Abstracts

Tóth Attila Lajos
Electron Probe Microanalysis For Restorers.
Part Iii: Sampling, Sample Preparation,
Data Processing and Presentation

No analytical measurement can be better and more reliable than the preceding sampling and sample preparation. Even the best instrument in the hand of the most skilled analyst gives poor results from sample of inferior quality and uncertain origin. In the practice of archaeometry and restoration the situation is even more problematic, as the sampling and preparation is done by the archaeologist or the restorer (i.e. the specialist) in most of the cases on the site or in the museum, while the measurement by the analyst.

What is even more dangerous, the modern instruments practically always give an output, what – in most of the cases – seems to be reliable (computer printout of corrected X-ray intensities with averages, standard deviations, furthermore images, line scans and element mapping can be extremely convincing). These results – if the analyst is professional – surely characterize the analyzed microvolume or the whole of the sample in the microscope, but the obvious requirement is the characterization of the piece of art.

Our goal is to ensure the reliability of the whole process, from the sampling to the data correction and presentation. The paper shortly summarize the rules of sampling and sample preparation in the electron microprobe analysis, the importance of documentation and the presence of the restorer during the measurement,

Attila L. Tóth PhD, CSc
Senior res.fellow
Hungarian Academy of Sciences MFA
H-1121 Budapest
Konkoly-Thege u 29–33.
Phone: +36-1-392-2691; +36-30-287-5290
E-mail: tothal@mfa.kfki.hu

Gyöngyvér Mara – Zsuzsanna Mara
Fungi Damaging Works of Art;
Their Detrimental Effects

The author discusses damages caused by mould fungi on works of art made from organic materials, as well as their examination methods. As for its taxonomy, the fungus kingdom is highly varied; several genera are known of species which cause damage to works of art, such as Alternaria, Aspergillus, Cladosporium, Myrothecium, Paecylomices and Penicillium. Invasion by fungal hyphae causes serious physical degradation in objects; even their material may crumble away. Deterioration can also be chemical in nature; exoenzymes or organic and inorganic acids produced by fungi may damage structural elements of works of art. Not infrequently, fungal hyphae penetrate and discolour materials without extracting nutrients from them. Papers may display coloured deformation called foxing. Beyond material degradation, fungi may also frequently cause health impairment through the spores, mycotoxins and volatile organic compounds (VOC) they produce. Mould fungi are examined predominantly by classical microbiological methods. Samples taken from the surface of works of art are cultivated on Czapek-Dox agar in sterile conditions for about five days of incubation at a temperature of 30°C. Fungal growths are then analysed both morphologically and microscopically. With the appearance of electron microscopy, scanning electron microscopy (SEM) is used to detect fungal colonisation and mechanical deterioration in works of art. Owing to the development in molecular biological methods, several DNA based methods are available for the identification of fungal species that cause deterioration or are difficult to cultivate. First and foremost step in up-to-date conservation of works of art is preventative protection which calls for appropriate storage conditions at low temperature and below 60 per cent relative humidity. As long as stored or displayed in the specified conditions, danger of microbiological contamination of objects of art is eliminated. Protection against fungi can also be ensured by physical (radiation, temperature) and chemical fumigation methods. Reducing temperature, such as freezing, proves ineffective for fungi; on the contrary, increased temperature may prove an effective method for protection against fungi, provided that objects of art are treated at a suitably high temperature and for an appropriate time. Another physical method is radiation treatment; γ radiation is used for the treatment of paper and wood based objects. While a small dose of γ radiation is highly effective against vermin, the suitable dosage against some fungi is 10–16 kilo grey. Of inert gaseous disinfectants, N_2 is unsuitable for the elimination of fungi by fumigation. An environment with low O_2 content (0.005–0.1 per cent) however, might effectively eliminate aerobe cellulose-destroying micro-organisms. If newly acquired from an alien environment, a thorough examination of the item is imperative. If signs of moulding are observed in the course of macro- and microscopic examinations, it is important to cultivate the fungi for the purpose of identification. In this way, information can be obtained on the degradation to be expected and the methods to be applied in the course of eliminative protection.

Dr. Gyöngyvér Mara
Biologist
Sapientia Hungarian University of Transylvania
Faculty of Technical and Social Scienses
530104 Miercurea Ciuc, Piaţa Libertăţii nr. 1
Phone: +40-266-317-121

Zsuzsanna Mara
Painting conservator
Muzeul Secuiesc, Miercurea Ciuc
530110 Str. Cetăţii nr. 2
Phone: +40-266-311-727
E-mail: zsuzsamara@yahoo.com

Levente Domokos

Raw Materials of Natural Pigments in Transylvania, their Prevalence and Use in Light of Literary and Ethnographic Data

