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PAPER CONSERVATION CATALOG

Presented in L.A., AIC Meeting.
Saturday, May 19, 1984

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This group of papers represents efforts to begin a Paper Conservation Catalog. The statement of purpose for the project follows on another page.

We hope that Book and Paper Group members will be interested in taking on the project to set down this body of knowledge. Three entries have been started: Mending, Drying/Flattening, and Humidification. They are incomplete and will require additions and modifications. The primary reason for including the three partial entries here is to present a format for the Catalog. Consistency among the entries will be a valuable asset in using the Catalog, and therefore has been a primary consideration in working on these entries. The format has been developed after considering the need for clarity, flexibility, consistency and efficiency. We need and welcome your comments.

We very much hope that as many Book and Paper Group members as possible, working individually or in groups, will take on parts of the Catalog, such as outlining a treatment area, writing an essay, setting down treatment steps, etc.

As you know, this project will only succeed as a group effort.

Nancy Ash,
Marian Dirda,
Doris Hamburg,
Murray Lebwohl,
Meredith Mickelson,
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Dianne van der Reyden,
T. J. Vitale

PAPER CONSERVATION CATALOGUE

STATEMENT OF PURPOSE

The purpose of this project is to compile a catalogue or inventory of current conservation treatments for art on paper. The intention is to record the variety of treatment procedures in fairly common use, not to establish definitive procedures. Neither is the intention to provide step-by-step recipes for the untrained. An attempt will be made to include a variety of techniques used by BPG members and divergent opinions about particular techniques. Inclusion in the catalogue does not constitute an endorsement or approval of the procedures described. The catalogue is designed for practicing paper conservators and is intended as an aid in the decision making process. It is understood that the individual conservator is solely responsible for determining the safety and adequacy of a treatment for a given project and must understand the effect of his or her treatment.

The catalogue is to be distributed to BPG members. Distribution will be in looseleaf format to permit additions and revisions and to allow the catalogue to be updated as necessary. It is anticipated that this project will be a collective volunteer effort of the BPG, with members contributing catalogue entries, additions and revisions. A list of categories and a standard outline format have been proposed. The pilot group for this project has drafted prototypes for three treatment categories in the standard format to serve as examples. Conservators who know of or use other variants to these treatments are asked to contribute short entries to be added to the text. Initially individual conservators or groups of conservators will be needed to write text for broad treatment categories, including treatment variants. After distribution, additions can be contributed by interested BPG members. The format is intended to be simple and flexible enough to encourage paper conservators to contribute any specialized techniques or innovations, however broad or narrow in their application.

Information which cannot be usefully catalogued under the Treatment Variations heading will be outlined under Materials/Equipment or Special Considerations. Wherever possible Treatment Variations will cross reference to Special Considerations to avoid repetition. An Index will more fully cross reference Treatment Variations, Materials/Equipment and Special Considerations information.

The catalogue can be thought of as a goal but the "doing" will offer unlimited opportunities to exchange large and small amounts of information with our associates. The quality of this information should be similar to that learned while visitng or working with a colleague and discussing specifics.

The BPG membership has always expressed interest in contributing or exchanging small amounts of information, but there has never been a convenient format available. It is hoped that this Catalogue will prove to be an attractive vehicle while also performing the professionally necessary task of recording our "Body of Knowledge".

PAPER CONSERVATION CATALOGUE

1. Fiber Identification
2. Media Identification
3. Media Problems
4. Support Problems
5. Condition Forms and Description
6. Visual Examination
7. Authentication
8. Documentation
9. Instrumental Analysis
10. Spot Tests

16. Fumigation
17. Dry Cleaning
18. Washing
19. Solvent Treatments
20. Alkalization and Neutralization
21. Enzyme Treatments
22. Bleaching
23. Consolidation/ Fixing/ Facing/ Sizing
24. Backing Removal
25. Mending
26. Filling and Compensation
27. Humidification
28. Drying and Flattening
29. Lining and Mounting
30. Inpainting
31. Collage and composite pieces

40. Matting and Framing
41. Encapsulation
42. Lamination and Impregnation
43. Environment
44. Exhibition/ Storage
45. Transportation/ Packing
46. Adhesives
47. Materials/ Tools/ Equipment
48. Mold/ Foxing

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Format

Each major category is identified by a specific number to facilitate indexing and cross-referencing.

Each treatment category (#16 - 31) is broken down into six subheadings: Purpose, Factors to Consider, Materials and Equipment, Treatment Variations, Bibliography and Special Considerations. Each of these subheadings can be further outlined as shown for 1.4 below, i.e. with treatment variations numbered 1.4.1, 1.4.2, 1.4.3, etc.

1. Major Treatment Category

Definition:

1.1. Purpose

1.2. Factors to Consider

1.3. Materials and Equipment

1.4. Treatment Variations

1.4.1.

1.4.2.

A.

B.

1.

2.

a. (etc.)

1.5. Bibliography

1.6. Special Considerations

Bibliography can be annotated to the extent that the subject dictates.

Special considerations can take many forms. It may include extended essays relating to the material in the preceding outline. It can offer a critical review of the existing literature. It can evolve into a dialogue between conservators with complementary or dissenting viewpoints.

Special considerations material is segregated from the broader body of outlined information in an effort to keep the outline simple enough for easy reference.

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The list of categories has been partially expanded below to indicate how the proposed standard format can be applied to individual catalogue entries and to suggest ways in which the catalogue outlines might be developed.

