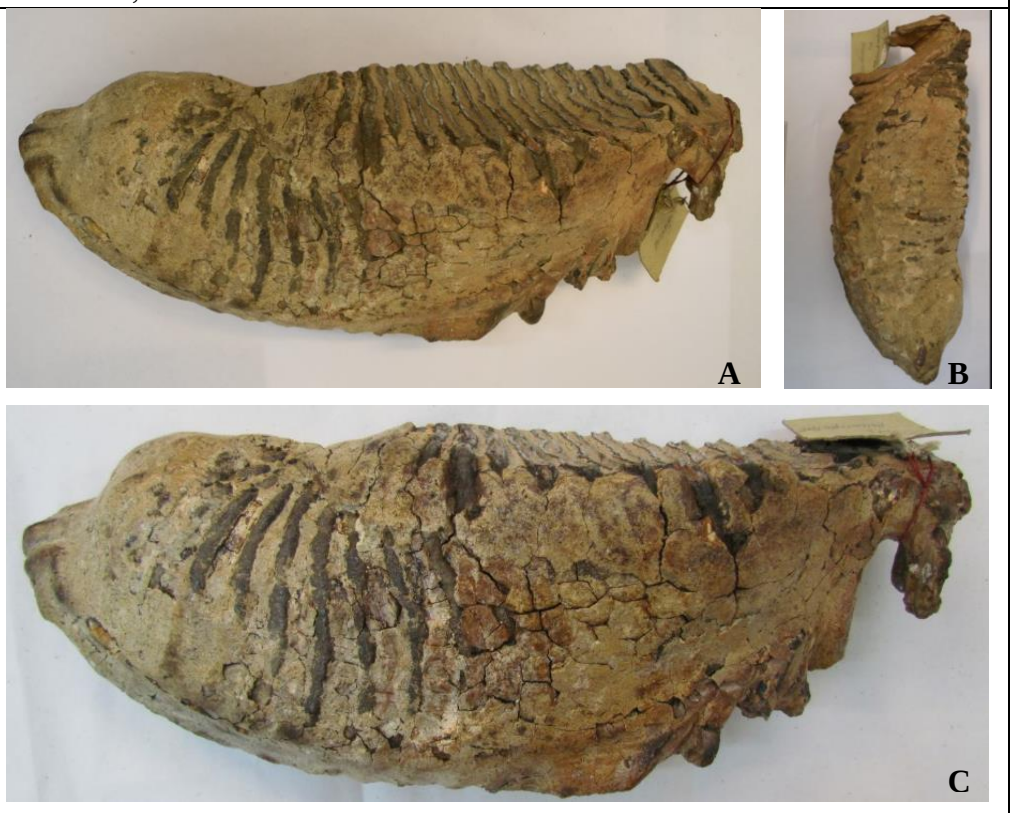
LISTA ILUSTRAŢIILOR

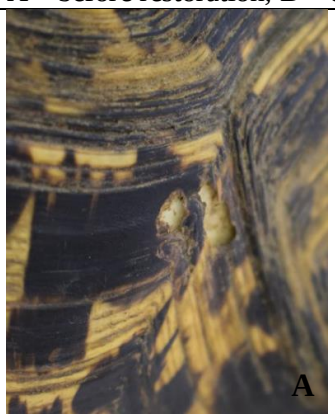
No	Name	Proposals for restoration interventions	Aspects of the operations performed
1.a	*Mammuthus primigenius* Molar	Impregnation with 5% Mowilith solution in acetone to stabilize chemical processes and increase mechanical resistance	Fixation of the mobile fragments was made with higher concentration solution Consolidation has taken place in several stages.
1.b	*Coelodonta antiquitatis* Skull	Dismantling Mechanical cleaning of sand matrix with brushes, scalp, and light wet cleaning of traces of old adhesive (appropriate solvent choice - alcohol, acetone). Impregnation to stabilize degradation processes and strengthen the workpiece (Mowilith in acetone at a low concentration of 5%). Assembly with epoxy resin, followed by reinforcing by applying glass fibres strips to create some stability and handling resistance (being a fossilized object, the specific weight is higher). Completing gaps with plaster paste with a product based on vinyl polyacetate (to increase the elasticity of the filling material under variations in the physical characteristics of specific microclimate). Chromatic integration and final consolidation.	In the first step of applying the consolidation solution, it was done to level in the area of the bone deformation - joining clamps were used for fastening until complete drying. For wet cleaning, acetone has proven to be the most effective solvent for adhesive traces. For brazing was used Devcon dual component resin of 5 minutes. Water based colours were used.
1.c	*Coelodonta antiquitatis* Humerus	Dust removal with fine brushes Partial consolidation to increase mechanical strength (Mowilith 5% in acetone).	The bone-length crack was also reinforced in a second step by applying a more concentrated impregnating solution.
2.a	*Calcite*	Dedusting with a fine brush. Wet cleaning with alcohol. Partial consolidation of the disintegrated area.	Partial stabilization of the object was accomplished with Paraloid B 72 in acetone.
2.b	*Quartz*	Dust removal with the brush. Wet cleaning with water.	The piece was dried with alcohol
3.a	*Testudo graeca*	Dry cleaning, dust removal, wet cleaning with alcohol. Completing the side shield with Modostuc, then chromatic integration and a film coating with an impregnating material local applied by brush. The mobile scutes are fixed by introduction of the gypsum paste.	The scutes were gently pressed with cardboard strips until the paste was completely dried. Pellicle was made with Paraloid B 72 in acetone. Chromatically integration was done with water based colours.
4.a	*Stigmochelys pardalis*	Dry cleaning, full dust removal Wet cleaning and uniformization of the film layer of lacquer previously used to protect	Completing areas were chromatically integrated with acrylic colours followed by film coating with Paraloid B

		the workpiece Fixing ventral dermal plaques Fill in the gaps and colour integration	72 to increase mechanical resistance
3.b	*Natrix natrix*	Opening the jar Investigating the type of conservative liquid. Washing the jar, the piece in distilled water. Cleaning the glass cover. Fixing the preparation on the support plate Place the piece in the jar, replace the liquid and sealing the jar.	The investigation confirmed that the piece was preserved in ethyl alcohol The support plate had cracks and it was necessary to replace it The piece was fastened to the new plate by the cotton thread A genuine wax recipe was used to seal the jar
4.b	*Haliaeetus albicilla*	Grouting holes Completing with feathers Chromatic integration localized where colour is faded	Although excretions were observed in the tars, the investigations did not find an active attack
3.c	*Capreolus capreolus*	Disassemble the trophy from the support wood plate Fill in the missing décor and colour integration For bone: dust removal, degreasing, water neutralization, alcohol drying Replacing the piece on the panoply	Completion of the missing component and chromatic integration of the support base from wood was carried out at the Restoration Laboratory of Polychrome Wood
4.c	*Capreolus capreolus*	Disassemble Dedusting Filling the missing part of the bone Mounting on the support wood plate	Dust, excretions, and insect moult body were observed on the inside of the bone, so the part was treated with insecticide solution
4.d	*Capreolus capreolus*	Dedusting Whitening of the bone with a solution in low acetic acid, neutralization, drying.	The mobile teeth in the alveoli were fixed with 15% Mowilith in acetone.

Table 1. Proposals and observations during the operations of restoration

Identification features	Photos
1.Coelodonta antiquitatis, Skull, dorsal view Paleontological Collection Inv. no. 32556	     A, B, C – details before restoration; D – during restoration, E – dorsal view after restoration

2.Coelodonta antiquitatis, Right humerus Paleontological Collection Inv. no. 34127	 A – inner lateral view before restoration; B – detail on the deltoid crest during restoration; C – caudal view after restoration
3.Mammuthus primigenius, Right lower molar Paleontological Collection No. inv. 34118	 A – lateral view before restoration; B – occlusal view before restoration C – after restoration
4.Calcite ($CaCO_3$), Mineralogical Collection No. inv. 3359	 A – before restoration; B – verso, during the restoration; C – after restoration

5.Quartz (SiO_2), Mineralogical Collection Inv. no. 792	  A – before and B – after restoration
6.Testudo graeca, Zoology Collection Inv. no. R 349	  A – before restoration; B – dorsal view after restoration
7.Stigmochelys pardalis, August von Spiess Collection No. inv. VT 749	    A – detail before restoration; B – detail during the restoration; C – lateral view before restoration; D – dorsal view after restoration

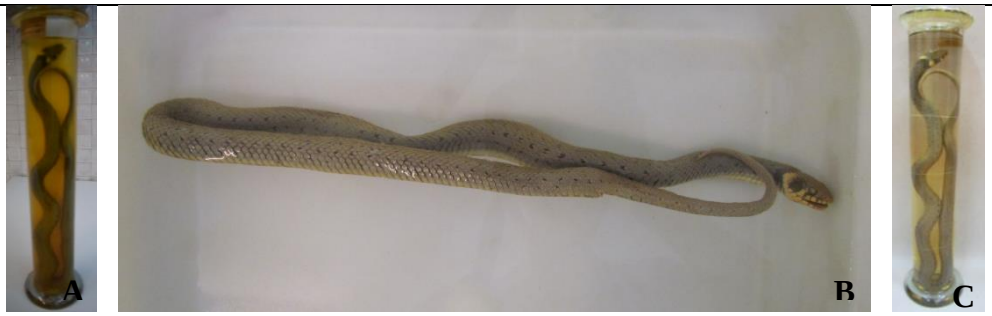
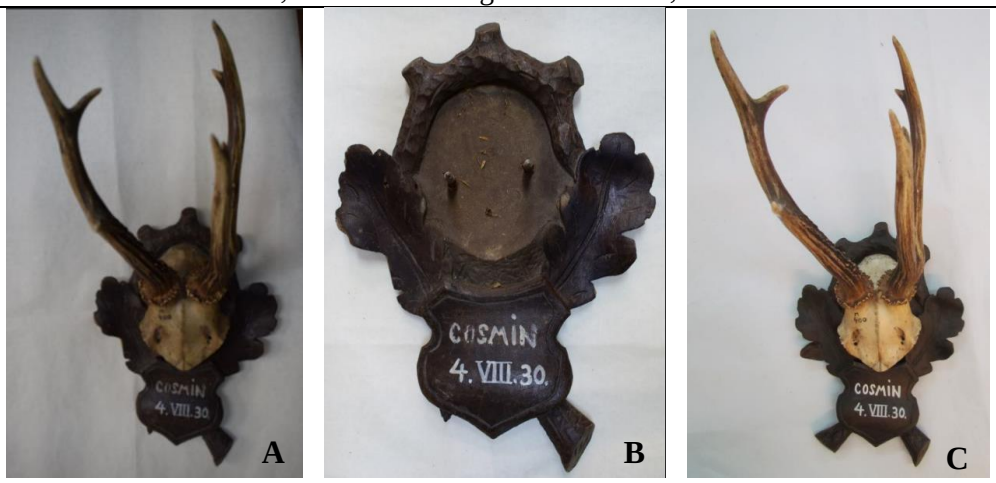
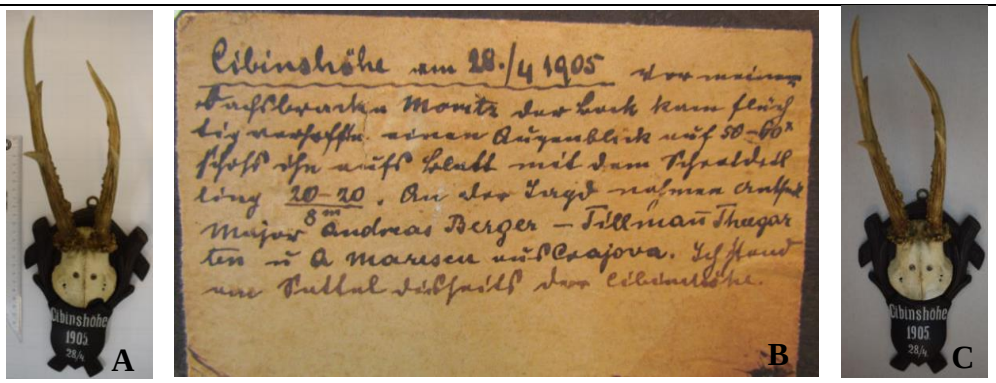
8.Natrix natrix, Zoology Collection Inv. no. R 158	 A – before restoration; B – the specimen during the restoration; C – the jar after restoration
9.Haliaeetus albicilla, August von Spiess Collection Inv. no. VT 768	 A – tarsus detail before; B – detail during the restoration; C – after restoration
10.Capreolus capreolus, Zoology Collection Inv. no. M 400	 A – before restoration; B – support wood plate during the restoration; C – after restoration
11.Capreolus capreolus, August von Spiess Collection Inv. no. VT 327	 A – before restoration; B – verso; C – after restoration

Table 2. Photographic documentation of the specimens (before, during and after restoration)

RESTORING TWO PORTICO TABLE CLOCKS FROM THE COLLECTION OF THE BRUKENTHAL NATIONAL MUSEUM

Ioan BRAI*

Abstract: *Two objects - a common front: portico clocks. The portico clock with animation - architectural decoration, gilded elements, alabaster columns and nacre elements, give verticality and relief to a painted landscape on a steel plate; through the slits of the plate twisted glass rods are seen running to play the flow of a the river surrounding the entire story of the mountain scene.*
The portico clock with a lyre, a similar architectural decor, therefore a trend that formed a type of ornamentation of clocks in the nineteenth century.
It is precisely from this description that the challenge of restoring these objects originates: functional versus aesthetic. Objects made of materials with composite structures with a pleasant appearance and a touch of curiosity given by the animated elements or the use of a musical instrument as decoration have been treated as such and are currently exhibited in the Brukenthal Collection of Masterpieces.
The emergence of several restoration schools has led to the prefiguration of several approaches to the functionality and aesthetics of a piece. In the case of clocks, it is easy to understand that the functionality is often the most important aspect, but in some cases aesthetic qualities equal or even exceed the importance of functionality, an elaborate décor that enhances the function is becoming important too because it denotes the sense and taste of different epochs, regions and craft traditions.
Two complex objects both technical and decorative - a unitary approach to restoration has involved interdisciplinarity and the avoidance of compromises to the detriment of either functionality or appearance.
Keywords: *pendulum, clock, portico, mechanism, restoration, conservation*

Rezumat: *Două obiecte- un front comun: ceasuri cu portic. Ceasul portic cu animație- decor arhitectural, elemente poleite, coloane din alabastru și intarsii de sidef, ce încadrează, dau verticalitate și suplețe unui peisaj pictat pe o plăcuță de oțel prin ale cărei fante se întrezăresc baghete de sticlă ce rulează pentru a reda curgerea unui râu în jurul căruia se compune întreaga poveste a scenei de munte.*

Ceasul portic cu liră reprezintă un tip de ornamentare a ceasurilor în secolul al XIX-lea. Tocmai din această descriere rezultă provocarea restaurării acestor piese: funcțional versus estetic. Obiecte compuse din materiale cu structuri compozite, cu aspect plăcut și o notă de curiozitate dată de elementele animate sau utilizarea unui instument muzical ca decor, au fost tratate ca atare ajungând în prezent să fie expuse, pe drept, în Galeria de Capodopere a Colecției Brukenthal.

Apariția mai multor școli de restaurare a dus la prefigurarea mai multor tendințe de abordare în ceea ce privește funcționalitatea și estetica unei piese. În cazul ceasurilor este lesne de înțeles că funcționalitatea este deseori cea care primează, fiind bunuri de uz, dar nu de puține ori însușirile estetice egalează sau chiar depășesc importanța funcționalității, devenind important un decor elaborat ce înobilează funcția, denotă simțul și gustul diferitelor epoci, regiuni și tradiții meșteșugărești.

Două obiecte complexe atât din puct de vedere tehnic dar și decorativ - o abordare unitară a demersurilor de restaurare ce au presupus interdisplinaritate și evitarea compromisurilor în detrimentul aspectului.
Cuvinte-cheie: *pendul, ceas, portic, mecanism, conservare, restaurare*

You may wonder how, a clock, of relatively recent production, given the chronology specific to these artefacts, is classified as treasure and treated throughout the restoration process as a true work of art.

The answer to these questions is easy to outline at

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the sight of the piece and is now exhibited among the masterpieces of the European paintings in Baron Samuel von Brukenthal's collection.

The portico clock with animation, dated to the nineteenth century, is certainly an interesting piece in terms of artistic achievement and shape. One of its key points is the animation of the pastoral landscape created by the mechanism that generates the movement of twisted glass rods in sight, thus simulating the movement of a mountain river as a centre of interest in the splendid bucolic sight.

The painted dial, in which the animation mechanism is inserted, is bordered by a beautiful frame with architectural decoration, a simple porch with two columns shaped from alabaster with Corinthian gilded capital and gilded stylobate.

Prior to the restoration of the piece, the whole team considered it was a good idea to carry out some museographic research to establish broadly what origin or the influences of the epoch that led to the manufacture of such a clock. From the bibliography I had at hand, it turned out that this kind of portico clock is characteristic for the production of Viennese workshops in the first half of the nineteenth century. We support this, because we were not surprised to find out that there is a nicely shaped niche in the art and antiques market, which exploits exactly this kind of Viennese clocks with architectural decoration, generically called portico clocks (Christies 2004).

Portico clocks had an entablement supported by columns or caryatides. The pedestal supported the clock body with the dial and the house of the mechanism suspended between two columns. In the case of the short pendulum the dial was placed on a golden or metallic ornament in the form of a lyre, the pendulum grid being framed to mimic the strings of the lira (Campbell 2006, 138).

Lyre clocks and generally those with small pendulums fall into the category of so-called bracket clocks (Betts no date) – clocks with a short pendulum, that is sometimes hidden, the weights being replaced by engagement springs (one for the clock's own mechanism and also a spring for the gong). Bracket clocks could be mobile and placed on furniture or hanging on the wall if they were supported by a console type ornament. The bracket variants of the wall clock are actually the stage of transition to the fireplace clock, the table, and later on the travel clocks that, although created by Abraham Loius Brequet (1747-1823), are only popular in the second half of the 20th century (Campbell 2006, 252).

Precursors of portal or portico clocks have been known since the 17th century. The classical form of the portal clock was initiated in the Directoire style that emerges from Louis XVI style and then continued into Empire style, being transmitted later on, in classicism and then passes to the Biedermeier style. This model is traced from France to the south of Germany and then to Vienna, and from Vienna further to the east. Today, stylistically distinguished elements can be noted between pieces manufactured in France and those produced in Germany or Austria (*Louis VI Style* 1998).

The first restored object is a portico clock with animation (M 2235) (Fig.1), made in a Viennese workshop dating from the first half of the nineteenth century, with the dimensions: 33 cm wide; thickness 12 cm; height 50 cm, (53 cm after restoration). The enamelled dial shows Roman numerals. The pedestal and housing of the clock and animation mechanisms are made of black shellac polished fir wood. The housings are framed on both sides, by two columns with the stylobate and capital made from gilded wood, and the centre part, from turned alabaster.

The housing and the gilded sculptured motifs are covered with a fine layer of dust due to exposure. There are three ornate and engraved ornaments from nacre, missing. There are 3 decorative ornaments turned, located on top of the clock that are missing. There is no back cover on the animation mechanism housing. Most of the housings joints are loosened and, as an inappropriate intervention, some of them have been fastened by means of iron nails. There is a missing element in the column capital, on the left side of the clock, replaced with a piece of plain wood.

The brass components have a discontinuous and uneven layer of mechanical products and copper-specific corrosion products, the mechanisms are complete but non-functional, with missing enamel portions on the dial.

The painting surface is covered in dust and varnish that turned yellow due to time, gaps in the layers of the painting and scratches.

The mechanisms (Fig. 2) were removed from the casing, dismantled, cleaned with extraction gasoline and then lubricated with oil for fine mechanisms; the glass was degreased with ethylic alcohol and fixed to the brass frame; the turned alabaster columns were degreased with alcohol and cleaned with Romopal OF-10 non-ionic detergent; the detachable brass parts (gong support bracket, dial frame, pendulum) were degreased with acetone,

immersed in 20% orthophosphoric acid, mechanically cleaned with a brass brush, polished with Autosol paste, and protected with special Exquisit cloth.

The enamelled copper dial (Fig. 3) that showed gaps (of enamel) in the keyhole inserts, was degreased with ethylic alcohol, then the missing area was filled with epoxy resin into which a white pigment was added to bring the resin to the colour of the dial. The steel gong was mechanically cleaned with a rotary brush then passivated with BallistolR (special oil for ferrous metals and firearms). The pedestal and clock casing have been dusted, brushed with fine steel wool, and repolished with black shellac. The gilded parts (Fig.4) (stylobate and column capital) were cleaned with Deck 3000 and white spirit.

The cover of the animation's housing was made from fir wood, finished and polished with black shellac. New brass screws have been added to the mechanism that attach to the housing. The three top ornaments were made (cast in resin after a witness similar to the original), these were gilded and coated with shellac. Three ornaments were made from nacre and engraved with the help of a small rotary tool. The back cover, that envelops the animation mechanism, was made from wood and after was polished with black shellac. To facilitate restoration interventions on painting and the mechanism behind it, it was necessary to dismantle and disassemble the animation mechanism (Fig. 2).

Interventions on the painting: removal of dust from the surface painted, with ammonia water 2%; removing the yellowish varnish layer with a mixture of 40% turpentine and 60% ethylic alcohol; filling the gaps with a mixture of Beva 371 and chalk powder, that was applied with a thermostatic spatula; chromatic integration of the gaps that were filled was made with varnish colours; final varnishing was done with dammar diluted in essence of turpentine (Fig.5).

The whole casing and the new made parts was reassembled using bone glue. After restoration, the clock is complete, functional and can be exposed (Fig.6).

The second clock is also a portico clock without animation (M 7838) (Fig.7), built in a Viennese workshop and dated from the first half of the nineteenth century, with dimensions: width 26 cm; height 45 cm; thickness 11 cm. The enamelled dial is presented with Arabic numerals. The clock case and the pedestal are made from wood polished with black shellac. The casing is supported in the back by a wood carved and polished lyre. This housing as well as the previous one is framed on both sides by 2 columns with the stylobate and capital made from gilded wood and the centre part of the column made, from turned alabaster.

The housing and the gilded sculptured motifs are covered with a fine layer of dust due to exposure. There is no wooden cover behind the casing. Most of the housings joints are loosen. The brass components exhibit a discontinuous and uneven layer of mechanical and copper-specific corrosion products, the mechanism is complete but non-functional the dial has functional wear traces.

The mechanism (Fig. 8) was removed from the casing, dismantled, cleaned with extraction gasoline and then lubricated with oil for fine mechanisms; the glass was degreased with ethylic alcohol and fixed to the brass frame; the turned alabaster columns were degreased with alcohol and cleaned with Romopal OF-10 non-ionic detergent; the detachable brass parts (gong support bracket, dial frame, pendulum) were degreased with acetone, immersed in 20% orthophosphoric acid, mechanically cleaned with a brass brush, polished with Autosol paste (a fine polishing compound), and protected with a special Exquisit cloth (microfiber cloth used for polishing).

