This Will Stick Forever
Attaching & Releasing

Symposium Budapest
25-27 May 2005

Organized through the
International Association of Book and Paper Conservators (IADA) and
Technical Association of Paper and Printing Industry (PNyME, Hungary)

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P R O G R A M M E

Wednesday, 25 May 2005

8:00 – 9:30 Registration

Chair: Christa Hofmann

9:30 – 10:00 Opening

Ferenc Rády, Deputy director general, National Széchényi Library; *Markus Klasz,* President of IADA; *dr Gabriella Albrecht-Kunszeri,* Head of Preservation Department, National Archives of Hungary; Ex-president of PNyME Conservators' Section

10:00 – 10:30 *Gabriëlle Beentjes:* **Some aspects of animal glues: origin, use and recipes**

10:30 – 11:00 Coffee Break

11:00 – 11:30 *Nguyen Thi-Phuong:* **What is gelatine?**

11:30 – 12:00 *Anna Haberditzl* et al.: **Gelatine as chameleon: change of its adhesive properties during the paper splitting process**

12:00 – 13:30 Lunch

Chair: Beatrix Kastaly

13:30 – 14:00 *Gabriëlle Beentjes:* **The history of paste: from 'pap' to 'shin-nori'**

14:00 – 14:30 *Adrien P. Holl:* **Identification of various starches and animal glue: microscopy analysis**

14:30 – 15:00 *Weronika Liszewska:* **Japanese polysaccharide adhesives: wheat starch and funori in theory and practical conservation treatments**

10:30 – 11:00 Coffee Break

15:30 – 16:00 *Jürg Schleuniger:* **JunFunori: a new media for the consolidation of matt paint**

16:00 – 16:30 *Michaela Ritter:* **Consolidation with JunFunori: practical treatment of gouaches with different paint layer problems**

19:00 – 21:30 Evening Reception at National Széchényi Library

Thursday, 26 May 2005

Chair: Markus Klasz

9:00 – 9:30 *Bernadette van Beek et al.:* **Results revealed: national enquete on the use of adhesives among Dutch conservators**

9:30 – 10:00 *Robert Fuchs:* **Adhesives in conservation: new findings about preparation and application**

10:00 – 10:30 *Christa Hofmann:* **Comparison of consolidants for matt gouache paints**

10:30 – 11:00 Coffee Break

11:00 – 11:30 *Jedert Vodopivec et al.:* **Leaf casting: the influence of starch and methyl cellulose coating on the properties of leaf-cast paper**

11:30 – 12:00 *Karin Eckstein:* **Preservation concept and remounting of a baroque drawing collection**

12:00 – 12:30 *Ágnes Ádám:* **Conserving 17th century protocols: is it necessary and worthwhile to remove old corrections?**

12:30 – 14:00 Lunch

Chair: Anna Bülow

14:00 – 14:30 *Péter Gönczi:* **Conservation of the cover of the Göttinger Gutenberg Bible: removing the protective cover**

14:30 – 15:00 *Manfred Mayer:* **Adhering vellum to board: the multiple role of priming of vellum for fine bindings**

15:00 – 15:30 *Beatrix Kastaly:* **Experiments in separating blocked coated papers**

15:30 – 16:00 Coffee Break

16:00 – 16:30 *Anja Koschel:* **The use of solvent gel Carbopol to delaminate pressure sensitive adhesive tape, in particular, Filmoplast products**

16:30 – 17:00 *Jane L. Down et al.:* **Report on the CCI tapes and heat-set tissues project**

Closing?

25 – 26 May 2005 **9:00 – 17:00** Trade fair

27 May 2005 **9:00 – 12:00** Workshop Tours for a special programme, by pre-registration

1. Some aspects of the history of animal glues: origin, use and recipes

Gabriëlle Beentjes

Animal glue is a generic term for a very old adhesive. It encompasses all glues made from animal products that range from swim bladders to hides and hooves. Because of the immense variety of glues, recipes and application techniques, this lecture will be restricted to useful and interesting facts of importance to conservators.

