Abstracts

Brigitta Mária Kürtösi
Medieval mosaic finds from the royal basilica at Székesfehérvár. Researching their history and the way they were made.

The subject-matter of the author's doctoral research builds on investigation of hitherto unpublished Roman and medieval mosaic finds from historical Hungary. In the course of the work, emphasis was placed on examination of mosaic fragments of early medieval origin which have come to light during excavations at the one-time royal basilica at Székesfehérvár. These finds reveal the technical history of the only glass wall mosaic fragments known up until now from the Middle Ages in Hungary. Mosaics are closely connected with their architectural surroundings; in their aesthetics and in their materials they convey information attesting to the characteristic features of a given time and place.

Beyond any shadow of doubt, the Székesfehérvár mosaic fragments belonged to a mural work. This meant fundamental differences in comparison with the technique used to make floor mosaics. The material of the mosaic cubes that have come to light is glass. The *tesserae* are for the most part golden ones, namely pieces where a layer of gold foil has been applied to a cube of transparent glass of a yellowish or pale purplish-brownish hue. The gold foil was traditionally protected by a thin layer of glass (*cartellina*). If this top protective layer is damaged, then the metal foil becomes more vulnerable. Decorative fragments at the King Stephen the Saint Museum in Székesfehérvár well exemplify the likely technological differences between different kinds of glass mosaic featuring metal foil, as the degree of deterioration varies greatly from one type of cube to another.

As well as stray *tesserae*, a few fragments have survived, of approximately equal thickness (1.8–2.5 cm), bedded in plaster. The colour of the lime-based mortar is white. It does not contain brick rubble; on the other hand, small grains of limestone added as filler can easily be seen. Mortars are very lasting. Marks made by plant matter observable on the reverse side refer to the composition of an initial plaster layer. Regarding its type, a parallel may be drawn with the grounding plasters of the mosaics in St. Mark's Basilica in Venice and in the Hagia Sophia in Istanbul. In the latter case, a fine bedding layer (*intonaco*), which held the mosaic cubes, was applied to two layers of coarser grounding (*arriccio*). During the work, the bedding mortar was applied in smaller amounts, similarly to the *giornata* in the fresco technique. Mosaic-makers in Byzantium sketched the composition of the mosaic onto the ground plaster, or sometimes directly onto the brick wall. Detailed colour sketches painted in fresco were made for the bedding layers of the mosaics in the Hagia Sophia in Istanbul. Gold and silver cubes were used for backgrounds; sometimes these were mixed with dark purple *tesserae*. Not only was the effect of gold put onto glass of various hues exploited, but also a role was assigned to colour, painted onto the mortar layer to achieve the utmost colour effect and intensity.

On the fragments of the bedding plasters of the mosaic in Székesfehérvár, translucent red and black paint can be observed. There are probably traces of sinopia; the surface was not painted in its entirety. The colour painted on was not identical with the colour of the mosaic cubes set in it. From this, likewise, we may infer the use of an underdrawing.

During investigations with a polarising microscope for the making of slides from pieces characteristic of the glass and gold mosaic cubes recovered from the excavations, heterogeneity in the fabric structure of the different types of mosaic glass could be observed: air bubbles and grains of colouring material that had not been mixed in. For the fashioning of the coloured glass *tesserae*, cast glass, called girdle-cake on account of its shape, was broken into small cubes. This is proved by the rounded-off sides on some of the *tesserae*; these were from the edges of the 'girdle-cake'. The (metallic copper) grains of the colouring material (they are less than a micron in size) in the red glass used for mosaic cubes in the royal basilica at Székesfehérvár appear as bands in the base-glass matrix. Quartz and cristobalite employed as materials responsible for opacity are uniformly characteristic of another group of cubes of coloured glass (blue, greyish green, dark purple). The optical characteristics of the *tesserae* belonging to this type are very similar. The coloration of the blue types results from cobalt content different in proportion from type to type.