The enamelled copper dial was degreased with ethylic alcohol. The steel gong was mechanically cleaned with a rotary brush then passivated with BallistolR (special oil for ferrous metals and firearms). The pedestal and clock casing have been dusted, brushed with fine steel wool, and repolished with black shellac. The gilded parts (stylobate and column capital) were cleaned with Deck 3000 (paint thinner) and white spirit. New brass screws have been added to the mechanism that attach to the housing. The three top ornaments were made (cast in resin after a witness similar to the original), these were gilded and coated with shellac.

The cover of the housing was made from fir wood, finished and polished with black shellac.

The whole casing was reassembled using bone glue (Fig. 9). After restoration, the clock is complete, functional and can be exposed (Fig.10).

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THE PRESERVATION OF BRUKENTHAL`S WOODEN COFFERS COLLECTION

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Abstract: *In this paper I will show how proper storage conditions for the Brukenthal museum collection of wooden coffers were created, by applying a simple yet functional methodology while working on a short budget.*
Keywords: *Preservation, collection, wooden coffers*

Rezumat**:** *Articolul prezintă modul în care am creat condițiile potrivite de depozitare pentru colecția de cuferele din lemn a muzeului Brukenthal, aplicând o metodologie simplă și totuși funcțională, lucrând cu un buget restrâns.*
Cuvinte-cheie: *Conservare, colecție, cufere din lemn.*

At a given moment, arises the issue of the development of a competent methodology with practical application in the organization and carrying out of preventive preservation activities on various categories of heritage goods. It is to my understanding that when it comes to preventive conservation, or in more accurate terms, the preservation of an entire collection, the general idea is that these sets of preventive measures are of the utmost importance and that they should come at no expense.

It is a known fact that museums often struggle with the lack of financial funds for this matters, all the while it is expected of them to ensure the best quality of service and conditions in both their exhibiting and storage spaces. The ones dealing with these problems are, in most cases, the museums curators and heritage preservation specialists. Not only that this requires good communication and teamwork between the parties involved, but also a broad knowledge and understanding of the reactions of museum objects, depending on their constituent nature and the place they are located in at all times.

Simple but important measures can be appropriate for many conservation functions, particularly on the broad preservation of the collections through providing proper storage conditions (Keene 2002, 8). In other words, preventive preservation is responsible for creating favourable environmental conditions that slow down the process of degradation of cultural goods (Nicolescu 1979, 130).

The coffer collection of the History Museum „Casa Altemberger", the history branch of „Brukenthal National Museum" in Sibiu, is largely composed out of craft crates that belonged to various guilds, community coffers, travel trunks, money crates, wooden boxes and cassettes belonging to the church, or boxes of common use. The morphological structure of the collection is relatively homogeneous. The coffers are mostly made entirely out of wood, glued (45° joints, wooden fastenings, dovetail joints, or flap and groove), veneered or painted, with sculptural decoration, with hardware elements (locks, hinges, metal corners, decorative nails or plates). Out of the immediate necessity to save this collection I was able to convince management and obtain funding for my intended preservation plans. We will see in the course of this paper exactly the conditions in which these goods were previously kept, how that small room has been transformed into a place of proper storage for cultural goods and how it has succeeded in fulfilling the conditions necessary for this function, according to the conservation norms.

The storage room is situated on the ground floor of the „Altemberger House" architectural ensemble and is an integrated part of the centralized warehouse for cultural goods. Although it has major drawbacks in terms of volume of space, caused by a lower ceiling with the appearance of a semi-cylindrical vault, 255 cm being the highest point of the ceiling and having a ground surface of only 735x530 cm, the room is not crossed by sanitary pipes or heating systems, which is an advantage. In

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disadvantage of the goods are the fir tree shelves, which in most cases is sapwood and bark, which are linked with the development of biological attacks and the possible infestation of the entire collection. The shelves are designed in such way that they ensure no stability for the coffers, and the tipping dimension is only a poetic notion, large coffers being stored above the smaller ones, with little or no regard to their shape or positioning, some being sat directly on the floor, blocking the access lanes (Fig.1,2). Precious space is being wasted by the inefficient arrangement of the coffers, a matter which led to storage of crates in other sectors of the centralized warehouse.

Due to the defective storage, many coffers have suffered damage, loss of material, scratches, breaking apart of decorative elements, and even breakage of the casing itself. So mechanical degradation in general. All of the pieces show significant dust deposits, some even biological attacks in the early stages, mold being present on their surface. Many of the coffers lids are either broken or displaced, due to inadequate handling. Moving a coffer is made difficult by the racking system, which has only two wooden beams as supporting elements (Fig.3,4,5).

According to articles: 4,11,12,13,14,15,16,18, annex 1. Chapter 2 of the decision no. 1546 of December 18, 2003, issued by the Government of Romania and published in the Official Gazette no. 58 of 23 January 2004 on the rules for the preservation of cultural goods; It is considered proper for storage of such goods the space meeting the following conditions:

a. It is salubrious
b. It has microclimatic stability: relative humidity should generally be between 50-65% and temperature should not exceed 22 degrees C, always following its correlation with R.H.
c. The level of illumination of organic goods, adjusted according to their degree of sensitivity to photochemical degradation, does not exceed the maximum allowed lumen x hours per year. It is generally recommended 50 – 80 lumen for painted wood and 150 – 200 lumen for wood objects and the UV component emitted by the light sources should not exceed 75 microW / lm (microwatt / lumen)
d. It is pollution free: lacks harmful powders or gases
e. The lighting, heating, water and canals are in good condition, have been thoroughly checked and function properly
f. It ensures security of goods
g. It fulfils all the conditions imposed by the regulations in force on fire prevention and fighting

It is envisaged that the storage of movable cultural goods will be made in suitable spaces in order to ensure optimal conservation conditions. The organization of the deposit must be preceded by the choice of space and the determination of its quality. This was previously done, the storage room only needed a complete makeover.

Elaboration of the project

Of all the phases that constitute the organization of a warehouse, the most important of all is the elaboration of the project. Designing is a complex activity, and the final result is the project. The project is an ensemble of written and drawn pieces, tables, inventory, sketches, etc. regarding not only the place of each object, but also the other associated information: how, in what context, the way of organization, the succession, etc. The project also sets out the nature and size of the storage modules. In this way, the mismatches between the dimensions of the objects and the modules, the mismatches that create the greatest problems for the state of objects, disappear. Preliminary design of a storage project allows the necessary furniture to be made in accordance with the morphological and dimensional particularities of the objects to be placed therein. Organizing a warehouse by designing a preliminary project is a complex operation that is carried out without moving a single object out of place. First, the site, where the object will be placed, how it is placed, the type and size of the modules are determined by the project. Then they are executed and placed in the warehouse, at the site provided in the project, and the objects directly in the way and at the place established by the project. This way of solving storage has an enormous advantage in the organization plan (time, quality) and for the plan to ensure conservation conditions. This reduces the number of movements of objects, which ensures their conservation status. It rationalizes and makes the activity more fluid (Moldoveanu 2010, 211,213,216).

Onsite measuring

The first step in the preparation of the project development was to carry out the measurements in the storage space to determine the surface of the room, thus making it possible to design a new storage system that maximises space use and increases the number of coffers to be deposited.

Measurement of objects

Size is a fundamental element of the physical identity of objects. It is mandatory to record the dimensions of the objects involved in the project. Many times during this task of rearranging a warehouse, the conservator must know the objects size either when determining the formats, the basic modular unit or the size of the storage modules (Moldoveanu 2010, 211, 216). Each coffer was measured, which served both in designing storage modules and in grouping the pieces. Thus, shelves were dimensionally designed to serve the needs of the total number of coffers and the size of the largest ones or, as the case may be, the smallest.

Grouping coffers into formats

After measuring the coffers I divided the collection into four large dimensional categories:

- Large coffers, with lengths up to 1.80 m and heights up to 65 cm
- Medium coffers, with lengths between 1.50 and 1m
- Medium small coffers, with lengths between 1 and 0.50 m
- Small coffers, with dimensions less than 50 cm

Also, the number of coffers in each of the four categories dictated how the storage modules would be designed.

Typo dimensioning and designing the storage modules

Of all the possible criteria for the organization of a storage space, the one that best meets both the conservation requirements and the rational and intelligent use of space, is dimensioning. Typo dimensioning is a technique of storing cultural goods that groups successively the cultural goods, first of all with the nature of the materials they are made of, then according to the morphological type and, finally, according to the format (Moldoveanu 2010, 211,216). Having done all the measurements needed, I was able to design a simple, two module layout for the new storage room (Fig.6,7).

Getting the materials

Considering the design of the new modular storage units, and after consulting with my colleagues from the administrative sector, we choose the materials we were going to use, worked out how much we were going to need and filed for the supplies purchasing. We estimated the cost to be less than 1.700 EUR (2.000 USD)

Clearing the storage room

With the help of my colleague, the collection curator, we began making preparations for taking the coffers out of the storage room and dismantling the old shelving. The old, so called storage modules, were so improperly made that we had to take apart the wood shelves around the large coffers (Fig.8,9).

Temporary relocation of the objects

While undergoing renovation, or a complete reorganisation of a heritage goods storage space, the objects themselves have to be taken out and deposited in another space that has to be appropriate to host them and must ensure good conservation condition. In our case, we stored the coffers, until the new storage room was finished and dry, in adjacent rooms of the centralized warehouse, making sure that the objects were not being tensioned, deposited directly on the floor or on top of one another.

Sanitation of the storage space

In order for the space to meet the requirements of a cultural goods warehouse, it had to be cleaned first. The walls were swept with dry brushes and brooms, and the floor was vacuumed, then washed thoroughly by the cleaning personnel. Before being painted, the walls were selectively scraped, repaired locally and washed with anti-mold primer. Two successive layers of washable paint were applied afterwards by the museums painter (Fig.10).

Electrical system revision

This involved replacing the intakes and dose caps, changing the light fixtures and rebuilding the wiring paths where needed. All electrical works were carried out by the certified electrician of the museum.

Preservation of individual coffers

Romanian legislation stipulates that there should be a period of up to three months of drying for renovated heritage storage spaces and six months for newly constructed ones, before depositing a collection within the precincts. I've passed the time by attending to individual coffers in terms of preservation and by overseeing the construction of

the new storage modules. Each and every one of the coffers was vacuumed cleaned, measured, photographed and had its conservation state updated. Dusting on the painted surfaces of the boxes was done with a soft brush. In total, 126 coffers and wooden boxes were subjected to minimal interventions before being reintroduced into the storage area (Fig.11).

Curative conservation of coffers

Curative conservation consists of all the actions and measures taken directly on a cultural object or on a set of goods, in order to stop the active processes of deterioration or to structurally strengthen the object. These actions are put into operation when the very existence of goods is threatened, in the short term, by their extreme fragility or the speed of their deterioration and are generally carried out by an accredited restorer (Capotă 2016, 3). In this regard, the coffers with minor conservation problems were recorded in the restoration plan for the following years, to enter the restoration laboratories of the Brukenthal museum, wood restoration sections, polychrome wood, and metal restoration for curative treatments, or to undergo restoration interventions. Since that time, some of them were fully restored, and others are in the process of being restored or await restoration.

Manufacture and installation of modules

Since the beginning of the new modules manufacturing, the first concern was to cut the metal pipe to the dimensions and in the necessary numbers set at the time of designing the modular storage units (Fig.12). It was followed by sealing the space and mounting the metal profiles by welding, operations done by our qualified personnel (Fig.13). After the modules were constructed, they were painted. We applied a very resilient paint called hammer blow. Even though versatile shelves that can glide on a rigid structure are preferable for being able to adjust to the dimensions of various objects, I chose to design the modules as fix ones, appropriate for the pre-established dimensions of the coffers. I chose to go with this approach because the collection will be stored in this space for a long time and the room itself won't be designated to serve another purpose. This also has raised the challenge of dividing the shelves for an exact number of coffers and for their total width combine, with space to spare, not only between them but also for the eventual enlargement of the collection in time. Usually 10% of the module capacity should remain free space reserved for this purpose. In the end, the newly designed modules, not only that they could fit the entire coffer collections and there will also be room for another 10 medium small and other 4 large crates. I also opted to have very few frontal vertical support beams, to make access to the coffers as easily as possible. The shelving itself is very strong and can support the entire collection with ease, do to ingenious steel working and professional welding. After making the metal structures, OSB shelves were put into place by the museum carpenter.

Mounting protection curtains

In order to reduce the dust deposition on objects, I opted for the installation of cloth curtains and not individual shutters. Advantages consist in easy opening and closing of the modules, which allows periodic checking of the collection; the designed protection curtains can be periodically cleaned (Fig.14).The drapes themselves were made by my colleagues in the textile restoring compartment.

Bringing back the coffers

After measuring wall humidity with an induction hygrometer and when the walls were properly dry, the coffers were each place onto the modules according to topographic register created at the moment of typo dimensioning.

The topographic register

From the start of the project, it has been established how to arrange and find the objects. This was done on formats, the position of the individual pieces being subsequently marked in a new topographic catalogue showing the modular unit, the shelve number and the order number of each inventory number. All the coffers in the collection were given new labels on the occasion of the warehouse arrangement. Shelves were in turn numbered and labeled, each module and shelf being encoded according to the project scheme. Their inventory numbers correspond to a catalogue in which their positions in the modules can be found exactly. Ex: **M.5044-** Module I, shelve 2, third on the right (Fig.15). Also, in this catalogue, notes on the whereabouts of the objects are being made, in cases they are undergoing restoration or have left the storage room for any other reasons.

Ensuring microclimatic stability and monitoring

Air from the environment of cultural goods always contains a certain amount of water vapor. They constantly sweep the surface of the objects, therefore a number of water molecules are absorbed by them through weak bonds called Van der Waals (Smith 2009, 19,20,21,22). Hygroscopicity is the property of materials to absorb water, or to have absorption and desorption ratios of relative hu-

midity in the ambient atmosphere. The abundance or lack of water due to hygroscopic humidity is the basis for all the degradation processes determined by it (Moldoveanu 2010, 63). For example, wood can absorb up to 40% of its weight, and through variations between absorption and desorption of moisture, dimensional changes, twists, cracks and even fractures may result. Therefore, it is imperative to continuously monitor the regulation of microclimate parameters in accordance with the legal provisions in force. On the occasion of the redevelopment, the warehouse was equipped with microclimate monitoring equipment, data logging type. The unit is programmed to record the UR and T values once every 30 minutes. In order to adjust the relative humidity values inside the coffer storage room, a dehumidifier and a humidifier device is being operated at the time of observation, during the control, of the parameter deregulation. As for the temperature, the room does not have heating sources, but the temperature is stable and optimal due to the position of the room in the central warehouse. Lighting is made artificially only during entry into the warehouse. At the end of the work program, the current for the light sources and the outlets in the storage room is interrupted from the general electrical panel, leaving only the anti-burglary and smoke sensors active, both of which are connected to the museum's centralized alarms system.

Prevention and fire-fighting

The storage room is equipped with a smoke sensor connected to the centralized alarm system. When the alarm is triggered, the central panel indicates the room where the responsible sensor was triggered. Also, according to P.F. regulations, the room is provided with two fire extinguishers, one with powder and one with carbon dioxide, so that they can be used depending on the nature of the fire.

Security

The coffer storage room is part of the centralized warehouse of the History Museum. It features anti-burglar sensors, connected to a general alarm panel and video monitoring. Access to the store is made on a single access path and it is permanently monitored video. The video surveillance system records in real-time, saving videos on a general server

Periodic inspection

Inspection of collections is done twice a week by the conservators and the service museographer. Mondays and Thursdays, when cleaning is carried out by vacuuming. Collections, installations, windows and monitoring equipment are checked. Intervene if necessary.

In conclusion, the preservation of the coffer collection was ensured for years to come. It was a team effort that should inspire everyone to come together for the greater good.

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LIST OF ILLUSTRATIONS

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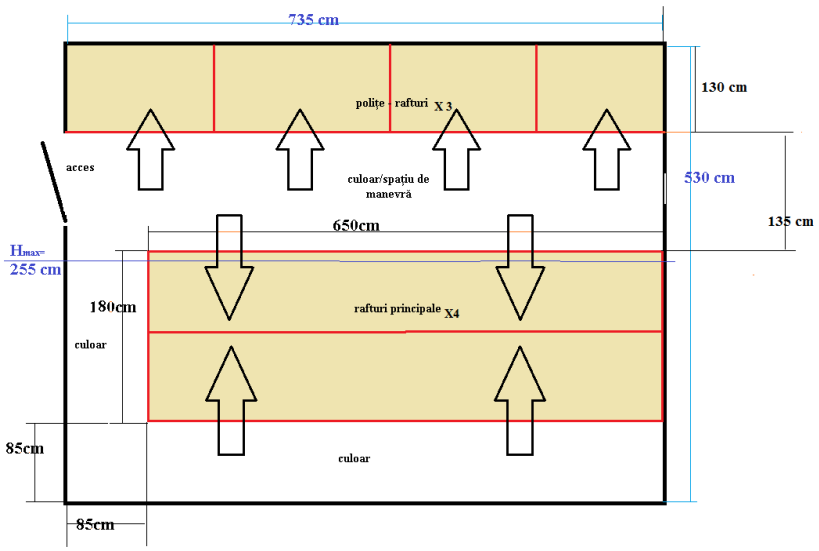
1. Appearance of the old storage room

2. Appearance of the old storage room

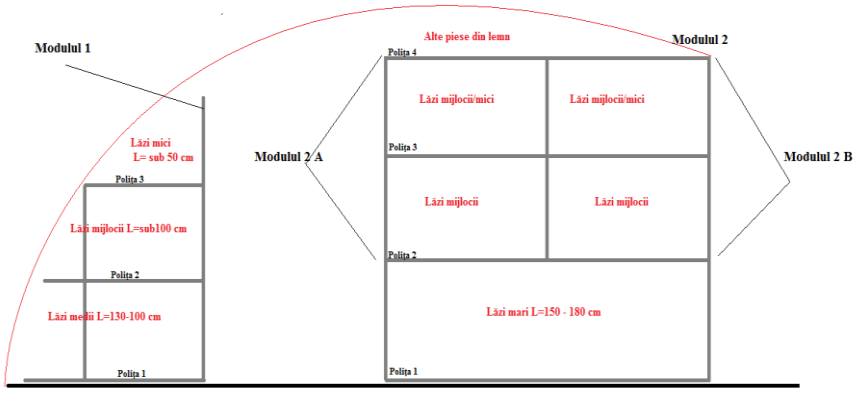
3. Aspects of degradation

4. Aspects of degradation

5. Aspects of degradation



6. Outline of the project



7. Outline of the project

8. Appearance during the removal of the old storage

9. Appearance during the removal of the old storage

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METHODS AND TECHNIQUES APPLIED TO THE RESTORATION OF ARCHAEOLOGICAL POTTERY. CASE STUDY

Simona Maria CURSARU-HERLEA*

Abstract: *The article presents the technological process of restoring an oriental amphora used for transport. The amphora was discovered in the archaeological site of Capidava in 2008, dating in the 5th-6th centuries. Aspects of working style, use, dosing, batching and applying of some reversible and compatible substances are analyzed, as well as alternative past or present materials and methods.*
Keywords: *Romania, Dobruja, pottery, amphora, conservation, restoration*

Rezumat: *Articolul prezintă fluxul tehnologic al restaurării unei amfore orientale de transport (Carthage LR1, British BII, Kuzmanov XIII, Scorpan 8 B, Benghazi LR 1, Keay LIII, Peacock &Williams Class 44), descoperită pe șantierul arheologic de la Capidava, în anul 2008 și încadrată cronologic în secolele V-VI. Sunt abordate aspect ale stilului de muncă, modul de folosire, dozare și aplicare a unor materiale și substanțe reversibile și compatibile, precum și unele metode alternative care se foloseau sau se mai folosesc.*
Cuvinte-cheie: *România, Dobrogea, ceramică, amforă, consevare, restaurare*

Introduction

The Carthage LR1 oriental amphorae used for transport are frequently found in the west and north of the Black Sea, especially around the Mediterranean Sea, starting with the 5th century AD. They seem to have originated in eastern Cilicia, a roman province located in southern Anatolia (Opaiț 2010, 2015). In Dobruja, this type of amphorae is mostly widespread in the 5th and 6th centuries and the merchandise transported was most probably wine (Opaiț 1996, 47-48).

The amphora mentioned above was discovered in Dobruja, at Capidava (sector 1, C1) in 2008 and it was dated in the 5th-6th centuries (Opris 2003, 53). This amphora was made of a type of clay which was rich in iron oxides and tempered with sand, providing a well-homogenized paste. It was made on the fast potter's wheel and the firing was oxidizing and homogenous.

State of Conservation

The amphora was discovered in fragmentary state (36 fragments - fig. 1). Approximately 25% of the amphora is missing- small fragments from the shoulder, a handle and larger pieces from the bottom section. Traces of secondary firing were found in the rim and shoulder areas (black spots) and they were probably produced as a result of the dwelling firing (Fig. 1 a, b).

The chemical analyses showed the existence of semi-adherent deposits of $CaCO_3$ and $CaSO_4$. Moderately adherent deposits of dirt containing dust and other impurities were also found[1] (Fig. 2). Some pieces indicate the exfoliation of ceramic material.

Following the assessing of the laboratory results, we established the diagnostic that was discussed in the restoration committee, where the restoration plans were made, mentioning all the materials, substances and techniques that are to be used.

The technological process of restoration

The curative conservation and restoration of an object involves a certain set of operations and stages.

First of all, physical treatments were applied, such as mechanical cleanings followed by drying with adequate tools. Dusting was carried out by brushes with long and soft natural hair, in order to avoid physical damage to the pottery surface. Plastic brushes or cotton cloths will by no means be used.

The high-fired pottery allowed the removal of moderately adherent dirt by immersing the pieces into solution of water and non-ionic detergent (Fig. 3). At the same time, mechanical cleanings were carried out. The thick deposits were removed using

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[1] Analysis Bulletin no. 401 / 13. February 2013, performed by the chemist Lăzureanu Daniela, the ASTRA National Museum Complex, Sibiu.

the scalpel, spatula, proper needles and even the binocular eyeglass (Fig. 4). This was the stage when strata of moderately adherent dirt, as well as deposits from the storing ground were swept away.

This stage was followed by rinsing in running water and immersing in distilled water at the temperature of 20° C.

In order to remove calcareous deposits acid baths are usually used. Hydrochloric acid bath is a cheap method, but its reaction is difficult to control and neutralize and it is toxic for humans. Therefore, it is not widely used nowadays. Acetic, citric or phosphoric acid is currently used in laboratories (in concentration of 10-20%). These types of acid are relatively non- toxic, cheap and easy to neutralize.

