TCN
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NEWSLETTER

Annotated Bibliography on the Use of Adhesives Used in Textile Conservation

Prepared by
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Provincial Museum of Alberta
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ANNOTATED BIBLIOGRAPHY ON THE USE OF ADHESIVES USED IN TEXTILE CONSERVATION

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ARMSTRONG, NANCY

"The repair of fans"

The Book of Fans. Nancy Armstrong, Mayflower Books Inc., N.Y. 1978. pp. 79-84

This article acquaints the fan owner with the necessary materials needed to repair fans as a hobby. The author stresses that the article is not on conservation. The purposes and method of use of a variety of materials including tools, insecticides, adhesives and fabrics, are discussed. The water-soluble adhesive Cellofas is suggested as a versatile and reliable adhesive to use.

BALLARD, MARY; CHONG QUEK, LIM

"An unfinished solution for treating an unfinished batik"

Personal communitcation from M. Ballard

The treatment of an unfinished batik is limited to washing, deacidification and rolling or suspending flat for storage. An evaluation of potential support systems for this textile is made with considerations given to the physical condition of the artifact and the environmental conditions in which it will be stored. The use of stitching, of synthetic adhesives, of starch or cellulose pastes, and of mylar encapsulation are considered as possible mounting mediums, but are rejected as sources of further damage to the very fragile textile.

BARCLAY, R.

"Wood consolidation on an eighteenth century English fire engine"

Studies in Conservation. Vol. 26. (4) 1981. pp. 133-139

The condition before treatment and the subsequent consolidation of the wooden parts of an eighteenth century English fire engine are described. Experiments on a range of possible consolidants are outlined, and the application of poly(vinyl butral) (Butvar B90, Monsanto) by both brushing and vacuum methods is presented. A closing discussion examines the relationship of the experimental findings to the practical application, the need for consolidation, and the final results of the treatment. (Authors Abstract).

Although this article discusses the treatment of a wood artifact, the reported results of tests performed on poly(vinyl butyral), poly(vinyl acetate) and acrylic resins are valid to the textile conservator who may be questioning the performance of these resins.

BAER, N.S., INDICTOR, N., SCHWARTZMAN, T.I., ROSENBERG, I.L.

"Chemical and physical properties of poly(vinyl acetate) copolymer emulsions".

ICOM-Committee for Conservation Preprints - 4th Triennial Meeting 1975. 22.5.1-20

Adhesives successfully tested for use on paper presents possible adhesives to safely use on textiles.

The effects of accelerated thermal aging on Whatman chromatography paper that was treated with both copolymers and homopolymers of poly(vinyl acetate) are discussed. The test methods and the equipment used to measure folding endurance, pH, colour change, reversibility and break strength are included along with the results of these tests. Several resins, such as Elvance 1874, Flexbond 800 and Jade 403, are reported to have acceptable longterm stability.

BARTON, GERRY

"Pigment consolidation on six Pacific artifacts"

Report on work carried out during 6 months internship at CCI, May-Oct, 1981.

The conservation of flaking paint on the surface of ethnographic artifacts made of various materials like bark and fiber, is discussed. Consideration of the effect of the adhesive on both the artifact and the pigments is stressed. An interesting range of natural and synthetic adhesives is tested, including gelatins, cellulose derivatives, acrylics, poly(vinyl acetete)s and poly(vinyl butyral)s. The percentage concentration and application methods used are included with the observations.

BERGER, GUSTAV A.

"Art adhesive needs stability, reversibility, compatibility"

Adhesives Age. Vol. 28. No. 3. March 1985. pp. 30-32

The need for research and testing of adhesives specially formulated for various conservation needs is expressed. The characteristics of a good adhesive, including the need for stability, reversibility and compatibility with the artifact are stated. The use of elaborate testing procedures and equipment is stressed as a means of proving the

effectiveness of adhesive products before their use. BEVA is singled out by the author as the only adhesive successfully formulated (or 1970) for art conservation. The need for financial support in this area of research is stressed.

BERGER, GUSTAV A.

"On hot-melt, heat-seal and hot-set adhesives".

Journal of the American Institute for Conservation. Vol. 18 (1978). pp. 44-45.

This short article defines and clarifies the differences between hot-melt, heat-seal and hot-set adhesives. Errors made in the usage of the three terms are pointed out to avoid possible confusion in the interpretation of the literature.

BERGER, GUSTAV A.

"Heat-seal lining of a torn painting with BEVA 371"

Studies in Conservation. Vol. 20. (3), 1975 pp. 126-151

The use of the new heat-seal adhesive, Beva 371, is described step by step in the lining of a torn oil painting by the American artist Rembrandt Peale. The following new devices and methods connected with the development of Beva are described in detail:

1.Heat-seal facings and their preparation
2.Bridging of tears; fillings and inlays
3.Deacidification of decaying canvas
4.Strenghtening of decaying canvas by impregnation
5.Choice of fiberglass in heat-seal laminates
6.Preparation of heat-seal laminates. (Author's Abstract)

This article outlines the merits of the adhesive Beva 371. It also provides a good discussion of a method of lining heavyweight fabrics like canvas.