The use of natural stone, too, was characteristic of the Byzantine tradition, mainly when portraying skin colours. During the investigations into the materials used in the Székesfehérvár mosaics, one type of white stone and one type of red served as samples. The white-coloured stone occurred naturally: it was pure magnesite. Hitherto, there is no example internationally of its use in this way. Soft in colour, magnesite ($MgCO_3$) resembles porcelain in appearance. Among the excavation finds were not just a cube-shaped version, but also one formed so as to resemble a disk.

The period which followed the foundation of the state favoured ecclesiastical arts in Hungary, and in addition to the royal town, a few more distant, smaller centres, too, began to flourish. In the course of the 11th and 12th

centuries, almost all Hungarian monarchs had links with Byzantium or Venice, while important trade routes passed through Hungarian towns in the medieval period. Comparison of the findings of the investigations regarding the materials used in the Székesfehérvár mosaics with data available in publications allows the conclusion that materials from Byzantium were used.

István Bóna
Restoring canvas pictures without a vacuum table

Writings which introduce modern methods of restoration for the most part report on the results that can be achieved using expensive up-to-date equipment. Vacuum tables were widely used in the 1960s. Subsequently, equipment was employed which utilised low levels of pressure, while later on various 'vacuum pocket' procedures were applied. However, many well-trained conservators were obliged to work without access to such equipment.

According to the author, after different treatments using expensive equipment, paintings mostly become too 'perfect', smooth and even in a way that they never were before. According to the modern principle of 'minimum intervention, maximum result', conservation performed by hand with results that are not 'perfect' is also acceptable. Often, innovation does not strive to improve apparatus, but seeks methods of intervention that are more and more gentle. For example, with the aim of reducing damage, conservators frequently try to treat and reinforce pictures in such a way that the stretchers are not straightened out.

The study presents the following methods: smoothing out using cool moisture, smoothing out using a moisture chamber, smoothing out using stretchers and magnets, stretching out using springs, reattachment of paint and the smoothing out of unevenness with the help of magnets.

Stretchers and the use of moisture can be combined. If it is possible to make a moisturising tent into which a stretched picture is able to fit, the work can be very much speeded up.

The author shows the suitability of the above procedures in conservation tasks that he himself has performed, among them the smoothing out of undulation on large-sized pictures that has developed for various reasons.

Máthé Zsolt
Evaluation and conservation of painted furniture from the 19th and 20th centuries with the help of the Mihai Eminescu Foundation, Sighişoara (Segesvár), Romania

The Mihai Eminescu Foundation (MET) was founded in Britain in 1987. Its goal was to support Romanian poets and writers, in the interests of maintaining links with Western countries. Over time, this aim changed, and it worked to protect Transylvanian villages marked out for erasure in the interests of industrialisation. This heritage-protection work began in Transylvania's Saxon villages, since the built environment there was in danger after the moving out of the Saxons. The MET attaches importance to the co-operation of the inhabitants in the preservation and revival of the cultural, built, and natural heritage in Romania. It has therefore launched an initiative, the so-called Independent Village Project. The project's goals are the development and support of local enterprises and economic life, as well as the protection and conservation of the cultural and natural heritage. In 12 years, more than 1100 projects – from the renovation of houses and roofs to the conservation of church and castle walls – have been carried through successfully in 49 villages and 6 towns. In the settlements participating in the Independent Village Project, the MET converts architectural monuments into places where people can stay. These buildings also serve as miniature museums for surviving folk furniture and fittings from the locality and neighbouring areas. When these places of accommodation were established, artefacts were brought to a single place from various households, barns, and cellars. On the basis of an inventory and an assessment regarding condition that were made not long ago, the 15 painted artefacts found to be in the poorest condition will be conserved during the year 2014–2015 with support from Britain's Horizon Foundation.[1] So far, a painted cupboard from Almakerék and a low chest, likewise from Almakerék, have been conserved. During the conservation work, overpainting performed with oil paint was removed, weakened structural elements were made stronger, and missing parts were made good. Retouching of missing paint was performed with aquarelle paint using the *tratteggio* and *ritocco* techniques. Later, the painted surfaces of the artefacts were given a protective coat containing dammar resin.