Acetic acid with a concentration of 20% was recommended by the chemist for shards covered with $CaCO_3$ and $CaSO_4$ deposits.

The shards must be always rinsed copiously with water before immersing them into acid baths, so that the acid can react only on the surface, removing the carbonate crust. This way, getting to the pottery core, where it is more difficult to clean is avoided.

Thereafter, several shards which had no $CaCO_3$ and $CaSO_4$ deposits were taken out from the distilled water and left to dry on a stand at ambient temperature. The drying lasted two days. Fragments that presented carbonate deposits were left in the water until the 20 % concentration of acetic acid bath was prepared.

Wet shards were introduced in this bath. Thirty-five minutes later, when the effervescence reaction was completed, we removed the carbonate crust using a soft brush.

The neutralization was obtained by repeated distilled-water immersions. Six neutralization baths were performed, each lasting 30 minutes. The complete neutralization was checked with PH indicator paper.

After removing the shards from the last neutralizing bath we went through drying. Drying can be hurried by placing the shards in a stove at 25-30 ° C, or it can be done slowly at ambient temperature by placing the fragments on a stand or filter paper and left there for 1-2 days. In our case we chose the second option (Fig. 5).

The amphora reconstruction was done in several stages. Prior to reconstruction, we identified and established the position of each fragment in the amphora and then numbered them in the order in which they were going to be glued.

Assembling/gluing fragments is done using adhesives, materials that have to fill the spaces between the joint surfaces, adhere to both and provide a durable and rigid soldering. In restoration, the adhesive mustn't affect the object in any way and it must follow the reversibility principle. We chose BISON D3 (vinyl polyacetate) for this operation. BISON D3 is chemically pretty stable and it is reversible in water, but faster in acetone or ethyl alcohol.

Bonding the fragments involved the following steps:

- we made sure that the gluing surface was perfectly clean;

- the adhesive thin film was applied in a fine and uniform layer using a brush on the edge surfaces. The pairing fragments were fixed together and pressed and the surplus emerging from the crack was immediately wiped with a tampon soaked in water;

- the gluing of the shards was done gradually, letting the adhesive bind;

- the gluing was performed at the sand casket in normal position and because the object allowed it, we first glued the fragments at the work table (fig. 7);

- the gluing was done from rim to foot (Fig. 7, 8, 9, 10).

The missing sections were shaped out of moulding plaster. The moulding plaster we used was Modulan, which combined with water adheres to ceramics and binds in a short period of time, offering the amphora stability. The missing parts were integrated step by step, after the drying of glued fragments (Fig. 8, 9, 10).

The reconstruction of the amphora began by taking two types of impressions:

- semi-elastic impressions made out of modelling clay, for the sections without "ribs".

The advantage of this type of impression is the rapidity of execution and the modelling clay can also be used for other objects.

- elastic impressions made of dental wax, for the fragments with "ribs". The wax becomes malleable at approximately 40-50° C and this is why the its heating was performed using the I. R. lamp.

After the plaster hardened (in approximately 10 minutes) the impressions were removed and the fills were shaped using a special modelling tool.

This technique was used to simplify the final filling.

To increase the durability of both reconstructed and glued handles, we considered that the consolidation with metal armatures was necessary. These armatures were made of stainless steel wire. With the help of an electric outboard we made the mounting holes of the metal armatures, using the drill that was appropriate to the thickness of the object (Fig. 11). The armatures were fixed into these holes using epoxy resin. The polymerization of the resin (Bizon type) was performed in normal conditions, at ambient temperature. The piece remained untouched for 12 hours.

Cementation of the fissures and cracks was done using plaster with water, which is the same mixture used for the fillings, but this time its consistency was a bit more fluid, to better infiltrate into the cracks and fissures. The operation was carried out using spatulas (Fig. 12).

After the thorough drying of the plaster, the interior and outer surface of the fillings and cementations were finely polished with fine granulation sandpaper. A dust collector was also used, in order to avoid the dust penetration in the pores of the artefact, as well as in the restorer's lungs (Fig. 13).

Following the restoration principles, the nuancing of the plastered sections in a neutral colour similar to the colour of the surface of the pottery was acquired. Using watercolours, samples of colours were prepared and a homogenous nuance was chosen. The final colour was slightly lighter than the original colour of the amphora.

The coating is usually done using Paraloid B72 (a few years ago nitrocellulose lacquer dissolved in acetone was used, but it is no longer preferred, due to the fact that it is toxic and it changes its colour in time) dissolved into methyl acetate, ethyl acetate or butyl acetate. We decided upon ethyl acetate for our amphora and the concentration of the Paraloid was 1% (not to give the gloss of additions). The solution was applied to the entire surface of the inner and outer parts of the fillings in two successive layers using a brush with long, soft, natural hairs. Pottery usually maintains a stable balance with the environment, so the coating of the whole artefact isn't generally necessary. The coating assures a protective film that reduces the risk of filling or colour scaling allows the dusting when necessary. This film-forming material complies with the principle of reversibility and it can be easily removed using the same solvent used for its preparation.

Conclusions

For the restoration of this amphora we used techniques, materials and substances that were tested in time, in adherence to the rules of the profession. In the end we obtained an amphora with a pear shaped body and oval cross section handles, with two middle slots. The decoration is with grooves (known in the literature as "ribs") traced from the shoulder to the bottom of the amphora. After the restoration process, the amphora has the following dimensions: height: 51 cm, maximum diameter: 28,5 cm, rim diameter: 10,5 cm, mathematically estimated volume: 15 l (Fig. 14).

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RESTORATION OF THE PAINTING "BARON SAMUEL VON BRUKENTHAL" BY JOHANN GEORG WIENKERT

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Abstract: *To honour the memory of Samuel von Brukenthal, the founder of our museum, at the 200th anniversary of its opening, we have restored the most important painting which represents him. The work of the Viennese painter Johann Georg Weinkert from 1792 was restored by the whole painting restoration team. All restoration - conservation operations are described below.*
Keywords: *Samuel von Brukenthal, Johann Georg Weinkert, restoration*

Rezumat: *Pentru a cinsti memoria lui Samuel von Brukenthal, fondatorului muzeului nostru, la jubileul a 200 de ani de la deschiderea muzeului am restaurat cea mai importantă pictură care-l redă. Lucrarea realizată de pictorul vienez Johann Georg Weinkert în anul 1792, a fost restaurată de către întreg colectivul de restauratori pictură. Toate operațiunile de restaurare – conservare sunt descrise mai jos.*
Cuvinte-cheie: *Samuel von Brukenthal, Johann Georg Weinkert, restaurare.*

Without any doubt, the work done by the Viennese painter Johann Georg Weinkert is the most iconic portrait of Baron Brukenthal[1]. The large dimensions of the canvas allowed the character to stand in the natural size. The Baron is painted at the age of 71, inside his palace in Sibiu. Two years after the date mentioned on this painting, in the palace, on the second floor thirteen halls were arranged, in which were exhibited the paintings from the personal collection. This fact is mentioned in the calendar published by Hochmaister[2].

The sumptuous interior with golden furniture, with marble countertop on the table, creates a classic, elegant atmosphere that supports the personality featured in colours. He wears red-brown nobility costume, embroidered with golden thread, over which he wears a velvet cloak, also decorated with gold embroidery and hemna fur. These vestments are the costume of the ceremony corresponding to the rank of the Great Cross of the Order of Saint Stephen. Over the vestments on the chest, the baron wears the golden stamen and the silver star (Mureşan, 2009, 33). With his left leg in front and his left hand in the hip, the baron positioned in the semi-profile looks dignified and sure of him.

Although it was exhibited for a long time in the first floor of the gallery and it had a stable conservation status, the work entered the restoration laboratory for aesthetic interventions. There have been degradations caused by older restoration interventions or the presence of gaps in the primer and colour layers. Another aspect that disturbed the visibility of the painting was the old chromatic retouches that aged and changed in tone, and this gave the impression of pigmented spots on the portrait. The canvas has been doubled during a previous restoration on wooden plywood, and this plywood has extensive corrugations, losing the flatness of the painting. In addition to all these technical aspects described above, we also had a duty of honour to the founder of this museum, that at the celebration of the 200th anniversary of its opening, this painting could receive the visitors in impeccable state, as we think it would be pleasing

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[1] Mureșan Valentin, Formă și culoare Decor și mișcare, Editura Altip, 2009, p.41: „ ... tabloul acesta rămâne cel mai reprezentativ și impunător dintre portretele lui.”
[2] Ittu Gudrun – Liane, Muzeul Brukenthal de la constituirea colecțiilor până în zilele noastre,Sibiu, 2000, p. 32: „Dintre sursele autohtone tipărite,calendarul din anul 1790, editat de tipograful Martin von Hochmeister, a acordat Galeriei Brukenthal atenția cuvenită, informând cititorii că aceasta ar ocupa 13 săli la etajul doi al edificiului cu numărul 121 din Piața Mare din Sibiu.”

to the patron. Just because of this last aspect, the team that worked on this piece was composed of all painting restorers, each of us wanting to honour the Baron's memory in this way.

The vast team of restorers and museum specialists have proposed a sum of restoration interventions and the restoration methodology has been approved by the National Commission of Museums. This approval is necessary, due to the fact that our painting has been classified as a „thesaurus" of mobile cultural goods.

The conservation-restoration work has begun with extensive photographic documentation, conducted in different light types.

In order to make the best decisions regarding the restoration interventions, the painting was radiographed in the laboratory of Sibiu Paediatric Clinic Hospital, the image of the portrait in RX revealed a series of stratigraphic loopholes that were chromatically integrated on the occasion of the older restoration.

Ranked in the „Thesaurus" category, the painting done in oil technique has a size of 228 cm on 149 cm and was restored between 1950 and 1960 by the local painter and engraver Hans Hermann. During this restoration, the doubling of the painting was carried out, passing it onto a rigid chassis of plywood. This plywood in turn was fixed with metallic nails of the original chassis. The adhesive used during this operation was a wax-resin mixture, applied in a layer of 2-5mm thickness. There were "air bags" present between the original canvas and the plywood, resulting from bad doubling (too fast cooling of the adhesive). All the plywood is curled, waved and therefore the general aesthetic aspect of the painting is altered. After the X-ray investigation, we found out that this doubling was performed to strengthen the textile support that showed traces of tears or ruptures. By radiography, different types of putty can be seen on its surface, one of these was lead white covering the forehead of the character.

Also, the many areas with stratigraphic loopholes (for which integration with oil colours have been used) have chromatically turned to a generally unpleasant appearance. Surfaces with old retouches are easily visible in UV light. The painting being realised in the oil painting technique, we considered that the support should be reinforced with cloth-compatible materials. If we had strengthened the support by the parquet method, we would have risked creating on the surface of the painting a network of cracks specific to the wood support.

Following these preliminary analyses, the restoration proposals submitted by the experts of Brukenthal National Museum Restoration Laboratories (Cristina Fău, Ilie Mitrea, Ioan Muntean, Andrei Popa and Celestina Albişor) were approved by the Museum Commission. The first stage of the restoration was the application of the Japanese paper on the entire painting surface with 4% rabbit glue, this providing temporary protection during the operations. The separation of the original canvas from the plywood was accomplished with the help of heat generated by IR light. Subsequently, painting restorers cleaned the back, from which they removed an impressive amount of wax, about 3 kg. The wax was mechanically removed from the entire surface of 3.4 square meters. The cleaning operation of the verso was performed in three steps and approximately 300 scalpel blades were used. Since the original textile backing was impregnated with wax and resin, we used a compatible adhesive (Beva 371 as a film) for the doubling operation. The adhesive used has a thickness of 0.67mm compared to the thick layer from the 2-5mm of the previous intervention. To prevent the formation of air bags between the two parts, the doubling operation was performed with the help of a thermostatic table, which allows us to optimally control the temperature and pressure. By this method, we released the flexibility of the original degraded support. The doubling canvas used was similar with the original, this way we respected one of the basic principles of restoration, namely material compatibility.

After doubling, we removed the Japanese paper and conducted the cleaning tests. For this operation a variety of cleaning solutions have been tested on various surfaces. Selection of the cleaning solution is a complex process and takes into account the integrity of the original colour layer and the desired effect in an optimal period. In the end we used two types of solvents, acetone for removing aged varnish and superficial dirt, and a solution composed of dimethyl sulfoxide and ethyl acetate to remove repainting's in areas where it was needed. The radiographic images of the painting were used to select test areas. The areas with old repainting's have been differentiated from the original colour layer. With the cleaning operation, the problems of the previous cracking have also come to light, many gap areas being excessively covered with puttying and without the subsequent removal of the excess of material. For the volumetric completion operation, a mixture of Beva 371 with mountain chalk is selected, this way thermoplastic putty is applied with a thermal spatula. Once the

gaps have been brought to the same level as the painting layer, chromatic integration has taken place in the imitative style, invisible to the eye, but which can easily be highlighted by UV light. Maimeri Restauro colours, specially made for this restoration operation, are used. They are stable, respect the principle of reversibility, they apply only over the varnish layer, and interact less with the original colour layer. After mounting the painting in the original frame, the image of the founder of the Museum was raised again on display.

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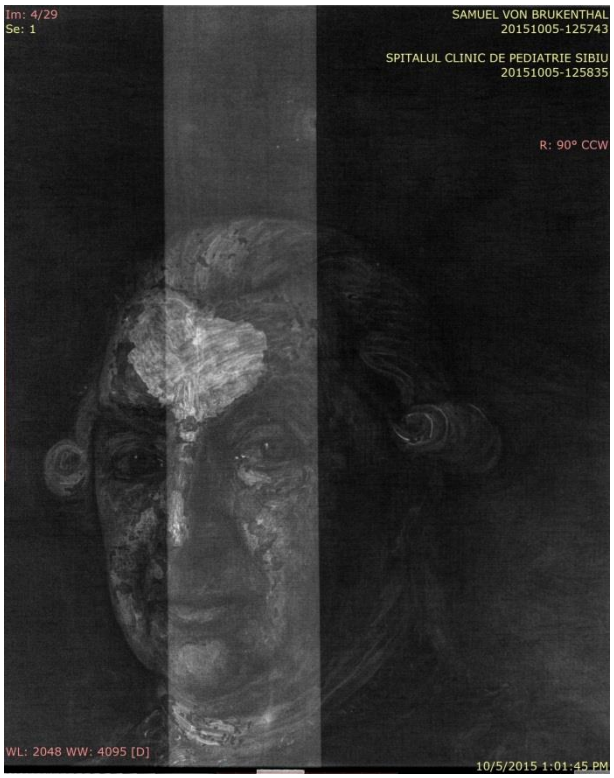
1. Assembly prior to restoration

2. Assembly prior to restoration, in UV light

3. Portrait detail before restoration, in UV light



4. X-ray portrait

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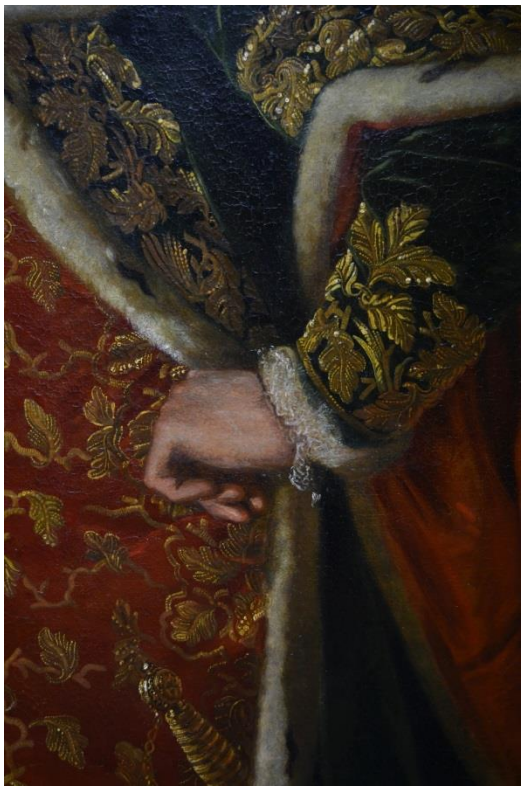

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17. Detail after restoration

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REMARKS ON A WOMAN PORTRAIT BY LORENZ STRAUCH FROM THE COLLECTION OF THE BRUKENTHAL NATIONAL MUSEUM, OCCASIONED BY ITS CONSERVATION

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Alexandru Gh. SONOC**

Abstract: *Although the conservation works brought back the original beauty of the painting „Woman in German Costume", unfortunately they did not lead to the discovery of the long-awaited signature by monogram and of a date, as on the most portraits by Lorenz Strauch currently known. However, the painting from the collection of the Brukenthal National Museum could be considered, due to an in-depth stylistic analysis, as an original work of this Nuremberg master, dated during the period 1610-1614, when he was already a prestigious portraitist and, as a result, he began to carry out public dignities, as that of a head of the painters' guild. From an artistic point of view, this is the peak period of the painter, but from which quite few works are known and which is characterized by his return to the more famous Nicolas Neufchâtel's compositional models and forms of expression, which he studied in his youth.*
Keywords: *oil painting conservation, lining, Lorenz Strauch, German portraiture, Nuremberg.*

Rezumat: *Deși lucrările de restaurare au redat frumusețea originală a tabloului „Femeie în costum german", ele nu au dus din păcate la descoperirea îndelung așteptatei semnături prin monogramă și datări, ca pe majoritatea portretelor de Lorenz Strauch cunoscute în prezent. Cu toate acestea, tabloul din colecția Muzeului Național Brukenthal poate fi considerat, datorită unei aprofundate analize stilistice, drept o lucrare originală a maestrului din Nürnberg, datată în perioada 1610-1614, când el era deja un portretist cu prestigiu și, ca urmare, începuse să îndeplinească demnități publice, precum cea de staroste al breslei pictorilor. Din punct de vedere artistic, este perioada de apogeu a pictorului, din care însă sunt cunoscute relativ puține lucrări și care se caracterizează prin revenirea sa la modelele compoziționale și formele de expresie ale mai celebrului Nicolas Neufchâtel, pe care le studiase în tinerețe.*
Cuvinte-cheie: *restaurarea picturii în ulei, dublare, Lorenz Strauch, portretistică germană, Nürnberg.*

Over the last few years, some important works by 16th-17th c. painters from southern Germany were brought to the attention of the conservators and art historians from the Brukenthal National Museum, like the pendant miniature portraits of a couple (Johann Conrad Rehm and Anna Haugin from Augsburg), both dated 1606 and which are fixed in two gilded capsules constituting actually the parts of a pyxis, made in Augsburg or Ulm (Ziegler 2012), the *Portrait of a Bearded Elderly Man* (oil on canvas, 87.5 x 65 cm; signed by monogram and dated 1555; inv. 20), whose author proved to be Jakob Seisenegger (1505-1567), who worked mainly in Vienna and Linz (Mureșan 2009, 334-335) and *The Sacrifice of Abraham* (oil on fir tree wood panel, 92.5 x 69 cm; signed and dated 1579; nr. inv. 134) by Anton Johann Brew (documented at 1579), an artist about whom it cannot be said with certainty if he worked in Augsburg, like the rest of his family or (at least temporarily) in Nuremberg, where he was inspired by a stained glass window made by the workshop of Veit Hirschvogel the Elder (1461-1526) after the drawings of Albrecht Dürer (1471-1528) for the chapel of a local asylum (see Sonoc 2017, 320, fig. 13 and 13a; as well, the study of Ilie Mitrea and Alexandru Gh. Sonoc in this volume). Beside two works of painters whose families settled from the Netherlands to Nuremberg following the religious persecutions, respectively *Jesus Cleansing the Temple* (oil on oak wood, 46 x 60 cm; signed by monogram and dated 1636) by Paul Juvenel the Elder (1579-1643) (Muntean, Sonoc 2015) and *Robbers Attack* (oil on canvas, 58 x 82 cm; signed

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and dated 1622; inv. 1192) by Frederik van Valckenborch (1566-1623), a portrait by Lorenz Strauch (1554-1636) should be added as well. The conservation of this painting will be described below, followed by the analysis of its importance in the context of the work of this still less known master from Nuremberg.

The painting *Woman in German Costume* (oil on canvas, 77 x 60 cm; inv. 1144; Fig. 1) was purchased by Baron Samuel von Brukenthal and recorded in the handwritten catalogue of his collection as due to Hans Holbein. The gallery guides of the Brukenthal Museum printed in 1844 (Die Gemälde- Galerie 1844, 107, cat. 59) and 1893 (Führer 1893, 55, cat. 210), which both assigned it to the school of Hans Holbein the Younger, mention it erroneously as a pendant of an elder man's portrait, whose author, after the recent discovery of the signature by monogram during the conservation works is actually Jakob Seisenegger (Mureșan 2009, 334-335, fig. 1-4; Löcher 2012, 126-127). In 1894 Theodor von Frimmel pointed that these painting are not actually pendants and assigned the woman portrait to Lorenz Strauch, due to its similarity to the paintings by this artist which he had seen in Würzburg, Vienna and Nuremberg (Frimmel 1894, 72, cat. 210). This assignment, which remained undisputed till now, was taken up in the gallery guides published by Michael Csaki in 1901 (Csaki 1901, 307, cat. 1101), 1909 (Csaki 1909, 340, cat. 1144) and 1926 (Csaki 1926, 28, cat. 1144), then also in that published by Rudolf Spek in 1941 (Spek 1941, 30, cat. 1144). In 1967, considering the Renaissance elements of the work, Teodor Ionescu mentioned it in his study about the German Renaissance paintings from the museum's collection (Ionescu 1967, 53, fig. 4). By contrast, Valentin Mureșan emphasized, more appropriately, the importance of this portrait in the general context of the Early Baroque German portrait painting, still marked by Mannerist reminiscences (Mureșan 2006, 53-54, fig. I.1; Mureșan 2007, 166-167, cat. 98, fig. 98).

Being known that most of Lorenz Strauch's works are signed and dated, but usually in a bad condition of preservation (Vollmer 1938, 170), the conservation of this painting, asked in March 2015, was intended as well to lead to the confirmation of its assignment to this painter by the discovery of his monogram and of a date, which unfortunately are lacking in this case.

1. The condition report.

As we can see them today, the works of art do not appear to us with the same look they had immediately after their execution. In best cases, if temperature and humidity variations, natural disasters, wars, human negligence and inappropriate restorations did not produce irreparable degradations, other alterations they may have suffered, as cracks and cleavages, are superficial and aren't damaging, literally, the paintings. These marks of their old age do not reduce the emotional power which original images can transmit; on the contrary, they are intensifying the flavour given by passing of the time.