Animal glue, such as gelatin, was commonly used for the sizing of paper. There was a difference made in paper factories between the amount of size used for writing and drawing papers (more thoroughly sized) and that for printing papers (less sized). The bookbinder, however, made his own variations in stiffening the soft printing papers as it made it easier for him to bind the book.

This lecture will provide some historical quotations describing the choices of glues used to size particular papers. Fish glue is a specific animal glue that is frequently referred to. How was this glue made? And where did it come from? It appears that there is an interesting economical-historical story connected with fish glue that illustrates the commercial relationship between Russia and Holland.

Finally, 'Mouth glue' the predecessor of our ready-for-use glue-sticks will be described. Various recipes for this protein glue that was commonly used in previous centuries will also be provided.

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2. What is gelatine?

Nguyen Thi-Phuong

Although widely used in conservation treatments, the chemical and physical properties of gelatine are not well understood by paper conservators. Different types of gelatine have different visual and adhesive properties. They may also vary in consistency and long-term stability including color change and flexibility.

What does gelatine consist of and what are the reasons for it to be so different from one type to the next? What is the difference between photographic and food-grade gelatin? What are the consequences for choosing a 'bad' gelatine and which gelatine should be used for which purpose?

The aim of this paper is to answer some of these questions by introducing basic gelatine chemistry. A better understanding of this complex product would allow for gelatine to be used more efficiently in the paper conservation field.

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3. Gelatine as a chameleon: Change of its adhesive properties during the paper splitting process

Anna Haberditzl*, Eva Galinsky, Meryem Nouaimi-Bachmann and Hans Bisswanger

There has been a remarkable renaissance of gelatine as an adhesive in paper conservation over the last years. However, during the paper splitting process, it has been used for decades for facing a paper support temporarily to both verso and recto of an original. Once firmly adhered, the original is split with each half adhering to one support. A new core-paper is inserted using a mixture of cellulose ethers - the structure then resembles a sandwich. After drying, the gelatine is traditionally resolved in a warm enzyme bath so that the then superfluous supports can be removed.

Within a research project supported by the German Research Association (Deutsche Forschungsgemeinschaft DFG), enzymologists and conservators have developed an alternative method to dissolve gelatine. The aim was to avoid the original getting into contact with free enzymes in aqueous solution. For that purpose, thermophilic proteases were immobilized onto a synthetic support material. This support material is attached to the original using gelatine. The gelatine is therefore in close contact with the protease, which is supposed to digest it at the time of support removal - at the end of the splitting process. The enzymes are activated using controlled heat. Until this moment, the enzymes must be inactive to allow the gelatine to form a firm gel, necessary for the splitting process. The support material can be used several times.

In this complex system, the requirements for gelatine as an adhesive are changing radically: according to the schedule of the conservation treatment, its adhesion properties should allow to be 'switched on and off' without any negative influence on the original and other materials present. The paper explains the new enzyme application and the problems arising during adaptation for practical conservation. It then introduces a solution for controlling the adhesive properties of gelatine.

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4. The history of paste: From 'pap' to 'shin-nori'

Gabriëlle Beentjes

Paste is a vegetable product that has been used as an adhesive throughout the centuries. This lecture will discuss the ingredients employed and the changes that have occurred in paste making over time. Recipes and descriptions of making starch from the 14th century until the 20th century are given, in which an interesting development is seen in the use of flour or wheat starch as the basic ingredient.

Starch was also used to stiffen textiles such as clothing and linens. Starch provided a beautiful rigidity for collars as well as an absorbent for dirt. During washing, both the starch and dirt were rinsed away. Until the 19th century, this kind of starch was made out of wheat flour.