Zsuzsanna Tóth
The connection between bichrome headbands and different types of bookbinding from the historical perspective

The study follows the changes in the best-known types of headband, discussing not just the headbands themselves, but also their linkage to bookbindings of various kinds.

Bichrome headbands occur on books from the late 15th century already. Today, headbands with this type of stitching are still being made for books bound by hand. In more than 500 years, headbands have hardly changed in appearance, but their linkage with the sewing and the boards of books has evolved continuously with the changes in the types of binding. At the same time, the changes have meant a gradual weakening of the linkage, since to begin with the core of the headband served a holding function, rather like a band, while later on already it was attached

[1] For more details, see www.horizonfoundation.info.

to the boards only by gluing. Finally, it was stuck to the spine as a decoration, merely as a covering for the gatherings. In this way, its direct linkage to the boards ended.

László Nemes Takách
The materials and structures in 'homemade' Nativity scenes, and some ethical and technical issues relating to their conservation

Artefacts can be said to be 'homemade' when, during their creation, materials and techniques are employed freely, without regard to handicrafts or trade prescriptions and customs. Homemade Nativity scenes were, generally speaking, made by simple people or by trained craftsmen whose training was in another field. Work by trained craftsmen which is intended for sale can be recognised on account of the correct use of tools, the correct sizes of the parts, the making of joints, etc. The efforts of the hands of simple people speak of *ad hoc* selection of materials and inexact workmanship generally, but also of great love.

The study deals with the different types of wooden and cardboard structures used in homemade Nativity scenes, and with the types of damage to them that are frequent. It lists the most important properties, from the conservation standpoint, of the paints decorating their surfaces, and also those of the various types of matt, waxed, and lacquered paper used to cover them. In addition, it presents those printing inks – silver, gold, copper, indigo, Prussian blue, and madder lake – used on this paper and on images of the protagonists which are sensitive to certain conservation treatments.

The conservator often has to take artefacts apart. By so doing, he discovers what is inside and information which must be retained. For this reason, presenting and documenting the structure of an artefact, the way it was made, the decoration of its inner surfaces, and the decorative layers one on top of another are especially important, with the help of digital photographs and drawings also.

The primary goal of every conservation intervention is the most complete preservation possible of the materials making up the artefact. In certain cases, saving the artefact may put pressure on this basic ethical rule. The author has conducted the conservation of 21 different Nativity scenes. The ethical problems arising in the conservation of two of these, both Nativity scenes featuring string puppets, are presented in the paper.

Supplied with the inventory number 132230, the string-puppet Nativity scene from Tiszacsécse is covered using coloured, waxed paper stretched over a frame made from strips of wood. Paper star motifs have been stuck onto the inside surfaces of the covering paper. These provided a festive atmosphere; the Nativity scene was lit from within during the puppet performance. The artefact was seriously damaged during the Second World War. When it was conserved, the pinewood strips of the frame had to be repaired or replaced. In addition, the discoloured, fragile, and faded coloured paper had to be conserved. The colouring of the repairs to the incomplete, faded paper which covered large surfaces represented an ethical problem. In the end, the repairs were given the original colour of the paper surfaces and the original, faded paper remains were stuck back onto them. As a result of this, an authentic, if less aesthetically pleasing, exhibition artefact took shape which represents the artefact's original function slightly.

The string-puppet Nativity scene from Szatmárcsekei (inventory number: 68.120.24) is likewise an artefact which was damaged in the war. In this case, pieces of cardboard have been nailed onto a frame made of strips of wood. Different motifs have been cut out from the cardboard and then covered with coloured paper. During the puppet performance, a shining image of the coloured motifs illuminated from within could be seen. During conservation, after the fitting of new wooden strips to the frame and its strengthening from the statics standpoint, treatment of the cardboard covering took place. Paper that was faded, scorched, and fragile through acidification was, after mechanical cleaning and de-acidification, removed from the cardboard to which it had been stuck using flour-paste. This was done on a light table using a solution of amylase enzyme (Pankreoflat). Some of the paper covering was so faded that its one-time colour could only be identified in traces only. The discoloured paper was, therefore, not put back on the artefact; instead, it was included with the documentation. Acid-free paper painted with acrylic paint fitting the colour of the original and made glossy with acrylic lacquer was stuck to the surfaces of the cardboard nailed back onto the artefact. In this way, from the aesthetic point of view the artefact resembled the earlier one in appearance. The newly-made, good-quality paper covering enabled the Nativity scene to be exhibited – for a set period – in such a way that it would light up for a short time when a visitor approached it.