BLACKSHAW, SUSAN M. and WARD, SUSAN E.

"Simple tests for assessing materials for use in conservation"

Resins in Conservation. Proceedings of the Symposium. Edinburgh, 1982 Ed. by J.O. Tate, N.H. Tennent and J.H Townsend. 1983. pp. 2.1-15.

Most adhesives and resins available to conservators are not specially developed for conservation purposes. The need for both the routine testing of adhesive properties and consultation of the literature before using an adhesive is stressed. The procedures to follow and the

equipment to use for a variety of simple tests performed at the British Museum, along with variables to control, are outlined. The properties that can be tested are the solubility, flexibility, shrinkage and tear strength of heat- and light-aged samples. The results of tests done on Mowital B30H (PVB), Paraloid B72 (acrylic), Vinamul and Mowilith DMC2 (PVAs), as well as BEVA 371 are included.

BLUM, DILYS

"An evaluation of some uses of synthetic resins in textile conservation".

Resins in Conservation. Proceedings of the Symposium. Edinburgh 1982. Ed. by J.O. Tate, N.H. Tennet and J.H. Townsend. Scottish Society for Conservation and Restoration. 1983. pp. 8.1-8.

The use of synthetic resins in textile conservation as seen in Great Britain in the 1960's and early 1970's is reviewed. The characteristics of synthetic resins required for proper textile conservation are outlined, followed by the results of studies on the PVA resins Vinamul 6515/6525 and Mowilith DMV1, DM5 and DMC2. Problems encountered in the use and aging of these resins are then discussed with reference to specific textiles and costumes that were treated.

"Recommendations for repair and allied processes for conservation of documents"

British Standards Institution, BS 4971 Part 1. December 1973, pp. 18-19 British Standards Institution, 2 Park St. London.

This short article, written more specifically for paper conservation, outlines essential characteristics for all natural and synthetic adhesives. The author suggests that only internally plasticized poly(vinyl acetate) emulsion adhesives should be used and that the type and the amount of acid used to emulsify the PVA's should be known. Recipes for the preparation of starch pastes and its accompanying fungicides are included.

CHADWICK, E.

"The technology of synthetic resins with special reference to leather".

International Society of Leather Trades' Chemists Journal. Vol. 30 (1946). pp. 53-64

Although this article was written in 1946, the discussion of manipulation of adhesive properties is still valid and well expressed. Thermoplastic and thermosetting resins are contrasted, with emphasis on the molecular and physical characteristics of the thermoplastics. Preparation methods like polymerization, copolymerization and condensation reactions are explained, followed by processing and fabrication methods. A variety of uses for these resins as surface

finishes and impregnants on leather are outlined. These modify various properties of leather such as abrasion resistance, tensile strength, hardness, flexibility or porosity.

CLARK, THURID

"Conservation of an aboriginal wallaby skin waterbaf at the Australian Museum".

Recent Advances in Leather Conservation. FAIC sponsored refresher course. Harper's Ferry, West Virginia. 1984. pp. 62-64

The use of BEVA 371 and Primal AC235 to repair a skin waterbag is discussed. Reasons given for choosing BEVA 371 as a temporary facing adhesive are its immediate adherence, resistance to moisture, good bond strength along torn edges, and its easy removability. Application to gossamer nylon and the fixation using a heat spatula are outlined. The acrylic colloidal dispersion Primal AC235 on Japanese mulberry paper was chosen because of its neutral pH and its superior flexibility and adhesion.

COLLINS, CATHERINE

"Conservation techniques for ethnographic leather artifacts".

International Institute for Conservation - Canadian Group, Eleventh Annual Conference in Halifax. 1985. p. 26

One of the various conservation techniques used to repair ethnographic leather artifacts at the Manitoba Museum of Man and Nature is the use of the poly(vinyl acetate) emulsion Jade 403 with a pellon backing. One of the factors given that effects the choices of an adhesive instead of stitching is the stiffness of the damaged skin.

DE WITTE, E., FLORQUIN, S., GOESSENS-LANDRIE, M.

"Influence of the modifications of dispersions of film properties".

Adhesives and Consolidants. Paris Congress, 2-8 September 1984. IIC Preprints. pp. 32, 35 (6 tables, 3 refs.)

Modifications to aqueous dispersions, such as the addition of surfactants, plasticizers, thickening agents and buffers are discussed as to their influence on the physical properties of the resulting adhesive films. Twenty-six adhesives available for use in conservation are tested. Preliminary results show that these additives do change the characteristics of the dried film in favourable ways, depending on the type of adhesive used (poly(vinyl acetates) and acrylics).

DE WITTE, E.

"Resins in conservation" Introduction to their properties and applications".