Displaying the influence of Renaissance floral design, painted furniture represents a notable form of material culture in Transylvania, where it spread owing to the work of painter cabinet-makers and became a new popular craft. The prices and standards set by urban cabinet-makers' guilds and the price of imported colouring matters put no obstacles in the way of the spread of painted furniture. In order to meet increased demands, lower-price products made by rural master craftsmen, who relied on local resources and raw materials, competed with the high-standard, set-price products made by members of cabinet-makers' guilds. The craft as practised in the countryside was characteristically of a family character: often extending to related trades, it passed from father to son, slowly combining centuries-old tradition with technological innovation in the process. The subject of this study forms part of the author's researches carried out for his university thesis. Without attempting to be comprehensive, it deals with the provenance and mention of natural pigments which were found in Transylvania and used by painter cabinet-makers, rural or urban guild-members, and it also offers a survey of the literature on Transylvanian pigments. As attested to by the cave drawings found in the Szamos Valley in Szilágy County, made in the Palaeolithic age, the earliest mineral pigments used in Transylvania were ferric oxide and coloured clays. Noteworthy mentions of painter cabinet-makers and raw materials are found relatively early in descriptions written inside and outside the country, which include works on painting, geology and geography, travelogues, dictionaries and grammar-books, as well as literary, medical and pharmacological works. Transylvanian and Hungarian data are found in Agricola's works Bermannus sive de re metallica dialogues (1530) and De Re Metallica Libri XII, the latter, on mining, was published in 1556. In his book published in 1649 "On the Art of Painting", F. Pacheco del Río complains that since the Turks had occupied Hungary, no azurite mined in the Carpathians was available in Spain. The recipes published in Valentin Boltz's Illuminirbuch (1549) and J. B. Pictorius's Den Geheimen Illuminer-Kunst (1713 or 1742) were well-known in Transylvania and were probably used, too. Pictorius's book was translated into Hungarian in 1802 by Sámuel Kendi, minister of Etéd. The next known book on painting, "A short textbook on the preparation and properties of some paints used in cabinet-making and painting on architecture", was written by Antal Ferencz at Csíkszenttamás in 1828 and is preserved in the Szekler Museum of Csík (now Ciuc, Rumania). A book of recipes that has come down incomplete was written by Péter Bálint at Csíkszentdomokos in the 1830s. The rich resources of mineral pigments found in Transylvania were well known in Europe. Apart from Agricola and F. P. del Rio, later travellers also made mention of raw materials used as pigments. Transylvanian sources containing several mentions of pigments and paints also include inventories, court records and guild books. Descriptions of quarries of pigments and mineral paints with no claim for comprehensiveness appeared in both the geological-geographical and ethnographical literature. The literature on conservation and restoration also introduces recipes of various pigments or recommendations on their quality, but mostly without their provenance. Since utilisation of minerals as pigments is not a primary target in mining, geologists mostly make a mere mention of the fact that the minerals or raw materials in question can be used as paint. Ethnographers make mention of earth paints being mined near a village, but offer no exact position. Identification of sites runs into several difficulties. Depletion of mines and quarries, or abandonment of sites for economic reasons, rendered survival of relevant data more difficult. Identification of sites was also made difficult by changes in place-names over the times, their loss in communal memory, as well as by changes of borders, natural features and environment. The identification of the sites of coloured earth and pigments used in Transylvania can be attempted on the bases of data found in the literature cited above, through ethnographical collection work and in the course of inspection of sites. Parallel and subsequent to these, a comparison of samples collected with the pigments found on items must be carried out.

Levente Domokos
Conservator student
Muzeul Molnár István
535400 Cristuru Secuiesc
Phone: +40-266-242-580
E-mail: domokoslev@freemail.hu

Zsuzsánna Váli
Aspects of Visual Inspection of Medieval Wall Paintings. Visual Inspection of Medieval Mural Paintings from Transylvania

In this article author tries to provide some aspects and to present and emphasize the importance of visual inspection as an important part of the study of wall paintings, through the example of four medieval murals from Transylvanian churches. Visual inspection, documentation, non-destructive and destructive material testing are complementary phases of the study of artefacts. Through these methods, we can size up the circumstances of production, the materials used by the artist, the process of decay and its causes and the possibilities for treatment. All conservation-restoration interventions are irreversible, so the importance of visual inspection and recording of knowledge in writing and picture is great. Following conservation-restoration some information will be compromised or lost, so the state of preservation, the causes of deterioration, the materials and process of work can be studied worthwhile only prior to any intervention. Visual inspection can be done easily, it requires only a few, cheap instruments, but it can affect later on the whole process and course of work, so one should do it very attentive. The investigation of Transylvanian wall paintings is important not only for the study of murals from the territory of the Hungarian Kingdom, but also for the research of the pictorial traditions of medieval Europe, especially as in Transylvania there are wall paintings which are belonging to the Byzantine school, other which have Italian influence, and yet others with German connections. In Transylvania dozens of wall paintings, which were lying under plaster for centuries, just about in their medieval condition, are being revealed now, and give us the chance to study them, without being compromised by later repairs and restorations. The aspects of visual inspection include the studying of the structure and composition of plaster, completed by microscopic analysis of layers and materials; the order of work revealed by the order in which the „pontate", „vertical joints of plaster" and „giornate" are following each other; the relief of the surface partly influenced by the materials used for building the wall; the finish of the surface, and of the joints of plaster, the marks left by the tools used for spreading and smoothing the mortar, which can hint to the type of tool used; the preservance of the marks left by these tools can show us the state of dryness and carbonation of the plaster during work process; those defects of the plaster, like cracks and fissures, which clearly originate from the work process can indicate the technical blunders made by the artists during work; the lumps in the binding material, like pebbles or ill scorched limestone bits can cause micro-fissures in the wall, or if they are underneath the surface, the peeling of the paint; on the other hand lime clots called „kalkspatzen" are benefice for the wall, the presence of these lumps in the mortar can give us information about how was the mortar made; we can observe what tools were used to make the underdrawing; from the state of preservation of the paint layers we can deduce in which order the painters proceeded with their work and by consequence, what technique did they use, fresco buono, mixed technique or secco painting; Studying the painting technique of certain paintings and comparing them to the prescriptions written in treatises of the same period we can attest the similarities and differences between real practice and literature. This comparison can also help us to evaluate the craftsmanship of the painters in question, which can be important if one desires to establish stylistically connections and workshop relations; studying the typical formal solutions, we can also make stylistic comparisons and conclusions. By observing the forms and signs of deterioration we can gather information about the history of the building and take proper decisions concerning the conservation and restoring of the wall paintings. Of course, these aspects can and should be developed further by studying, documenting and comparing more and more of the artistical evidence left us by the medieval workshops.