Márta Kissné Bendefy
The difficulties of saving and conserving archaeological finds made of leather

Leather finds on the territory of Hungary come to light most often in locations where there is water (wells, castle moats, rivers, lakes) and in burial places (cemeteries, churches, crypts). Frequently, those recovered from the first group of places are incomplete, not connected with one another, and different in age. With leather artefacts found in burials the situation is different: we can expect them to belong together and to be similar in age; also, their identification is easier. In settlements, leather waste, too, can come to light, indicating the production of footwear in these places.

In the majority of cases, finds are moist or waterlogged when they come to light; also, they are mostly in a weakened condition and are contaminated with soil remains, products of metallic corrosion, and products

of the decomposition of organic materials. Ideally, the cleaning and conservation of finds would need to begin immediately. However, excavation sites are not very suitable for this. It frequently happens that large numbers of leather artefacts are found all of a sudden; their recovery, documentation, transportation to a conservators' studio, and conservation require special training on the part of conservators.

During the recovery process, it is important to protect the leather from physical and microbiological damage, and, as much as possible, to preserve its moisture content until such time as its treatment begins. If an artefact consists of very delicate or multiple pieces, it is appropriate to raise it together with the earth around it. In the past, it was general practice to soak finds which were fragile in a solution of synthetic compounds. Substances which served to consolidate helped keep fragments in one piece, but impeded investigations later on regarding the techniques and materials used to make the artefact. Nowadays, artefacts are protected from falling apart by means of physical support, padded wrappings, and gentle moving.

In locations which are wet or waterlogged, only vegetable-tanned leathers are to be reckoned with, while in crypts that are dry or moderately moist leathers tanned using alum can also be expected. The microclimate of crypts favours microorganisms, for which decomposing organic remains provide nourishment. Hence, at the beginning of the work microbiological investigations need to be made; so, too, does a survey of mould activity. It is recommended that the lifting out of finds be performed in protective clothing, with the use of spore-proof masks.

In case of the unexpected discovery of leather in large amounts, especially waterlogged leather, there is a need for measures which have been well thought through. At the location where conservation is to take place, preparations need to be made for the reception and safe storage of the artefacts, as well as for the evaluation and documentation of their condition, and for the taking of samples necessary for later investigations. The scheduling of tasks is essential, as is the division of finds into smaller groups on the basis of their condition and their constituent materials.

Soil, vegetable matter, and corpse remains are removed means of cleaning mechanically. In the case of a strong presence of mould, dry cleaning must be omitted, in order to guard against spores and mycotoxins getting into the air. The deterioration of finds can be prevented by spraying with a 70% solution of isopropyl alcohol or a 70% solution of ethyl alcohol, but special care needs to be given to their treatment subsequently. After cleaning mechanically, remaining soil and water-soluble salts are removed from vegetable-tanned leathers using water (soaking or spraying). Alum-tawed leathers, which are sensitive to water, should be cleaned using swabs moistened at the very most with an emulsion containing organic solvent, while archaeological parchment and rawhide finds should be cleaned dry. After wet treatments, leathers are always drained of water and thoroughly blotted, so that solvents used in the following step are not diluted. When necessary, those salts which cause stiffness in the leather and which are insoluble in water are removed using chemical substances (complexing agents, ion-exchange resins), as are harmful corrosion products. This is followed by thorough rinsing. During the conservation work which follows next, substances are introduced among the fibres of the leather which, after drying, prevent the sticking together of the fibres and stabilise the amount of water in the leather. For this, polyhydric alcohols with hygroscopic properties (polyethylene glycols or glycerol are used. Following conservation, finds are dried out, the purpose of which is the removal of excess water in such a way that the leather preserves its shape and suppleness in the best way possible. The choice of method used depends on the condition of the find and on the possibilities open to the conservator. Mostly, two methods are used: freeze-drying (currently considered the best method) and drying at room temperature, in controlled conditions.