Resins in Conservation - Proceedings of the Symposium, Edinburgh 1982. Ed. by J.O. Tate, N.H. Tennet and J.H. Townsend. Scottish Society for Conservation and Restoration. 1983. pp. 1.1-6

This article is a very good introduction to the properties of synthetic resins: chain structure, molecular weight and glass transition temperature. The applications of resins as consolidants (including a discussion of the use of pre-polymers and monomers), as varnishes (including optical properties, solubility, and long-term stability), and as adhesives are outlined. The author stressed both the importance of testing the useful properties of a resin before using it for conservation purposes, and the difficulty of obtaining reports about unsuccessful adhesive applications.

DORE, JUDITH

Recent textile conservation projects: Conservation in relation to display

Conservatione E Restauro dei Tessili - International Conference Como 1980. Ed. Francesco Pertegato. Published by C.I.S.S.T. - Lombardy Section, Milan. pp. 188-190

The need to discriminate between textile artifacts that can be stabilized using adhesives and those that are more successfully stitched is outlined in this article. The use of an adhesive-treated net and adhesive-coated polyester thread (using poly(vinyl acetate) Mowilith DMC2) are justified by the author for mounting the badly deteriorated bodice of a mid-eighteenth century child's silk dress, and to reinforce a rayon lace collar. The rejection of an adhesive as a means of supporting a fragile, heavily beaded silk tulle dress is explained. The importance of considering display methods when deciding on a conservation treatment is emphasized.

DORE, JUDITH

"The conservation of two eighteenth century English court mantuas".

Studies in Conservation. Vol. 23 (1) (1978). pp. 1-14

The cleaning, supporting and mounting of two court mantuas and petticoats of the early eighteenth century is discussed. Included in the conservation section is an explanation of the use of the poly(vinyl acetate) emulsion Mowilith DMC2 (60% in H_2O) to adhere a nylon net support (20/20 gauge) to the fine silk lining of one dress and the petticoat of the other, using a hot vacuum table and a hot domestic

iron. The consolidation of loose metal embroidery thread using fine extrusions of the water-soluble carboxymethyl cellulose adhesive Cellofas B (30% in H_2O) is also discussed.

DOWN, JANE L.

"The yellowing of expoxy resin adhesives: Report on natural dark aging".

Studies in Conservation. Vol. 29. (2) 1984. pp. 63-76

Natural dark aging is carried out on various commercially available room temperature cure epoxy resin adhesives in order to determine which formulations are most resistant to thermal yellowing. (Author's Abstract)

This study is valuable to the textile conservator using adhesives since the method and instruments used to measure the yellowing of adhesive films are described.

DOWN, JANE

"Adhesive testing at the Canadian Conservation Institute, past and future".

Adhesives and Consolidants. Paris Congress, September 1984. IIC Preprints. pp. 18-21

Research at the Canadian Conservation Institute on the effects of natural dark aging at room temperature and photochemically accelerated aging of the poly(vinyl acetates) currently in use, is presented. Potential problems with adhesives such as changes in pH, flexibility, shrinkage, solubility, discoloration and emission of dangerous degradation products are listed. Appropriate scientific testing methods and equipment needed to study these problems are outlined. Their new testing approach is well explained.

FELLER, R.L. CURRAN, M.

"Changes in solubility and removeability of varnish resins with age".

AIC Bulletin. Vol. 15, (2), 1975. pp. 17-26

The solubility and ease of removal of Acryloid B72 and the poly (vinyl acetates) following accelerated aging are discussed. These results are compared with those obtained from the aging of natural, low molecular-weight resins.

FELLER, R.L.

"Polymer Emulsions III".

Bulletin from the American Group: IIC Vol. 9, (2). 1969. pp. 15-17

The effect of the size of particles of emulsified resin on its properties as an adhesive or a consolidant are discussed. These include the adhesive's gloss, its degree of penetration and its ability to transport vapour.

FELLER, R.L.

"Polymer Emulsions".

Bulletin of the American Group: IIC. Vol. 6, (2), 1966. pp. 24-28

This article is a brief description of the properties of a polymer emulsions and how they dry to form continuous films of the polymer. The conservator is encouraged to check the pH of the emulsion prior to using it. Two advantages of polymer emulsions are: (1) that high concentrations of resin can be used, and (2) that relatively low adhesive viscosities can be maintained. The strength of the final adhesive film depends on the molecular weight of the dispersed polymer, and polymer emulsion films vary in the "strength" of solvent required to remove them.

FENN, JULIA

"Some practical aspects in the choice of synthetic resins for the repair of ethnographic skin and gut".

Adhesives and Consolidants. Paris Congress. September 1984. IIC Preprints. pp. 138-140

Guidelines used to select resins for four types of skin and leather repair are discussed in this paper. The author's criteria for selecting an adhesive stresses the need to choose one with a good reputation and to avoid emulsions and problematic resins.

The successful use of BEVA 371 as an adhesive for waxed and oily skins and leathers, as well as a lining adhesives for very porous skins with a napped texture, is discussed. The preference of Klucel G and Modocoll EK1200 as adhesives for gut is justified. A discussion of the merits of Klucel G, Pliantex and Acryloid B72 as consolidants for deteriorated leather conclude this paper.

GEIJER, A.

