

## **THE RESTORATION OF THE TIN SARCOPHAGI OF THE CARDINAL FRANZ VON DIETRICHSTEIN'S**

Ivan Houska, Helena Zápalková

In Olomouc in 2005, after many years, the Dietrichstein's crypt in the Cathedral of St. Wenceslaus was opened. In the crypt four bishop's coffins were found (Franz von Dietrichstein, Karl von Liechtenstein-Castelcorn, Johann Wilhelm von Kolowrat-Liebstein and Maria Tadeas von Trauttmansdorff-Weinsberg). The first three bishops died in the 17th century and were buried in spectacular tin coffins. Maria Tadeas von Trauttmansdorff-Weinsberg died in 1819 and his remains were mummified and placed in the cooper coffin and the copper canopus standing besides. The humidity in the crypt, tin corrosion and degradation processes led to the total destruction of the tin coffins. Archbishopric of Olomouc decided to open the crypt to the public, with bishop's mausoleum and restored coffins. In 2008 year the project was selected and implemented into the Norwegian funds projects. The restoration works began following year 2009. This article is focused on the restoration of the Cardinal Franz von Dietrichstein's coffin, the first of three tin sarcophagi.

## **RESTAURATION OF ST. ELIZABETH AND ST. JAMES ANTEPENDIUM FROM ST. NICHOLAS CHURCH IN CHEB**

Zdeňka Němcová, Václav Němec

We discuss the front side of one out of three parts of the original antependium which is now in the collection of the Regional museum in Cheb. The antependium is ranged into strips and divided in individual beaten fields by the vertical and horizontal dividing line of halfcylinder side faces. It is mounted on a supporting wooden frame. The central motif has an oval form with the initials MAR planted with kettles with glass stones, on the side are circular medallions with motifs of saints. The beaten silvered segments of copper were covered on both sides with a considerable layer of corrosion products with absence of original material, there were large cracks imitating the ridges of the beaten decorations, some parts of the beaten initials were missing and also the kettles with the stones the missing parts of the beaten segments were grounded- in concern the reversibility – with newly manufactured silverplated galvanoplastic replicas that supported the disturbed parts of the segments and completed the missing ones. The missing parts of the initials and the kettles were manufactured in galvanoplastic way and gilded, replicas of glass stones were refined.

## **THE CONSERVATION OF THE HELMET OF SAINT WENCESLAUS**

Milena Bravermanová, Alena Havlínová

The helmet of Saint Wenceslaus is presented as heritage from 10th Century. There was preliminary research of handcraft construction of the helmet before the conservation. A calotte of the helmet is hammered from single piece. A nose-piece and a rim are connected to the calotte by rivets. There was found a local corrosion on surface of the calotte. The corrosion products of iron were also found between silver decor of the nose-piece and its iron base.

The helmet was examined by means of X- ray; the silver plate of the nose-piece was studied by x-ray fluorescence analysis (XRF); the products of corrosion were analysed by means of X-ray diffraction and the filler of the space between nose-piece and the calotte was studied by FTIR spectroscopy.

The results of iron corrosion products analysis indicated a presence of akaganeit in the calotte. It is not possible to remove akaganeit from the nose-piece, because it could cause lots of silver decor. That is why it is necessary to store the helmet in the environment with the lowest possible relative humidity of the air. Hygroscopic filler (that also contains akaganeit) was removed from the space between the nose-piece and the calotte. After very gentle cleaning of the corrosion products the helmet was dried, lacquered and waxed. The helmet is stored in hermetic glass showcase where the relative humidity of the air is maintained on low level by silicagel. The air humidity is continuously monitored.

## **TIN BAPTISTERIES OF THE SECOND HALF OF THE 16TH CENTURY**

Šárka Msallamová, Eliška Jindrová

The study deals with a research on materials and states causes of corrosion of tin baptisteries dated from the 1548 until 1581 owned by the National Museum in Prague. The metallic surface of the tin baptisteries was analysed by electron scanning microscope, HITACHI S-450 with Kevex Delta5 EDS analyser. Corrosion products on the surface of the baptisteries were analysed by X-ray diffraction analysis, PAN analytical X'Pert PRO equipped with the High Score plus software. The results imply

that the tin baptisteries are made of a tin and lead alloy. There is a mixture of tin corrosion products on the surface – cassiterite and romarchit. The X-ray diffraction analysis eliminated the presence and modification of tin to gray  $\alpha$  phase. The analysed corrosion products correspond to the corrosion of tin-alloy objects formed during their exposure to outdoor moisture or due to their deposition in a church. Localised chemical removal of tin corrosion products from the surface of the baptisteries using 2–3% HCl or NaOH solution with addition of urotropine was suggested. Moreover, it was recommended to braze the damaged places and subsequently protect the surface with a microcrystalline wax. Preventive conservative measures were also proposed in accordance to the environment of the objects in the National Museum in Prague.