In fortunate cases, artefacts for use could be reassembled in their earlier form from the finds that had been conserved. However, this was only possible when every essential part of an object had come to light, and when the leathers were sufficiently supple and strong to allow re-sewing. When this was not possible, the most important goal during the work was the preservation and interpretation of the marks and data conveyed by the fragments, because even the smallest piece of leather containing traces of sewing can convey important information with regard to the production technique used. The study touches upon the possibilities of re-assembling footwear fragments of different levels of preservation, from complete re-sewing to attachment to a support using non-rusting pins.

Andrea Várfalvi
Possibilities for the investigation and conservation of archaeological textiles

Different types of damage affect archaeological textiles in different ways.

Physical damage appears in the form of wear, creasing, tearing, and loss of shape. Breakdown of chemicals brings about changes of colour and also fading. Rodents, larvae, insects, and microorganisms can cause changes that are biological in origin, in the form of colour changes, fading, and missing fabric.

Alongside the making of accurate documentation, the most important task when finds are discovered is the fixing of weakened fabric. In order to avoid any further deterioration of the finds, the environmental circumstances they experienced prior to their excavation must be ensured until treatment can be started.

In order to interpret and get to know textile-based finds, it is necessary to perform different investigations. With the help of these, the organic and inorganic materials in the finds, along with contaminants, can be identi-

fied. Additionally, the degree of the contamination can be measured and the production techniques employed can be established. All this, together with the findings of X-ray photographs, pH measurements, and pigment investigations, affords assistance to conservators in their selection of the procedures, materials, and treatment substances to be used. With regard to the findings of the investigations into the contaminants, we need to decide whether these contain historical information and whether their retention will assist the analysis of finds. It is important to bear in mind that the materials used to mummify bodies, the making of X-ray photographs, the use of certain disinfectants and plastic coatings, treatments with water, and aluminium foil placed under the ball of earth when a find is lifted out of the ground all impede accurate investigation of textiles.

Before the starting of the conservation work, an appropriate environment for the work of art needs to be created. In the case of a find assemblage consisting of many pieces, it is necessary to ensure transportation and the storage of those fragments which are not yet under treatment. In the case of archaeological textiles, the aims are to impede the spread of deterioration processes in the fabric, to prevent additional damage of various kinds, and to develop an overall aesthetic picture of the work of art. During conservation, the following types of treatment can be employed: disinfecting, dismantling, cleaning, humidification, conservation of stitching, preparations for reconstruction, and the creation of the circumstances for storage and exhibition (preventive conservation). Cleaning of artefacts may be performed mechanically, by soaking them in water, or by applying ion-exchange synthetic resin to them. Disinfectants need to be used when infection has already developed. The taking apart of textiles can be partial, but may affect the entirety of the stitching also, depending on the condition of the find. Loosely-attached soiling found on the surface of fabrics may be removed mechanically. As well as serving to remove soiling, cleaning with water also makes it possible to replace some of the water lost from the fibres of fragile threads, thus making them suppler. Owing to the softening effect of the water, out-of-shape textiles can be smoothed out after the treatment. Textiles covered in thick, hard corrosion can be cleaned using ion-exchange resins. Humidification of fabrics can be carried out in a humidification cabinet or using a semi-permeable membrane or damp tissue paper. The disassembly, cleaning, and rehydration of archaeological textiles are not always performed in the same order, since textiles from different environments require different treatment schedules. The difference needs to be made between the conservation of textiles brought to light from a dry environment and the conservation of textiles brought to light from a wet and waterlogged one. Because it reinforces them statically, conservation of the stitching of archaeological textiles is performed on a structure which supports them on the reverse side. If a work of art is so fragile that use of backing material does not afford it sufficient protection, the two layers can be covered with a thin, loosely-woven silk fabric. By sewing crumbling fragments between two thin pieces of fabric, appropriate protection can be afforded them without the additional physical damage to the object that needle marks would cause. Backing has the additional effect of substituting missing areas. The repair of embroidery may be justified by considerations of statics. In the case of metal threads, repairs are made using coloured cotton thread. With a three dimensional object or attire, repairs may be made on the basis of fitting analogies and according to the original technique, with the marking of the principal features, avoiding solutions that are rich in detail. If conservation has been preceded by disassembly, the different fabric parts treated must be put back together in the light of the original technique. Reconstruction of archaeological textiles can be made using materials identical with the original ones and also identical techniques, but may be effected in sketch form also. When optimal conditions created for the storage and exhibition of archaeological textiles are regularly checked using measuring devices, the condition of the works of art can be stabilised reassuringly going forward.