Starch factories, such as those in the very productive region of Zaanstreek in North-West Holland, extracted the starch from flour. In conclusion, this lecture will discuss the ethics of paste used in conservation by illustrating the change in preference from big buckets of ready-to-use paste to the portion-wise making of paste "a la Japonaise".

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5. Identification of various starches and the animal glue: examining them by microscope

Adrien P. Holl

Animal glue and starch pastes were used exclusively in European bookbinding until the first half of the 20th century. They were applied for consolidating and lining the spine, sticking up strips, attaching the boards to the textblock and pasting down previously existing end-leafs.

When working with old books, the conservator must determine the original bookbinding materials in order to document the original technique and to determine the proper conservation treatment in which the same or similar materials are to be used.

Until now, starch and protein (chemical) tests have been used by conservators to determine the presence of starch paste or animal glue found on certain spots of the binding. Difficulties can arise with the spot testing because the result is often ambiguous. The two aims of microscopic examination are to provide a definite identification of natural adhesives from a tiny sample (i.e. starch or animal glue) and to determine if it is possible to microscopically identify the type of plant from which the starch paste was made.

A control group of paste samples were prepared from fresh raw materials (wheat, maize, potato, and rice starch) and starch extracted from wheat, barley, rye and millet seeds. These samples were made according to early 20th century home-made starch recipes. Flour paste and dextrin produced by various methods were also microscopically examined.

Adhesive samples taken from four 16-18th century bookbindings were compared to the samples for identification. The samples were first roughly examined by scrutiny and spot testing. All the examinations were carried out with an axioplan Zeiss Opton microscope under 100x, 200x and 400x magnifications. Polarized light was also used for both examinations and photomicrography.

With a microscope, a positive identification of starch or animal glue could be made. It was also possible to distinguish between the various types of plants used for the starch as long as the starch grains had not been destroyed. This identificaiton was made on the basis of the morphological properties (size, shape, structure) of the grains and the changes brought about by aging. These properties will be shown in the projected slides.

To prove the usability of this testing method it is still necessary to collect and examine more original old adhesive samples. Our long-term plan is to compile an atlas from the photomicrographs of these adhesives for supporting the conservators' everyday work.

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6. Japanese Polysaccharide Adhesives: Wheat Starch and Funori – in Theory and Practical Conservation Treatments

Weronika Liszewska

Wheat-starch paste, one of the most commonly used starch adhesives in Western paper conservation, is being increasingly used in the application of silk linings. *Funori*, a traditional seaweed adhesive in Japanese conservation, is used primarily by western conservators as a consolidant for flaking media. In this project, two Japanese polysaccharide adhesives will be investigated. The wheat starch, *shofu*, which is commercially available in Europe as a powder form (Paper Nao) and the seaweed adhesive, *funori* (Masumi Corp) were selected for the research. In order to test the applicability of the adhesives, their properties and ageing stability were examined.

The detailed composition of *shofu* starch was determined. *Shofu* was modified by acid and enzymatic hydrolysis. Viscosity, flexibility and bond-peel strength tests of *shofu* and *funori* were executed, and the data was compared to the properties of modified *shofu*, other starches and CMC (Tylose CB 200, Gabi Kleindorfer). *Shofu*, modified *shofu* and *funori* were applied to Japanese paper and silk. They were exposed for 10 days in a Xenotest chamber (Heraeus Original Hanau, 150 S; 50±5% RH, 20±3°C) and for 24 days in a clima-chamber (Vötsch Industritechnik, VC-0033; 55±3% RH, 65±2°C).

The changes in the mechanical properties of the samples (i.e. tensile strength, tear resistance, ultimate elongation at break) were determined (tensile testing equipment, Lhomargy DY 20) and the change of optical properties was specified by spectrophotometric analysis (spectrophotometer Elrepho 2000, Datacolor).