## **ALTERNATIVE COATINGS FOR STABILISATION OF IRON ARTEFACTS**

Jan Stoužil, Eliška Křečanová, Robert Mundil, Tereza Jamborová

Tannates are usually used for the stabilization of iron artefacts. Tannates show very low stability under humid conditions, while phosphates have more complex application. Alternative coatings based on hydrophilic polymers (polyvinylpyrrolidone, acrylophosphonate), organosilane and carboxylate were studied in present work. They were subjected to exposure in water as well as humid atmosphere and analyzed by means of scanning electron microscopy X-ray diffraction, infrared spectroscopy, spectrophotometry, image analysis, contact angle and impedance measurements. Tests showed organosilane and carboxylate as a good alternatives to the classical coatings.

## **THE RESTORATION AND CONSERVATION OF THE AUTMATOPHON „POLYPHON“**

Miroslav Kost'un

Polyphones used to be widely spread in saloons and cafes. One of their advantages was possibility of changing music mediums with variety of songs according to the taste of musical consumer. From the constructional point of view musical automatophones are complicated machines, which were overshadowed by modern era with coming of phonograph and gramophone. One of the basic principle of controlling the automatophone is data medium, which organizes tones in real time (metal plate,

paper roll, cardboard, nail cylinder). At the present time we could compare these data with MIDI data, where the difference is between mechanical and digital way of storing data. Development of the polyphones took place in 19th century. Popularity of automatophones using nail cylinders were significant due to the smaller dimensions and good quality of sound and moreover, production of music did not requested special musical skills. The most famous producers of the polyphones were companies like Brachhausen & Riessner 1889–1895 Leipzig, Polyphon 1895–1930 Leipzig, etc.

This restored Polyphon comes from the collection of The National Museum – The Czech Museum of Music. The restoration contributed to the improvement of the collection of the Department of musical instrument in the Czech Museum of Music.

**THE RESTORATION OF THE ARCHAEOLOGICAL CERAMICS FROM POLYCULTURE FUNERAL LOCALITY VLINĚVES 1997–2007**

Ljuba Svobodová

This paper presents the basic approach to the archeological ceramics treatment. Described are the basic methods of ceramics conservation and restoration, like cleaning, joints searching, assembly and fixation, missing parts replacements, corrections of the shape and colour of the replacements, conservation, all recorded in the restoration report, which includes also the list of used materials, full photo documentation and the recommended climate control and regular inspections of the restored ceramics in the deposit storage. Practical demonstration on the ceramics, excavated on the site VLINĚVES (region Mělník) in the years 1999–2008.

**THE EVALUATION OF PROPERTIES AND MICROSTRUCTURE OF THE CERAMIC BODIES FROM THE EARLY LA TENE SETTLEMENT**

Vladimír Hanykýř, Alexandra Kloužková, Martin Trefný, Tomáš Polišenský

During the archeological research of early La Tene settlement in Prague-Pitkovice in the years 2006–2007 the fragments of very fine pinkish ochre ceramics were found. These fragments differed from the standard local ceramic production in all regards. The subject of this paper was to study microstructure of the found fragments in terms of basic properties of the ceramic bodies, their chemical and mineralogical composition and comparison of these properties with those of local pramic production. The analyses and their comparisons show, that the fine pinkish ochre ceramic differs from the fine and rough local early La Tene ceramic products. For this reason, it was possible to suppose that this ceramics was not of local origin, but it was an imported ceramics of temporarily unknown provenience.

**ON THE PROBLEMS OF REPEATED RESTORATION INTERVENTIONS ON ARCHAEOLOGICAL GLASS; THEIR INFLUENCE ON AN UNDERSTANDING OF THE OVERALL VALUE**

Aranka Součková Daňková

This paper discusses the most common causes of the growing frequency of revisory conservation and restoration of historical (archaeological) glass objects of national heritage. Revisory conservation and restoration intervention is most often undertaken in cases, if it is found that the processes of degradation were not sufficiently suppressed, where there was a disturbance of the overall value of the object, and is an attempt to obtain new information about the object. The present state of some archaeological glasses confirm that the consequences of repeated interventions, through which there could be an impairment of the material structure or significant inaccuracy, limits or lowers the value of the prospective use of the glass objects as a source of scientific or aesthetic information. The process of irreversibility of conservation interventions is usually deemed unacceptable by the professional community. Reversibility as a quality, i.e. the capability of returning the object to its previous (not original) state is not, in the case of archaeological glass, satisfactory from this point of view. In the example of a gold-painted and enamelled stemmed glass from the end of the 13th beginning of the 14th century, I would like to point out the pitfalls and the advantages and disadvantages of re-restoring this material. If the knowledge resulting from the revisory treatment of the stemmed glass is summarised, it has to be said that the principle of reversibility of conservation interventions on archaeological glass is rather an illusion, because even if the stabilising material is easily dissoluble, it does not necessarily mean that the consequences of the process of consolidation and the entire course of action of restoration are reversible too.