Zsuzsánna Váli
Painting conservator MA
Budapest
Mobile: +36-30-443-5305
E-mail: valizsuzsa@yahoo.com

Miklós Szentkirályi
The Iconostasis of Máriapócs Restored

In 1696, the Mother of God icon in the small wooden church at Máriapócs began shedding tears. Leopold I, Austrian emperor and Hungarian king, ordered the painting to be transported to Vienna, where it was placed on the altar under the Gothic marble canopy in the southern aisle of St. Stephen's Cathedral on 11 September 1697. The place of the icon at Máriapócs stood empty for years until, at repeated demands by Prince Francis Rákóczi II, and by favour of István Telekessy, Bishop of Eger, an exact copy was made for the Máriapócs church. It is recorded that the painting was weeping again in August 1715. With that, the cult of the place with an object of pilgrimage took its beginning. On the site of the small wooden church, a stone church was built and was consecrated in 1756, complete with the iconostasis. Subsequent to the restoration of the iconostasis in 1896, the second weeping picture was placed above the Royal Doors. The third weeping took place in December 1905. A team of restorers worked on the Máriapócs iconostasis for two years. Aesthetic and ethical issues posed greater challenge for them than professional techniques. More than a determinant liturgical part of a Uniate cathedral, the iconostasis is also a testimony to the history of the church, to all changes in it, and to encounters between 18th century Oriental and Western art trends. The restorers aimed to acquaint themselves with, explore, and present the iconostasis in its artistic unity complete with values acquired in the course of its history of 250 years. Based on research, exploration and the microscopic analysis of cross-section samples, it has been established that for close to 140 years, the wall of icons displayed a Baroque-Rococo riot of colours. Historically, the first coat of paint on the perpendicular elements of the structure was blue marbled with white, and the horizontal elements, rims and consoles were red marbled with purple. The carved bits, foliated scrolls, were green and the floral details scarlet and blue alternately; they display direct stylistic kinship with the iconostasis of the Uniate church at Balázsfalva (now Blaj) in Transylvania. At the bicentennial of the weeping, large-scale renewal work was carried out on the iconostasis. Marking the beginning of a second historical period, altar builders Gyula and Imre Spisák, of Pest, painted over the superstructure in brown, and gilded all the carvings with matte and bronze powder technique. As attested to by the signatures, they replaced the icons in the bottom, Feasts and Apostles tiers with new ones painted by Gyula Spisák and his students in 1896. Only five of the old icons survive; these are housed in the Uniate Collection at Nyíregyháza. Between 1943 and 1945, the entire inner furnishings of the church were rehauled and the inside repainted under the direction of the Franciscan friars of Pécs. Marking the third historical period, the structure of the iconostasis was again repainted in reddish brown, and the doors, which had also been made in the Spisák workshop, were entirely renewed. The icons were retouched too, no doubt with intent to improve them. Restoration work started out from these last historical conditions. An agreement was arrived at, namely that the gilding and the icons painted by the Spisáks were to be preserved and restored, out of respect for the transformations carried out in various historical periods. On the other hand, the brown coat of paint was to be removed, so the wall of icons could regain the coloured marble painting it had in the mid-18th century. Exploration of the pediment revealed that the dragon motif occupying central position has preserved its 18th century condition. The likenesses of the prophets were repainted by the Spisáks, and the Baroque layer was uncovered. In this way, nine prophet portraits on the pediment and the figures of John the Baptist and the Virgin on the Calvary have come to light. The structure of the iconostasis has regained its original, Baroque character and, in part, colour scheme, but preserved a large part of the gilding on the carved parts as well as the icons. At the same time, the pediment crowning the structure is nearer its 18th century condition. Finally, 21st century has made its mark too: on its reconstructed part above the Royal Doors, a composition of Christ's head by a contemporary artist was placed. After conclusion of the restoration work, the renewed church was consecrated on 11 September 2010 by diocesan bishop Fülöp Kocsis, and a sermon was given by Cardinal Christoph Schönborn, Archbishop of Vienna.

Dr. habil Miklós Szentkirályi
Painting conservator MA
Museum of Fine Arts
1146 Budapest, Dózsa György út 41.
Phone: +36-1-429-759
E-mail: miklos.szentkiralyi@szepmuveszeti.hu