"Modocoll as a preservative for textiles and other fragile materials".

Svenska Museer. No. 1, 1961. pp. 11-14

The central office of antiquities in Stockholm has experimented with an adhesive of Modocoll E (EHEC), Polyglycol 400 and Bonomold Na (fungicide). Tests conducted by the National Institute for Testing Materials have concluded that this adhesive ages well. Applications of this mixture to a Coptic tunic (circa 700 AD) are said to have softened the brittle wool and brightened the colours. Modocoll, used in different combinations and as an impregnant, is also suggested as a means of providing temporary protection to fragile archaeological objects and is praised for its water solubility.

GEIJER, A.

"The conservation of textile objects".

Museum. Vol. 14, 1961. pp. 161-164

In this general overview of preventive and treatment oriented conservation practice for textiles, the use of adhesives is classified as a "chemical treatment to strengthen fibres." The author outlines the disadvantages of adhesives, but justified their use in cases when stitching is not possible. The use of the cellulose adhesive "Modocoll" used in Stockhom textile laboratories is discussed.

GHIARDI THOMSEN, FONDA

"An old adhesive - starch paste. A new technique - the suction table offers new horizons in the treatment of brittle textiles".

Adhesives and Consolidants, Paris Congress, September 1984, IIC Preprints. pp. 74-77

The testing and use of AYAA/AYAC (1:1) as an adhesive to temporarily face a silk regimental banner is described. The preparation of the adhesive, its application to the silk crepeline in a spray, and the fixation process using a tacking iron are outlined. An explanation of the removal of the original fiberboard support in H_2O and of the application of a new silk crepeline support coated with a modified wheat starch paste is given. The use of the suction table is stressed. Potential problems associated with humidity and the starch paste are prevented by a humidity buffered, sealed exhibit case.

GHIARDI THOMSEN, FONDA

"Re-evaluation of a modern treatment for a historic textile".

The American Institute for Conservation of Historic and Artistic Works. Preprints of papers presented at the 6th annual meeting. Texas. 1978. pp. 153-159.

This is an excellent discussion of the pros and cons of previous and projected treatments for a four-panel oriental silk screen (1901):

1. horizontal breaks held together with iron-on seam binding; panels sandwiched between silk crepeline; edges adhered to support with white glue;

2. panels faced with silk crepeline and adhered to fine cotton support fabric using Mowilith DMC2 and a vacuum hot table; UF3 plexiglass mounted in front on fabric;

3. possibility of mounting panels between fabric-covered 1/2" plywood and a sheet of glass

The discussion includes time and cost estimates.

GOMES, MARILIA C.

"The conservation of a beaded belt".

IIC-CG Journal. Vol. 2, (1), 1877 pp. 18-21

The cleaning and fixing of a beaded belt from Fort Malden, national Historic Park, Amherstburg, Ontario is discussed. Plextol B500, thickened with natrasol (HEC) is used to adhere the loose ends of the very brittle threads. The use of a stereomicroscope and a syringe to apply the adhesive is explained.

GREENWALD VIERRA, SANDRA - compiled by GIBSON, BETHUNE

"Conservation of a fan".

Journal of the American Institute for Conservation. Vol. 16 (1977). pp. 3-11

The use of three different adhesives to restore a fragile, late 19th century Siamese silk fan is discussed. Consolidation of the highly degraded silk front and fixation of a silk crepeline backing and facing using the adhesive Ethulose 400 (2:3 in H_2O) are carefully explained. The delicate metallic and silk (thread) braid trim was backed with crepeline using BEVA 371 and a tacking iron. The poly(vinyl acetate) emulsion TAIAS R-131 is used to adhere the silk panels to the frame edges.

HILLYER, LYNDA

"The conservation of a group of painted mummy cloths from Roman Egypt".

Studies in Conservation. Vol. 29. (1), 1984. pp. 1-9

The conservation of a group of five fragmentary painted mummy cloths from Roman Egypt is described. The account covers the relaxation of the linen grounds, consolidation of the fragile powdery surfaces and the application of new linen supports using the vacuum hot table. An anaylsis of the pigment and media of two of the fragments is also given. (Author's Abstract).

The testing of the adhesives Mowilith 50, Mowital B30H, Beva 371 and Paraloid B72, and the subsequent choice of B72 as consolidant and Mowilith DMC2 as backing adhesive are discussed along with their individual methods of application.

HIMMELSTEIN, P., and APPELBAUM, B.

"The use of sprayed poly(vinyl acetate) resin mixtures in the mounting of texiles".

Journal of the American Institute for Conservation. Vol. 17. 1977. pp. 37-44

A badly deteriorated 19th century silk American flag, a painted Chinese silk and a printed silk square by Matisse are treated using a mixture of equal amounts of the poly(vinyl acetate) resins AYAA and AYAC. The application of the resin to the silk crepeline backing facric and the fixation process using a tacking iron are explained. Repeated application of the adhesive using the spray gun is said to offer greater physical flexibility to the artifact.

HERSH, S.P., HUTCHINS, J.K., KERR, N. TUKCER, P.A.