**STUDY AND TREATMENT OF A LATE 18TH CENTURY PAIR GLOBES**

Ana Rita Vaza, Joana Campelo, Joao Garcia

This paper concerns the study of a pair of globes from the late 18th Century produced by the firm W. Bardin & G. Wright and the conservation treatment of the celestial globe sphere. A brief introduction of the globes history and construction precedes the material and technique characterization of the globes pair. It describes the condition report and the treatment of the celestial globe. The globe presented common alterations which usually occur in these objects. Its treatment included the removal

of the aged varnish, repair of a major fracture in the celestial equator, paper cleaning, removal of parts of the gores, repair of damaged plaster, replacement of the paper gores, resizing and revarnishing. A specific globe registering database was developed to include material and technical description, conservation diagnosis and treatment.

### **THE RESTORATION OF THE CEREMONIAL UNIFORM OF IMPERIAL PRIVY COUNCILOR B. PACÁK**

Hana Tefal Juránková

The purpose of the restoration of the full set of the ceremonial uniform of the Imperial Privy Councilor B. Pacák was to preserve as much of the original fabric as possible. This particularly concerned the rich wire embroidery, decorative uniform coat. The uniform was partly damaged through wear however the serious damage was caused by insects eating into the fabric, especially in the stiffeners under the embroidery. The places of the damaged silken thread in the golden embroidery billion wires did not initially seem to pose a serious problem. However, after further examination extensive damage was detected to the padding of the surface fabric. The padding consisted of paper and buckskin. Another part of the uniform – the trousers, waistcoat and hat in the paper box – showed signs of damage of

a less serious nature. The restoration method chosen considered the fact that the uniform would be displayed in an exposition, as well as the possible later removal of repairs without damage to the exhibit.

### **THE RESTORATION OF HISTORICAL SILK PAINTED BANNER OF THE VOLUNTEER FIREFIGHTERS CORPS FROM VELVARY**

Lenka Dolanská, Dana Modráčková

This paper describes a conservation of a silk painted banner from the collection of museum of the Firefighters Movement Centre in Přebyslav. Before the choice of the conservation technique it was necessary to solve the problem of reinforcing the painting on silk where stitching techniques can't be used. A combination of two methods was chosen as the most appropriate, the adhesive treatment of central painted parts and the stitching sandwich technique for peripheral parts of the banner. Appropriate concentrations of adhesive Klucel G in different solutions were tested. The properties of bonding formed by the reactivation of adhesive surface using heat and pressure and reactivation by ethanol vapour through the semipermeable membrane were evaluated. On the basis of this evaluation, 8% aqua solution of Klucel G applied to the silk crepe line Usavelon and reactivated by ethanol vapour was chosen as the best.

### **THE INFLUENCE OF NATURAL DYES ON DEGRADATION OF TEXTILES FROM VEGETABLE FIBRES**

Lenka Kučerová

Textile objects are part of many museum collections. The textiles belong among materials which are at risk from bad storing conditions. The question is if a degradation rate of dyed textiles is influenced by a presence of dyestuffs or not. The influence of various natural dyes on the degradation of textiles from vegetable fibres was studied. The dyed and undyed textiles were artificially aged under different conditions (high temperature, different air humidity, light exposure). The influence of the dyes on the degradation of the textile materials was evaluated on the basis of the comparison of the degradation degree of the dyed and undyed textiles after ageing. The degradation degree was

evaluated on the basis of changes in the structure of cellulose which is main constituent material of the vegetable fibres. It appears that most of studied dyes have no significant influence on the degradation of dyed textiles from vegetable fibres.

### **AGEING OF COLOUR PHOTOGRAPHY**

Vladimír Bukovský, Daniela Švehlová, Katarína Klanicová

In storerooms of Slovak National Library there is relatively high amount of colour photographs. It is known that lifetime of colour photographs is relatively short. In article we tried to solve lifetime of color photographs in conditions of accelerated ageing. We evaluated whole changes  $\Delta E^*$  as well as changes particular dyes in color space CIELab 1976. Dry accelerated ageing went 35 days by the temperature 80 °C. Wet accelerated ageing went 35 days by temperature 80 °C and relative humidity 60 %.

Measured changes suggest the variability in ageing of chosen groups of dyes. The results brought new information about conditions of longtime store of colour photographs.

### **THE COMPARISON OF SEPARATION AND SPECTROSCOPIC TECHNIQUES FOR THE IDENTIFICATION OF ORGANIC DYES**

Eva Svobodová, Martina Ohlídalová, Miroslava Novotná, Zuzana Bosáková

Natural organic dyes are used primarily for the production of organic pigments, paints and textile dyeing or as lakes (insoluble form). These dyes are extracted from plants and animals and contain various organic compounds which are typical for locality and climatic conditions of their origin. These substances are structurally very similar and thus for their identification, analytical separation and spectroscopic techniques are used. Methods such as Raman or IR spectroscopy are outstanding in their nondestructivity and accuracy, but vibration bands of individual dyes could be overlapped by vibration band matrixes. Separation techniques such as thin layer chromatography, capillary zone electrophoresis, and micellar electrokinetic chromatography are considered to be destructive methods, but they have a power to resolve the dyes from their matrix with high separation efficiency. This could be used for precise identification of dyes.