Zsuzsanna Korhecz Papp
The Restoration of the 'Bleeding Picture' of Bács

The study describes the restoration work carried out on the votive picture "Bleeding Virgin Mary" in the Franciscan monastery of the Assumption at Bács (now Bač, Serbia). Belonging to the iconographical type of 'bleeding pictures' widespread in the territory of the Habsburg Empire, the painting, done in oils on canvas, displays the Virgin in a frontal position against a brown background, wearing a red garment and a blue gown decorated with letter symbols and stars, with an ornate crown on her head. Standing in front of her is the Christ-Child in golden-hemmed green garb. His right hand is raised in blessing, and in his left hand he holds a scroll with the inscription Ingremio Matris sedet Sapientia Patris. There is a wound on the Virgin's forehead from which blood is dripping on her son. In the bottom of the picture there was probably an inscription explaining its provenance, but this section of the painting, together with the canvas support, was destroyed. In 2000, experts at the City Musem of Szabadka (now Subotica, Serbia) photographed the Baroque heritage in the Voivodina for the theme project "Baroque Routes in Hungary", on which occasion the author first saw the votive picture in the cloisters of the Franciscan monastery at Bács. Standing in front of the faded oil painting she pledged herself to save it from further deterioration. Because of bureaucratic obstacles, keeping her pledge proved quite difficult. However, restoration was eventually made possible with the support of the Illyés Public Endowment in 2006. Owing to adverse conditions of keeping, the coat of paint on both the picture and the frame was flaking; some 15–20 per cent of the painted surface was damaged. Restoration work proper was preceded by various photo-technical examinations then available in Serbia (normal, oblique light, luminescent and X-ray), as well as microscope examinations in normal and ultraviolet light of the cross-section of samples taken from the work of art. These were complemented by solubility tests. After applying a protective layer on the painted surface (Nowotex sheets, carboxymethyl-cellulose) and cleaning the reverse, the torn support was secured on the edges with polyvinyl acetate based glue and complemented with canvas marquetry work. Conservation of the painting was performed with wax resin. The canvas was reinforced with a double canvas and transferred from the old, vermin-infested frame to a new canvas stretcher with wedges. An 1:1:1 mixture of Palma Fa waterproof glue, Plextol, and CMC was applied to secure the stretching edge. Cleaning was done with a mixture of four parts of butyl acetate, four parts of cellosolve and one part of formic acid. Losses in the red ground-coat were complemented by coloured filling paste, and after protecting the surface with dammar varnish, the reconstruction of the coat of paint was carried out with invisible oil retouch. Infestation of the ornamental frame was terminated with carbon tetrachloride, and conservation done with a 10 per cent solution of Paraloid B72 in nitro diluent. In her study, the author describes how it is possible to do justice to standards acquired in the course of university studies, even though no trodden paths exist. She also raises issues of restoration ethics and problematical attitudes in the protection of art heritage in Serbia.

Zsuzsanna Korhecz Papp
Painting conservator MA
City Museum of Subotica
24000 Subotica, B. Stankovica 26.
Serbia
Phone: +381- 2457-1165
E-mail: korhecz.zsuzsi@gmail.com

Doina Boroş

An Examination of Metal Thread Fabrics in the National Museum of Transylvanian History

The conservation of textiles, especially their cleaning, calls for a thorough knowledge of their support and ornamentation materials, since appropriate cleaning methods must be chosen in its light. This is doubly so in the case of metal thread textile objects. The collections of the National Museum of Transylvanian History in Kolozsvár (today Cluj-Napoca, Rumania) contain many metal thread fabrics. In the study, results of the material tests of some exceptionally fine items are described. The fabrics have been conserved in the museum workshop by Katalin Vajda. The 16th-century finds that have come to light from the crypt of the Lutheran church of Küküllővár (today Cetatea de Baltă), a bonnet, a neckband, and a gown decorated with ornamental metal buttons, precious stones and genuine pearls, which had belonged to Zsófia Kendi, are most spectacular. All three items are made from silk velvet, onto which the ornaments are fastened with cotton thread − enamelled gold buttons and genuine pearls on the bonnet, enamelled and plain gold buttons, spherical gold pearls, spiral-shaped silver wire ornaments, genuine pearls, cut pyrope (garnet) pearls, and gilded ceramic plates with three small cabochon-shaped garnets fastened on them, on the neckband. The bonnet and the neckband have been conserved. The velvet support was extremely weak; therefore a new base was tailored onto which the ornaments have been fastened. The support fabric of a 17th or 18th-century communion table cloth is thin, light linen, which is embroidered with spun gold. The gold of the metal thread is alloyed with some silver. In the course of conservation work, the fabric was supported by thin linen. The majority of items in the collection are embroideries on thinner or thicker linen supports, but some, primarily accessories to clothing, are sewn on silk. In examining the gold and silver-coloured metal threads, the author identified alloys in which one or the other metal dominated, as well as, among others, silvergilt, gilt copper brass, copper, and silver. Examinations revealed that the threads used for textile items in the collection consist predominantly of pure silk core and metal strips tightly wound around it. Other threads used on some items are the ‘brillant’ and the ‘bouillon’. The support material of a 17th-century funereal pillow, which has been cleaned and lined in the museum, is silk, on which the needlework was made with silk threads of pastel shades and a metal thread made of 0.2 mm thick silk yarn wound with silvergilt strip. The work of 17th-century master embroiderers, a saddle-cloth is made of two green silk fabrics of the same size, one is embroidered velvet, the other unadorned satin, and is decorated with tassels all around. The examination of metal threads used both in the embroidery and the tassels revealed that silver and silvergilt strips are wound on silk core. The support of an 18th-century sabretache is red velvet, on which the raised embroidery was made. The metal threads, plain, brilliant and bouillon, are made of silver and silvergilt strips wound on the silk core. The sequins are made of silver and silvergilt. The splendour of the piece is further enhanced by silver lamellae, which are painted red, with traces of madder lake still visible on them. Silver-coloured lamellae painted red and green are also found on a 19th-century county banner. These are made of thin pewter, the red paint is madder lake, and the green is earth-green mixed with glue. The support material of the banner, consisting of two sheets of satin-weave silk, beside the lamellae it is decorated with raised embroidery and appliqué work. The metal threads and ornaments are identified as silvergilt strip wound on silk core, silver strip by itself, silver and silver-plated copper sequins, ornamental braids (silk yarn twisted up with silvergilt strip wound on silk core), bouillon made from copper wire, and glass beads. A hairnet made from silk thread with mesh netting, macramé technique, was made in Kolozsvár in the 18th century and came to light during the excavation of the crypt of the Calvinist Church in Farkas Street in the early 20th century. It is decorated with several types of silvergilt threads, genuine pearls and silvergilt, enamelled clasps. An interesting type of metal thread was found in the needlework of a towel from the late 17th century: the cross section of the blue-grey, 0.6 mm wide and 0.015 mm thick strip is shining yellowish-white. It is a silver alloy containing a small amount of gold and copper. The metal thread is patinised; its surface colour is due to silver sulphide. Two of the towels in the collection of the museum display such metal threads. Several other items in the collection are ornamented with metal threads, and results of their examination will be published at a later date.