"Prevailing opinion in the U.S.A. on the desirable qualities of fabric consolidants".

Conservazione E Restauro dei Tessili - International Conference, Como 1980. Ed. Francisco Pertegato. C.I.S.S.T. Lombardy Section, Milan. pp. 96-98

The aims and results of an adhesive questionnaire given to U.S. practicing textile conservators in 1979 are discussed. The survey addresses the questions of why and when adhesives are used to treat textiles and what characteristics of an adhesive make its choice more appropriate for stabilizing textiles. The results indicate that only 25% of the respondents used adhesives and that adhesive characteristics like chemical stability, chemical compatability with artifact, and flexibility were most desirable.

HOFENK-de GRAAFF, JUDITH

"Hydroxpropyl cellulose, a multipurpose conservation material".

ICOM Committee for Conservation - Preprints of 6th Triennial Meeting, Ottawa 1981. Vol. II. 14/9.1-7

Tests conducted on the hydroxpropyl cellulose KlucelG used as sizing on 100% rag paper give us an insight into its useful properties as a textile adhesive. Its solubility in both cold water and polar solvents is stressed. Case studies show hydroxpropyl cellulose used for a variety of different purposes including leather consolidation. The testing apparatus and test methods are indicated.

HORIE, C.V.

"Reversibility of polymer treatments".

Resins in Conservation - Proceedings of the Symposium. Edinburgh 1982. Ed. by J.O. Tate, N.H. Tennentt and J.H. Townsend. 1983. pp. 3.1-6

The reversibility of polymer treatments is presented, with it various standards that arise from the physical state of the artifact as well as the properties of the polymer. A discussion follows on the factors that may counteract successful reversibility such as: distortion upon application of resin, physical and chemical changes in the polymer during aging, damaging effects of solvents and mechanical action upon removal, and finally, distortion and unsuccessful future treatments following the removal process. A few examples are given of tests performed to measure the reversibility of polymers used as coatings and consolidants.

JEDRZEJEWSKA, HANNA

"Problems in the conservation of textiles: needle versus adhesive".

ICOM Committee for Conservation. 6th Triennial Meeting, Ottawa, 1981. 9/1.1-10

A systematic review is given of problems connected with preferences and objections concerning the choice of sewing or gluing procedures in the treatment of old textiles. The conclusion is that either system may be "gentle" or "drastic" depending on circumstance. Decisions in favour of one or the other technique should be free of personal biases and based more on the actual needs of the object. In many cases, the most effective seems a clever combination of both procedures. (Author's Abstract).

Although this article does not mention one single adhesive, it does provide the textile conservator with a basis for decision making.

JIRAT-WASIUTYNSKI, THEA
"Sprayed poly(vinyl acetate) heat seal adhesive lining of pen and iron gall ink drawings on tracing paper."

Journal of the American Institute of Conservation. Vol. 19. (2) 1980. pp. 96-102

Pen and iron gall ink tracings in deteriorated condition by the American painter Washington Allston (1779-1843) were lined with a nylon web prepared with a sprayed-on poly(vinyl acetate) film. The linings were heat-sealed to the tracings with a tacking iron, on a dry mounting press or on a hot vacuum table. Another application, the lining of a fragile, double-sized Italian drawing in pen and iron gall ink, is also described. (Author's Abstract)

This article reinforces the popular use of spray gun to apply adhesives onto thin, porous surfaces. The choice of the poly(vinyl acetate) AYAF (10% in toluene) is said to be based on good ageing results published in the literature.

KATZ, KENNETH B.

"The quantitative testing and comparisons of peel and lap/shear for LASCAUX 360 H.V. and BEVA 371."

Journal of the American Institute for Conservation. Vol. 24. 1985. pp. 60-68

The experiment involved the quantitative testing of bond strengths produced by the reactivation of dried adhesive, Loscaux 360 H.V. and Beva 371. Reactivation was by heat or solvent activation (xylene). These reactivation methods were chosen because of the apparent new interest in lower temperature linings and linings that can be easily reversed mechanically. Bond strengths were also tested and compared to canvases that were sized with 10% B72. Results indicate that sizing the original canvas can increase the peel strengths significantly during heat activation. It also appears that solvent activation of both adhesives produce stronger peel strengths than the heat activated samples. The results corroborate empirical tests and are meant only as broad guidelines for using these adhesives in the ways tested. (Authors Abstract)

The issues of reversibility and solvent versus heat activation are presented. These are relevant in textile conservation when heat activation can cause more damage than the adhesive itself.

LAKI, ILONA

"The restoration of Prince Ferenc Rakoczi's banner."

ICOM Committee for Conservation - Preprints - 7th Triennal Meeting Copenhagen. September 1984. pp. 9.30-32

The methods used for selectively treating a large early 18th century Hungarian silk banner are carefully outlined and discussed. The banner, previously enclosed and stitched between silk tulle, was very brittle and fragile, especially in areas heavily painted in oil. The cracked, flaking paint was secured with the acrylic resin Paraloid B72. The shattered silk was ironed onto a silk organdy backing impregnated with the poly(vinyl acetate) adhesive Mowilith DMC2/DM5/H_2O in a 1:1:6 ratio. This method was chosen because the conservator was acquainted with experiments done at the Amsterdam Central Laboratory.