### **THE INFLUENCE OF THE INORGANIC PIGMENTS TO THE IDENTIFICATION OF PROTEINACEOUS BINDER BY THE MASS SPECTROMETRY**

Štěpánka Kučková, Lucie Čámská, Pavla Kofroňová, Radovan Hynek, Milan Kodíček

The aim of this work was to learn how inorganic pigments influence the identification of whole egg, yolk, animal glue and casein binders using trypsin cleavage and mass spectrometry MALDI-TOF (matrix-assisted laser desorption/ionization time of flight). We prepared a set of model color layers including ten inorganic pigments combined with these four temperas. The egg tempera was distinguished from the yolk tempera and it was found that Cu-bearing pigments most severely complicated the identification of the temperas. The m/z values were found out for all temperas and they were used to upgrade our database of the reference proteinaceous binders that have been used in art works.

### **ON THE TRACING OF GOTHIC STRIATIONS**

Martin Nauš

During the implementation of the conservatory intervention of a late Gothic cupboard (May 2008), unusual striations were accidentally discovered. The aim of this work was to learn how inorganic pigments influence the identification of whole egg, yolk, animal glue and casein binders using trypsin cleavage and mass spectrometry MALDI-TOF (matrix-assisted laser desorption/ionization time of flight). We prepared a set of model color layers including ten inorganic pigments combined with these four temperas. The egg tempera was distinguished from the yolk tempera and it was found that Cu-bearing pigments most severely complicated the identification of the temperas.

The m/z values were found out for all temperas and they were used to upgrade our database of the reference proteinaceous binders that have been used in art works. That it was made with a by us little-known decorative technique dating from the second half of the 15th century.

This technique sporadically appears in Saxony, but is more often found in the Tyrol, especially in South Tyrol. It is in fact a striation pressed in laterally against the direction of the wood fibers, resulting in a different reflection of the light from the surface, thus creating an unusual aesthetic effect. In this case the stripes cross each other at an angle of 40° and 20°, which is almost identical of the findings in the chest cabinet from the cathedral of Meißen, Saxony.

## **CONSERVATION OF SILHOUETTES, REVERSE PAINTINGS ON GLASS, FROM THE COLLECTION OF THE MUSEUM OF DECORATIVE ARTS IN PRAGUE**

Eva Rydlová

This paper details the conservation of two silhouettes on flat glass, circa late 18th and early 19th centuries, and discusses techniques used in their creation in an historical context. The silhouettes represent a significant part of the reverse painting collection of the Museum of Decorative Arts in Prague. The silhouettes were scratched by needle point in gold with the framing in silver, then the entire surface was covered with black paint. Analysis proved that the binding media of the black paint was colophony. The paint layer delaminated completely from the glass; small parts of the gold and the silver were missing. The paint was consolidated with synthetic hydrocarbon resin and adhered to the glass with microcrystalline wax. Missing gold and silver decoration was restored directly on glass with gold and silver leaf, the black acid free paper backing substituted for the missing black paint.

## **POLLUTANTS IN THE INDOOR AIR IN THE BAROQUE LIBRARY HALL OF THE NATIONAL LIBRARY IN PRAGUE**

Ludmila Andělová, Jiří Smolík, Lucie Ondráčková, Jakub Ondráček, Susana López-Aparicio, Terje Grøntoft, Jerzy Stankiewicz

Indoor air pollution in the exhibition rooms is a serious risk to works of art stored there. In the Baroque Library Hall of the National Library we examined concentrations and compositions of aerosol particles, temperature, relative humidity and concentrations of gaseous pollutants CO<sub>2</sub>, O<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>, NH<sub>3</sub>, HNO<sub>3</sub> and formic and acetic acids. Time variation of fine particles concentration indicated outdoor origin with traffic as the most probable source. The concentration of coarse particles revealed periodic increase and decrease, corresponding to beginning and end of visiting hours, indicating visitors as a source of these particles. The major water-soluble inorganic components of the fine particle mode were ammonium sulphate and nitrate, and ammonium, with indoor nitrate concentrations decreasing to zero. It was apparently caused by evaporation of ammonium nitrate after penetration indoors. This process also increased indoor concentrations of ammonia.

## **EVIDENCE OF TIN COATING ON ARCHAEOLOGICAL ARTEFACTS BY VOLTAMMETRY OF MICROPARTICULES (VMP)**

Estelle Ottenwelter, Virginia Costa

Voltammetry of microparticules (VMP) using a paraffinimpregnated graphite electrode (PIGE) to transfer material directly from the artefacts to an electrochemical cell, was applied on two objects from Medieval Ages covered by a grey metallic coating in a variable state of conservation and appearance as a non invasive analytical method to characterise artefacts. Results have shown that the light grey metallic surface layers observed on both objects present different chemical composition, which could be determined in a selective way, following their stratigraphical location of the artefacts.