The resulting data demonstrated that *funori* has a good light fastness and is a good strengthening material for silk. Tests also showed a relatively good stability for the acid hydrolysate of *shofu*. However, the acid modified shofu showed less improvement in bond flexibility than expected from comparison to the references on wheat starch modifications for conservation purposes. The possible additives to *shofu* paste (CMC, *funori*, sodium alginate, gelatin, rabbit glue, isinglass, glycerol) were therefore reconsidered. Among them, the addition of isinglass and sodium alginate caused better results in paste flexibility tests than hydrolysis.

The test results are followed by a discussion of uses for the polysaccharide adhesives in practical conservation treatments.

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7. JunFunori®: A new Media for the Consolidation of Matt Paint

Jürg Schleuniger*, Françoise Michel

Funori is a polysaccharide extracted from *Gloiopeltis furcata*, a red algae which typically grows in the inter-tidal zone of the Pacific coast of Japan, Korea, South China and North America. Traditional funori, which is used in conservation as an excellent consolidant for matte paint, is manufactured in small Japanese factories from the bleaching of this red algae. Because of variations in quality of the traditional funori, EMPA (Swiss Federal Laboratories for Materials Testing und Research) in collaboration with the Institute of Monument Conservation at the ETH Zurich and the Centre for Conservation of the Swiss National Museum, has developed an extraction and purification procedure to obtain the pure polymer, JunFunori®. JunFunori® is produced directly from *Gloiopeltis furcata* and is available as a white water-soluble powder. The properties of this purified product have been tested and compared with the characteristics of other consolidants such as gelatine, cellulose ethers (Methocel, Klucel-E) and sturgeon glue. JunFunori® produced minimal changes in unbound pigment layers when compared to paint consolidated with Klucel-E. Accelerated ageing shows that JunFunori® has the same stability to UV light exposure and variations in relative humidity and temperature as those of gelatine and sturgeon glue. The cellulose ethers degraded considerably under these same conditions. Stress strain tests and IR spectroscopy were used to verify the results. In contrast to Klucel-E and sturgeon glue, JunFunori® remained water soluble after accelerated ageing. Microbiological investigation shows that JunFunori® does not have an increased susceptibility towards fungal growth. These findings indicate that JunFunori® demonstrates a high potential as an alternative to traditional consolidants.

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8. Consolidation with JunFunori®
Practical treatment of gouaches with different paint layer problems

Michaela Ritter*, Olivier Masson

When consolidating powdery, cracking, or flaking paint, care must be taken to avoid any changes in the appearance of the media. These include discoloration and formation of a white haze or tidelines. The chemical and physical tolerance between the consolidant, support, and media must also be considered. The consolidant, JunFunori®, an adhesive produced by the chemical refinement of natural red algae (Gloiopeltis furcata) used in Japan to make Funori, has shown good results. It is especially successful when used in conjunction with sturgeon glue. However, the methods of application required several adjustments and the technique had to be adapted for each specific consolidation problem. A "two-brush technique" used in conjunction with ultrasonic humidification and application with a pipette proved to be most effective.

Case studies included works by Gustave Moreau (1826-98 in Paris), Marianne von Werefkin (1860 in Russia - 1938 in Switzerland) and Kurt Schwitters (1887 in Germany - 1948 in England). The gouaches by Moreau had thick, matte, flaking paint layers dispersed with tiny, brittle, glossy flakes, whereas the sketchbooks of von Werefkin contained thin matte, powdery paint layers with numerous losses. In Schwitter's collage, "Huthbild", the complex layers of paint, paper and adhesive were unstable and had many tiny, yellow, glossy flakes. These works of art were all successfully consolidated with JunFunori® in combination with sturgeon glue.