Károly László
A preliminary presentation of a stove-tile find from Csíksomlyó

From the 15th century onwards, pottery output increased in Transylvania and pottery centres developed there. In these centres, certain skilled craftsmen went beyond the production of household pots and started to make stove-tiles, used in the building of heating and cooking structures. These stoves were built in the rooms of castles and manor houses for the most part. One such manor house stood on the site of today's Fodor house in Sumuleu (Csíksomlyó), a village already absorbed into the town of Miercurea-Ciuc (Csíkszereda). A significant discovery of stove-tiles was made on this site in 2011. Six different stove-tiles were unearthed, most of them in a condition that permitted almost total reconstruction. All of these stove-tiles are unglazed and all are made of clay containing mica. Perhaps the most beautiful of them all is a stove-tile from the early 17th century with Italian pot and tulip decoration; it is not yet restored. Also notable is a decorated square stove-tile of a type found in some other manor houses as well. This stove-tile is probably from the 17th century. In the assemblage, there are three types of stove-tile with a brocade pattern. This type is known to have been made by the Habans (Hutterites), but later on became very popular amongst local potters also. A common characteristic of all three is that their curved decoration would form a complete circle if several such stove-tiles were put together. Stove-tiles with a brocade pattern that date from the 17th or 18th century can be found in figs.

6, 8, and 10. The assemblage also contains a fragment of a cornice. There is another very interesting fragment, too, namely a small piece which dates the stove-tile to the 17th century, and which allows us to reconstruct the decoration of the entire artefact. Fragments of two distinct pots were also found in the assemblage. The refuse pits of old castles and manor houses are often rich from the archaeological point of view, as in the case of the Fodor house above.

Olimpia Coman-Sipeanu
Safeguarding the national heritage in a time of crisis. The camp for the restoration of icons, Ohaba, 2010

Ohaba village lies in beautiful landscape at the foot of the Fagaras Mountains. This Orthodox parish is home to around 200 people and boasts a church from the 17th century, as well as a church built in the third decade of the 19th century. Many good things have been done in this small parish since Lucian Tilvar became its priest in 2007. Major repairs and changes have been made by him, including transformation of the look of the later church, whose unpainted walls were decorated with glass icons in an advanced state of decay. Fr. Tilvar, who studied at the Faculty of Theology in Sibiu and whose specialisation was Theology and Conservation, decided to ask his former restoration and conservation teachers for their advice and help. In view of the poor economic circumstances, the only simple and cheap solution was to organise a restoration camp. This convened on 16 August 2010 and came to an end on 30 August 2010. The participants were the members of parish which held the collection of glass icons, students from the Lucian Blaga University in Sibiu, teachers at that university working in the ASTRA Museum, and a number of specialists present in a private capacity. For two weeks, this team worked intensively in the auditorium of the village's Cultural Centre. This was turned into a genuine restoration laboratory. When the collection had been studied and the condition of each icon assessed, 11 such artefacts were selected for conservation. The passage of almost two centuries, the poor technique employed in their making, and improper preservation had all caused much damage to the icons: detachment or even loss of the paint layer, extremely fragility in the frame and cover, and sometimes broken glass. The first steps focused on the study of iconography and style. Study of the techniques came next: measurement of the objects, including their component parts, and identification of the materials used. All this helped the dating of the icons, as well as their attribution to particular icon painters and centres of icon painting. During the course of the activity, the co-ordinators delivered lectures on the restoration of glass icons.