## **THE CURRENT STATE OF STORAGE OF COLLECTION ITEMS IN THE CITY OF PRAGUE MUSEUM**

Jindřiška Drozenová, Jan Klimeš

Subject of this presentation are graphic collections and depositories of The City of Prague Museum. This lecture will be concentrated to the description of manipulation process with graphic collections containing their movement from the depository through the atelier of conservation, where their cleaning and conservation is carried out. When conservation steps are done, the digitization operation follows, which in part is completed directly at our museum and in the other cases is realized in The Development department of the City of Prague in The Archive division – The Department of digitization. This practice is supported by the contracts with both institutions. After finishing the digitization of graphic objects their adjustment to convenient non-acid packing material comes up and their back emplacement into depositories of The City of Prague Museum follows. New depository buildings in Prague district Stodůlky were finished and put into operation in 2009 and their equipment assures optimal conditions in accordance with progressive tendency of preventive conservation of art collections objects.

## **THE NEW CHEMICAL LABORATORY OF THE NATIONAL TECHNICAL MUSEUM**

Ivana Kopecká

Information on the new chemical laboratory of the National Technical Museum, its instrumental equipment (optical microscopy and FTIR microscopy) and possibilities of collaboration.

## **ENVIRONMENTAL AND ECONOMICAL PROCESS OF PAPER CONSERVATION**

Martina Bajzíkuvá, Daniela Švehlová, Martina Maršala

The documents from second half of 20th century are damaged and it is necessary to protect them and preserve them. A lot of them are needed to treat, deacidify and protect before next deterioration. From the environmental balance, price accessibility is process SoBu the cleanest. It is the platform water, air and dolomite particles. The process SoBu has the smallest environmental impact, toxicity and fire dangerous. The aim of this work was familiarized with process and tested his efficiency on original books of 20th century.

## **WATERMARKS AS A KEY FOR DATING INCUNABULUM INVESTIGATIONS OF WATERMARKS IN BOOK BLOCK CHRONICA HUNGARORUM (1488)**

Marie Benešuvá

*Chronica Hungarorum* is an incunabulum dating to 1488. The author of this incunabulum is Johannes de Thuróc and was printed in Brno. The book block contains 35 different watermarks. The five main

motives are three-peak, letter P, bull head, crown and balance. Nine watermarks were identified and dated according to the literature. Another nine watermarks weren't directly identified, but it was observed very close similarity. All papers with identified watermarks were produced in-between 1484-88. This fact assured this method to be proofed for dating the unknown date-of-print incunabula.

Majority of watermarks originated in northern Italy. The location is not clearly determinable; therefore further investigation of paper properties and their comparison is difficult. Only two watermarks – letter P – originated in different place the Zürich. Values put into a chart showed similar colour variations of papers with the same motive. It showed possibility to make out individual papermill or smaller places were made a paper. This finding pointed out the direction of further investigation.

## **THE LEATHER BINDING WITH TEXTILE BOOK BOARDS FROM 1524**

Anna Boďová, Beata Vojteková, Peter Sabov

In the Slovak National Library collections there are stored significant works by medieval authors. Besides their content the works are interesting for old bookbinding technique and materials used in them. Book covers often reveal rare fragments of manuscripts and codices. In many cases these findings are even more precious than the printed or handwritten book itself. The volumes TOMVS PRIMVS PA RAPHRASEON, TOMVS SECVNDVS CONTINENS by Erasmus of Rotterdam were bound in brown leather and tough textile material (sackcloth) was used for making book covers.

## **CONSERVATION WORKSHOPS OF THE NATIONAL TECHNICAL MUSEUM**

Zbyněk Heřmánek, František Hulec, Štěpán Brabenec

Conservation workshops play an indispensable role in the system of care for collections of the NTM. Their major mission is to care for collection artefacts in the full extent of preventive conservation. It follows from the structure, extent, and diversity of the NTM collection (the original collections, which documented merely history of machinery industry, transport, electric technology industry and building industry, were over time added with new self-standing branches mapping further specialised fields of exact science from photographic and cine technology, through mining and metallurgical industries, to information technologies and industrial design) that the spectrum of collection artefacts, necessary to be taken care of, is very wide and therefore also that of material used for.

## **INFLUENCE OF UV IRRADIATION ON THE STABILITY OF POLYMERS USED IN THE CONSERVATION PRACTICE**

Zuzana Cílová, Šárka Jonášová, Martina Ohlidalová, Martin Zlámal

This work investigates changes in properties of polymeric materials due to the UV light exposition, used not only in the restoration/conservation of glass objects. UV light is high energetic radiation which is part of sunshine. Despite its low amount in solar spectra and high absorption in glass (windows, showcases) it is able to degrade mainly organic compounds. Four types of commonly used commercial products were selected for this work: PARALOID B-72, HXTAL NYL-1, ARALDITE 2020 and Veropal D709 (previous name Veropal KP 709). Polymers were tested in the form of coatings on microscopic glasses and their ageing was simulated by QUV panel for 250, 500 and 1000 hours. Changes in optical properties of studying polymers were characterized by UV-VIS spectroscopy. Based on the results it can be concluded that the tested materials differ markedly in their stability to UV light and some changes are accompanied with undesirable colour change. The right choice of polymer is very important, with regard to possible subsequent exposure of restored object to the UV light.