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9. Results Revealed: National Enquete on the Use of Adhesives among Dutch Paper Conservators

Bernadette van Beek*, Birgit Reissland, Walter Castelijns, Barbara Cremers, Henk Porck

For the first time, insight into the use of adhesives in Dutch paper conservation studios was gained. 33 conservators spoke frankly during interviews about the type of adhesives that they use, suppliers, frequency and extent of orders, storage, properties and preferred application techniques. Four different adhesive groups were focused on: starches, cellulose ethers, proteins and synthetic polymers. The most important questions concerning adhesives were determined in order to prepare a custom-made symposium for Dutch paper conservators on the subject of adhesives. In November 2004 the Dutch paper conservation association (VAR) organized the symposium "Lijmen & Geheimen" (Adhesives & Secrets) at the Royal Library, Den Haag. The results of the interviews were presented in four lectures - one for each group of adhesives. This paper aims to reveal the results and to summarize the present situation in The Netherlands. - Noticeably, the results amongst each adhesive group varied significantly. Even for the group of starches, which is commonly felt to be prepared in quite a consistent way, the outcome was surprising. Just one fact was coherent: synthetic polymers are seldom used for conservation measures. It has been discovered that even in such a small country as The Netherlands, nearly everybody purchases adhesives from a different supplier. Interestingly, the producer of the adhesive usually is not known and product properties are not well defined. The adhesives are stored in boxes, bags or cans, mainly on the shelf, sometimes in chemical storage cabinets. The shelf life of dry adhesive powders is usually felt to be everlasting, while the ideas about the expiration date of 'ready for use' or prepared adhesives is rather varying. The application of each adhesive depends on the final conservation measure. But even for the same measure, different adhesives are in use. Conservators were especially interested in new developments, new application techniques and background information on chemical and physical properties of adhesives.

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10. Adhesives in Conservation – New Findings about Preparation and Application

Robert Fuchs

Over the last years, many new adhesives such as modified starch, cellulose ethers and funori, an algae adhesive, have been used in paper conservation. However, starch paste and protein adhesives are also still being used. The paper will give an overview over advantages and disadvantages of different preparation methods and applications of these adhesives in paper conservation. It will draw attention to their ageing properties and their effect on the materials in contact. In particular, decrease in adhesion as well as material and colour changes will be considered. The presentation will also discuss future developments.

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11. Comparison of Consolidants for Matt Gouache Paints

Christa Hofmann

Trying to find an adhesive for the treatment of matt gouache paintings is often difficult, as the adhesive needs to provide sufficient adhesion for powdery or flaking layers but at the same time not alter hue, saturation and lightness of the paint. The use of ultrasonic misters for the application of adhesives has proved to be a promising tool. Research has demonstrated that adhesives can show different results depending on the pigment. In a feasibility study four different adhesives for the consolidation of matt gouache paint layers on paper were compared. All four adhesives – hydroxypropylcellulose (Klucel), methylcellulose (Methocel A4C), gelatin (photographic gelatin Rousselot) and isinglass – were applied with an ultrasonic mister on samples of five different gouache paints on paper. The treatments were evaluated before and after artificial aging by visual assessment, color measurement and a simple abrasion test. Colour changes were within a very small range, which varied according to the pigment. The best mechanical stability could be achieved with isinglass and gelatin solutions. The use of an ultrasonic mister offered the advantage of applying very dilute concentrations with the possibility of closely monitoring possible color changes. In various case studies the use of misted gelatin solutions for the consolidation of gouache paintings of paper and parchment will be described ranging from portrait miniatures to animal studies on parchment by Giorgio Liberale.

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12. Leaf Casting: the influence of starch and methylcellulose coating on the properties pf leaf cast paper

Jedert Vodopivec*, Stanka Grkman, Meta _erni_ Letnar

Starch and cellulose ethers are important additives in paper production. They are also used in paper conservation as adhesives, surface coatings and consolidants. The main objective of "Optimization of conservation leaf-casting techniques", a national project co-financed by the Ministry of Technology and Ministry of Culture of the Republic of Slovenia, was to optimize the current use of leaf-casting and to determine the best materials for its use. The first part of the project focused on the impact of fibre-composition on the permanence and stability of paper made by leaf-casting. The second part, which is the subject of this presentation, focused on the comparison of starches and methyl celluloses (MC) for use as surface coating materials.