Our look over the paintings should establish all transformations occurred in time. It is essential not only to distinguish an original old work from a more recent forgery, but also to recognize the interventions made by successive restorers and, after that, being able to guide the future actions. The conservation of a painting is always a delicate procedure. It has to be discreet and reversible, without affecting the original. All this motifs demand from the specialist a considerable work of scientific and technique documentation which precede any restoring operations. The information, provided by investigations, either made by the chemist, by the physicist or by the art historian, is precious for the historic of every piece of art.

According to the information from the older literature (Csaki 1901, 307; Csaki 1909, 340) and to the record on the typed label applied on its backside, the painting *Woman in German Costume* underwent conservation works in 1897. The stretcher is made of resinous wood, with hinged and tangled joints, having neither retraction slopes, nor tensioning wedges. Due to this fact, the inner edges of the stretcher pressed in the support and the stratigraphy. The support, a fine grained linen cloth oxidized over time, lost its tensile strength and wrinkled at the corners (Fig. 1). If looking in backlight, the light passes through the grain of the cloth. The support was resized and stretched on the stretcher and on all its edges the stratigraphy continues till the border, as well as the drawing of the sitter's gloves.

The stretcher shows bumps and scratches, heavy deposits of dust, dirt and insect excrements. On the vertical left wand is glued the label with the inventory number 1144, written in red, while on the upper wand there is a 19th c. collection label with the German text „*D. Schule 59 210*" over which was sticked the typed label with information about the work in Romanian, with the remark that the work's title is given as well in German. On the old German label the inscription was obliterated (most likely after in 1894 Theodor von Frimmel

assigned the portrait to Lorenz Strauch) and two other numbers were written on it, most likely in two different periods: one is 30 (which was also obliterated) and the another is 1144 (which is not obliterated), as it is the current inventory number, given in 1909, by Michael Csaki. Inside the stretcher, close to the left upper joint, the rest of a cloth patch can be seen (Fig. 2).

The backside of the work, impregnated with the oil contained by the used pigments shows dust deposits. In the lower part the inventory number was marked with white chalk, in the upper part a patch of cloth was glued and near the left wand a wax dressing, was made, applied far above the cloth's level. The support is stretched on the stretcher with metallic nails, of which some are still original, handmade ones, while the missing ones were replaced with modern metal nails (Fig. 3).

The colour layers are thin, smooth, with small impasto on the carnation areas and on the coat's fur collar. The stratigraphy shows small scratches, cleavages and gaps on the whole surface, a retouch whose colours changed and many abrasions, especially in the background. By looking to the sitter's carnation (Fig. 4, 5) and to the white painted surfaces it can be noted that the previous removal of the varnish and of the dirt was not evenly made (Fig. 6, 7).

The surface of the painting is covered with a thin layer of varnish which in time accumulated dust and became yellow. This varnish layer was unevenly brushed and on some spots it looks dull.

2. The conservation works.

After the work is studied in direct, shining light, in UV light and under the magnifying glass, a conservation project is proposed, accompanied by the photographic documentation. At first it is necessary to remove the dust, using a fine-grained brush, in order to prepare the painting's surface for the facing. By facing is meant the temporary protection of the painting's stratigraphy, by covering in this case its whole surface with a sheet of Japanese paper, on a layer of rabbi-skin layer, applied by brush. This operation was necessary because the original support needed to be lined and the paper sheet forms an auxiliary support (Fig. 8), which will be removed after the treatment (Nicolaus 1999, 90).

The metallic nails which fixed the canvas on the stretcher were removed, as well as the labels. Subsequently, the labels were glued on the wood of the new-made stretcher. In order to restore the strength of the support, by lining it, the original backside needs to be clean and smooth. The deposits of dust and the residues collected between the canvas and the stretcher were vacuumed. The patch was removed and the flatness of the borders was restored by applying wet compresses (Fig. 9). All irregularities, the knots in the cloth, the dirt and wax deposits, the remnants of the glue used to stick the patch were removed mechanically, with the scalpel. Any treatment applied on the backside will put pressure on the paint layers, so it is necessary to verify constantly the facing. The work surface must be smooth and soft enough, so the pressure exerted during the cleaning does not degrade the stratigraphy (Nicolaus 1999, 91).

To line the backside, was chosen a linen cloth with a similar grain, which was checked at first, to ensure that there were no irregularities which could press in the paint layers and then it was stretched on a work stretcher. After this both the original canvas and the new cloth were covered with a coat of Beva 371, which provides the adhesiveness. This thermoplastic adhesive, which is appropriate for the conservation works, has characteristics resembling to the natural resins, can be applied easily and is soluble in organic solvents (Nicolaus 1999, 127). The lining operation is done using the hot-lining table, on which the painting lays face up. Thus, the heat and the pressure are accurately controlled (Fig. 10).

The conservation works continued with stretching the work on the new stretcher, which has a retraction slope and tensioning wedges. The facing was easily removed with cotton wool dampened in warm water. Following the cleaning tests, two solvent mixtures (acetone and white spirit, respectively turpentine essence and alcohol) resulted to be appropriate to remove the dirt and the varnish layer. The cleaning operation involves particular attention, due to the considerable stress on the painting layer. Another problem is that at the previous conservation the varnish layer was unevenly removed and the excessive cleaning thinned on large surfaces the colour layer (Nicolaus 1999, 350).

To fill the gaps in the stratigraphy was used a mixture of purified mountain chalk and rabbit-skin glue, applied by brush, was used (Fig. 11). The next step was to bring the applied material to the level of the gaps, then the retouch in watercolours, followed by the isolation of the original paint layer with a varnish applied by brush. First, it reinstates the richness of the paint, allowing the darks to have their proper tone. Second, it keeps dirt and air

pollution off the picture surface. Third, the varnish coating protects the paint layer from damage caused by abrasion, moisture and accidental accretions. The varnish also creates an ethical buffer between the original paint layer and the retouching or impainting (Nicolaus 1999, 300). Restorers do not paint directly on the original; the work is done on top of this isolating coat and can be taken off by simply removing the underlying varnish.

After the drying of the varnish layer, the next step was the retouch in varnish colours, in an imitative retouch. Retouching is carried out to correct visual irregularities caused by inherent structural problems or surface damage. It is applied only on areas of loss and never extends over the original paint. Retouching will be kept to a minimum, not attempting to make the painting look new, but merely restoring the unity of the surface so that the damages are not distracting the viewer. The retouching was completed using varnish colours that are both colour- and light-fast, offering confidence that the restoration areas will remain consistent over time. Also the colours are soluble in relatively weak solvent and permit safe and easy removal (Fig. 12) without risk of injury to the original surface (Nicolaus 1999, 260).

The work was fitted in its frame using metallic fix plates (Fig. 13, 14).

(Cristina-Maria Fău)

3. Lorenz Strauch – biographical references.

Lorenz Strauch's importance in the artistic life in Nuremberg is an undoubted issue, although it was remarked only in the 20th c. (Rée 1905, 150; Adriani 1982, 88): during the first half of the 17th c., before Joachim von Sandrart became (1664) the leader of the first Art Academy in Germany, established in 1662 by his nephew Jacob von Sandrart, the fame of the local artists had already been eclipsed by their old rivals from Augsburg (Adriani 1982, 88) and Nuremberg began to be noted (already in the late 16th c.) rather for the works of copyists and imitators of Albrecht Dürer, among whom the earliest was right a contemporary of Lorenz Strauch, namely Hans Hofmann (c. 1530-1591/1592) and among whom should be mentioned also the more talented Paul Juvenel the Elder (1579-1643), known as well for his interiors inspired by Hans Vredeman de Vries (Rée 1905, 150). As Andreas Tacke stressed (although referring mainly to the second half of the 17th c. and to the 18th c.), Nuremberg's Baroque painting is still „a stepchild" of the art history, despite the city's glorious artistic past (Tacke 1995b, 62), but the same statement can be made also about certain late 16th and early 17th c. painters, among whom Lorenz Strauch as well. In late 18th c. or in the first half of the 19th c. Lorenz Strauch, still mentioned in 1730 as a „wonderful artist and for this reason at the service of quite many [art] lovers" (*herrlicher Künstler, und deswegen gar vielen Liebhabern zu Diensten*) in a biographical note by Johann Gabriel Doppelmayr (1677-1750) in his work about the mathematicians and the artists from Nuremberg (Doppelmayr 1730, 217), was already almost forgotten, even in Bavaria. An old gallery label glued on the portrait of portrait of Karl Tetzel in the Bavarian National Museum in Munich (oil on lime tree wood, 55.5 x 43.4 cm; dated 1601 and signed by the monogram LS) records wrongly the painter's name as *Lukas Straus* (Voll *et al.* 1908, 131, cat. 422). In early 20th c., in certain important works dedicated to the history of Nuremberg, to its monuments and to the local artistic life (Uhde-Bernays 1904; Bell, Bell 1905; Headlam 1908) Lorenz Strauch is not mentioned at all. Otherwise, the biography of Lorenz Strauch is still less known (Doppelmayr 1730, 217; Vollmer 1938, 170-171; Tacke 1995a, 245), due to a still incipient stage of exploitation of the archive sources concerning the artist and his work, respectively of the research on the chronology of the portraits (signed or not) which are attributed to him (rightly or not) on the international art market, where after some notable occurrences in auctions during the period 1941-1944 such works are more and more frequent in the last four decades. Obviously, the poor state of preservation of many of the paintings by this artist, deplored in 1938 (Vollmer 1938, 170) has as well a negative influence on the research on his work.

It was believed that Lorenz Strauch might have been the son of Hans Strauch the Elder (1510-1580), a painter and engraver, although long time ago it was noted that actually no documents are known which could support a kinship between the two artists (Vollmer 1938, 170). As Hans Strauch the Elder's portraiture skills are evidenced by a self-portrait of 1575, from the gallery of the former royal palace in Schleissheim near Munich (Katalog 1905, 34-35, cat. 130), it was believed also that under the guidance of this painter Lorenz Strauch would have begun his artistic training. However, the church records show that Lorenz Strauch was in fact the son of the innkeeper Hans Strauch and of Elisabeth Metzlin and that he was baptised on November 3, 1554 in the St. Lorenz parish of Nuremberg (Tacke 1995a, 245), and therefore the painter Hans Strauch the Elder could not be his father. As Lorenz Strauch was influenced by the style of the Flemish artists, it is supposed that he

was the disciple of Nikolaus Juvenel the Elder (c. 1540-1597), an appreciated portraitist and skilled animal painter, documented in Nuremberg in 1561-1573 (Barock in Nürnberg 1962, 39). A stronger influence on Lorenz Strauch had the portraitist Nicolas Neufchâtel / Colijn van Nieucasteel (1525/1527-1573), initially called *Nutzschidell* in Nuremberg (wherefrom as well his nickname *Lucidel*, by which he is better known). From him Lorenz Strauch took the sober manner, in a narrow chromatic range, dominated by cold tones, but without being possible to specify if as his disciple or only indirectly, due to the works of this painter of Calvinist faith, whom in 1561 was granted asylum in Nuremberg, where he has settled definitively, like many refugee artists from the Netherlands (For the biography and work of Nicolas Neufchâtel: Doppelmayr 1730, 209; Ticozzi 1818, 83; Peltzer 1926; Vollmer 1931, 407. For the Netherlandish painters working in Nuremberg: Smith 1990-1991). Mentioned as a painter since 1573, Lorenz Strauch undertook a journey to Tirol in 1613-1614, when he was already a famous painter in his city (Vollmer 1938, 170; Tacke 1995a, 245), and therefore can be only speculated whether he actually intended to head for Italy or he was just looking there for commissions.

At first, Lorenz Strauch was a painter of city sights (among which many of Nuremberg, in various collections and one of Danzig / Gdańsk, at the Rafael Valls Gallery in London) and an engraver (known especially for the works inspired by his hometown, among which the 22 engravings of 1599, showing its Large Square), then mostly a portraitist (Vollmer 1938, 170). The archive sources attest that in 1598 the Council granted to him the permission to make drawings, paintings and copper engravings with city sights and on July 17, 1621 the permission to make an engraving showing the City Hall's new building, for which he received on November 27, 1621 a honorarium of 25 guldens (Tacke 1995a, 245). The engravings depicting the new City Hall are made, it seems, after works by Jacob Wolff the Younger (c. 1571-1620) and were printed in 1621 by Johann Tröschell (1585-1628), as resulting from the records concerning two prints kept at the Nationalmuseum in Stockholm (inv. NMG Orn 1954 and NMG Orn 1955). It is said that Lorenz Strauch painted also on glass (or rather made stained glass windows), but without more information about the theme of this kind of works, maybe due to the fact that they seem to be lost. Recently, on the international art market appeared some drawings with religious scenes (*Job in Misery*, *The Temptation of St. Anthony* and *St. Jerome in His Study*) assigned to Lorenz Strauch, allowing the supposition that he made also paintings of this kind, which remained completely unknown or maybe lost.

However, the first portraits undoubtedly assigned to Lorenz Strauch date back to 1581, but he was particularly productive only in the 90's of the 16th c. and the peak of his work is in the first decades of the 17th c. (Vollmer 1938, 170). He painted portraits both on panel and on canvas and as well miniature portraits, but it seems (as far as they are signed) only on copper (sometimes round or oval ones), like the portrait of a young man (oil on copper, 12 x 9.1 cm; dated 1607, signed by the monogram LS) auctioned by Sotheby's in Amsterdam on May 5, 2009 (lot 3), which comes from the former collection of P. van Wijck in Oosterbeek, auctioned in The Hague after its owner's death, by the house Van Stockum (July 19, 1943, lot 42).

Although in 1605 Lorenz Strauch was prosecuted for distribution of products of the Nuremberg gold spinners (Tacke 1995a, 245), during the years 1606-1610 and 1625-1629 he was the head of the Nuremberg painters' guild, and in 1624 he was elected to the Grand Council of the city (Vollmer 1938, 170; Tacke 1995a, 245), a position he held until 1629, with the remark that in 1628, due to the frailty of his health, a locator was appointed to him (Tacke 1995a, 245). Johann Gabriel Doppelmayr stated (Doppelmayr 1730, 217) that the artist „died about year 1630" (*starb gegen A. 1630*), a date used also by the later research, till recently. Currently, it is accepted that the painter died (according to archive sources) on October 11, 1630. His resting place (in current numbering: tomb nr. 536), which he purchased in 1591, how is dated also his metallic portrait epitaph (Fig. 15), is in St. Rochus Cemetery (Tacke 1995a, 245), which is located now in Nuremberg's Gostenhof district. Although until 1825 (when it was incorporated in the city) Gostenhof (documented since 1311) was a village located close to the city walls, the mentioned cemetery is not a rural cemetery in the true sense of the word, because it was established in 1518, following a pestilence epidemic and it shelters the graves of many important personalities of the city. As such, it is unlikely that the artist lived in the former village of Gostenhof (concerning the Gostenhof district of Nuremberg: Kasparek 2005). Furthermore, considering the parishes in which his children were baptised, it can be argued that on September 9, 1586 the painter was still living in the

parish of St. Lorenz (where himself was baptised in 1554), wherefrom he later moved to St. Sebald's parish, in whose records he is mentioned on August 22, 1592 (Tacke 1995a, 245).

In mid-20th c. from Lorenz Strauch were known many signed and dated portraits, often poorly preserved and characterized by a certain stiffness, which is compensated by a careful depiction of the garments and of their accessories (Vollmer 1938, 170). A good draughtsman and portraitist, in whose art influences of the German Renaissance painters persist, especially of Hans Holbein the Younger and Albrecht Dürer, Lorenz Strauch is revered, together with Gabriel Weyer and Michael Herr, as one of the most representative painters from Nuremberg in early 17th c. (Rée 1905, 150; cf. Adriani 1982, 88) or even the most prominent among all the local painters in late 16th c. and early 17th c., if considering the doubtful fame of the local copyists and imitators of Albrecht Dürer (including even Paul Juvenel the Elder, who imitated Hans Vredeman de Vries as well) and ignoring the activity of some artists of Flemish background, as Nicolas Neufchâtel, Nikolaus Juvenel the Elder and Frederik van Valckenborch. Therefore, considering the existence of a relatively large number of portraits made in the manner of Lorenz Strauch, which are not signed by his monogram and are of a poorer artistic quality, as well as that in 1730 Johann Gabriel Doppelmayr assigned to him „many hundred" (*viel 100.*) of portraits (Doppelmayr 1730, 217), it seems very likely that the painter had a workshop where several disciples worked, yet anonymous. One of them could be, as usual at that time, his own son Johannes, baptised on August 13, 1597 and mentioned as a painter till 1636 (Tacke 1995a, 245).

Beside the painting from the Brukenthal National Museum in Sibiu, a portrait from Museo Civico Correr in Venice (Guida 1909, 27, cat. 73; cf. Vollmer 1938, 170), the miniature portrait (dated 1612) of the chemist Basilius Besler in the Göteborgs Konsthall in Gothenburg (Vollmer 1938, 170-171), which are stray items, if compared to the main distribution area of the portraits by Lorenz Strauch, such works are mentioned in different museums and collections from Germany, most frequently in Bavaria: at the Bavarian National Museum in Munich (Voll *et al.* 1908, 130-131, cat. 419-422), in the gallery of the former royal palace in Schleissheim (Katalog 1905, 55, cat. 217-218) and at the Germanisches Nationalmuseum in Nuremberg (Katalog 1909, 130-131, cat. 427-429), as well as in various private collections of some aristocrats from Nuremberg and Munich (Vollmer 1938, 170). Tracking the origin of the portraits painted by Lorenz Strauch or by his workshop, respectively by his circle which occurred on the international art market, it results that, after Bavaria, a quite significant number of works comes from private collections from Britain, where maybe such paintings still could still be found, as were as from the Rhineland.

Although at his time Lorenz Strauch was appreciated especially as a portraitist, the posterity remembers him mainly as a draughtsman (Adriani 1982, 88) or, more precisely, as an engraver, whose city sights and cityscapes (some of them kept at the Germanisches Nationalmuseum in Nuremberg) are of a particular historical and documentary value (Vollmer 1938, 170; cf. Barock in Nürnberg 1962, 39-40, cat. A12 and A13). Booklet pages showing sights of Nuremberg are mentioned to exist in this very city, at the Germanisches Nationalmuseum, as well as at the Herzog Anton Ulrich Museum in Brunswick (Vollmer 1938, 170). As previously mentioned, city sights by Lorenz Strauch are known in some other collections too, as that of the Rafael Valls Gallery in London. During the last decade of the 20th c. and, especially, during the first decades of the 21st c., works signed by Lorenz Strauch or attributed to him or to his workshop, respectively to his circle occurred in auctions organized in Vienna, London, Amsterdam, Zürich, Cologne, Ahlden, Hamburg and Stockholm and even in the United States of America, in Boston and New Orleans.

4. The portrait from the Brukenthal National Museum's collection: its description, research history and date.

The dark tones and the white and black contrast, harmonized by the grey shadows of the portrayed woman's face are essential elements, which give to this painting from the Brukenthal National Museum's collection a note of realism and sobriety, specific for the Protestant bourgeois portrait, whose canons were set in the 16th c. by the Netherlandish painters, as a reaction to the offensive of the theatrical, but life-lacking Italian style. The meditative, silent attitude of the sitter, highlighted by her calm, slightly stiff figure, as well as the clasped resting hands belong also to this category of portraits. The determined figure of the sitter, her penetrating gaze, as well as the hands are emphasized by the white accents due to the headdress, to the ruff and to the cuffs, contrasting with the black costume, but attenuated by the brown accents of the yellowish fur and by the red ones of the yellowish leather

gloves' ribbon. The expressive, slightly severe face, emphasized by light, with few shadows of the character portrayed by Lorenz Strauch are elements of Renaissance tradition, recalling the manner of Hans Holbein the Younger, and this aspect was already noted in the first half of the 19th c., as it results from the assignment which was given to the work at that time. The three-quarter view, the careful depiction of the lace, as well as of the three rings on the fingers are props which later are much exploited in the Baroque portraiture.

Resuming in fact partially P. J. Rée's opinion about the features of the portraits by Lorenz Strauch (Rée 1905, 150), Teodor Ionescu, the first commentator of this work who pointed to Nicolas Neufchâtel's influence on this German artist, said that the portrait is painted in a dry and accurate manner, showing interest for the accessories of the costume (Ionescu 1967, 53), considered by P. J. Rée to be specific for the old local style (Rée 1905, 150). Among the works of the most talented portraitist in Nuremberg during the period 1561-c. 1573, the Flemish painter Nicolas Neufchâtel, the most appropriate term of comparison (in respect of the accurate depiction of the costume, but also of the chromatic and light effects) for this painting could be, in my opinion, *Portrait of an Elderly Woman* (Fig. 16), dated 1562 and kept at the Gosudarstvennyj Ermitaž in St. Petersburg (oil on panel transferred on canvas, 90 x 69 cm, inv. 4124), which Empress Catherine II purchased in 1764 from the collection of the Prussian merchant Johann Ernst Gotzkowsky (1710-1775) (Nikulin, Asvarishsch 1986, 27, cat. 42).

For dating the work from the gallery of the Brukenthal National Museum, a good clue could be its black background, occurring sometimes, but rarely in Lorenz Strauch's work. Beside the portrait of Johann Eiser (oil on canvas, 93 x 76 cm, dated 1610) from Germanisches Nationalmuseum in Nuremberg (Fig. 17), another example is his self-portrait of 1614 (Fig. 18) from the same museum (oil on wood, 43.5 x 52.5 cm) (Katalog 1909, 130-131, cat. 429; Barock in Nürnberg 1962, 39, cat. A11): the left half of the work is occupied by the artist's face on a black background, while the right one by his hand, in which he holds the painting implements (the palette, the maulstick and 4 brushes) and which seems to rest on the frame of the cartridge with a bilingual awkwardly versified inscription (in Latin and German), in background being a window through which the cloudy sky can be seen.