## **METHODS OF MANUAL DRYING**



Zbyněk Heřmánek

Manual drying of frozen archival artefacts has several fundamental working procedures differing depending either on formats of documents treated, either on the materials they are made of.

Although the manual drying may seem, at first sight, labourintensive and time-consuming, it might be the best choice for specific materials. On the contrary to mass or automated methods, it is very gentle to artefacts and its outcomes are selected, dry, clean, and flattened archival documents, which in great portion thereof, may be directly stored into archival repositories, just following their disinfection and without any further treatment, not even mentioning costly conservation thereof.

## **THE RESTORATION OF THE OBJECT MADE OF THE MILK GLASS**

Šárka Jonášová, Zuzana Cílková

There was conducted an archaeological research of Salmovsky palace on Hradčanské square in Prague. During this research were found some fragments of light blue milk glass in the waste reservoir. The appearance of these fragments, respectively their coloration, was very unusual. The main aim of this work was to find the glass material among the other ones, to suggest restoration plan and intention to characterize the scraps of this glass more closely. Furthermore to determine the chemical composition of the glass, perchance specify used dyestuff and opacifier. Those measurements have been performed by SEM/EDS methods. During the research and shape reconstruction was found that it was a pitcher without a funnel in light blue colour complemented by ear and spin in dark blue colour. On the basis of the gained information about this subject and its proposed restoration plan, was carried out further purification using distilled water and acetone. For sticking the object to its original shape was used resin on base epoxide HxtalNyl-1. Last but not least were suggested acceptable conditions for storing the object and the proper way of its manipulation.

## **PIGMENTS OF MAYAN SCULPTURES FROM THE COLLECTION OF THE NATIONAL MUSEUM**

Alexandra Kloužková, Kateřina Klápšťová, Miroslava Novotná

The paper deals with the evaluation of surface treatments of Central American Maya ceramics from the 8th or 9th century AD. Part of the unique collection of sculptures, which were the subject of research are property of the National Museum. The main objective of this work was to identify the pigments used for decorating ceramic sculptures. For the characterization X-ray fluorescence analysis (XRF), X-ray diffraction analysis (XRD), infrared spectroscopy and Raman spectroscopy were used. Combining these methods the chemici and mineralogical composition of dyes and organic ingredients

was determined. It was shown that the blue pigment is Maya blue (composed of indigo as an organic and palygorskite as an inorganic constituent), whose hue is controlled by the addition of gypsum.

The staining component of the dark red layer of the frog and head sculptures is cochineal, in the case of the jaguar sculpture it is a dye with a high content of hematite.

## **CONSERVATION OF THE ROMAN SWORD FROM IŽA**

Marián Knoll, Ján Rajtar

Poster presents the conservation of a Roman double-edged sword that was discovered in the destruction layer of the earth and timber fort at Iža (district Komárno, Slovakia) dated to the period of the Marcommanic wars (170s AD). It was found rather corroded in clayey layer with acidity 6,71–7,01 pH. It was collected complete in a block of soil fixed in a gypsum case. X-ray pictures showed

damages at its surface as well as in its inner structure. The sword was mechanically hand- and abrasive sand cleaned; and subsequently electrochemically cleaned in the vessel with distilled water by voltage 12 V and intensity

1 A. For neutralization it was saturated by a stabilization solution on the basis of phosphorus; and then coated by transparent Paraloid B72. Fragments were joined by epoxy glue. For permanent storage a vacuum case from transparent Plexiglas with fixing clips was made suitable also for transport and exhibition purposes.

## VERIFICATION PRECISION OF MEASUREMENT MECHANICAL PROPERTIES WITH NEW METHODOLOGY

Martin Maršala, Daniela Švehlová, Martina Bajzíkova

The mechanical properties are very important for utility perspective of paper materials. The strength of paper materials influences the lifetime and function. For testing of paper materials we can use following methods: tensile strength, zero tensile strength etc. For determination of mechanical properties we need the regular amount of testing samples. From this reason these methods are not suitable for original documents. We were tested the new device ZT3P® and compared the results with folding endurance on device MIT.

## RESTORATION OF LA TENE IRON SWORD FROM THE ARCHAEOLOGICAL SITE OF RESCUE EXCAVATION VELKÉ PŘÍLEPY 2003

Iva Nacherová

This work presents the process of restoration of the sword that was lifted from the grave „*in situ*“ in the plaster block. X-ray slides showed that the sword was lifted in its entire length. The fragmented and very fragile parts of sword held together only by earth and corrosion product. It was necessary to separate the scabbard from the blade. It was possible to put the sword together correctly according to the discovery state due to the correct procedure of lifting and careful radiographic and photographic documentation.