LANDI, SHEILA, and HALL, ROSALIND M.

"The discovery and conservation of an ancient Egyption linen tunic."

Studies in Conservation. Vol. 24. (4), 1979. pp. 141-152

This article shows the use of a synthetic adhesive to treat an archaeological textile. The structure, conservation treatment and mounting of an ancient Egyptian linen tunic are described. The method used to back the entire bodice and skirt of the tunic includes preparation of the silk crepeline support by impregnation with Mowilith DMC2 (15% in H_2O) and heat-sealing the support to the artifact using an iron at 75-80^{0}C.

LAZARUS, D.M.

"Adhesives based on starch."

Adhesion 7 - Ed. K.W. Allen. Applied Science Publishers. London 1983. Chapter 10. pp. 197-219

Adhesives based on starches are discussed. Advantages of starch pastes are outlined including their stability, insolubility in fats and oils, non-toxic nature and low cost. The properties of starch responsible for bonding are are given. Variations on the unmodified starch method like pregelatinization, alkali conversion (with or without oxidation), dextrinization and salt conversion are explained.

LEENE. J.E.

"Aging of adhesives used in textile conservation."

Symposium Conservation of Flags - Rijksmuseum, Amsterdam. 1980. pp. 61-64.

The effects of adhesive treatments on the flexibility of textiles like flags and banners are tested at the Delft University of Technology. Results are given for flexibility tests on polyester fabric samples treated with either Mowital B60 H.H. (aged 12 years in the dark at standard conditions), Mowilith DM5/DMC2 in H_2O (1:1:5) or Paraloid

F10. The latter two adhesives being exposed to constantly changing conditions for 7 years. Testing equipment and test methods used are mentioned.

LEENE, J.E., and LOEDWIJKS, J.

"Conservation methods using only natural and synthetic adhesives."

Textile Conservation. Ed. J.E. Leene. Smithsonian Insitute, Washington. 1972. pp. 144-152

This guide to methods used in the conservation of old fragile textiles focuses on the use of natural and synthetic adhesives. Variations on a starch adhesive recipe used at the Hermitage Museum in Leningrad is provided. The properties and conservation requirements of synthetic resins are outlined, including the preferred uses of poly(vinyl butyral) as either adhesive or impregnant. Adhesion of an artifact onto a support base after impregnation of the backing facric is suggested with the PVA Mowilith DM5 and DMV1 in H_2O (1:1:4). Impregnation of the artifact itself or to its support base is not encouraged but suggested with the PVB Mowital BH10 (1% in ethanol). Situations are discussed when both stitching and adhering are favorable.

LEENE, E.

"Flexibility of fabrics: Part II - Aging of adhesives used in textile conservation."

Committee of ICOM for Conservation. Amsterdam. September 1969. pp. 1-6

The effect of aging on the flexibility of adhesive-treated fabrics are reported. Following two and a half years of dark aging at standard conditions, cotton, polyester mousseline, polyester and silk crepeline samples impregnated with the poly(vinyl butyral) Mowital B60HH are reported to show no significant changes in flexibility. A shorter, one-month aging experiment on polyester fabric showed a decrease in flexibility over time in those samples treated with Mowilith DM5/DMV1 (1:1) and with Paraloid F10. A decrease in flexibility was also found with increased amounts of resin with F10, but not with Mowilith DM5/DMV1 (1:1) or with Mowital B60 H.H..

LODEWIJKS, J.

"The history of conservation and restoration of flags and banners in the Netherlands."

Symposium Conservation of Flags. Rijksmuseum, Amsterdam. 1980. pp. 57-59

A historical survey beginning in 1953 describes methods used to conserve flags and banners in the Netherlands. The reasons why certain materials and techniques were adopted and later rejected are well outlined. More recent and successful experimentation with polyester crepeline backings impregnated with the poly(vinyl acetate) resins Mowilith DM5 and Mowilith DMC2 (1:1) indicate that research and testing are essential in the search for appropriate textile adhesives.

MAEDER, M.

"Methods of conservation and restoration at the Swiss National Museum."

Symposium Conservation of Flags. Rijksmuseum, Amsterdam. 1980 pp. 117-121.

The use of an acrylic resin adhesive rather than a starch paste to treat a disintegrated silk flag is discussed. The use of Paraloid F10 to impregnate a terylene support facric, and the use of a "special iron" to apply the backing to the silk is explained. This method of conservation is said to be developed and used in Zurich.

MARKO, KSYNIA

"Experiments in supporting a tapestry using an adhesive method."