Doina Boroş
Chemist
Muzeul Naţional de Istorie al Transilvaniei
Cluj-Napoca, str. Constantin Daicoviciu nr. 2
Mobil: +40-722-735-268

Hédy M-Kiss
Conservation Conditions of Historical Textiles in the Banate Museum, Temesvár

The Restoration and Conservation Laboratory of the Banate Museum in Temesvár (now Timisoara, Rumania) was established in 1975 as part of a national network. Up to recent times, nine people worked in its textile unit. Today the author is the sole conservator employed, and since 1997 the laboratory has been defunct owing to moving several times. In the 35 years, textile conservators prepared 365 ethnographical textile items, 196 archaeological leather items, 122 historical textile items, 32 applied arts items, and 9 church textiles. Unfortunately, regulations concerning the storage of textile objects have not been kept in the museum, therefore the items have suffered damages of lesser or greater degree over the years. Historical textiles in the museum, comprising 20 modern-age flags, six guild banners, 13 banners of societies and civilian associations, five ferpár[?] and coat of arms, 23 ribbons and ten contemporary historical flags, are kept in the memoirs collection of the Historical Department. When in 2007 the author began surveying historical textiles, she found that the storage room was dirty and dusty, and the objects were covered by a thick layer of dust. The textiles had no cover, and were unprotected from light. In cases, flagpole, bunting and streamer were stored in different places, each having a different inventory number or no number at all. Flags were inappropriately stored, with the bunting wound around the pole. Temperature and relative humidity fluctuated, and in the absence of instruments, no measurements were made. Documentation of conservation work carried out thirty years ago revealed that some flags in the collection had already been severely damaged at the time. Their number has regrettably grown since then. Alongside physical, chemical and biological damage factors, all this testifies to poor standards of human care. Damages affecting the textiles can be classified into several groups. To begin with, almost all items have suffered discolouration due to exposure to light. In painted flags, the majority of paintings were done straight on the bunting with no appropriate grounding. Both the paints and the support materials are, in general, of poor quality, in consequence of which the paint of coat is cracked and flaking, and the particular, original message of the depiction is lost. The same applies to flags with inserts painted on both sides. The degree of damages sustained by the flags depends much on their age, materials, form, and technique of manufacture. Early items, for instance, are triangular flags made of a single sheet of pure silk painted on both sides, with decoration and inscription. If the painted part was supported by silk, deterioration progressed farther, as pure silk is more liable to deteriorate when exposed to light. Flags and banners made of two sheets and painted on both sides are mainly rectangular or square in shape, and are lined and embroidered. Their mechanical strength greatly depends on the material of the bunting, as the hardiness of silk, brocade, damask and velvet varies greatly. Needlework caused the support to deteriorate faster, especially if it was raised and done with metal thread, since the heavier a flag is, the sooner it tears. Stains on the buntings may have been caused by contact with other objects in storage, by 'domestic' accidents (ink, food and candle stains, small burns, etc.); in the case of flags hung in the open for a long time, humidity caused paint bleedings. Metal threads, metal threaded tassels and knots, and pins fastening the bunting to the pole also left corrosion stains on the textiles. Amongst biological factors, bacteria in the dust dried the textiles and mould fungi left stains both on the textiles and the paintings. Wool and cotton fabrics have been damaged by moths. To sum it up, in order to provide appropriate conditions for housing historical textiles in the Banate Museum, a storage room fitted out especially for the purpose is needed, where the buntings of flags and banners can be stored spread out, flagpoles kept in repository, and pointed tips of flagpoles kept in separate boxes. Humidity and temperature in the room are to be controlled by instruments. Conservation work could only be carried on with the collaboration of more textile conservators and appropriate laboratory equipment.

Dr. Hédy M-Kiss
Textil artist and conservator
Muzeul Banatului, Timişoara,
300561 Timişoara, Str. Ofcea nr. 5
Phone: +40-256-202-394
Mobil: +40-720-311-758
E-mail: andraskiss2000@yahoo.co.uk

Orsolya Koppán – Zsuzsanna Tóth
Stabilisation of Ink-corroded Manuscripts by Calcium-phytate/Calcium-bicarbonate Treatment; Application of Treatment in the Conservation of the Apor Codex

Iron gall ink was made predominantly of tannin extracted from oak gall, of vitriol (iron sulphate) and water, to which gum arabic was added. It was in use from the Middle Ages onwards up to the mid-20th century.

Ink corrosion is a complex process in which iron gall ink causes the material of paper, cellulose, to deteriorate.

Corrosion is caused mainly by the acidity of the ink and the presence of metal ions. Deterioration takes place due to two major reactions − acid hydrolysis of the cellulose caused by ink acidity, and oxidation catalysed by an excess of free iron ions. As a result, the paper cracks along lines of writing, leading in severe cases to fragmentation at a mere touch. The calcium-phytate/calcium-bicarbonate procedure was first recommended for treating ink-damaged manuscripts by Johan G. Neevel in 1995. Thanks to the treatment, a prolonged lease of life with minimal side effects can be ensured for ink-corroded manuscripts.