## NEW WORKSHOP FOR PAPER CONSERVATION IN THE NTM

Zbyněk Heřmánek, Tereza Nedbalová

At the beginning of May 2009 a new specialised workplace of the National Technical Museum – Workshop for Paper Conservation – started its operations. It was equipped with furniture and equipment made to order according requirements of conservators (among others, a pneumatic large-format press with above standard pressing area of 150 × 100 cm and non-typical work table with the desk of 250 × 170 cm). Thus a great scale of damaged documents of various types from common archival documents, books, and photographs, down to large plans and posters may be treated there.

## RESTORATION OF THE PARCHEMENT DOCUMENT

Jitka Neoralová

The restored document was issued in Olomouc in 1866. It is the graduate diploma of Čeněk Rýzner. The document was written on parchment with a thick layer of chalk, which was damaged by micro-organisms and mechanical stress. The document itself has been strongly damaged and only two out of three fragments have survived connected by hang of the seal. The seal is made of red wax in a wooden case. Case is suspended on the black-yellow hang. The seal is retained in only three quarters. Fragments of the dokument were connected by a parchment membrane and taped by Japanese paper. During restoration different fixation techniques of layer of chalk on the samples were tested. On the basis of the results Klucel G was chosen to ensure the layer of chalk and Vyzina for capturing detached krakels.

## **EFFECT OF VISIBLE LIGHT AND PAPER DEACIDIFICATION TO THE STABILITY OF HISTORICAL AND MODERN INKS**

Lucie Palánková

Papers can be damaged by exhibitions or in study rooms by light. Extremely sensitive are recent recording media produced and used from the second half of 19th century. Therefore it is important to know hazards linked with photodegradation of these subjects to avoid their eventual irreversible damaging in archives and libraries.

Target of this work was to research influence of visible light on stability of selected recording medias coated on wood-pulp paper (high content of lignin) and Whatman paper (high content of cellulose) after deacidification through magnesium oxide suspension in perfluoroheptane (Bookkeeper Deacidification Spray). There were studied acid and basic arylmethane dyes (Acid Green 16 a Basic Violet 1), xanthene dyes Acid Red 87 and phenothiazine dyes Basic Blue 9. Further was studied iron gall inks (with and without copper ions) coated on both papers which were deacidified by technology Bookkeeper and methanol solution of MMMC.

## **CONSERVATION-RESTORATION OF RENAISSANCE PARCHMENT LETTER FROM 1561**

Pavel Petr

Parchment letter was written in Czech language (69 × 26 cm, plica 7 cm, Public Record Office in Šumperk, Archival collection of Šumperk's Archives). It was furnished by seven wax seals, which were appended to the document by parchment strips. The letter is intended to reconciliation between Petr and Jan from Žerotín and town Šumperk. The document was mostly mechanically eroded (repeated creasing, unacceptable archiving). Parts of the four wax seals (including sealing cups) were broken in the past. The sealing cups were also eroded by chemical process, called "excessive drying" of wax. Stabilisation of this unique historical letter was ensured by softening and mild process of straightening. Highly degraded sealing cups were restored by reconstruction of expected historic condition. The letter was embeded into specific box which was made from paper board with alkaline margin.

## **THE METHODOLOGY CENTER FOR CONSERVATION AND CENTRAL DEPOSITARIES OF THE TECHNICAL MUSEUM IN BRNO**

Alena Selucká, Ivo Štěpánek, Martin Mrázek

The paper presents the project of the Technical Museum in Brno of the creation of the Methodology center for Conservation (MCC) and of central depositaries, which was granted a support within the EU Integrated Operational Program in 2010. The projects aims at the revitalization of historical buildings of former military area in Brno-Řečkovice for the purposes of extended activities of the existing Methodology Center for Conservation which provides complete services in the field of investigation, conservation and restoration of museum collection objects, methodic of intervention, consulting, verification and development of new technologies, education of museum workers and students.

## **THE OBSERVATION OF CONSOLIDANTS DEPTH PENETRATION IN CRETACEOUS CALCITIC SPONGILITE "OPUKA"**

Monika Slavíková, Michal Pech, Petr Kotlík

The aim of the presented work was to observe consolidants depth penetration. Consolidants depth penetration is a key factor for evaluation of the stone protection efficiency. Among methods (IR spectroscopy, coloring and etching methods, ultrasound, resistive drilling) able to monitor consolidants penetration ability in the stone profile, radiography and tomography are newly classified and these can monitor consolidation process in time. It is required to dope siloxanes consolidants with specific elements in order to be able to make observations with X-ray radiography which can see these elements. For example iodine and bromine doped trialkylsiloxanes can be used. Depth penetration was observed on selected types of stone with various porosity and consolidant agents were prepared in several concentrations.