The Conservator IIC-UK. Vol. 2. 1978. pp. 26-29

The use of the poly(vinyl acetate) adhesives Mowilith DMC2 and DM5 in H_2O (3:1:2) to support a large sixteenth century wool and silk tapestry is described. The application of the adhesive to lengths of terylene net, the heat-sealing process using a vacuum hot table and the stitching done as reinforcement are explained. This treatment is evaluated as one that maintains the flexibility of the artifact. The reversal of an earlier, unsuccessful treatment using nylon net and Vinamul 6515 is mentioned.

MASSCHELEIN-KLEINER, LILIANE

"Conservation of very brittle textiles."

Conservazione E Restauro die Tessili. International Conference Como 1980. Ed. Francesco Pertegato. C.I.S.S.T. - Lombardy Section, Milan. pp. 245-249

A discussion of the conservation procedures to clean and mount very brittle textiles presents the limitations placed on the conservator by the physical state of the artifact. A detailed outline of wet cleaning procedures is followed by a discussion of different mounting procedures. Stitching methods are said to be preferable because of their reversibility, but relining with modified (hydrolised) starch is

presented as an alternative to using synthetic and other natural adhesives. Applications of this last mounting procedure to a painted linen map and a silk flag are included.

MEHRA, V.R.

"Dispersion as lining adhesive and its scope."

Adhesives and Consolidants. Paris Congress, September 1984, IIC Preprints. pp. 44-45

The discussion of linings for paintings using dispersion adhesives outlines methods of thickening the adhesives Plextol B500, Primal AC634 and AC507. These are emulsions of acrylic co-polymers that may be used on textiles.

PATTERSON, CARL

"An approach to the conservation of ethnographical musical instruments."

The Conservator IIC-UK. Vol. 2. 1978. pp. 45-48

Ethnographic musical instruments will require conservation treatments if environmental conditions are not monitored and if storage supports and display methods are not carefully considered.

The use of the poly(vinyl acetate) emulsion Vinamul 6515 as a means of laminating acid-free tissue to repair split skin soundboards is one possible conservation procedure discussed.

PHELAN, W.H., BAER, N.S., INDICTOR, N.

"An evaluation of adhesives for use in paper conservation."

International Institute for Conservation - American Group Bulletin, 1971. pp. 58-75

A study begun at the Conservation Center of the Institute of Fine Arts of New York University evaluating the use of impregnating agents, poly(vinyl acetate) emulsion adhesives and natural pastes on paper provides information that can be relevant to textile conservation. The materials, application method and type of artificial aging chosen to test samples are described. Test methods and equipment used to perform folding endurance tests, pH measurements, colour change evaluations and treatment reversibility tests are included. The numerical data set out in tables are interpreted for all the adhesives tested.

QUANDT, ABIGAIL

"KLUCEL-G."

Leather Conservation News. No. 2. December 1983. p. 8.

The use of the hydroxpropyl cellulose adhesive Klucel-G is suggested to consolidate powdery leather. Its solubility in alcohol and water is stressed. Its use at the Trinity College Library for the last 10 years is justified by successful treatments and reference to the article "Hydroxy propylcellulose: A New Water Soluble Cellulose Polymer". Food Technology 24: 51-54, 1970.

RABIN, BERNARD

"A poly(vinyl acetate) heat seal adhesive for lining."

Technology of Adhesives International Institute for Conservation, Libon Congress. 1972. pp. 631-635

The successful use of synthetic adhesives for lining paintings on canvas can often be transposed to conservation procedures used for heavier textiles.

The solution of the poly(vinyl acetate) resins AYAA/AYAC in toluene (1:1:3), the application of the adhesive at specific time intervals using a brush, and the fixation using a vacuum hot table, are discussed. Reasons given for choosing the adhesive are the proven long-term stability of the polymers and their well-defined properties. The reversibility of the treatment is explained.

REEVES, PAT

"Use of BEVA in the conservation of an interlocked warp and weft Nazca textile."

The American Institute for Conservation of Historic and Artistic Works: Preprints of 7th annual meeting. Toronto, Canada 1979 pp. 108-115

The use of BEVA 371B as an adhesive to join a silk crepeline backing to a valuable but fragile pre-Columbian Nazca textile is described. The preparation of the adhesive by dissolution in xylene, its application to the backing fabric using a spray gun, and the fixation process using a tacking iron and hot vaccum table are explained. The results are described as an evenly adhered flat textile that can be successfully stitched to a sturdier backing. One of the reasons given for the choice of Beva is its ability to re-soften with solvents, enabling the re-alignment of fibers.

RENSHAW BEAUCHAMP, RICHARD

"Adhesives used in the British Columbia Provincial Museum Conservation Lab."

ICOM Committee for Conservation - Preprints of 6th Triennial Meeting, Ottawa 1981. Vol. 3. pp.5.1-3

The fear that artifacts may lose integrity at the expense of unnecessary treatments has led conservators from the British Columbia Provincial Museum to a more cautious use of adhesives in treatment conservation. The BCPM's choices of starch paste, methyl cellulose, cellulose nitrate and Jade 403 for use in conservation is explained. The author suggests that conservators limit their use of adhesives to a few of proven reversibility.

SCOTT, KATHRYN

"Treatment of a pre-Columbian (Chancay) textile."