Because of the decay of the icons, treatment consisted of the mechanical removal of the surface soiling, consolidation of the extremely fragile paint layers, cleaning of the paint, and the making good of gaps in the paint layer. The frames and covers regained their strength and wholeness during the process of consolidation. The final stage was the fixing of the glass icons in their frames. This used a method which avoided strain on the glass and damage to the colour layer.

After restoration, the icons were displayed in an exhibition which opened on 21 November 2010. The festive opening celebrated the re-consecration of the new church. The project experiment was successful in that it restored cultural assets of the Ohaba community. Most importantly, it proved that even at a time of deep economical crisis, heritage that was otherwise doomed to perish could be saved with minimum financial effort, hard work, and the involvement of the community.

Éva Mester
The conservation of large glass paintings 'in situ' and in the studio

When stained glass windows are to be conserved, the practice in Hungary is to lift the different fields out of their settings without deliberation and, for reasons of convenience, to perform interventions in the studio. This is not a problem when the degree of damage – surface buckling, cracks in the glass, missing glass, out-of shape and missing lead cames, loose framework, etc. – justifies it. Nor is there any issue with this method when fields can be lifted out of their stone surrounds or wooden frames simply and without suffering damage. Even in the case of windows several hundred years old, this may not cause problems – given caution and expert removal – where small fields consist of small pieces of glass and where the method of fastening is simple. The problems begin when we wish to remove large window-fields made at the turn of the 20th century and consisting of large pieces of glass where the edges of these fields have been set in a bed of plaster, often containing cement. At such times, losses are great, because as a result of the corroding of the lead cames, which are often more than a century old, the fields are not able to tolerate the movements which accompany lifting out, namely changes in the centre of gravity and extra loading, since when they are cut away from the plaster, the edges of the fields break and there is nothing to hold the heavy, non-rigid surface together. Since corroded cames cannot be soldered together, the original cames should be discarded: the entire surface needs to be re-leaded with new cames. This goes against the international recommendations, which propose that all the original parts be kept, not just the glass pieces. As a result of bending, glass pieces, too, can break or fall out. In cases such as these, the statics of individual panels can decide the issue of removal to the studio or conservation *in situ*.

Around the turn of the 20th century, many glass-painting studios operated on the territory of the Austro-Hungarian Monarchy. The aesthetic value and technical condition of the stained glass windows made there was rather various. For *in situ* conservation, only those works are suitable

which, at the time of their production and installation, too, met the strict claims made on the genre and which have stood the test of time. These conditions are the following: good quality cames and glass; paint that lasts well; and expert leading of the various fields, with accurate soldering of the joins, appropriate plugging of any gaps, and, for the stiffening of the glass surfaces, use of iron rods that continue into the wall surrounding the window. On this, and on many details, the statics and technical condition of the window-fields depend. Another important condition is that since their installation windows have not been exposed to appreciable damage (e.g. wartime destruction, harmful chemical substances, etc.). We know of very few stained-glass assemblages in the Carpathian Basin today which survive in their original places of installation. In the case of surviving windows in good condition, the obligation of conservators is to retain the original materials and method of installation, thus increasing the historical value of these works of art.

In the study, the author mentions a 100-year-old glass-painting assemblage which has survived in its original place of installation in a church. The product of two different ateliers that had worked on it simultaneously, it was in rather an unusual condition technically. The stained-glass windows of the archiepiscopal cathedral at Kalocsa had survived in very good condition, albeit with a high degree of surface soiling. There was some lasting damage caused by air-rifle shots, as well as by cracks in the glass over a large area. This stemmed from carelessness during building work during the present restoration of the church. The glass paintings at Kalocsa are good examples of conservation performed using the *in situ* method. The author has been conserving windows on the site over a period of three years. In the case of large windows made at a similar time in the Church of the Minorites in Szeged, insufficient care was taken during the making of the windows and during their installation. The author presents the findings of many months of research and evaluation in connection with the windows in the Szeged church. These windows can be conserved only in a studio.