In accordance with the results from the first part of the project, reference samples were leaf-cast using a mixture of cotton linters (65%) and bleached sulphate eucalyptus pulp (35%). Six different starch types of various sources (potato, wheat and corn) as well as two different MC-types (Culminal® 2000 and 7000) were manually brushed on the samples. Concentrations of 0.5 and 1% were used with the exception of the Culminal® 7000 which was applied in a 0.5% concentration. The properties determined were weight, thickness, density, specific volume, and uniformity of the paper sheet. Structural properties determined included tearing resistance, bursting strength, folding endurance/double fold, and stiffness. Mechanical properties determined were smoothness, porosity, and contact angle. The surface properties and optical properties examined include ISO brightness, opacity, light scattering and light absorption.

All analyzed starch- and MC coatings improved the homogeneity of paper sheet formation. The MC coatings proved to be better than the starches for improving surface properties such as reduction in water absorption and decreased porosity. The MC coated papers also showed the best results for internal bond strength and folding endurance. Predominantly, the origin of the starches (wheat, potato, corn) influenced the properties of the leaf-cast papers. Wheat starches show the most satisfying results among the analyzed starches. Potato starch improved the properties but is not suitable for leaf casting due to its strong adhesive forces. Corn starches did not provide satisfactory results. From the results we are able to recommend the use of MC with shorter chains and wheat starch. We exclude the use of corn and potato starch. However, the selection of the proper pulp combination and surface coatings, for particular work with original documents, should be done individually. Only in this way can we achieve the desired quality results.

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13. Preservation Concept and Remounting of a Baroque Drawing Collection

Karin Eckstein

The collection of nearly 300 baroque red chalk and charcoal drawings dating from the 17th and early 18th century originates from the Académie de Saint-Luc in Paris. It contains figurative drawings of the famous French painter Simon Vouet (1590 – 1649) and his students. In 1716 the Earl Von der Wahl, treasurer of the Bavarian prince elector, acquired the drawings during his own studies at the academy. Up to the beginning of the 19th century the collection remained with the descendants of the Earl. After this time it passed into the possession of the Bavarian State Library. The collection subsequently fell into oblivion. It was only in 1989 that public attention focused on the Old Master drawings: on occasion of the 400th birthday of Simon Vouet his work experienced a renaissance, beginning in France, where these almost unknown drawings were rediscovered.

The collection was found in totally inadequate storage conditions. In 1913, the corners of the single drawings had been glued straight onto paper of poor quality and low surface pH. The glue caused distortion and there was a genuine risk of this damaging the paint layer. This and the poor housing now required a remounting of the crayons.

An individual preservation concept for the whole collection had to be developed. In the preliminary stage the following aspects had to be considered: removal of the mounting paper, reaction of the old adhesive, possibilities of reducing this adhesive, efficiency of the treatment, the diversity of quality and surface characteristics of the papers, the drawings sometimes being on verso and recto, and mountings that had been made in painted areas. On some selected drawings different methods of removing the old mounts were tested (applying different amounts of moisture with various techniques). The adhesive was analysed using ninhydrin and Ehrlichs reagent, which proved it to be collagen based.

On the basis of the information obtained a modus operandi was found considering possible proceedings, taking also advantages and disadvantages into account. In the end a concept for the preservation of the collection could be determined: The mounting paper was peeled off by hand and residues of the paper were taken off mechanically. Preliminary tests suggested the glue to remain on the drawings, because reducing the adhesive did not relax the paper. In order to counteract the tension and handle the drawings safely - some of them being painted on both sides – hinges of Japanese paper were mounted on the long sides of the drawings. These now keep the drawings under the passepartout and serve to turn the works without touching them. The mat used consists of a front board, passepartout, mounting board and back board as is common in graphic collections. For additional protection special housings were made in order to preserve the originals in their mats.