When applying the calcium-phytate/calcium-bicarbonate treatment, following the appropriate order of steps is of paramount importance. At the same time, adjustment of the treatment is necessary in view of the unique features of documents − as was the case with the Apor Codex. Phytic acid is a natural compound which readily forms complexes; its salt is calcium phytate. In the course of treatment, calcium ions replace harmful free ferric ions, resulting in the white-coloured complex ferric phytate. Thus neutralised, ferric ions cease acting as catalyst to cellulose oxidation. The iron gall ink sustains no damage during the process. Calcium-phytate treatment alone cannot eliminate the acid hydrolysis of cellulose; therefore, it must be followed up with neutralisation by calcium carbonate solution, which forms an alcalescent residue in the paper. The concluding step in the treatment is paper re-sizing with gelatine, which contributes to the lasting effects of the phytate treatment.

One of the earliest records of the Hungarian language, the Apor Codex was written in the late 15th and early 16th century. It was named after its first known owner in the modern age, Baron Péter Apor. Today it is in the collection of the Szekler National Museum in Sepsiszentgyörgy (now Sfantu Gheorghe, Rumania). Iron gall inks of various qualities were used in the manuscript. Leaking on more than one occasion caused its paper to get mouldy; water stains appeared on it, the destructive process of ink corrosion started, and in places, ink crumbled away. Most important task, therefore, in the course of conservation work was to arrest not only ink corrosion but also ink crumbling to dust. Pre-treatment assessment established that the manuscript showed ink corrosion of all degrees.

Aqueous cleaning and calcium-phytate/calcium-bicarbonate treatment of the pages were followed by paper repair. The manuscript is a linguistic record of major importance; therefore the best possible conservation of the written form was necessary for more than just aesthetic reasons. Complementing the sheets was to be carried out by manual paper leaf casting. Trial leafcasting, however, proved not really successful, because the paper pulp covered all too much of the written text area, so a different complementative method had to be found. Leafcasting combined with special manual repair work produced the finest results. With the use of two brushes, tiny pieces of paper, "fluffs" matching the colour of the inks were glued with methyl cellulose to fill out lost or fragmented parts of the sheets − it was a time-consuming work which demanded great precision.

Orsolya Koppán
Paper and leather object conservator MA
Book and paper conservator
Országos Széchényi Könyvtár
1014 Budapest,
Szent György tér 4–6.
Phone: +36-1-487-8611
E-mail: koppan@oszk.hu

Zsuzsanna Tóth
Wood and furniture conservator MA
Book and paper conservator
Országos Széchényi Könyvtár
1014 Budapest,
Szent György tér 4–6.
Phone: +36-1-224-3700/321
E-mail: toth.zsuzsanna@oszk.hu

Csilla Farkas

Hebraica Biblia, Latina planeque nova Sebast Munsteri tralatione

Housed in the National Széchényi Library, Budapest, in the Collection of Early Books, the book was made in the 16th century. With wooden covers bound in blind-tooled, alum tawed pigskin with corner pieces, originally it was secured with two asymmetrical hook-clasps. The text block, of hand-made paper, was fastened on five double cords. The front cover displayed writing in black ink; on the inside of covers and the pages, a number of handwritten notes in ink and pencil were found. The leather was strongly soiled and defective in many places. The back wooden cover had been broken lengthwise and stitched up with parchment ribbons. The straps and hook-clasps were missing. The headbands were embroidered on a wide parchment lining in three alternating colours – plain, light tobacco and greenish-blue. The sheets were extremely soiled, and water-stained for soaking. Also, some were mutilated. The flyleaves were missing. Sewing came undone in places. The ink of the notes spread through neighbouring pages in several places, causing ink corrosion damage and acidification of medium degree.

Conservation work commenced with dry cleaning. Regnal (polyvinyl butyroacetate) diluted in ethanol was applied to consolidate the deteriorated sheets. Next the water-soaked endleaves were removed from the covers, revealing a second breakage in the back cover which had been kept together only by the binding leather and paper. In order to carry on the treatment, the first and last sheets had to be detached from the text block. In case of handwritten marginal notes, the surfaces were moistened with water, which was followed by the topical treatment of sheets inside the volume with calcium phytate solution in order to neutralise excess Fe(II) ions, the cause of ink corrosion damage. During this process, the part of the text block underneath a sheet was protected by polyethylene foil. Blotting papers placed under the sheet drained the liquids applied and therefore had to be replaced frequently. To speed up drying, a hair-dryer was used to prevent the forming of water-stains and the seeping of water to the spine. Losses in the paper sheets were filled out with paper pulp made from cellulose fibre of various colours and substances. Subsequent sizing of the sheets was carried out with the solution of Klucel J (hydroxypropyl cellulose) in ethanol. After removing the old adhesive, the cords were completed with hemp strings, and then the sheets and the endpapers, complete with flyleaves, which had been taken down and repaired, were re-fastened on the spine. The binding leather was cleaned with cleaning emulsion. Infilling, with the exception of the ribbon, was done with the use of dyed pigskin. Wheat starch was used to stick back the original leather parts, and two-component epoxy resin to fasten the back cover. The missing clasps were replaced by new ones made from sheet-brass with suitable ornamentation. The back cover received only a handmade paper band, leaving the old repair work visible and at the same time fastening the text block to the cover. The note-filled original paste-down thus became a second flyleaf.