Unlike these works, in the case of the earlier portraits, during the period 1583-1596 the background is, usually, grey. Also in this period, but less often, the left half of the background is in a darker tone, but although never black: an example is the portrait of a 23 years old man (oil on canvas, 55.50 x 46.50 cm; dated 1587; signed by the monogram LS), auctioned in 2017 in London by the house John Bennett or the portrait of a 19 years old man (oil on panel; 40.3 x 34.4 cm; dated 1593; signed by the monogram LS) auctioned in Zürich by Galerie Koller on March 30, 2012 (lot 3024) (Fig. 21). This is a trend which can be noted also in 1597, as evidenced by the portrait of the goldsmith Christoph Jamnitzer (1563-1618) from the Nuremberg City Museum's art collection (Barock in Nürnberg 1962, 39, cat. A 10), whose structure is much more elaborate and strongly influenced by the Italian models, due to the landscape visible through the window in the painting's left side (Fig. 22), which gives it a particular status within Lorenz Strauch's work, maybe that of an experiment with a new model, which the artist will use later, making the mentioned self-portrait of 1614 (Fig. 18) from the Germanisches Nationalmuseum in Nuremberg. Later this kind of background can be noted rather exceptionally, as the portrait of a man (oil on panel, 47 x 36 cm; undated and unsigned) in a pair of pendant portraits (the female portrait dated 1605 and signed by the monogram LS) from the former collection of the family von Bodenhausen in the Pöhl castle and later in the Kreismuseum Plauen, auctioned in Ahlden, by Schloss Ahlden, on May 4, 2007 (nr. 1362). During the period 1599-1607 the background of the portraits due to Lorenz Strauch becomes darker, having sometimes the left half slightly darker. As examples, should be mentioned: the portrait of a 26 years old man (oil on panel, 50.4 x 37.3 cm; dated 1599, signed by the monogram LS) from the former collection of Countess Jeny Esterhazy, auctioned in Zürich by Galerie Koller on March 18, 2013 (lot 3013), the pendant portraits (oil on panel, 48.4 x 36.3 cm, dated 1603, signed by the monogram LS) auctioned by Sotheby's at first in Amsterdam, on May 10, 2011 (lot 36) and then in London, on October 27, 2011 (lot 15), rendering Hans Ernst Hütter and maybe his wife Clara. Another enlightening example is the portrait of a city councillor (oil on panel, 40 x 31 cm; dated 1605, signed by the monogram LS), coming from a private Viennese collection, auctioned in Vienna by Dorotheum on June 11, 2013 (lot 8); according to Dr. Alexander Strasoldo, this portrait belonged

initially to a private collection in Frankfurt am Main, but was auctioned by the house Wilhelm Ettle in the same city on May 20-21, 1941 (lot 130) for the benefit of the Chief Prosecutor and of the Finance Office Moabit West of Berlin, then again by the house Heinrich Hahn, also in Frankfurt am Main, on April 13-14, 1943 (lot 188) and, finally, in Vienna, on June 21, 1944 (lot 248), in an auction held on Kärntner Straße. This remark regarding the portraits' background colour can be made also in respect of the artist's miniatures, such as the mentioned portrait (oil on copper, 12 x 9,1 cm; dated 1607, signed by the monogram LS) auctioned by Sotheby's in Amsterdam on May 5, 2009 (lot 3).

However, exceptionally, the background of the portraits made by Lorenz Strauch during the last decade of the 16th c. or during the first decade of the 17th c. can be also in other colours (green, bluish green and bluish grey). For now, only the portrait of Hans Fupieger (oil on panel, 49 x 41 cm, dated 1597, signed by the monogram LS) from the Germanisches Nationalmuseum in Nuremberg (Katalog 1909, 130, cat. 427) proves that the artist used the traditional simple background of dark green colour, frequently occurring in the first half of the 16th c. at the German and Netherlandish portraitists. On a miniature portrait (Fig. 20), rendering a young man (oil on copper, diameter 9,5 cm; dated 1604; signed by the monogram LS), auctioned by Lempertz in Cologne on May 17, 2008 (auction 920, lot 1151) and previously by Christie's in London (December 13, 1991, lot 148) as coming from a private collection in Rhineland can be remarked the artist's attempt to bring forward the sitter's figure by chromatic contrast to a background in three successive shades of grey (blackish grey, bluish grey, grey with ochre), suggesting a graduate diminution of the stage-lighting from right to left, according to a preference noted as well in other portraits by Lorenz Strauch, as already mentioned. Another particular situation is that of the two pendant portraits from the former royal palace in Schleissheim, which come from a monastery in Franken: while the background of the woman's portrait (oil on panel, 40 x 35.5 cm; dated 1591 and signed by the monogram LS) is grey (Katalog 1905, 55, cat. 218), that of the man (oil on panel, 41.5 x 31.5 cm; dated 1605 and signed by the monogram LS) is greenish grey (Katalog 1905, 55, cat. 217). In general, only the period beginning after 1591 is associated with an increase of the artistic quality of the portraits made by Lorenz Strauch (Vollmer 1938, 170).

The background of the portraits by Lorenz Strauch became black, it seems, only during the period 1610-1614, when (as evidenced by the mentioned portrait of Johann Eiser, the self-portrait of 1614 from the Germanisches Nationalmuseum in Nuremberg and especially by the portrait in the Brukenthal National Museum) the artist, dissatisfied with the traditional solutions of the German Mannerist portrait, returned to a manner which is closer to that of Nicolas Neufchâtel, probably studied by him in his youth, but from which he later departed. However, contrary to expectations, this new change did not lead Lorenz Strauch to new, more profound artistic experiments, to attempts of exploiting the compositional chiaroscuro, maybe not so much due to the conservatism of his commissioners, but rather to the lack of new artistic contacts with the new trends in the Italian art and, especially, with the portraitists from the Netherlands. That is why, in the following period, until the beginning of the last phase in the old artist's activity, the background of his portraits gradually returned to a dark grey, practically uniform over the whole surface of the work. An example is the portrait of an elderly man, aged 61 (oil on pannel, 50 x 36 cm; dated 1623; signed by the monogram LST), auctioned in Vienna by Dorotheum on June 22, 2010 (nr. 116). It could indicate that during this later periode even the painter's monogram changed (at least sometimes) from LS (ligated) to LST (ligated). From the last phase (1624-1630) there are quite few works, maybe because Lorenz Strauch, whose creative power seems to be exhausted, was concerned rather with the affairs of the painters' guild and with his municipal duties, as much as his weakening health allowed him to do this.

Consequently, the artistic evolution of Lorenz Strauch can be considered as typical for this twilight period, when the old painters' guilds, which ensured the framework through which, due to the relationship between the various artistic centres, both people and ideas and innovations used to circulate, fail in their efforts to control the local artistic life and the painters' education, which soon will be made in an institutionalized framework, that of the art academies, after whose graduation the artists affirm themselves as independent personalities, less and less limited by the constraints of the guilds (Adriani 1982, 88-89).

Considering that the conservation of the portrait from the Brukenthal National Museum's collection did not lead to the long-awaited signature by monogram and of the date, customary on the

portraits made by Lorenz Strauch (Vollmer 1938, 170), there is the question of the validity of this assignement, but in view of the above discussed remarks it lasts only in respect of the possibility that it could be made by the artist himself, by his workshop or by an imitator working in the master's manner. Despite the difficulties due to the current state of research on the work of Lorenz Strauch, an analysis of the works assigned with reservation to the artist, as well as of that attributed to his workshop or to his imitators which occurred during the last decades on the international art market shows that the painting from the collection of the Brukenthal National Museum, although unsigned, undated and unaccompanied by any inscription is superior to them, in respect of its artistic quality. For this reason, I believe that this portrait should be furtherly considered as a work by Lorenz Strauch, to whom it was otherwise attributed since 1894, without any doubt.

During the last decades, on the international art market (especially in Vienna, but also in Cologne, London and in the United States of America) several portraits appeared, often dated, rendering representatives of the Nuremberg patrician families or even of the Bavarian gentry (sometimes identified or identifiable by inscriptions or/and coat of arms), which are assigned to Lorenz Strauch or to his circle, although from a stylistic point of view they are quite distant from this artist's manner, as for this attribution prevailed rather the portrayed character's relation with Nuremberg or at least with Bavaria and some relative chronological clues (their date, if not mentioned on the painting, being inferred from the analysis of the characters' costume or considering relevant stylistic elements). An example are two pendant half-length portraits assigned to Lorenz Strauch, showing the Nuremberg builder Valentin Kaut (Fig. 23) and his wife (Fig. 24) Magdalena Kaudin (oil on copper, each 17.5 x 14 cm; coats of arms and legends on the backside; dated 1623, respectively 1625), auctioned in Cologne on March 15, 2017 (auction 1083, lot 73) by Lempertz: while the woman is portrayed holding in her hands a rose and a prayer book and standing in front of a table on which there is a crucifix, her husband is rendered at his working desk, on which there is the project of a church, and a city sight is visible through the open window in the upper left corner. Although by the structure of its composition and the chromatic effects the male portrait would recall the aforementioned portrait of the goldsmith Christoph Jamnitzer (Fig. 22), the latter's artistic quality is however much higher.

Excluding such kind of works, the study of some unsigned portraits assigned to Lorenz Strauch himself, to his workshop or only to some more or less skilled imitators, but whose date is ensured right by their legends and which stylistically are close to the master's manner, shows that in a certain measure they follow the changes in the previously described succession of the master's attempts to find the most expressive modalities to bring forward the figure of the sitter, especially by chromatic effects, which were taken from the late Renaissance artistic arsenal, but with minimal attempts to exploit the stage-lighting. An example, dated 1610, is the portrait of the patrician Johann van der Beeck from Nuremberg (oil on panel, 63.5 x 50.8 cm), auctioned by Neal Auction Company in New Orleans on July 13-14, 2013 (Nr. 524) as belonging to the manner of Lorenz Strauch: it has a simple black background, on which at right, in the upper part, there is the portrayed character's coat of arms and a legend (Fig. 25). The portrait of a 32 years old patrician woman from the Schleicher family in Nuremberg (oil on panel, 42 x 29.7 cm), assigned to Lorenz Strauch or to his workshop, which is dated in 1593 by the legend located above the coat of arms (Fig. 26) and was auctioned by Schmidt Kunstauktionen Dresden OHG on December 10, 2016 (lot 23) attests the artist's new attempts to exploit the stage-lighting, suggested by large spots, in three successive tones of grey: a blackish one, suggesting the shadow projected on the wall, at right, a warmer one, mixed with ochre and a colder one, in the upper left extremity. These attempts recall the mentioned miniature portrait of a young man (Fig. 20), dated however later, in 1604, auctioned by Lempertz in Cologne on May 17, 2008 (lot 1151), as well as by the pendant portraits of two sisters (oil on panel, each 46.5 x 35 cm; wrongly dated 1502 and 1506 instead of 1602, respectively 1606), assigned to the circle of Lorenz Strauch (Fig. 27) and auctioned also by Lempertz, in Cologne, on November 16, 2002 (auction 828, lot 1105), suggesting most likely that the imitators or disciples of Lorenz Strauch followed their master's example. Right due to the impact of the innovation which can be noted in the aforementioned portrait of a patrician woman from the Schleicher family (which in respect of its composition structure, of the precision in rendering the sitter's physiognomy, as well as of the sitter's stiff attitude recalls the painting from the Brukenthal National Museum's collection) it has a particular

place among the portraits by Lorenz Strauch, respectively among those which are assigned to the artist's circle. The exceptional, experimental character of these works results also from the fact that usually, during this period, the background of the portraits made by the artist himself or assigned to him, as well as that of the portraits which are assigned to his workshop is grey, darker in the left side of the painting, as proves a work (oil on panel, 21.3 x 16.2 cm) dated also in 1593 and which, although signed by monogram, was auctioned in Boston by Skinner on April 9, April 2011 (lot 130) as belonging to the manner of Lorenz Strauch (Fig. 19). However, if compared to the mentioned self-portrait of 1614 from the Germanisches Nationalmuseum in Nürnberg, this painting shows actually to be an original, older self-portrait or a workshop copy. The portrait of an aristocratic woman (oil on canvas, 77 x 64 cm), dated in 1628 and assigned to Lorenz Strauch, which was auctioned by Stockholm Auktionsverket on November 29, 2007 (lot 2447) shows a simple grey, almost black background, from which the body of the character wearing a black dress and having the head covered by a black beret comes forward by chromatic contrast, due to its carnation, to the ruff and to a big and thick chain at her neck (an accessory occurring as well in other portraits by Lorenz Strauch, but also in some portraits made by Nicolas Neufchâtel, from the National Gallery in London and from the National Museum in Warsaw), but especially to the vermillion sides of the dress, balancing the work both in chromatic and compositional terms, in another attempt of the artist to find new solutions to highlight the character, but without departing too much from the traditional means of the 16th c. German portraitists. Similar to it, both in respect of how the background is treated and of the sitter's costume and jewels, but of a lower artistic quality, due to an obvious disproportion in the anatomical construction, is the portrait of a 22 years old woman (oil on panel, 40.5 x 31 cm; dated 1627), auctioned by Lempertz in Cologne, on March 15, 2017 (auction 1083, lot 74), as coming from the former collection of H. Leroux in Versailles (Fig. 28) and attributed to Lorenz Strauch, but which (even subject to the extremely small number of works from this period which are undoubtedly assigned to this artist) seems to have been made rather by one of his disciples.

5. Conclusions: the importance of the portrait from the Brukenthal National Museum's collection in the context of Lorenz Strauch's work.

Although the conservation works brought back the original beauty of the painting *Woman in German costume* from the collection of the Brukenthal National Museum, they did not lead to the discovery of the long-awaited signature by monogram and of a date, as on most portraits by Lorenz Strauch currently known. However, this painting could be considered, due to an in-depth stylistic analysis, as an original work of this Nuremberg master, dated during the period 1610-1614, when he was already a prestigious portraitist of the local elites and, as a result, he began to carry out public dignities, as that of a head of the painters' guild. From an artistic point of view, this is the peak period of the painter, but from which quite few works are known and which is characterized by his return to the more famous Nicolas Neufchâtel's compositional models and forms of expression, which he studied in his youth. In Nuremberg there is as well, at the same time, an artistic production strongly influenced by the manner of Lorenz Strauch, due to his workshop, but maybe also to some former disciples who are working independently or even to some imitators, and whose origins can be tracked almost two decades back. During the following years, when Lorenz Strauch was increasingly involved in the leadership of the painters' guild, as well as in the city's affairs, his creative power began to shrink, as the master was unaware of the new artistic trends in Italy and in the Netherlands, resulting routine works, which are increasingly difficult to distinguish from those made in his manner by other painters, in a city already famous for the activity of its copyists and imitators.

(Alexandru Gh. Sonoc).

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REMARKS ABOUT AN IMPORTANT GERMAN MANNERIST PAINTING FROM THE COLLECTION OF THE BRUKENTHAL NATIONAL MUSEUM, OCCASIONED BY ITS CONSERVATION

Ilie MITREA*
Alexandru Gh. SONOC**

Abstract: *The painting "The Sacrifice of Abraham" by Anton Johann Brew was made in 1579 after a stained glass window of the chapel of the Twelve Brothers' House from Nuremberg. However, it is still unclear if its author worked in Nuremberg or (as his relatives, Jörg Breu the Elder and Jörg Breu the Younger) in Augsburg and if it was commissioned by an administrator of the mentioned asylum or by a wealthy inhabitant from Nuremberg. It is possible that the painting was made rather according to a drawing made after the mentioned stained glass window and not after an original drawing by Albrecht Dürer, used as model for that stained glassed window and possibly left in the possession of the asylum's administrators. The painting's conservation, which allows now its safe exposure, led to the rediscovery of the signature of this less known painter and triggered as well the research on his biography and source of inspiration*
Keywords: *painting conservation, cleaning solutions, German Mannerist painting, Anton Johann Brew.*

Rezumat: *Tabloul "Sacrificiul lui Avraam" de Anton Johann Brew a fost realizat în 1579 după un vitraliu al capelei Casei Celor Doisprezece Frați din Nürnberg. Cu toate acestea, rămâne neclar dacă autorul său a lucrat la Nürnberg sau (ca și rudele sale, Jörg Breu cel Bătrân și Jörg Breu cel Tânăr) la Augsburg și dacă a fost comandat de un administrator al menționatului azil sau de un locuitor înstărit din Nürnberg. Este posibil ca tabloul să fi fost realizat mai curând după un desen după amintitul vitraliu decât după un desen original al lui Albrecht Dürer, folosit ca model pentru acel vitraliu și rămas probabil în posesia adiministratorilor azilului. Restaurarea picturii, care permite acum expunerea sa în siguranță, a dus la redescoperirea semnăturii acestui pictor puțin cunoscut și a impulsionat cercetarea cu privire la biografia sa și sursa sa de inspirație.*
Cuvinte-cheie: *restaurare pictură, soluții de curățire, pictură manieristă germană, Anton Johann Brew.*

1. Conservation works.

The work *The Sacrifice of Abraham* by Anton Johann Brew (working in Augsburg or Nuremberg, in late 16th c.) from the collection of the Brukenthal National Museum (inv. 134) is painted on a fir tree wood panel, measuring 92.5 x 69 cm (Fig. 1). The painting is signed lower right: ANT: JO: BREW. It is dated 1579, the year being inscribed at right, on an ashlar of the altar.

In 2015, when the conservation of this work was asked, it came in the Conservation Laboratory having damages of the panel (Nicolaus 1999, 13) (Fig. 2-5), of the primer layer and of the colour layer (Fig. 5). Its varnish had blackouts and dull spots (Fig. 4, 5). Previously, according to older records, the painting was restored in 1897 (Csaki 1901, 38; Csaki 1909, 44), by Eduard Gerisch (18653-1915), Imperial Councillor and Custodian of the Academy of Fine Arts in Vienna (Csaki 1901, IV; Csaki 1909, IV).

In order to display and to transport the work in optimal conditions, the following conservation proposals were made:

- to eliminate the tapers supporting the joints of the panel (Nicolaus 1999, 23-24);
- to consolidate the panel with a skin glue and with new made tapers (Nicolaus 1999, 51);
- to consolidate the primer layer and the

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colour layer;

- to clean the aged varnish and the old, inappropriate retouching;
- to fill the gaps with putty;
- chromatic integration;
- varnishing with dammar varnish.

The conservation process began by removing the dust and continued by protecting the painting layer with Japanese paper, using an adhesive made of rabbit-skin glue 3 %. The tapers which supported the joint of the three wood pieces of which the panel consists were removed mechanically, using water and a scalpel (Nicolaus 1999, 23-24). The adhesive which remained on the panel was removed mechanically, using a scalpel. For the panel's consolidation were used 9 pieces of wood, 3 cm wide, whose length varied from 5 to 6 cm (Nicolaus 1999, 13). They were glued with rabbit-skin glue 30 % on the cracked areas, on their both ends (Nicolaus 1999, 51). The contact surface between the new wooden piece and the original panel was cleaned of primer, using a scalpel. Into the holes created by insects was injected paraloid B-72 (Nicolaus 1999, 37).

According to the tests made for cleaning the varnish and the inappropriate retouching, the most effective and less harmful solution for the painting is: 50 % turpentine essence + 50 % petroleum essence. The other tested solutions are: acetone, turpentine essence 80 % + petroleum essence 20 %; turpentine essence 70 % + petroleum essence 30 %; turpentine essence 60 % + petroleum essence 40 %; turpentine essence 40 % + petroleum essence 60 %.

The gaps were filled with putty consisting of skin glue 8 % and mountain chalk. The putted gaps were integrated at first in watercolours. After varnishing by brush with dammar varnish, the retouch was done, in varnish colours. The final varnishing was done using aerosols of dammar varnish.

(Ilie Mitrea)

2. Anton Johann Brew: biographical information.

The painter Anton Johann Brew is known only by his signature (Fig. 6) on this painting from the collection of the Brukenthal National Museum (Die Gemälde- Galerie 1844, 100-101, cat. 11; Führer 1893, 58, cat. 259; Frimmel 1894, 75, cat. 259; Csaki 1901, 38, cat. 124; Csaki 1909, 44, cat. 134; Csaki 1926, 6, cat. 134; Spek 1941, 13, cat. 134; Schileru 1954, 180; Ionescu 1956, 16; Ionescu 1967, 55, fig. 6; Milano 1996, 136-137, cat. 54 (V. Mureșan); Mureșan 2007, 52-54, cat. 24, fig. 24). However, for long time this signature could not be found and for this reason, Valentin Mureșan supposed in 2007 that after the letter W of the painter's name may have followed other letters, which are not preserved, but considering the date of the painting he did not exclude the possibility that its author would be a descendant of the painter, miniaturist and draughtsman Jörg Breu the Younger (1510-1547) from Augsburg. As Jörg Breu the Elder (c. 1475-1537) sometimes signed *Brew* as well, it is possible that Anton Johann Brew would be the son or another relative (nephew or cousin or even a younger brother) of Jörg Breu the Younger, as the latter's name is also sometimes mentioned as *Brew* and *Prew* and about whom is known that although his workshop was not prosperous (as evidenced by the preserved tax documents), he had several disciples: in 1539 and 1540 only Siegmund Feyrabend (c. 1528-1590), in 1543 already 3 disciples and in 1545 not less than 6 disciples, unfortunately all unknown (Thieme, Becker 1910, 596).

3. The painting's description and its cultural and historical importance.

Focused on its forefront, the scene of the sacrifice of Abraham (*Genesis*, 22:9-13), which prefigures the death on the cross of Jesus, the Son of God (Butts, Hendrix 2000, 118), has a complex composition. Its dynamism is moderate and relative, as the vigorous movements of Abrahams and of the angel, augmented by that of the frightened ram, which Abraham will sacrifice instead of Isaac, contrasts with the humble attitude of the latter, who is kneeling in front of the altar and is waiting for his end. The painter chose to depict the very climax of the narrative on this sacrifice, in which the movement of Abraham's arm, which the onlooker conventionally understands as being extremely quick, because the father has to overcome the pain of killing his only legitimate son and, in order to cause him as little suffering as possible, he has to curtail instantly his life, by a precise blow. The time seems, therefore, to have stopped at this decisive moment, full of tension and that's why the gestures are emphasized rather than the expression of the characters. Abraham is rendered as a vigorous old man, because according to the biblical account he was 100 years old when Isaac was born by Sarah (*Genesis*, 17:17; 21:5) and was 86 years old when his Egyptian slave, Abgar, gave birth to Ishmael (*Genesis*, 16:16), whom both latter he was forced to banish in the desert relatively short time after Isaac's birth (*Genesis*, 21:8-21). Isaac's face

is marked by sadness, a feeling which does not make him give up his decision to obey to God's will, while the angel's physiognomy is only sketched. Looking to the fingers of his left hand, which are touching of his tense right forearm's muscle, he seems to express the regret for losing his life at the very age when he just began to enjoy its pleasures, as the position of his fingers suggests a still unfinished move, "the step into the death".