### **VOLATILE ORGANIC COMPOUNDS IN THE BAROQUE LIBRARY INTERIOR**

Magda Součková, Susana Lopez-Aparicio

The measurements have been accomplished within the scope of the international project „Environmental monitoring and evaluation of tolerability of indoor environment in the Baroque Library Hall of the National Library “ (Norway grants) in cooperation with the Institute of Chemical Process Fundamentals, Laboratory of Aerosol Chemistry and Physics and Norwegian Institute for Air Research (NILU). The measurements of volatile organic compounds (VOCs) were taken at the Baroque Hall and contiguous rooms (five sampling places including the outdoor air) in July and November 2009. The poster explains the term „VOCs“ and informs about the results of measurements. Found VOCs concentrations have been compared from the point of view of the sampling date and place.

### **STUDY OF STABILITY OF FIBRES AFTER DISINFECTION**

Petra Šenkyplová, Miroslava Novotná, Vendulka Otavská

The presence of microorganisms in archaeological and tomb textile is continually resolved to many meetings and discussions. The question is, if the microorganisms are indeed able to survive in the long term under given climatic conditions, how really dangerous are they and how remove them effectively without damaging of textile and health of conservators. It's thus desirable to find acceptable methods of disinfection, proper solution and it's also necessary to know analytical methods, which are the most suitable for examination of effect of disinfection and of stability of fibres after disinfection. This work is firstly specialized in study of silk cloth degradation after disinfectant application, which is in common in inland in preservation-conservation (conservational-restorer) practice used. The disinfection process was simulated and subsequently was observed the measure of damage by the help of optical method and FTIR spectroscopy.

### **NEW REPOSITORY OF THE NATIONAL TECHNICAL MUSEUM**

Zbyněk Heřmánek, Katřina Šupová

All efforts and care invested into the collection creation, including their conservation and preservation, would be lost if artefacts are deposited in inappropriate environment where they would be deteriorated and finally would fall into ruins. Therefore in 2003 the construction of new repositories, which would be fully compliant with strict requirements for storage of collection artefacts, was launched on the NTM premises out of Prague. The design of the NTM Repository Hall earned the Gloria Musaealis Award in the category of the Museum Achievement of the Year 2006. In June 2009 the Hall No. 2 was approved; implementation of the Hall No. 3 is planned for the years 2010 to 2011.

## ARTEFACT DRYING FACILITY OF THE NATIONAL TECHNICAL MUSEUM

Zbyněk Heřmánek, Zuzana Švarcová

Following the floods in 2002 the National Technical Museum solved what to do with approx. 200 cubic meters of frozen archival artefacts. After a half year of experimenting that led to the choice of an optimum method of drying of flood damaged materials, a specialised artefact drying facility was built up. The drying method was discussed and verified for over a long time, and the fact the decision was the proper one is, inter alia, proven by that the project "Drying of archival artefacts deteriorated by the floods in 2002 at the Artefact Drying Facility of the National Technical Museum" was after one year of its functioning taken under the auspices of the Czech Commission for UNESCO and was awarded with 3rd prize in the category of the Achievement of the Year of the Gloria Musaealis Award.

## RESTORING JESUS CHRIST FROM THE CHURCH SAINT JOHN THE BAPTIST

Iveta Valešová

It was to preserve the metal part from the discovery, it was getting by archaeological excavation in the crypt next to the church Saint John the Baptist from Běstvína. The object is produced from yellow copper plate wroughting corpora Jesus Christ. It was doing a research restoring items the object, with including documentation, X-ray analysis and elektron microanalysis. This was detected the higher data about the metal compound and volume of the corrosive degradation. It was used the next

proceeding for treatment. The each of fragments was treated by mechanical cleaning. Because it was a large corrosive degradation of the object when it was the authentic thickness the yellow copper plate was in the fact mineralized in full wide, consequently the chemical treatment it was impossible.

Next step it was each of fragments from corpora attended by immersion in the benzotriazol solution with ethanol. After drying it was component parts joined together. It was the sticking with the aid solution Paraloid B72 with ethanol and keep hard surface by the gossamer from glass-fiber. The finish conservation step of the corpora J.Christ it was consolidation solution Paraloid B72 with ethanol.

## MICROSTRUCTURE OF CERAMIC BODY OF MOON-SHAPED IDOL OF THE LATE BRONZE AGE

Petra Zemenová, Alexandra Kloužková, Zdeněk Mazač

Moon-shaped idols are ceramic objects having a prism shape of the extracted beams at the ends of the horns. Their significance is not yet fully elucidated. The theories range from cult following to practical use. The aim of this paper was to evaluate microstructure of moon-shaped idol from the late Bronze Age found in Zdiby near Prague. Since now it has not yet been established whether these objects were heat-treated before the utilization. The chemical and mineralogical composition was analyzed using methods of optical microscopy, X-ray diffraction and X-ray fluorescence analysis, infrared and Raman spectroscopy. The results indicate the temperature of the object heat treatment. It was shown that the central section was exposed at higher temperatures compared to peripheral parts, which were identified by the presence of kaolinite.