Csilla Farkas
Librarian, book conservator
Országos Széchényi Könyvtár
1105 Budapest, Harmat u. 70. I. 5.
Mobil: +36-70-224-2142
E-mail: csfarkas@oszk.hu

Hajnalka Barabás
Proceeds of the Exhibition 'Useless fragile things' made in Remembrance of István Sovánka

Sovánka István János was born in 1858 in Liptovskỳ Mikuláš (today's Slovakia) and died in 1944 in Sepsibükszád (Bixad today's Romania). Between 1875 and 1880 he was a student of a wood-carving school in Uhrovec, later he turned to glass art and became the designer of the glass manufacture in Uhrovec. As Uhrovec was the most developed glass manufacture in that region, Sovánka had the opportunity to produce high-class glassware, in line with the European standards. His first success was brought by a more than 2-metre-high baptismal font exhibited during the Millennium Exhibition in Budapest in 1896. Sovánka was not only successful in applying new techniques in glass art (e.g. multi-layered glass) but also in introducing varied and unique forms. His activity and artistic conception can be related to the work of the French Art Nouveau artist, Emile Gallé. The latter's influence can be traced in Sovánka's practice of etching multi-layered glasses. Beginnig with the turn of the century, Sovánka took part in major exhibitions at home and abroad, his works thus being widely recognized. The first part of his glorious artistic career came to an end in 1907 when he moved to Sepsibükszád to become the leading artist of the glass manufacture there. That glass manufacture stopped his activity in 1914, after that time Sovánka made wooden toys for children.

Hajnalka Barabás
Art historian
Mobil: +40-724-278-407
E-mail: hajnalba@yahoo.com

Éva Mester
Glass Painting in the Carpathian Basin, Part III Restoration of Glass Paintings and Glass Ornamentation

Owing to a succession of wars ravaging in the Carpathian Basin, glass paintings have been destroyed. As archaeologist Katalin H. Gyürky writes on researches conducted into Hungarian glass paintings from the Middle Ages and on the elaboration of finds, "Nearly all objects of the material culture of the Middle Ages have come to light in a state of fragmentation in Hungary. However, through their reconstruction, we have succeeded in outlining a culture that is equivalent to that of any country in Europe …" In order to be able to salvage deteriorating mediaeval glass paintings, feverish research work started in the early 19th century to recover and reinterpret old procedures and recipe books. Combined with the achievements of technological revolution, such activities led to a large-scale development in glass painting. Revivalist architecture had a great demand for glass paintings. Owing to her political and economic conditions, Hungary joined in the European trends with a delay of a few decades, but the international successes achieved at the turn of the 19th and 20th century attested to the development. Disadvantage eventually turned into an advantage: glass painters could utilise the end results of earlier experimental work, because by then a wide range of high-standard glass base materials were available. This allowed the succession of workshops that had been founded in the second half of the 19th century to concentrate on high artistic and technological standards. The large-scale construction work that had been going on at the time ensured a large number of commissions. Alongside similarities, certain specific characteristics and unique features of individual workshops can be detected even on unsigned items. The deterioration processes that take place in glass paintings and glass ornamentation, which were made in the Carpathian Basin and which displayed a wide variety of compositions, materials and technical procedures, call for restoration methods that are different from those employed for their medieval counterparts. An international agreement for the protection of such works made in that period of great European prosperity was concluded as late as the early 1990s. Similarly to their medieval counterparts, recommendations proposed by the organisation Corpus Vitrearum International apply on these works of art. The study discusses the guidelines drawn up by Ernst Bacher, according to which, preserving structures, in-building methods, materials and techniques are of paramount importance and the preservation of the identity of the work of art is considered a basic requirement. In earlier times, restoration of architectural glass works was carried out by craft workers. Replacement of lead strips and broken glass was common, and no sufficient attention was paid to the use of suitable materials. Through case studies, the author introduces the work processes of architectural glass restoration and partial or total reconstruction as it is viewed today. Interventions must be preceded by comprehensive research work. The in-building structures and their technological problems are outside the glass restorer's remit, but he is a consultant partner in any respect relevant to the preservation of the aesthetic values of the works of art and their survival in optimal technological condition. In case of listed works of art, the restorer needs permission from the competent authority to begin work based on previously submitted permission documentation. The restoration plan contains a detailed description of the procedure and the techniques to be applied. The work phases carried out are recorded in the restorer's conservation report with detailed photo-documentation. On completion, the work is inspected by a joint jury of experts and representatives of the competent authority, and the restoration documentation is prepared which contains technological and aesthetic aspects of all interventions. Authentic and usable, this set of documents preserves facts that are to lend indispensable aid to future restoration work of the item in question.

Éva Mester
Glass artist, conservator
1082 Budapest, Nap u. 37. VI. 18.
Mobile: +36-70-211-3297
E-mail: mester.eva.11@gmail.hu