Although it is known that the theme of Abraham's sacrifice concerned also Jörg Breu the Younger, as a scene of a round stained glass window measuring 1 m in diameter, made for the castle of Neuburg an der Donau and as a scene of one of the 8 prints in maximum size dating from the end of his activity, in 1545 (Thieme, Becker 1910, 597), it is difficult to determine to what extent Anton Johann Brew's composition was influenced by how, more than three decades ago, Jörg Breu the Younger treated the same theme. Instead, it seems very likely that when painting the work kept now in Sibiu, Anton Johann Brew was inspired by a scene of a 90 x 43 cm rectangular stained glass window (Fig. 7), made c. 1508 by the workshop of Veit Hirschvogel the Elder after the drawings of Albrecht Dürer, once at the chapel (Fig. 8) of an asylum in Nuremberg dedicated to All Saints (the Twelve Brothers' House), which arrived later at the Kunstgewerbemuseum in Berlin and was destroyed during World War II (Butts, Hendrix 2000, 118, fig. 21). This asylum was founded by Matthäus Landauer (deceased in 1515), the owner of a bronze foundry in this city, in order to shelter 12 old and impoverished craftsmen and the asylum's chapel (heavily affected by World War II bombings, which led to the destruction of the replicas of the original stained glass windows) was built in 1506-1507, under the supervision of Hans Behaim the Elder, its decoration being entrusted to Albrecht Dürer (Butts, Hendrix 2000, 116; cf. Rée 1905, 59). In this chapel, consecrated to the Holy Trinity and to All Saints, the stained glass window with the scene of Abraham's sacrifice and the scene of the rebellious angels' fall form a double lancet and their common inscription (in Latin) advises the believers not to be proud and to put their faith in God, that is to avoid the error of the fallen angels, who revolted against Him and to follow the example of Abraham, who was ready to sacrifice even his own son in order to obey the divine will (Butts, Hendrix 2000, 118-119). These stained glass window were greatly appreciated, not only at the time when they were made, but also later, therefore (unlike the chapel's altar, due as well to Albrecht Dürer) the duty of their care is expressly mentioned by the founder in the asylum's regulation. In 1913 Hermann Schmitz, who ordered the pictures by which the stained glass windows are known now, considered them to be the main late Gothic and Renaissance age work of this kind in the city and attributed to Albrecht Dürer not only the drawings after which they were made, but even the participation in painting the stained glass windows, whose nuances echoes the chromaticity of the altar which was positioned just below them (Butts, Hendrix 2000, 118-119; cf. Schmitz 1913, 142 and 145). This association of the theme of Abraham's sacrifice is extremely important, as it indicates a change in its perception by believers, if compared to the Middle Age. It was noted that the medieval iconographic programs associated very often this Old Testament scene with one from the New Testament, that of laying down the poor Lazarus in the bosom of Abraham (*Luke*, 16:22), in close connection with a remark of St. Augustine (according to which Abraham proved to be a worthy host for the souls of the righteous ones, like Lazarus, although he has shown his total obedience and faith in God, by his will to sacrifice Isaac), but the artists, for whom the two scenes remained difficult to be reconciled, sought to resolve this contradiction of the perception of Abraham by focusing the onlooker's attention on the New Testament scene, due to its happy ending, not on the ambiguous message of that from the Old Testament (O'Kane 2007, 149-150). The new association of the theme of Abraham's sacrifice with that of the fallen angels emphasizes the importance of perfect obedience and of full faith, the first being the most important one, as the scene of the angels' fall is far less frequent.

Compared to the stained glass window from the chapel of the mentioned asylum from Nuremberg, the composition of the painting from Sibiu shows both similarities and differences, and its comparison with the biblical account of the events indicates a certain freedom of the artist in dealing with this theme, whose details were known to him probably not directly, from reading, but rather indirectly, through the theological discourse assimilated into the common knowledge. The stained glass window shows Abraham with raised sword, looking to the angel who stops him, grasping by his hand the blade ready to hit the neck of Isaac, who is rendered wearing a tunic and kneeling on a bundle of wood, carried for his cremation after the sacrifice, according to the divine will (*Genesis*, 22:2). To the left, in a further plan, is rendered a frightened ram, raised on its hind legs and in the back-

ground can be seen the edge of a forest. Unlike in this stained glass window, the painting from Sibiu shows Abraham wearing a longer tunic and looking forwards, to the onlooker, while Isaac is rendered half-naked, with crossed arms, leaning his right knee on the step of the ashlar stonework, in front of which lays his turban. On this very altar, which was built by Abraham himself (*Genesis*, 22:9), Isaac's body was to be cremated. However, the wood on the altar, which according to the Bible was specially chopped for this purpose (*Genesis*, 22:3) and then transported by Isaac on his shoulders to the place of the sacrifice right (*Genesis*, 22:6-7), is in an insufficient quantity for the complete cremation of a human body, as already noted (Mureșan 2007, 52). As mentioned, on the stained glass window only a large bundle of wood on which Isaac is kneeling is depicted instead of the altar, and in a more distant plan there is a fire, already burning. In the painting, near the altar, but in a closer plan, beside the cloak of Abraham and the sheath of his sword (on which are hanging the straps needed for its fastening to the belt), there is a vase with embers, used to burn frankincense, but which is missing in the composition of the stained glass window. Unlike in the biblical account (*Genesis*, 22:9-10), but in accordance to the Qur'an, which insists on the fact that Isaac himself accepted the accomplishment of the will of God (*Qur'an*, 37:102-103), Isaac's hands are not bound, but in the stained glass window composition they are kept together as for a prayer, which is as well a consequence of the new perception of this theme, which emphasizes the obedience and the faith of both characters. Also unlike in the above mentioned biblical passage, for accomplishing the sacrifice Abraham does not intend to make use of a dagger, to slaughter Isaac according to the traditional ritual prescriptions for the sacrifice as a burnt offering (*Leviticus*, 1:5, 11), but of a sword, like an executioner in the age of the painter. Finally, the ram behind Abraham's figure having its horns tangled in a bush (*Genesis*, 22:13), is not rendered to the left, as in the stained glass window, but to the right. The unnatural position of the ram which, trying to free itself, rose on two feet, remaining thus suspended between heaven and earth, alludes to Jesus Christ crucified, leading the onlooker to understand the sacrifice of Abraham on Mount Moriah as a symbolic prefiguration of Jesus Christ's crucifixion on Golgotha, as *agnus Dei*. Unlike the stained glass window, in the background of the painting from Sibiu, to the left, there are the walls of a city, situated on a plateau bordered by mountains and to the right the side of a forest. As V. Mureșan noted, this vast perspective reminds the Italian compositions derived from Giorgione and Tiziano and its chromatic features also indicates a possible influence of the 16th c. Italian painting.

According to the handwritten catalogue (ms. 628, Brukenthal National Museum's Library, Sibiu) of Baron Samuel von Brukenthal's painting collection (dated c. 1800), the painting was acquired as a work by a German anonymous. The signature of Anton Johann Brew is mentioned in the gallery guides published in 1844 and 1893. As the author of the painting was unknown, Theodor von Frimmel (who stated that the signature is already lost) doubted its authenticity, but not the date of the work (which is visibly inscribed on the altar's stonework) and considered that it shows late echoes of the manner of Barthel Beham (1502-1540) and of the Master of Meßkirch (documented c. 1515-1540). Considering not only that the Master of Meßkirch, a German anonymous (identified with various German artists, some of whom influenced by the school of Ulm) is visibly influenced by Albrecht Dürer and the artists of his circle, as Hans von Kulmbach (c. 1480-c. 1522) and Hans Leonhard Schäufelein (c. 1480-1540) and by Hans Baldung Grien (c. 1484-1545) as well, but also by the school of Ulm and (after 1530) by the painting from northern Italy in some stylistic elements (the Manneristic proportions of his figures, the bright and iridescent colours of his first stage of work) (Osten, Vey 1969, 217-218), Theodor von Frimmel's hypotheses seemed verisimilar, but nevertheless it was never verified by the later researchers, maybe because the few available information, not only about Anton Johann Brew, but also concerning the Master of Meßkirch and his place in the German Renaissance art. In 1897 the painting was restored and it is possible that the signature of Anton Johann Brew became more visible, after the cleaning of the work. Perhaps that is why in the gallery guides published in 1901 and 1909 Theodor von Frimmel's opinion was no longer taken into account by Michael Csaki, who in the 1909 edition published the facsimile of the signature, about which he stated that it would be written on the altar on which there is also the year 1579, which he (curiously) did not mention at all, although by its position and size it can be easily noted. In 1954 Eugen Schileru chose to assign this work to Jörg Breu (doubting maybe the authenticity of the first two names in the signature and without to specify, however, if he was thinking of Breu the Younger or rather of Breu the Elder), both pointing that sometimes this artist signed also

Brew and (very strangely, indeed!) that the fair colours of his figures would indicate the influence of Hans Burgkmair, obviously the Elder (1473-1531). Teodor Ionescu did not agree with this opinion and in 1956 pointed that due to the fact that the work is dated 1579 and to the first name used by its author to sign it (according to his statements, "in the right corner below"!), the attribution of this painting to Jörg Breu the Elder is not possible, although it shows some features of this artist's work. In 1967, the same author mentions the signature as being still visible and considered that the artist would be "a Mannerist painter from southern Germany, maybe from Augsburg". In 1986, the painting was shown in Milan, in an exhibition of European painting from the galleries of Sibiu and Bucharest and on this occasion Valentin Mureşan kept its attribution to Anton Johann Brew, whom he considered to be one of the late 16th c. Italianate painters from southern Germany. In 2007, although the artist's signature was not visible anymore (being covered by the frame of the work) and, as consequence, it was considered again to be lost till it was recently rediscovered (on the occasion of the painting's conservation) in a completely different place (respectively, right below, as stated by Teodor Ionescu, but hidden under the frame!), Valentin Mureşan stated that there is no reason to doubt the authenticity of the signature and supposed that the author of the painting would be the brother or an unknown follower of the engraver Jörg Breu the Younger.

4. Conclusions.

Although this painting by Anton Johann Brew is made after a stained glass window of the chapel of the Twelve Brothers' House from Nuremberg, there are not enough reasons to claim that the artist worked in this city and not in Augsburg, as his relatives, Jörg Breu the Elder and Jörg Breu the Younger. Unfortunately, it is not known if this work was commissioned by an administrator of the mentioned asylum or by a wealthy inhabitant from Nuremberg. However, as the contribution of Albrecht Dürer to the decoration of the said chapel was well known and considering the existence of some differences, it seems possible that the painting kept in Sibiu was painted (even for an eventual commissioner from Nuremberg) rather according to a drawing made after that stained glass window than after an original drawing by Albrecht Dürer, possibly left in the possession of the asylum's administrators.

The painting's conservation, which allows now its safe exposure, led to the rediscovery signature of this less known painter (Fig. 6) and triggered as well the research on his biography and source of inspiration.

(Alexandru Gh. Sonoc)

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THE CONSERVATION OF A PAINTING DUE TO THE TRANSYLVANIAN PAINTER NICOLAUS MÜLLER AND SOME REMARKS CONCERNING HIS BIOGRAPHY AND WORK

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Alexandru Gh. SONOC**

Abstract: *The conservation of the painting 'Dance Party' by Nicolaus Müller from the collection of the Brukenthal National Museum in Sibiu triggered a new research on the painter's biography, allowing to propose a chronology of his works known until now, in relation to the available biographical information and to the date of some works by his teacher, Antoine Pesne, which may have influenced him. There was an occasion to assign him as well another work, from the Charlottenburg Palace in Berlin, previously believed to be by Antoine Pesne, but stylistically very similar to 'Dance Party' and to remark his participation, as a member of Antoine Pesne's studio, in painting 'The Fortune Teller' from the same museum in Sibiu, which is inspired by an older original work by Antoine Pesne, now in the National Museum in Wrocław.*
Keywords: *painting conservation, Transylvanian Saxon costumes, Nicolaus Müller, Antoine Pesne.*

Rezumat: *Restaurarea tabloului "Petrecere cu dans" de Nicolaus Müller din colecția Muzeului Național Brukenthal din Sibiu a impulsionat o nouă cercetare asupra biografiei pictorului, îngăduind să se propună o cronologie a lucrărilor sale cunoscute până acum, în raport cu informația biografică disponibilă și cu data anumitor lucrări ale dascălului său, Antoine Pesne, care l-ar fi putut influența. A fost de asemenea și o ocazie de a-i atribui o altă lucrare, de la Palatul Charlottenburg din Berlin, despre care anterior se credea că ar fi de Antoine Pesne, dar din punct de vedere stilistic foarte asemănătoare cu "Petrecere cu dans" și de a remarca participarea sa, ca membru al atelierului lui Antoine Pesne, la pictarea tabloului "Ghicitoarea", inspirat de o lucrare originală mai veche de Antoine Pesne, acum la Muzeul Național din Wrocław.*
Cuvinte-cheie: *restaurare pictură, costume săsești, Nicolaus Müller, Antoine Pesne.*

In the collection of the Brukenthal National Museum, among the works of the 18th c. Transylvanian painters there is an interesting painting: *Dance party* (oil on canvas, 36 x 47.5 cm, inv. 778), by Nicolaus Müller (Fig. 1 and 5). Although previously this small work was occasionally mentioned by the historians of the 18th c. Transylvanian art, the information about its author is few and insufficiently exploited, as generally, the name and the biography of the 18th c. local artists who practised the easel painting are less known. This work was considered to have a particular documentary importance, as the characters are rendered in the typical costume of the Transylvanian Saxon middle class of that age, when the genre scenes are rare in the Transylvanian painting, due to the fact that their presumptive commissioners were interested mainly in portraits (Mesea, Ittu 2017, 32 and 54) and more rarely in religious compositions. Therefore, it was already used in exhibitions about the 18th c. Transylvanian society or about the costume and the daily life of the Transylvanian Saxons, as its satisfactory condition of preservation allowed it be exhibited without too great risks.

Considering that the visual impact of this painting would be stronger after its cleaning and that the stabilisation of its preservation condition would allow its more frequent use in travelling exhibitions, it was brought into the Painting Conservation Laboratory on March 12, 2017 (Fig. 1-2), to be prepared for the exhibition *Sequences from 18th c. Transylvania*, organized at the Brukenthal National Museum during March 22 – June 11, 2017 (curator: Iulia Mesea, PhD). Checking on this occasion the existing evidence from the analytical record sheet of this cultural item (which was proposed to be classified in the Treasury category of the national cultural heritage), the research produced new information concerning the biography

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of Nicolaus Müller, the date of this painting and its place in the painter's work.

1. Conservation works.

In order to assess the painting's condition of preservation, it was examined in direct, grazing and contre-jour light, as well as in ultraviolet light. The preservation condition prior the conservation was relatively stable, despite nail holes on all sides of the work and some cleavages.

The stretcher bar is a simple one, made of resinous wood, with retraction slope and tightening wedges. On the upper part of the stretcher bar there are 3 collection labels (Fig. 2). One has the German inscription *Heimische Kunst*, which means "Local (i. e. Transylvanian) art" and the mark number 163/39. The other two labels are written at the typewriter and are partially unreadable, due to the aged brown glue, which penetrated the thin paper. They contain the current information about the author of the painting (given only as *Müller*), its rough date (18th c.), its inventory number and, respectively, its title, its dimensions and technique. Excepting the title (in Romanian and German), everything is written in Romanian and, therefore, these two labels where added after the nationalization of the museum. On a smaller label, glued at right on the lower part of the stretcher bar, there is a label bearing the current inventory number 778, printed in red and the old registrar's seal of the museum (before its nationalization in 148), printed with violet China ink, bearing the abbreviated German inscription: S(ammlung) B(aron) B(rukenthalisches) M(useums).

During the conservation performed in 1898 (Csaki 1901, 212; Csaki 1909, 235), the original canvas was doubled with a more resistant one, which was fixed on the stretcher bar by metal nails, placed approximately 4-5 mm apart.

In the upper left side, the work shows a flexion of the textile support and the original canvas split from the cloth used for doubling. As consequence of the flexion, a deposit of dirt was formed between the canvas and the stretcher bar.

The whole painted surface is covered with a layer of brownish aged varnish, featuring local opacification, scratches, splashes, deposits of adherent and clogged dirt (Fig. 1).

After the diagnosis, the conservation of the painting was performed in several steps.

First of all, the area on the upper left corner of the work, where the original canvas split from the doubling cloth was consolidated. In order to restore the adherence between the two cloths, at first ethanol was injected and then rabbit-skin glue in a concentration of 6%. The borders were consolidated using an electric spatula and pressed with sandbags.

Then the flatness of the canvas was restored, using a marble plate, water moistened filter paper and an iron. The marble plate was put on the place where the canvas was curled. The plate had to be of the same thickness like the stretcher bar, in order to avoid pressure on the surface of the canvas. Over water moistened filter paper was put the canvas, to straighten the yarns. Over the work was put a sheet of polyester film (polyethylene terephthalate, usually known as Melinex), with its non-adhesive part facing down, which was levelled by ironing at approximately 40^0 C.

According to the results of the tests for the solvation of the varnish, Solvanol (the diethyl benzene - 1,2-dicarboxylate, $C_{12}H_{14}O_4$) has proven to be the best solution for removing the aged varnish.

Putty was added on the areas with stratigraphic loopholes. The puttied areas were polished with cork and cotton wadding, in order to obtain a surface having the same level like the original one (Fig. 3).

Afterwards, the putted areas were integrated using watercolour type colours (Fig. 4), then was applied a layer of dammar gum varnish (Fig. 5). The chromatic retouch was done in imitative style, with retouch colours (Maimeri Restauro). The conservator's work can be easily noted using an ultraviolet light lamp.

(Celestina Albișor)

2. The painting's description and date. Remarks concerning its author's biography and the influence of Antoine Pesne on his work.

The work shows dancing women and men, wearing the festive costume of the Transylvanian Saxon middle class. The women wear a white blouse decorated with lace, a sack-back gown with corsage, a white apron with lace, a belt having at its ends articulated metal plates and red shoes. The male costume is inspired by that of the Hungarian gentry: dolman and tight trousers, of the same colour like the dolman, red sash and tall black boots, whose tops are cut behind the knees. All men are bareheaded. Although they are rendered in various attitudes, their figures are poorly individualized, all of them showing a high forehead, with incipient

baldness. To the right, a man, in a yellow suit, invites to dance a woman in a black-greenish dress, decorated in the neckline and on the hem with red velvet applications, golden ribbons and embroidered with golden wire, whose blonde hair is tied with a golden ribbon, which is hanging on her back. In the middle, a brunet man, dressed in green, is dancing with a fair young woman in a red dress, who is wearing a cylindrical headdress without top (called *Borte*), made of black velvet and specific to the unmarried young women. The right hand of the man grabs her waist and she is keeping her left hand at their back, her right hand resting on the shoulder of her partner. A little to the left, a blonde man in a blue suit greets with his raised left arm. In a farther plan, turning to the onlooker her back, there is a woman dressed in a white blouse, red waistcoat trimmed with black fur and a dark skirt, who has her hair tied with a golden ribbon, hanging on her back. At the forefront, on the left side of the work, a blonde young man in a red suit holds in his right hand the right hand of a woman in a green bluish dress, who keeps on his left shoulder her left hand, which he grabs with his left one. In the background, under a loggia, some onlookers are briefly outlined: two standing and three others seated. Of the standing onlookers, the one under the loggia's vault is keeping a beaker in his right hand and although he seems to want to head to the place where the other onlookers are, he turns his head to look at the couples dancing to the left and centre. Though the movements of dancers are unskilfully rendered, the composition is well structured, dynamic, chromatically balanced, with well-used light effects, aiming to suggest the merry atmosphere of a summer evening.

The cylindrical headdress, an important item of the young Transylvanian Saxon women's feast costume, but formerly spread as well in various regions of Germany and Switzerland and in the Sorbian environment in eastern Germany (Klusch 2002, 52), is worn since the confirmation ceremony and considered as a symbol of maidenhood and cannot be worn anymore after the young woman got pregnant (Schmidt, Förderreuther 2011, 82). In the Transylvanian Saxon bourgeois environment, this costume item was made of metal or cardboard wrapped in black velvet (Klusch 2002, 17), and its height was subject to the rigors of the clothing regulations (Schmidt, Förderreuther 2011, 82). In 17th c., the belt provided at its ends with articulated metal plates was no longer limited to the aristocratic and patrician environment, but begins to be worn as well by the wives and daughters of the craftsmen, of the merchants and of the officials and during the 18th c. even by those of the wealthy peasants (Klusch 1988, 30). Therefore, it could be concluded that in the work by Nicolaus Müller, datable in mid-18th c., are kept right those Transylvanian Saxon bourgeois costumes which begin to be abandoned by the urban population and are adopted in the countryside, generating the Transylvanian Saxon folk costume, as it is known in the 19th-20th c. (Bielz 1956, 8-9). For this reason, the painting was shown in 2014 in Craiova, in an exhibition concerning Transylvanian Saxon costumes and jewels and their depiction by the painters (Teodorescu, Frîncu 2014, 51).

The work *Dance Party* is mentioned in the collection of the Brukenthal Museum only beginning with the gallery guide printed in 1893 (Führer 1893, 72, cat. 39; Csaki 1901, 212, cat. 754; Csaki 1909, 235, cat. 778; Spek 1941, 24, cat. 778). In 1909 only the family name of the 18th c. artist was known, as well as the fact that he was born in Sibiu (Csaki 1909, 235) and in 1941 there was no additional information about this painter (Spek 1941, 24). As pointed later, until 1741 he was the disciple of Antoine Pesne in Berlin and for this reason it was suggested to identify him with the teacher of Christian Bernhard Rode (1725-1797) (Vollmer 1931, 217), a famous painter of histories and engraver from Berlin, known to have been the disciple of the Transylvanian Nicolaus Müller and after the latter's depart from Berlin the disciple of Antoine Pesne, the previous teacher of the mentioned Transylvanian artist (Vollmer 1934, 455). More recently, but without further details, it was stated even that the Transylvanian painter worked as well in Banat (Mesea, Ittu 2017, 54), although nothing about him is mentioned in an influential work concerning the Baroque art in Banat (Vârtaciu, Buzilă 1992). He was confused maybe with Anton(ín) Fiala, born in Timișoara, in Banat in 1820 and deceased c. 1892 in Brașov, in Transylvania and who painted a portrait of Fritz Wallinger (oil on canvas, 65.5 x 50 cm, inv. 1411) and one of his wife Johanna Wallinger (oil on canvas, 65.8 x 50 cm, inv. 1412) from the collection of the Brukenthal National Museum, bequeathed to the museum in 1934, respectively 1933. For the history of the Transylvanian Baroque art, the importance of Nicolaus Müller consists mainly in the fact that he is one of the first 17th-18th c. Transylvanian painters known to have studied abroad, with a famous painter.