Each drawing has its individual signature, which was applied like a collation mark on the spine of the passepartout in order to find signatures more easily and keep the mats in order.

To prevent damage through climate fluctuations the drawings are kept in a storage room with constant climate (i.e. 50% RH and 18°C).

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14. Conserving 17th century protocols: is it necessary and appropriate to remove old repairs?

Ágnes Ádám*, Pongrácné Mikesy

Using professional literature from abroad as well a process to save damaged archive records was started in Hungary during the 1950s and 1960s. Some of the records that had been stored in damp basements had badly deteriorated. Even though the 17th century handmade papers were of good quality they had discoloured and weakened due to micro-biological activities. Based on the knowledge of conservation and materials available at the time, mounting seemed to be the right technique. Conservators had strengthened several thousand damaged sheets with thin, transparent paper on one or both sides entirely or sometimes partially. After a few decades, these repairs had darkened. The glue that was used must have played an important role in this. This theory is supported by the fact that in places where paper was filled in from both sides, the infills had become brown, acid and fragile. In order to prevent further darkening and in order to improve legibility the old infills had to be removed. This was done with brief hot-water treatments. Unfortunately, the mouldy parts had welded together with the infills, which sometimes made complete separation impossible. It was questionable if it is worth to start separation where only partial removal was possible. It was decided to complete the process but in order to save the writing those parts, which would have been hard to separate were left intact. In these cases aesthetical aspects were considered secondary. The replacement was done using Japanese paper or leaf-casting by hand. Whatever technique was used in the past, the most important question today is whether or not the old document can be saved.

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15. Conservation of the Cover of the Göttinger Gutenberg Bible: Removing the Protective Cover

Péter Gönczi

Of the twelve remaining vellum copies of the Gutenberg bible, only four copies are complete; one in Washington, one in London, one in Paris, and one in Göttingen. The copy in Göttingen had been accessioned in 1812 from Helmstedt and had an additional protective cover made of suede. This cover had been glued directly onto the original rennaisance cover made of white pigskin, using a proteinous adhesive. The aim of the project was to remove the suede cover in order to reveal and restore the original binding. In a first step the protective cover was removed by carefully splitting the leather from the surface. This left the original binding with remains of leather and adhesive. It was discovered that the cover had been glued to the original binding more than once so that there were different kinds of adhesive present. The leather and adhesive remains were removed using Klucel (EF) poultices, where Klucel in distilled water was used to soften the proteinous adhesive, and Klucel in isopropanole was used for all remaining adhesives. The softened adhesive was carefully scraped off the original cover. Once the cover was free, conservation was completed by filling any losses with pigskin. The presentation will also include the results of research into the origin of the rennaisance cover.

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16. Laminating Vellum to Board: The Multiple Role of Priming of Vellum for Fine Bindings

Manfred Mayer

Priming of vellum plays different roles in the fabrication of stiff-vellum bindings. Besides turning the parchment opaque, priming acts mainly as a flexible link between the vellum and the board. More importantly however, it prevents humidification of the vellum when it is coated with glue and therefore reduces the risk of distortion in the boards. It is believed that this is a more-or-less forgotten practice, which is very valuable. Experiments have been carried out to reproduce the traditional methods. This paper describes the preparation of vellum and the primer including some advice on how to stretch the vellum and prepare the primer.

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17. Experiments for the Separation of Blocked Coated Papers

Beatrix Kastaly*, Veronika Szalai

Under the influence of water and pressure, for example following a flood, the leaves of books and journals printed on coated paper tend to block in smaller or bigger sections. The strong adherence is caused either by the binding agent of the coating or that of the printing ink, perhaps by the two binding agents together. The separation of these leaves is generally not possible by mechanical means without damaging the printed surface.