The American Institute for Conservation of Historic and Artistic Works - Preprints of 6th annual meeting. Fort Worth, Texas. pp. 149-152

The cleaning, blocking and repair of a pre-Columbian Chancay textile is described. Various methods of stabilizing the damaged tapestry areas are discussed. These include adhering a crepeline backing with heat-set tissue and a tacking iron, repairing small stable areas with rice paste and stitching, and using Jade 403 to attach new inlaid fibres. The treatment results are reported to be successful since the flexibility of the artifact is maintained, enabling it to be mounted an a strainer.

SHIELDS, J.

Adhesives Handbook

3rd Ed. Butterworths. London. Revised 1985. 358 pages

This is a good reference text on adhesives. Following a general introduction to adhesives, factors affecting their selection, as well as materials and properties of basic adhesives types are discussed. The bonding process is outlined, including methods of adhesive application, adhesive bonding and bond curing. Physical properties and corresponding tests of adhesives are well explained. Finally, the trade sources of adhesives are given. The book does not discuss uses of adhesives in conservation.

VAN NES, K., KIPP, A.

"Treatment of a gonfalon."

Symposium Conservation of Flags. Rijksmuseum, Amsterdam. (1980) pp. 112-115

The use of adhesive-impregnated synthetic backings or facings on silk and wool fabrics is discussed. The method of treatment using polyester crepeline backings impregnated with a mixture of DMC2 and DM5 in H_2O (1:1:6) and the fixation of this backing using a warm iron is explained. The effect of the adhesive on the hand of the silk and wool fabrics is not reported, nor is the success of the treatment evaluated in terms of environmental changes on the natural fibres.

VAN STEENE, G., and MASSCHELEIN-KLEINER, L.

"Modified starch for conservation purposes."

Studies in Conservation. Vol. 25V (2) 1980. pp. 64-70

The problems associated with choosing an adhesive to back fragile textile like silks are discussed, outlining the disadvantages of both natural and sythetic adhesives. The properties of a variety of starch pastes, particularly their colour, flexibility, degree of adhesion and degradation are compared. Methods of modifying starches to achieve more favourable adhesive characteristics are explained. Acid-hydrolysis of wheat starch is described as giving the most satisfactory results and is used to back a silk flag. The method of preparing this adhesive is described.

VERDU, J., BELLENGER, V., KLEITZ, M.O.

"Adhesives for the consolidation of textiles."

Adhesives and Consolidants. Paris Congress, September 1984. IIC Preprints. pp. 64-68

Preliminary results of a long-term program of thermally and photo-chemically aged adhesives suggest that some synthetic resins used as consolidants may yellow and embrittle over time. Aging experiments on a range of possible consolidants, including acrylics, poly(vinyl acetates) and copolymers, poly(vinyl alcohols), cellulose derivatives and starches, are outlined with their results.

The superior performance of poly(butyl methacrylate) is noted. The discussion presents a scientific along with a lay interpretation of results.

VUORI, JAN

"A possible adhesive for natice tanned skin."

Leather Conservation News. Vol. 2 (1), Fall 1985.

The use of the resin B72 in a solution of ethylhydroxyethyl-cellulose (EHEC), as a substitute for poly (vinyl acetate) resins like Jade 454 is suggested for the repair of leather and skins. Concern about the possibile release of acetic acid from PVA's and favorable reports on the stability of acrylic resins are reasons given for the choice of B72. A combination of 25% B72/15% high grade viscosity is preferred by the author for its ease of application, low penetration, good tack and fast drying.

WAGSTAFF, JOHN

"Further uses of BEVA 371 in the treatment of painted silk panels."

The Conservator IIC-UK. Vol. 3. 1979. pp. 9-13

The treatment of painted arabesque designs on two 18th century panels, using BEVA 371 as a temporary facing adhesive, is discussed. (The water-based adhesive methyl cellulose is considered but not used because the pigments are not colourfast. The impregnation of Eltoline tissue with BEVA 371 (1:1 in toluene) and the fixation process using a heated spatula is outlined. The relining of the panels using wheat starch and Japanese paper is explained along with removal of the facing tissue using both toluene and heat. The reversal method is described as a successful one since no colour transfer is apparent on the facing tissue.

WILKS, HELEN, Editor

Science for Conservators. Book 3. Adhesives and Coatings

Crafts Council Conservation Science Teaching Series. Crafts Council, 11/12 Waterloo Place, London. SW 1Y 4AU. 1983. 135 pages.

This is the third book in a series designed to introduce conservators with no previous knowledge of science to the scientific principles of adhesives and coatings. The information is meant to provide the conservator with guidelines to decision-making. Most of the examples used to illustrate a concept are adhesives, coatings or consolidants.

Polymerization, the relationship of polymer properties to their structure and the mechanical behavior of solids, are discussed.

The difference between solvent adhesives, reaction adhesives and melt-freeze adhesives are also well explained. The final section on consolidants outlines the properties of viscosity and porosity, then discusses consolidation methods.