The identification of the author of the work *Dance Party* with this disciple of Antoine Pesne was possible due to the existence in the collection of the Brukenthal National Museum of another painting by him (Fig. 6), titled *Woman with Pigeon* (oil on canvas, 41 x 33 cm; inv. 777) (Die Gemälde-Galerie 1844, 191, cat. 195; Führer 1893, 72, cat. 38; Csaki 1901, 212, cat. 753; Csaki 1909, 234, cat. 777; Popescu 2002, 217, fig. 5; Sabău 2005, 350, fig. 316; Dâmboiu, Mesea 2007, 154, cat. 47; Mesea, Ittu 2017, 31, fig. 20), which was acquired during 1803-1844, as the work of an unknown German painter, whose signature seems to have been visible, as its name is recorded as *... Müller* (Die Gemälde - Galerie 1844, 191). Very damaged in 1844, according to the record in the gallery guide, this work was assigned in 1893 to an unknown Transylvanian painter (Führer 1893, p. 72, nr. cat. 38; Csaki 1901, p. 212, nr. cat. 753). The character's physiognomy reminds indeed of one of Antoine Pesne's daughters, rendered by him holding a puppy in his arms, in a family portrait (together with himself and her sister, Fig. 7), which comes from a private collection from Croatia and which since 1902 is kept at the Gemäldegalerie in Berlin (oil on canvas, 179.4 x 151.2 cm, inv. 496B; signed and dated right below: *ant. Pesne av(ec)/ ses Deux fille Peint P(ar)/luy mesme* 1754), but which was painted in 1754, therefore much time after the date when it was believed that Nicolaus Müller left Berlin. However, it was believed that as source of inspiration for the painting from Sibiu may have served a completely different work by Antoine Pesne (Fig. 8), namely *Young Woman with Pigeons* (oil on canvas, 76 x 61 cm; signed and dated left below: *Pesne fecit 1728*), from the Gemäldegalerie Alte Meister in Dresden (Dâmboiu, Mesea 2007, 154; cf. Catalogue 1826, 44, cat. 286; Woermann 1899, 252, cat. 773), dated in 1728, which was acquired by the gallery from the author himself, right in 1728 (Woermann 1899, 252). This painting is known as well due to 3 different copies, auctioned during 2004-2011, assigned to the artist's circle and even to a copyist unrelated to them, and more recently even to the artist's studio and to the artist himself, but all are of a higher quality than the works of Nicolaus Müller known until now. To these 3 copies should be added one more, an ink wash painting. Nicolaus Müller's character has certain physiognomic similarities with Marie de Rège, that daughter of Antoine Pesne who in the painting from Berlin is rendered holding a puppy in her arms. With the painting *Young Woman with Pigeons* from Dresden, reproduced c. 1780 by Carl Gottlieb Rasp (1752-1807) in a copper engraving (Fig. 9), there are similarities, but not only concerning the subject and the structure of the composition, which means that the Transylvanian disciple of Antoine Pesne saw this very work, right in his master's studio, latest in 1728 and not the mentioned engraving, made much time later. Consequently, Nicolaus Müller was the disciple of Antoine Pesne during 1728-1741, if not even some time earlier, and thus it could be supposed that he was born c. 1708.

To the circle of Antoine Pesne is assigned a painting (oil on canvas, 81.9 x 96.5 cm) in the Museum of Fine Arts from Houston (Fig. 10), rendering two girls (one holding a puppy in her lap and a younger one playing a mandolin), as well as another one (Fig. 11), *Two Girls Holding a Basket of Cherries* (oil on canvas, 83.2 x 65 cm), auctioned on March 7, 2017 by Christie's (lot 125). Although they are actually portraits of the artist's daughters, but who are rendered at the age of adolescence, stylistically there is no relation between them and the two works of Nicolaus Müller from the Brukenthal National Museum in Sibiu. In terms of composition, but also thematically, the work *Woman with Pigeon* reminds a painting (Fig. 12) of a higher artistic quality (if considering the expressivity of the character's physiognomy and the successful effects of *trompe l'œil*), titled *Black Page with White Parrot* (oil on canvas, 54 x 43.5 cm), attributed to Antoine Pesne and auctioned on June 13, 2007 at Sotheby's (lot 66), about which unfortunately there is not more information. The same structure of the composition occurs as well in the works of some imitators, as in a painting which renders a girl with a canary (oil on canvas, 65.4 x 52.7 cm), auctioned at Christie's in New York (February 28-29, 2012, lot 121). Certain compositional similarities there as well between *Women with Pigeon* and a portrait (oil on canvas, 82 x 64 cm) of Marchioness Friederike von Ansbach (1687-1757), dated in 1756 and kept at the Museum der bildenden Künste in Leipzig (Fig. 13). Considering the date of the latter, but mainly the physiognomic similarity (with a small difference in age) between the character portrayed in *Woman with Pigeon* from the Brukenthal National Museum's collection (Fig. 6) and one of Antoine Pesne's daughters, who in 1754 was rendered together with her sister and their father in the family portrait from Gemäldegalerie in Berlin (Fig. 7) and earlier less skilfully, by painters from the circle of Antoine Pesne, together with her sister in the mentioned painting in the Museum of Fine Arts in Houston (Fig. 10), respectively in that auctioned on March 7, 2017 by Christie's (Fig. 11), the paint-

ing from the museum in Sibiu should be dated about 1756 or somewhat later.

As during the Seven Years War (1756-1763) Berlin was raided (on October 16, 1757) by the Austrian army led by the Hungarian general Count András Hadik de Futak (1710-1790), the Transylvanian painter may have returned from Berlin earlier, the latest at the outbreak of the war, rather before the Prussian invasion of Saxony (August 29, 1756) than later, when Austria entered the war in order to help its attacked ally, in late September 1756. Antoine Pesne died on August 5, 1757, therefore during the war and before Berlin was raided.

Referring to *Woman with Pigeon*, Elena Popescu (who, without other explanations, stated for first time that the artist's first name would have been *Nicolaus*) drew attention to its uniqueness in the context of the Transylvanian painting, considering that this kind of portrait with Rococo notes, innovative for its elegance and freedom of expression, recalls the work of Antoine Pesne (1683-1757) and of Joshua Reynolds (1723-1792), but was not followed by the Transylvanian portrait painters, as being rejected by the local conservatism and traditionalism (Popescu 2002, 217). Given that there are no other works to be attributed to Nicolaus Müller, who seems however to be a skilled painter, mastering well the drawing and the colour and who shows interest for depicting significant details, it could be assumed that he kept busy rather with the decoration of furniture and the carriages or the interiors of houses, as on the local market the demand for paintings other than portraits continued to be low even in early 19th c. (Mesea 2002, 302). Being no more possible to deny that the artist may have returned temporarily to Berlin, most likely about 1756, a plausible hypothesis about the rarity of the works of this artist could be rather his premature death, soon after 1756, than his emigration from Transylvania, which would increase the difficulty to explain the presence of both his works in Sibiu. Although mediocre (even if compared with some paintings of his contemporary Transylvanian fellows), one aspect that could be noted is the dynamism induced to the portrait by the symbolic gesture of holding the widely opened wings of the dove in the lap, aiming with its beak towards the young woman's bosom. On the other hand, the depiction of a genre scene with numerous characters, as in the painting *Dance Party* was rare at that time in the Transylvanian painting.

Consequently, until the discovery of more accurate archive sources relevant to the biography of Nicolaus Müller, I suppose that the period in which the Transylvanian artist lived is c. 1708-after 1756.

Stylistically, *Dance Party* (which, when it was proposed by me to be classified in the national cultural heritage, was dated during 1741-1754) recalls rather a painting (Fig. 14) belonging to the House of Hohenzollern, kept at the Charlottenburg Palace in Berlin, which depicts the reception of King August II the Strong of Poland (1697-1706) at the Berlin City Palace by King Friedrich II the Great of Prussia (1740-1786) and his consort, Sophia Dorothea of Hannover, dated in 1728 or 1729. Its main characters are also quite clumsily portrayed, almost like caricatures, and the others are less individualized, like in the mentioned painting from Sibiu, whose composition is similarly structured and whose background details dominated by brown shades are faded as well, recalling in this last regard the *Portrait of a Woman in Oriental Costume* (Fig. 15), attributed to the studio of Antoine Pesne and dated c. 1715, from the National Museum in Warsaw (oil on canvas, 83 x 67 cm, inv. 184731), where it was deposed by Jan Szembek, but whose artistic quality is obviously superior to the works of Nicolaus Müller. Compared to Antoine Pesne's works whose authenticity is undoubted, the artistic quality of the painting from Charlottenburg is much lower, despite to its belonging to the category of the official art, which should be unexpected for a work of this French painter known for so many portraits d'apparat of the members of the House of Hohenzollern and of other German aristocrats. Hence, this toot could be actually too a work by Nicolaus Müller, the disciple of Antoine Pesne in this period. According to this remark, the date of the work *Dance Party* should be reconsidered, at c. 1729.

In the collection of the Brukenthal National Museum there is as well a miniature signed *A. Pesne*, rendering Archduchess Maria Theresia of Austria (oil on ivory, 11 x 8 cm, inv. 2349), bought in 1965 from Otto Steensbale (Fig. 16), mentioned only as an inhabitant of Breaza (the name of several villages in Romania, of which in Transylvania are located 3). This work is actually a late 18th c. or early 19th c. anonymous fake, made after a portrait from 1727 (or few years later) by the Danish artist Andreas Møller / Möller (1684-c. 1762), from the Kunsthistorisches Museum in Viena (oil on canvas, 94 x 75 cm, inv. GG 2115) (Sonoc 2011, 27-28). Meanwhile, it is not known whether Nicolaus

Müller painted also miniatures, and the mentioned work cannot be assigned to him, first of all for stylistic reasons.

More recently, another painting from the collection of the Brukenthal National Museum (Fig. 17), *The Fortune Teller* (oil on canvas, 120 x 92.5 cm, inv. 627) (Die Gemälde-Galerie 1844, p. 13, cat. 66; Führer 1893, 7, cat. 80; Csaki 1901, 169, cat. 609; Csaki 1909, 188, cat. 627; Hrib 2010, 32 and 65; Sonoc 2010a, 125; Sonoc 2010b, 318), which previously was believed to be due to a late 17th c. anonymous Italian painter (Sonoc 2010a, 125; Sonoc 2010b, 318) and which, being proposed by me to be classified in the national cultural heritage and dated approximately during 1750-1760, was considered to be a copy or interpretation after Antoine Pesne, due to a 18th c. German anonymous (Gdańsk 2015, 320). The reason was, obviously, Antoine Pesne's work *The Gipsy Fortune Teller* (Fig. 18), kept at the National Museum in Wrocław (oil on canvas, 166 x 134 cm, inv. 97), dated c. 1710, about which is known that before 1786 it was transferred to the Berlin City Palace (inv. 1638) and that in 1883 it was brought to the Royal Palace in Breslau / Wrocław, where it was exhibited right in the bedroom of King Friedrich II the Great. After the conservation of the mentioned anonymous painting from Sibiu in 2015 (which was a true challenge, but with amazing results) and its recent re-attribution to a German anonymous, is possible to discuss the possibility to identify its author with the Transylvanian painter Nicolaus Müller. Since, in some respects, the artistic quality of the work exceeds the professional abilities of Nicolaus Müller, as they are known from the study of his two paintings from the Brukenthal National Museum's collection and of that now attributed to him from the Charlottenburg Palace, I believe that we should consider an intervention of Antoine Pesne in the making or/and correction of some costume details, but also in the drawing of the peasant woman's right hand, and possibly of a collaborator, to whom is due the landscape in the background, specific to the works by the master's studio, which imitates those from the original works of the latter, but stressing the chiaroscuro effects (For the biography and work of Antoine Pesne: Rey 1931; Berckenhagen *et al.* 1958; Börsch-Supan 1982; Bartoschek 1983; Eckardt 1985; Börsch-Supan 1986; Michaelis 2003). Therefore, in my opinion, *The Fortune Teller* from Sibiu should be attributed rather to the studio of Antoine Pesne, at the time when the Transylvanian artist Nicolaus Müller was a member of it, c. 1728-1741.

In the collection of the Brukenthal National Museum there are also two 18th c. paintings acquired by Baron Samuel von Brukenthal as due to an artist from the school of Jan Kupezky, then attributed in 1901 to an 18th c. unknown Viennese painter who followed the French artists and finally considered in 1909 to be anonymous copies after paintings by Antoine Pesne, about which at that time (as now as well) there is unfortunately only few information: *The Lute Player* (oil on canvas, 53 x 44.5 cm, inv. 884) (Die Gemälde- Galerie 1844, 134, cat. 302; Führer 1893, 69, cat. 463; Csaki 1901, 340, cat. 1213; Csaki 1909, 264, cat. 884; Lisan 1987, 222, cat. 23) and *The Gardner's Daughter* (oil on canvas, 53 x 44.5 cm, inv. 885) (Die Gemälde- Galerie 1844, 134, cat. 303; Führer 1893, 69, cat. 464; Csaki 1901, 340, cat. 1214; Csaki 1909, 264, cat. 885; Lisan 1987, 222, cat. 24), the single one about which Michael Csaki mentioned (in 1909) that it would be copied after an original work by the French artist, kept in Munich (Csaki 1909, 264, cat. 88). Verifying his statements, I found that indeed the catalogue of the Royal Gallery in Munich, published in 1845, mentions only the work which (according to its description) can be easily identified as that after which *The Gardner's Daughter* (Dillis 1845, 100, cat. 395), a situation which results as well examining the catalogue published in 1885 (Catalogue 1885, 260, 276 and 289), where the artist's signature is reproduced in facsimile (Catalogue 1885, 260, cat. 1366). It is unknown how and when this work came into the royal Bavarian collection, as it is difficult to say if the painting from Sibiu was copied right in Munich or rather earlier, in another place, where there could have been as well a pendant of it. Without to insist now on the description of these two works from the collection of the Brukenthal National Museum (of similar dimensions as the afore mentioned *Black Page with White Parrot*), I want only to mention the monogram A. D. which I discovered in 2012, written with white right below, on the edge of the table's board depicted in the work *The Lute Player* (Fig. 19a), but which is lacking on its pendant. It is precisely because of the obvious affinity with the manner of Antoine Pesne which can be noted by comparing the both these works between them and the work signed by the mentioned monogram with other works due to Antoine Pesne or attributed to him, that this discovery is not a convincing argument to support the hypothesis that *The Lute Player* was not copied as well after a work by Antoine Pesne (still unknown yet, probably missing), but it was made right by the monogrammist A. D. as a pendant of the copied work,

rather as a request of the commissioner than as a studio exercise. Thus, there is no reason why these two paintings should be attributed to Nicolaus Müller too.

3. Conclusions.

The conservation of the painting *Dance Party* by Nicolaus Müller from the collection of the Brukenthal National Museum in Sibiu triggered a new research on the painter's biography, allowing to propose a chronology of his works known until now, in relation to the available biographical information and to the date of some works by his teacher, Antoine Pesne, which may have influenced him. There was an occasion to assign him as well another work from the Charlottenburg Palace in Berlin, previously believed to be by Antoine Pesne, but stylistically very similar to *Dance Party* and to remark his participation, as a member of Antoine Pesne's studio, in painting *The Fortune Teller* from the same museum in Sibiu, which is inspired by an older original work by Antoine Pesne, now in the National Museum in Wrocław.

A more in-depth investigation of the works attributed to the circle of Antoine Pesne as well as of those which are conditionally (or even unfoundedly) attributed to this artist in various German and Polish museums and collections and, especially, the pursuit of the art market could lead to the discovery of new works, similar to those which are currently attributed to the Transylvanian painter Nicolaus Müller, whose biography seems possible to be completed with information from archive sources from Sibiu and Berlin.

(Alexandru Gh. Sonoc)

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RESTORATION OF AN IMPORTANT WOODEN ICON PAINTED BY IOAN HÂNDOREAN ZUGRAVUL

Cristina Maria DĂNEASĂ*

Abstract: *Ioan Hândorean from Poiana is an important Romanian ecclesial painter, who worked in the first three decades of the 19th century. He has painted in the Annunciation of Blessed Virgin Mary Church from Apoldul de Jos the royal icons and doors, crosses and ecclesiastic furniture (a tetrapod and probably a chandelier). In this study we aimed to describe the restoration steps of one icon of the patronal feast, collected from this church and currently stored at the Archbishop Museum from Sibiu.*
Keywords: *wooden icon, conservation, restoration, carved gilded ornaments, missing parts, deterioration of paint layer*

Rezumat: *Ioan Hândorean din Poiana este unul dintre zugravii importanți români, care a activat in primele trei decenii ale secolului al nouăsprezecelea. La Biserica Buna Vestire din Apoldul de jos, acesta a pictat icoanele și ușile împărătești, cruci și obiecte de mobilier bisericesc (un tetrapod și probabil un candelabru). În acest studiu sunt prezentate etapele de restaurare ale icoanei de hram din această biserica, ce se află în prezent depozitată la Muzeul Arhiepiscopiei din Sibiu.*
Cuvinte-cheie: *icoană pe lemn, conservare, restaurare, ornamente sculptate şi aurite, fragmente lipsă, deteriorarea stratului pictural*

Introduction

Ioan Hândorean from Poiana is a painter who worked with Stan Painter and Vasile Munteanu (Porumb 2003, 50). We base this affirmation on the proofs from his signed icons found in the same church with the other two painters. This three painters have similar artistic and technical style characteristics (Fig. 1 – a, b, c). Together with Ioan Ovidiu Abrudan and Maria Elisabeta Toader, we gathered older studies about Ioan din Poiana's activity. We found in Sibiu County (in situ, museums and storage) 14 pieces (few of them not published yet). This study will be detailed in another article. Another authors remark the activity of this painter in mural painting and icons in Alba and Hunedoara Counties: Marius Porumb, Ioana Cristache Panait, Ana Dumitran, Elisabeta Pop (Cristache Panait 1984, 77, Dumitran 2011, 13, 22, Porumb 2003, 50, Porumb 1998, 381).

At the Annunciation of Blessed Virgin Mary's Church from Apoldul de Jos (which was built at the beginning of the nineteenth century and partially painted in 1818), Ioan Hândorean painted the royal icons and doors, crosses and ecclesiastic furniture (a tetrapod and probably a chandelier). The four royal icons are stored in the Archbishop Museum from Sibiu. The icon of patronal feast was restored in 2017 in Laboratory of Conservation and Restoration Department of Sibiu Archbishop. The entire work of Ioan in this church represents his mature manner: here, we can observe both influences of his masters and the particular characteristics of his style: the byzantine canons are respected, the manner of painting the clothes is the same as that of his masters, but the drawing is characterised by simplicity and harmony. All his works from this church are equilibrated and the chromatic gamut is based on grey, pink, green, white and red shades (Fig. 2 – a, b, c). The metallic leaves (god and silver) are used to cover a big surface of the paint. Like his masters, he painted the upper metallic surfaces with translucent colours but his specific manner is characterised by uniformity and simplicity. The portraits and hands are carefully realised using light colours. The eyes are bigger and expressive, attracting the gaze of any person looking towards the icon (producing a hypnotic effect). The painter signed and usually dated all icons –

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Ioan Zugravu Poiana, anu 1820. His name is written on the painted tetrapod (…) *18 febrorie 1828. Ioan Hândorean zugrav Poiana.* (painted ecclesiastical furniture is normally used in the church, but at the moment is restored in the Laboratory of Conservation and Restoration Department of Sibiu Archbishop by Toader Maria Elisabeta)

Description of icons

The royal icon is composed from four pieces of soft wood (probably spruce), with two wooden crosses on the back. The frame is profiled and fixed on the panel with wooden nails.

The painted layer contains isolation glue layer, ground, colour or bolus, silver or gold leaf and varnish. Some areas covered with metallic leaf are painted with tempera or pigments mixed with natural resins.

The painter signed in the lower part: *Ioan zugrav Poiana anu 1820*. The composition is dynamic and harmonious. The scene composition respects the Erminian rules specifical for byzantine icons. Both characters are shown inside a room and citadel draw within an inversed perspective. The bodies are entirely visible and the proportions are harmonious, with the exception of the heads which are bigger than normally. The occidental influence can be observed especially regarding the clothes and curtain. These characteristics set the painting style apart from the sobriety of byzantine style (Abrudan, 2010, 111). The entire composition presents an interesting equilibrium between the colour areas and the gilded ones. The frame mixes the gold and silver leaf, partially covered with a green translucent colour (Fig. 3, 4).

State of conservation

The disadvantageous conservation conditions from the church, previous to the moving in the storage, obviously influenced the aspect and properties of the component materials.

The high humidity maintained in the church for a long period and the temperature and humidity variations of the storage (after 1970 the royal icons from the church were stored in the Archbishop Museum from Sibiu) caused the active biological attack, therefore the icon presented cracks, deformations and fragilization of the composing materials. The frame was exposed to the damage more than the icon surface, so in these areas we can observe how the wood broke, lost parts, and the superior and inferior rods of the frame were broken away from the main icon panel. Because the wood was dried in time, the components of the icon panel were separated in longitudinal direction.

The painting layer was weakened especially on the lower part. We could observe that the missing paint layers were on the curtain, and on the colours of the clothes. The silver leaf was oxidized unequally on the frame surface. All the icon was covered with dust, adherent and foul deposits. The paint presented cracklings, weakened and detached from decreased support. (Fig. 3)

Conservation and restoration treatments

Firstly, we made a photographic documentation and we analysed the wooden structure, the traditional techniques used, the stratigraphy and the nature of metallic leafs. Because we observed active attacks on some icons in the storage space, the biologist PhD Livia Bucșa helped us to prevent their spreading by fumigating the entire deposit with gas (all operations were performed by a specialised company after specific investigations).

Some areas needed preventive consolidation so they were glued with fish glue and Japanese paper. Then we disassembled the carved and gilded ornaments from the four corners of the frame. The polychrome layer also needed consolidation with alcohol and rebait glue at frame (Fig. 5 – a, b, c). On the icon surface we used Japanese paper and fish glue, and these areas were ironed with a thermostatic spatula alternating with cold presses.

The inferior and superior rods of the frame were removed slowly. To get better molding, it was necessary to saw the rods 3 millimetres on the back. When the elasticity progressed, these were glued back on the panel (Fig. 6). The missing part of the carved ornament was designed from lime tree, in respect to the original techniques (Fig. 7). The new wooden completion was prepared with ground based on skin glue and calcium carbonate (Fig. 8). All carved ornaments were glued on the corners of the frame (Fig. 9). We decided not to approach the panel components and therefore the distance between them is still visible. The deformation of the wood was preserved and the spaces between the frame and the icon panel were filled with balsa wood carved by shape (in order not to stress the original forms).

The lacuna wasn't completed with calcium carbonate and skin glue mixure. In this case, where was necessary, the big cracks were edged (especially at the intersection of the frame with the icon panel).

Because we have different materials and techniques used, the cleaning of polychrome and paint layer were adapted. The cleaning intentions were to keep the patina and all translucent effects made with resins. There were necessary many tests on different areas (on tempera paint, translucent colours, silver covered with resins or green colour and gold). The deposits were thinned, step by step, with different mixtures of two or three solvents: water, ethylic alcohol, isopropyl alcohol, acetone, ammonia, following the Belgian, German school (Guttmann 2013, 80, 92, 93) (Fig. 9).

The deposits on the missed polychrome areas from the curtain weren't cleaned as we considered that the gray formed is aesthetically integrated within the original. Another lacuna was integrated with aquarelle colours in pointillist style. For chromatic integration of the new carved ornament from the frame corner we used the imitative technique with aquarelle (ochre, red, green, brown, inka gold) (Fig. 10). The icon was varnished with Dammar resin solubilized in turpentine and applied in thin and uniform layer for a better protection (Istudor 2011, 222) (Fig. 4).