Tihamér András
The Restoration of the Owl Sign of the Teleki Library

Designed by Károly Gulyás, the "Library Owl" was placed on the façade of the Teleki Library in Marosvásárhely (now Târgu Mures, Rumania) during the reconstruction of the building in the 1920s, and has since become an emblem and symbol of the institution. Behind the wrought-iron library emblem, a wealth of Transylvanian intellectual heritage is preserved, which puts Marosvásárhely on a par with great West European intellectual centres. The first public library in Transylvania, it was established by Count Sámuel Teleki in 1802. The founder enriched the Teleki Library up to the end of his life; he purchased for it the most important scientific works, art albums and book rarities of his time, thus collecting altogether some 40 000 items. Significantly deteriorating both structurally and aesthetically, the sign of the institution was restored in 2009. Constructed from several separate pieces, the owl figure, perched on two books placed one on top of the other, is surrounded by an iron hoop decorated with wrought-iron leaves, and below it, a bent iron strip bears the inscription Bibliotheca Telekiana. The structure was fastened by cross-bars and welded at several points. It was repainted more than once over the times, in brown, green, or in Ceausescu era, black. The thick, multi-coated paint was cracked, revealing a thin corroded layer underneath. Water leaking into the hollow object caused serious damage. The book-shaped parts suffered major corrosion damage, with the iron sheet thinned or in places holed. No documentation on the original surface treatment of the owl is available, but according to non-official sources, it had not been painted at the beginning. For this reason, all coats of paint were removed from it in the course of restoration; all the more so because no layer that could have been established as homogeneous had been found during the examinations. Some pieces of the sign could be taken apart: the inscription sheet and the headgear of the owls were detached. This was followed by a mechanical cleaning, in the course of which a significant part of the cracked coats of paint was removed. Then high-pressure hot steam cleaning was applied and repeated several times. Since in some cracks and seams, paint had immovably set to the surface, alkaline cleaning was applied, then the remaining paint spots were again mechanically removed. After the alkali had been neutralised by hydrochloric acid solution, the corrosion damaged parts were chemically cleaned with RO55 phosphatic rust solvent. This was followed by mechanical cleaning with iron brush and scalpel, and the treatment was repeated until the corroded layers were entirely removed; finally, the sign was given a distilled water and alcohol rinse. The material of the books, which had been shaped from thin iron plate, was corroded to a degree that they got holed and had to be repaired. The infilling, from epoxy resin reinforced with fibreglass, perform the double functions of stabilising the structure and insulating it by preventing water leaks. After completions and reinforcement, the owl and its constituting elements were given a rust prevention treatment with the water-based tannic solvent Fertan, by spraying the inner surfaces which were difficult to access. After 48 hours, the surface treatment was finally concluded by applying a coat of Kreidezeit rust protection paint mixed with powdered carbon, and after it had dried, WD-40 corrosion protection solvent was applied on the surface by painting and spraying. On the inscription strip, the letters painted in the course of the last repainting have been replaced by cast metal letters.

Tihamér András
Metal objects conservator
Muzeul Judeţean Mureş
Târgu Mureş
Phone: +40-743-111-046
E-mail: andrastihamer@yahoo.com

András M-Kiss
Conservation Problems of a Soaked Bird Collection

Public collections normally provide secure protection for our cultural heritage. At times, however, events may occur which can ruin the work of long decades unexpectedly and in a short time. This is what happened in the Banate Museum (Muzeul Bănăţean) of Temesvár (now Timisoara, Rumania) on the evening of 22 June 2010, when a rainstorm caused the store-room of the bird collection to leak. The fibreglass insulation of the roof, renewed in 2006, filled with water and tore off the suspended ceiling, which fell on the cabinets. Their top and back panels got soaked, and water seeped through the stuffed birds which were kept in them. The museum's bird collection was the largest, best conserved and preserved lot in East-Central Europe. It bears the name of its founder, Dionisie Linţia (1880–1952) deservedly. Linţia was trained in the Zoological Collection and Dermoplastic Laboratory of the Hungarian National Museum, Budapest, and was a corresponding member of the Hungarian Royal Institute of Ornithology. Between 1904 and 1918 he was in charge of the zoological collection of the South-Hungarian Society of Natural Sciences, based in Temesvár, then became director of the Banate Museum and later headed Department of Natural Sciences. Birds he prepared are found in several museums abroad, from Vienna to Hanover. His Birds of Rumania is still regarded a standard work. In 1937 he donated his private bird collection of 1300 items to the city of Temesvár. The collection now contains more than 2600 items. In consequence of the leak, the plumage and the false body of the birds became damp, and the sand, leaves, shells, etc. fastened to the bases with bone-glue started to come unstuck. The plumage and the base structures were cleaned with dry brush. For lack of adequate equipment, drying was ensured by continuous ventilation and the use of hair-dryer, which proved efficient. The cabinets were sprayed inside and outside with fungicidal liquid and left to dry in a draughty part of the corridor. A few days later, white mould spots appeared on the wet parts, and the same was observed on the plumage of some birds. The skin surface of the birds, which had been treated with arsenic, started to dissolve, and traces of re-crystallisation of the arsenic were also found on it. The iron wires used for the inner structures showed signs of corrosion. Our idea was to speed up drying the surfaces and disinfecting the fungus-infested parts with 100 per cent pure alcohol, but no funds were available for the purchase. Progressive treatment of the birds is still underway, as the high relative humidity inside the building renders the extermination of mould fungi with the method employed apparently impossible. In the absence of suitable staff and rooms, fumigation is unfeasible, and no information can be obtained on the reaction chemical agents currently available produce when applied to organic matter. In the situation that has evolved, we are led to believe that problems of conserving a wet-damaged bird collection are far more complex than we might think. This prompted a re-assessment of a series of problems we have had to contend with for years now − the necessity to develop appropriate storage conditions, to co-ordinate storage and research purposes, to guarantee security, to find methods of salvaging damped specimens and of cleaning, to create the possibility for chemical treatment, and to establish compatibility of materials used in stuffing. It has become clear that the staff is unprepared for tackling emergencies, which raises questions of complex training. The second floor of the building was once occupied by the Department of Natural Sciences. Today our display area has been reduced by over 60 per cent. We hope that the planned reconstruction of the Hunyadi Castle will enable the museum to regain its due status, setting an example for appropriate display, storage and preservation of exhibits. Functioning as an independent museum, the Department of Natural Sciences may get a new lease of life in a new building in which storage rooms, display areas, multimedia and interactive workrooms are fitted out up to modern standards, so, in our particular case, they could withstand catastrophes like that. In the absence of this, the preservation and conservation of the largest bird collection in Rumania, which also lends itself for comparative studies, remains a labour of love for a handful people.

Dr. András M-Kiss
Biologist
Muzeul Banatului, Timişoara
300561 Timişoara, Str. Ofcea nr. 5
Phone: + 40-256-202-394
Mobil: +40-720-311-758
E-mail: andraskiss2000@yahoo.co.uk