The professional literature has provided some information both on the type (natural or synthetic) and the solubility of binding agents of coatings applied during various periods of papermaking, as well as on the binding agents in the printing inks and their solvents. Experiments for separating the leaves have been performed on books and leaflets printed with black and/or colour printing inks on coated paper from the 1910s, 1930s and 1980s, respectively. These tests entailed the use of warm or hot water, enzymes, solvents and poultices.

In the case of natural, water-soluble binding agents (proteins and starches) of coatings good results could be obtained with warm or hot water. This was also true for the cellulose-derivatives and polyvinyl-alcohol. The breakdown of water-soluble, natural binding agents was completed by specific enzymes. Separation of leaves was also successful using poultices made of methylcellulose or hydroxy-propyl-cellulose of medium viscosity, separating the leaves one by one.

Certain synthetic binding agents were found to be soluble through mixtures of ethyl acetate and water. Ethyl acetate usually dissolves neither the binding agents of the printing inks nor the pigments themselves. However, if the binding media of the printing inks rather than the coatings causes the adherence, the application of a borax-solution or the mixture of borax and boric acid was found to be effective though the disadvantage is that some printing inks are soluble in water. Wherever colour printing inks are present, the utmost attention should be paid to both the solubility and the possible change of colours of the inks. Further experiments on coated papers printed with colour are currently being carried out.

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18. The Use of Solvent Gel Carbopol to Delaminate Pressure Sensitive Adhesive Tape, in Particular, Filmoplast® Products

Anja Koschel

The lecture discusses the use of solvent poultices with carbopol to delaminate pressure sensitive tape, in particular, filmoplast® products. After an overview of the general construction and composition of adhesive tapes, the focus will be placed on the ageing processes of adhesive tapes, the carrier of which typically consists of either rubber or acrylics. Accelerated ageing of filmoplast® adhesives tapes, which are based on acrylic polymers, had confirmed the permanence of the carrier, however, the tapes proved difficult to remove. Since conservation treatments are supposed to be reversible, the use of carbopol containing poultices to aid removal was tested. Experiments demonstrated 2% toluene with carbopol as a thickener to be most successful. However, results also depended on the surface characteristics of paper. Advantages and disadvantages of poultices using carbopol in toluene for removal of pressure sensitive adhesive tapes are discussed.

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19. Report on the CCI Tapes and Heat-set Tissues Project

Jane L. Down*, R. Scott Williams, Season Tse and Sherry Guild

In June 2001, the Canadian Conservation Institute (CCI) began a project to assess various tapes and heat-set tissues for archival purposes. In a preliminary meeting of conservation professionals from CCI, the Library and Archives Canada, and the Walters Art Museum, a program of research study was worked out which includes the following steps:

1) Screening Program:
   a) collection of numerous and varied products,
   b) chemical analysis of major components of the products,
   c) pH measurement of products,
   d) outgassing test of products, and
   e) compilation of information and selection of reduced number of products to undergo comprehensive testing.
2) Comprehensive Testing Program:
   a) assessment of substrate damage upon aging,
   b) removability upon aging,
   c) ease of application,
   d) long term strength retention of components,
   e) long term bond strength to certain substrates,
   f) retention of flexibility upon aging,
   g) colour change upon aging,
   h) carrier suitability, and
   i) assessment of all results for archival suitability based on application.

This presentation will first review past CCI work done on this topic by the late Helen Burgess and then will report on the status of the current project which is at the screening program stage. During the current screening program, the products were sorted by application type (ie., water-activated, pressure-sensitive and heat-set), by carrier type (ie., paper, cloth, poly-propylene, polyester, nylon, no carrier, etc), and finally by adhesive type as determined by IR spectroscopic analysis [ie., starch, protein, acrylic (different types), rubber, etc]. Results of these analyses will be given. Discussion of the method used to measure pH and how it was arrived at will be presented along with the pH results. A list of the products identified from the screening program to undergo comprehensive testing will be revealed. Finally, aspects of the comprehensive testing, which is to occur over the next few years, will be discussed.

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