Conclusion

Our intention was to slow down the degradation process of the icon, to stabilize its actual state and to clean the paint for a better perception of the drawing and painting manner of Ioan Hândorean from Poiana. The icon is now exposed at the National Restoration Salon from Craiova. Currently, in the church the restauration of the royal doors and the tetrapod is taking place, facing minor problems with concern to their state of conservation. Our intention is to valorise this icon in situ but the actual condition of the church prevents this action.

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b) Ioan Hândorean

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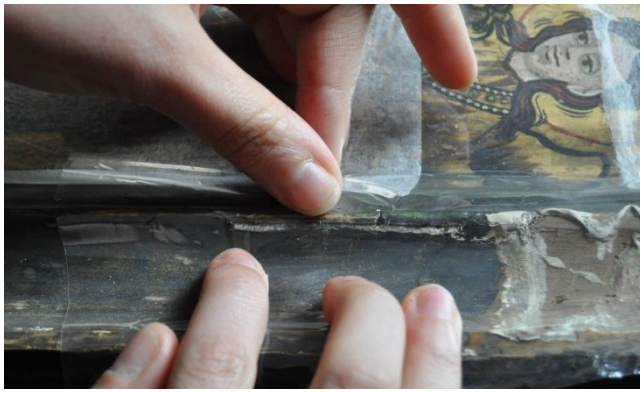
2. a, b, c Royal icons from Annunciation of Blessed Virgin Mary's Church from Apoldul de Jos

3. Icon before restoration

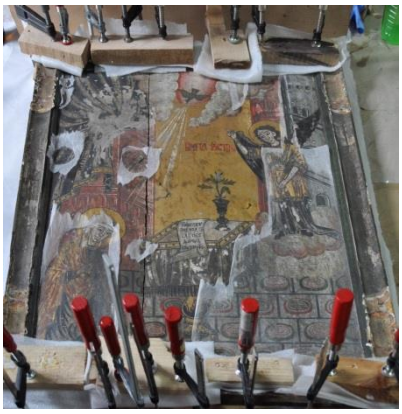
4. Icon after restoration

5 a)

5 b)


5c)

5.a, b, c – Consolidation of polychrome layer



6. Mechanic consolidation of frame rods

7. Carving a missing wooden fragment

8. Preparing of missing element with ground

9. Cleaning of painted surface

10. Gluing the carved ornaments

THE RESTORATION OF TWO WOODEN ICONS FROM THE 18TH CENTURY PAINTED BY STAN ZUGRAVUL

Mirel Vasile BUCUR *

Abstract: *The project "Museikon. A new icon museum revitalizes a historical monumental building restored in Alba Iulia" is conducted in partnership by the Alba County Council, National Museum of Unification in Alba Iulia, Romanian Orthodox Archdiocese of Alba Iulia and the University of Bergen - Norway. "Museikon" is financed under the Program PA16/RO12 "Preservation and revitalization of cultural and natural heritage", through the EEA Financial Mechanism 2009-2014. In the framework of this extensive project, two wooden icons, signed by Stan Zugravul, have been restored.*
Keywords: *Stan Painter, wooden icon, conservation, restoration, state of preservation, pigments*

***Rezumat*:** *Proiectul "Museikon. Un nou muzeu revigorează o clădire istorică monumentală restaurată în Alba Iulia " este realizat în parteneriat de Consiliul Județean Alba, Muzeul Național de Unificare din Alba Iulia, Arhiepiscopia Ortodoxă Română din Alba Iulia și Universitatea din Bergen - Norvegia. "Museikon" este finanțat prin Programul PA16 / RO12 "Conservarea și revitalizarea patrimoniului cultural și natural", prin Mecanismul Financiar SEE 2009-2014. Cele două icoane semnate de Stan Zugravul au fost restaurate în cadrul acestui amplu proiect*
Cuvinte-cheie: *Stan zugravul, icoană pe lemn, conservare, restaurare, starea de conservare, pigmenți*

In the project called Museikon, 52 icons were restored. We will not insist on the details of the project because there are references about it in other articles (Bucur 2016 p. 587-588, Bucur 2017, 194-195) and people can access the site: http://www.museikon.ro/[1] for more elaborated details.

The 18th century represents for Transylvania an outbreak in the painting area, Stan Zugravul together with his brother, Iacov, being the most referential names in the field of churches and icons painting. Both names can be found with elaborate information that proves the importance of these two painters by what they realized, due to research done by Marius Porumb (Porumb 1998, 169-172, 378-381). The same writer underlined the importance of these two in a book dedicated to Romanian painting from the 18th century in Transylvania (Porumb 2003, 41-51). Ana Dumitran along with her collaborators come with a major contribution by trying to make a directory of these two painters work into two monographic books (Dumitran *et al*. 2010, Dumitran *et al*. 2011). We will remind here only the fact that the names of these two painters were recorded in 1761 at the Curtea de Argeș monastery which was founded by Neagoe Basarab „STAN ZUG(RAV) I BRAT EGO IACOV ZUG(RAV) SIN POPII RADUL OT REȘINAR. ME(SI)T(A) SE(PTEMBIE) 1 LEAT 7270 (=1761) (Porumb 1998, 170 Porumb 2003, 46, Dumitran 2011,13-14). The study of the frescoes, after their destructions and interventions that that brought on a dramatic change on the original look, of the monument does not offer proof that can prove that the works belong to the painters. However, this inscription is a testimony evoked and mentioned by every researcher, showing appreciation that these two painters have enjoyed outside of the Transylvania (Șerbănescu 1975, 10-15).

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[1] The project *'Museikon'. A new icon museum revitalizes a historical monumental building restored in Alba Iulia"* is conducted in partnership by the Alba County Council, National Museum of Unification in Alba Iulia, Romanian Orthodox Archdiocese of Alba Iulia and the University of Bergen - Norway. 'Museikon' is financed under the Program PA16/RO12 "Preservation and revitalization of cultural and natural heritage", through the EEA Financial Mechanism 2009-2014. The program's operator is the Ministry of Culture by the Project Management Unit, The Managing Authority – national Point of Contact – Ministry of European Funds.

The two icons that we are going to approach were restored in the project mentioned above. The years 1755-1794 represent the period of Stan Zugravul's activity, well known from his work, that was already dated (Dumitran 2011, 25-46).

The first icon is a representation of St. Nicholas and it belongs to the collection of the Romanian Orthodox Archdiocese of Alba Iulia. The painter's signature is discreetly marked on the work and it is made with white pigment on a red background. The year 1782 is marked on the icon (with numbers, in the left down corner and with Cyrillic letters in the right down corner) which allows us to say that the icon was realized when he already matured as an artist.

The icon is imposing because of its gold background, an artwork that impresses with the scrupulousness of details that can be observed on the throne in which St. Nicholas sits or on his hierarchical garments. In the upper corners there are Jesus and Mother of God's miniature figures leaning against the clouds. From the picture of the icon that has been published for the first time in 2011, we can already see a series of degradations which determined Ana Dumitran to mark in the record: "the extremely precarious state of preservation in which the icon was makes a simple object of study" (Dumitran *et al*. 2011, 77). Beyond the golden metal foil, the chromatic that has been used is limited: we have colours like red, ochre, brown, green, blue, white and black. The piece comes from Galda de Sus and it is part of the Romanian Orthodox Archdiocese collection, which is located in Alba Iulia.

The second is a Festal Icon with 12 scenes[2] and is dated from 1794 and signed by Stan Zugravul and his son-in-law, Ioan Zugravul[3]. The icon is belonging to the collection of the National Museum of the Unification from Alba Iulia and there is no information about its origins. It is an important piece because it marks the end of the painter's activity. The 12 scenes painted on a metal foil are so usual in Stan from Răşinari's work, but the contribution of Ioan Covaci seems to be extended, his physiognomies presenting a shadow, made of an ochre-green colour. Explanatory texts are certainly his and in our opinion, this last icon is the artwork were Stan Zugravul contributed less. Both of them, beside their signature, put their wives signatures in their work, thing that also happened in this particular case[4].

Saint Nicholas, Inventory Number 428. The AOR Collection

a. State of conservation

The resinous wood support is made of two tangential planks and has the dimensions of 70 x 51 cm. The panel is reinforced on the back with two bevelled semi-buried crossbeams (forward to the right) (Mâle 1976, 18). On the surface has been attached a frame that consist of profiled bars, that has been fixed with adhesive and wooden splints dowel. The lower bar had been lost.

A consistent attack of xylophage insects (*Anobium punctatum* based on the flying holes) can be seen, especially on the backside, and this caused the support fragility. Crossbeams are strongly affected, the upper one being fractured (Baroni 1992, 17).

The picture layers show edge *craquelure* detachments, deficiencies and different areas, some of which have an appreciable stretch. A series of detachments in the roof-shape in two waters have appeared along the wood fibre. The old varnish was yellow, brown, but even though it did not prevent the reading of the representation; the clusters in point-shaped forms present themselves as hard and in a brownish-red colour.

The superficial, adherent and anchored dirt is visible on the whole surface of this piece.

In conclusion, the state of preservation has been conditioned by the aging of the materials, tangential debugging of boards, aging of glue, increased biological attack, poor conservation, accidents and liturgical use. All these factors led to the detachment and loss of the frame's lower bar (lower right corner), to age cracks and progressive detachment of the paint layers and gaps in the varnish browning, clogging dirt and wax deposits. There are some small pieces lost from the wooden material and there are obvious factures on the two traverses. It must be mention the Y fracture, visible on superior edge. This is a rare degradation, which determined the way of the intervention for the panel consolidation. Following the determination by X-ray fluorescence spectroscopy (XRF) made by DSc. Gheorghe Niculescu, it has been proven that the painter used a different metal foil to realise

[2] Marius Porumb records the icon as the last thing known in Stan's work (Porumb 1998, p. 381)

[3] Ioan is the team painter at Mesentea (1782), Deal (1789) - where the form of *Ianăș Covaci* - Cristian (1790), Laz (1791), Beriu (1793) in this last icon of Stan mentioning the names of the wives Ilinca and Aniţa (Dumitran et al. 2011, p. 21)

[4] Ana Dumitran, *Fișa de evidență 10755/20.02.2014*

chromatic effect. The alloys are silver based in the areas that the painter interferes with colour, where as in the background the alloys are gold and silver based. We can also see in all four XRF determinations the curve that is specific to the organic substance, which is the same as the protection substance. Ground is *gesso*[5].

b. The description of the restoration work

In order not to lose the pictorial material, preventive consolidation with fish glue in situ (5-6% aqueous solution) was done. After a close examination of the piece and after a series of photos, which capture the conservation state of the piece before its restoration, we firstly did a superficial cleaning with a brush that has soft hairs. Fragile areas had been protected with a Japanese paper and over it was applied 6% of fish glue. The consolidation was made by hot pressing-with a thermocouple that was heated to 75°C, alternated with a cold press, which is compose of marble pieces. In some areas it was necessary to inject hot glue into the loose substrate. After 24 hours the Japanese paper was removed with cotton wool pads soaked in warm water and at the same time we carefully removed the excess water with cotton wool (Baroni 1992, 22-23).

The mechanical consolidation of the support has been made through multiple steps. After the horizontal wooden rod and the fractured crossbeams were taken off on the longitudinal crack between the boards, a collagen based adhesive (rabbit glue, 20%) was applied. Presses were applied to hold the boards still for 24 hours. The adhesion between boards has been ensured by adding wooden rods made by the same wood essence. The upper wooden rod has been notched, cleaned and then glued on the panel with collagen based adhesive. The lower rod has been rebuilt with pinewood similar to the old ones. The rod profile has been handmade with chisels and notched so it can be applied on the panel. The adhesion has been realized with rabbit glue then fixed with presses for 24 hours. In addition to that, wooden splintsdowel have been applied through the existing holes. On the new wooden rod a glue layer was first applied following a chalk gesso layer. The gaps in the painted surface have been filled with a mixture of chalk and fish glue (8% concentration).

After the cleaning tests have been run we obtained the best result using a solution of isopropyl alcohol ammonia and water (50:25:25). The icons back was cleaned with ammonia water.

Chromatic integration was realized with imitative retouch in missing areas and pointillist style for the rest. Watercolours have been used for the retouch.

For the final stage we used a natural resin. Varnish has been applied with a brush for protection (dammar 8% + turpentine essence).

Festal Icon with 12 scenes. The National Museum of the Unification's collection

a. State of conservation

The icon is painted on lime wood. The panel is made of three tangential boards. The boards were processed using a drawknife. The panel is originally consolidated with two crossbeams. Both crossbeams are typical with a rectangular cross section. On the icon's surface is attached a frame composed of boards that are combined in 45°. The left board has been lost.

A massive attack of xylophage insects (*Anobium punctatum* based on the flying holes) made the icon's support fragile and, consequently, the painting layers.

The painting layers present detachments and different painting losses areas. There are multiple detachments along the wood fibre in a roof-shaped form. It can be seen as a serious deterioration of the colour pellicle. Also on the painted surface we are able to see a series of traces of wax. The old varnish is yellow and brown, having in some areas a scaly aspect.

The superficial, adherent and anchored dirt it is present all over the surface and it partially screens the painting.

b. The description of the restored pieces

At the beginning a cleaning has been done, using a gentle dusting with soft haired brushes on the painted surface, after which a close examination of the piece was done. Considering the fact that the painting's layers that were detached and the painting losses were numerous and widespread all over the surface, even though they were small, we decided to apply a consolidation treatment across the entire painted surface.

The consolidation itself of the painting's layers was done by brushing hot fish glue 6% on the icon.

[5] XRF is a non/invasive and non-destructive analytical technique that provides data in a short time regarding the elemental chemical composition of materials. Used equipment and working parameters: Innov-X Systems, Alpha Series - Portable X-ray Fluorescence Analysis System with Wolfram Anticathode, acquisition time 30 seconds, Si-PIN detector, Peltier effect cooling. 35 kV, 40 μA. No samples were taken.

The consolidation was made with a hot press (an electric spatula) with a cold press (marble pieces and bags with sand). After 24 hours the Japanese paper was removed with cotton wool pads soaked in warm water and at the same time we carefully remove the excess water by removing it with cotton wool. The jointing of the horizontal boards and panel being fragile we decided to dismantle them and work on treating each one of the elements. So, in the bottom left corner where the support fragility can be seen, we used Paraloid B72 in ethyl acetate (10% solution) to do a structural consolidation. To complete the corner we used Balsite W+K combined with wood sawdust. The backside of the icon was cleaned with ammoniacal water. To fill the small wood gaps a mixture of sawdust and glue was used. Then a mixture of fish glue and chalk has been used to fill the other lacunas. The putty has been applied with a dental spatula, finished after it dried with cotton wool pads, which were soaked up in egg yolk emulsion. For the cleaning test a mixture of isopropyl alcohol, ammonia and water (90:10:10) and (50:25:25) and ethyl acetate + DMF (50:50) showed satisfying results, but the cleaning with dimethylformamide worked the best.

Chromatic integration has been realized using a pointillist and imitative retouches. Watercolours have been used for this stage. For the final stage, varnish has been applied with a brush for protection (dammar in turpentine essence 8%).

Conclusion and recommendations

Stan Zugravul is not only an important painter but also a teacher from which models are inherited and reproduced by the disciples in the next century. The first is Ioan, signed on the Festal Icon from 1794, then Ioan from Poiana, Vasile Munteanu from Sălişte, Nicolae Oancea from Vale, Oprea Zugravul, Ioan Hândoreanu or Florian Munteanu. Therefore, beyond their own creation, the heritage left by the group of painters from Sălişte and Laz, makes the connection between Brancovan's art and its derivations of popular fact Transylvanian's artistic artistic area (Porumb 2003, 50). Through the restoration interventions, the icons of this important painter from Transylvania, from a degraded object of study, have become, once again, an object that can be exposed.

According to the Conservation Rules, we recommend that the icons be stored or exposed in a stable microclimate environment with a relative humidity of 50-65%, a temperature between 18-20°C, with no ample or sudden fluctuations in their values, and the illumination level should not exceed 180 lux.

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LIST OF ILLUSTRATIONS

Saint Nicholas, Inventory Number 428. The Orthodox Archdiocese of Alba Iulia Collection

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4. Consolidation on merge
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7. Attaching horizontal wooden rod
8-9. Cleaning tests
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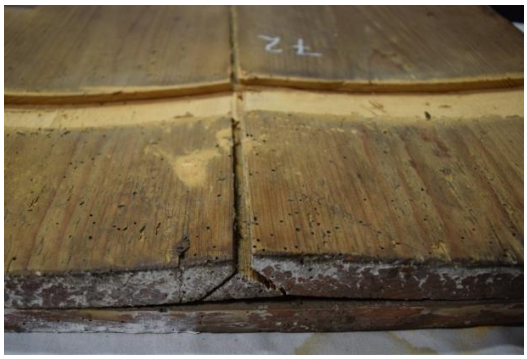
Prăznicar cu 12 scene - Nr. Inv. E.10755, Muzeul Naţional al Unirii din Alba Iulia

11. Ansamblu față înainte de restaurare
12. Ansamblu față după restaurare
13.-14. Detalii înainte de restaurare
15. Completarea colţului
16. Aspect în timpul curăţirii

Saint Nicholas, Inventory Number 428. The Orthodox Archdiocese of Alba Iulia Collection

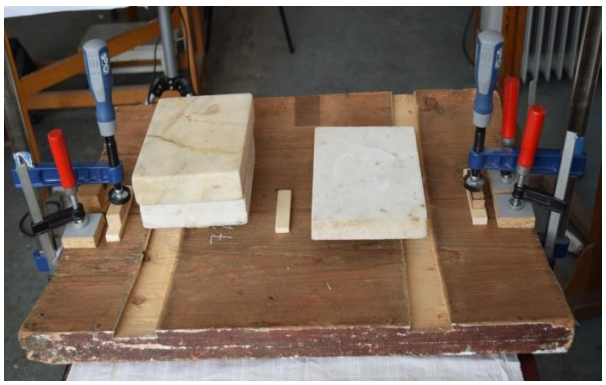
1. Assembly before restoration

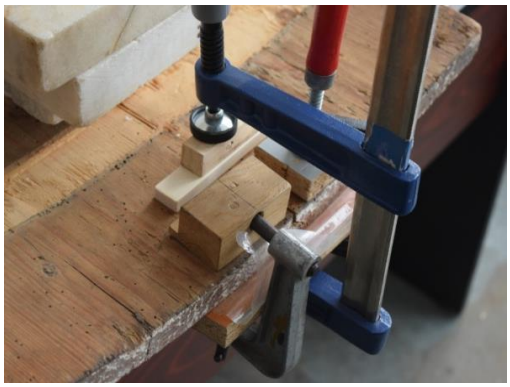
2. Assembly after restoration



3. Degradation of the panel

4. Consolidation on merge

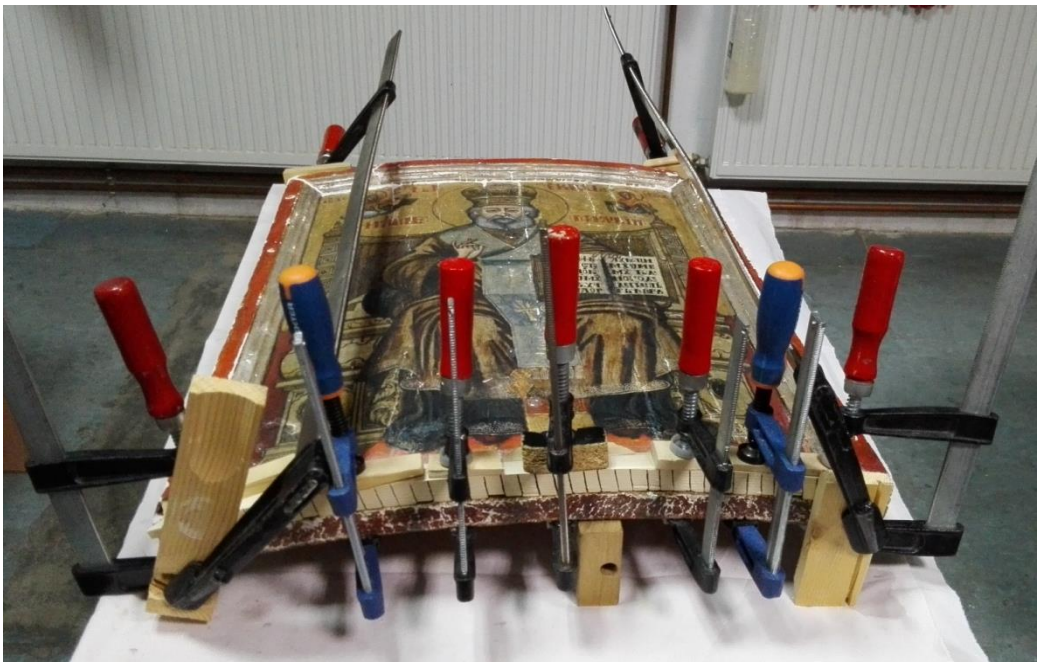




5- 6. Aspects when attaching wooden cleats

7. Attaching horizontal wooden rod

8-9. Cleaning tests

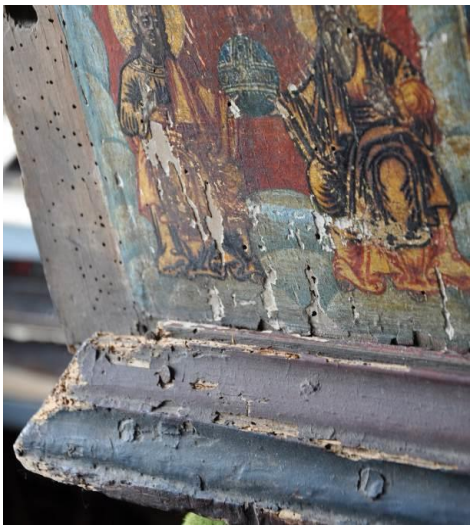


10. Attaching new wooden rod

Festal Icon with 12 scenes. The National Museum of the Unification's collection

11. Assembly before restoration

12. Assembly after restoration



13. 14. Detail before restoration

14. The completed corner

15. Detailed during cleaning

MUZEUL NAȚIONAL BRUKENTHAL

PUBLICAȚIILE PERIODICE APĂRUTE DE-A LUNGUL TIMPULUI
(INCLUSIV PRECURSORII)

CRONOLOGIE	ISTORIE, ARHEOLOGIE	ARTA PLASTICĂ	ȘTIINȚELE NATURII	RESTAURARE	ETNOGRAFIE
Ante 1950		Mitteilungen aus dem Baron von Brukentalischen Museum 1931-1937 - Neue Folge I-VII 1941 - Neue Folge I-VIII 1944 - Neue Folge IX-X 1946-1947 - Neue Folge XI-XII	Verhandlungen und Mitteilungen der siebenbürgischen Vereins für Naturwiessenschaften zu Hermannstadt 1849-1945 95 de numere		
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