1. Fiber Identification

Morphology
Staining Techniques
Bibliography:

2. Media Identification

Binders: morphology, chemical tests, instrumental techniques
Pigments: morphology, chemical tests, instrumental techniques
Inks: composition, chemical tests, instrumental techniques
Bibliography:

3. Media Problems

Alkaline sensitivity: Prussian blue
Acid sensitivity: Calcium carbonate
Pollution sensitivity: red lead, white lead, Naples yellow,
Fugitive Pigments: gamboge
Specific Pigments: red lead, white lead, zinc white, copper
pigments (verdigris, copper resinate)
Specific media: India ink-shellac binder soluble in alcohol
iron gall ink
Oil on paper
Bibliography:

4. Support Problems

Tissue Paper
Oil coated papers
Tracing papers
Artists' papers
Drafting linen
Coated papers
Colored papers
Textured papers
Western papers
Oriental papers
Bibliography:

5. Condition Forms and Description

Descriptive terms
Deterioration terms

6. Visual Examination

Raking Light
Transmitted Light
Stereobinocular Microscope
Ultraviolet Light
Techniques
Detectable materials:

pigments: rose madder, Indian yellow, whites
other: mold, varnishes, adhesives, oils and fats,

iron-containing materials
Infrared Light
Techniques
Specific Uses

7. Authentication
8. Documentation
 - Photographic
 - Analytic: Dylux
 - Beta Radiography
 - X Radiography
9. Instrumental Analysis
 - X Ray Fluorescence
 - X Ray Diffraction
 - Gas Chromatography
 - Visible Spectroscopy
 - Scanning electron microscopy (SEM)
 - Transmitted electron microscopy (TEM)
 - Gas Chromatograph Mass Spectroscopy (GCMS)
 - High Pressure Liquid Chromatography (HPLC)
 - Atomic Absorption (AA)
 - Plasma Spectroscopy
 - Laser Microscopy
10. Spot Tests
 - Starch - potassium iodide
 - Protein - ninhydrin
 - Lignin - phloroglucinol
 - Alum - aluminon
 - Alum Rosin - Raspail
 - Bibliography
16. Fumigation
 - Use of insecticides and fungicides to kill insects and/or mold which are harmful to media and paper
 - Purpose:
 - Factors to consider:
 - toxicity to humans
 - long term effectiveness
 - tendency to alter the artifact
 - Materials and Equipment:
 - Thymol
 - Ethylene oxide
 - Paradichlorobenzene
 - Carbon Dioxide
 - Freezing
 - Silica Gel
 - Treatments:
 - Airtight Chamber
 - Thymol Cabinet
 - Plastic Bag
 - Bibliography:
 - Special Considerations:

17. Dry Cleaning

Mechanical surface removal of grime, dust and other marks using erasers and eraser-like materials.

Purpose: To remove surface markings that are not part of and detract from the original design.

Factors to consider:

Erasable nature of the original design material

Residues left by dry cleaning materials

Materials and Equipment:

Eraser types:

powdered erasers

gum erasers

kneaded erasers

vinyl erasers

Abrasives

abrasive sheets or sticks

lasars

air abrasives

Treatments:

Dry cleaning with each of the above.

Bibliography:

Special Considerations:

18. Washing

Using water to remove impurities, discoloration, residues and accretions from a work of art on paper.

Purpose:

Factors to Consider:

Water purity

Physical action of water on paper/alkaline water

Media solubility

Pigment solubility

Possible alterations in the paper through wetting and redrying

Paper strength

Ability of paper to wet out

Materials and Equipment:

Auxilliary supports: Wet strength fabrics, screens

Water

Alkaline materials

Surfactants/detergents

Chelating/Sequestering Agents

Ethanol

Spray equipment

Suction Tables

Treatments:

Relaxing/wetting out paper support/ wetting agents

Humidification (See 27. Humidification)

Spraying with water and/or ethanol

Washing by Immersion

Float Washing

Adhesive Removal: local aqueous treatment

Stain Removal: local aqueous treatment

Bibliography:

Special Considerations:

19. Solvent Treatments

Use of organic solvents to remove spots, stains, discoloration, adhesives and tapes by dissolving or softening the foreign material.

Purpose: to remove foreign material which discolors, disfigures or otherwise threatens damage to the art object.

Factors to consider:

Solubility of media, optical brighteners, coatings, coloring agents

Damage to media from solvation of degradation products

Damage to cellulose by desiccation or other solvent interaction

Coloring agents in solvents

Safety factors (toxicity, explosiveness)

Materials and equipment:

Fumehood; organic fume respirators

Suction table (large and small)

Trays (stainless steel, plastic, improvised)

Solvents

Poultice materials (Fuller's earth, kaolin, fumed silica, cellulose powder)

Treatments:

Immersion

Local application with brush, swab or dropper

Local poultice treatment

dry mounds with solvent applied

solvent wetted poultices applied

Pressure sensitive tape support (backing) removal

Pressure sensitive tape adhesive removal

overall solvent chamber

"small" inverted solvent chamber

"small" suction table

Stain Removal (see above)

Bibliography:

Special Considerations:

20. Alkalization and Neutralization

Def.

Purpose:

Factors to Consider:

Materials and Equipment:

Treatments:

Immersion:

calcium hydroxide

calcium bicarbonate

magnesium bicarbonate

methyl magnesium carbonate

magnesium methoxide

barium hydroxide

Poultice with:

calcium/magnesium bicarbonate

Spray with aqueous or non-aqueous alkalization agents

Bibliography:

Special Considerations:

21. Enzyme Treatments

Removal of starch or animal adhesives or stains using enzyme baths or poultices.

Purpose:

Factors to Consider:

Speed

Purity

Order of use

Neutralization

Washing

Materials and Equipment:

Treatments:

Immersion in enzyme bath (alpha amylase, protease, etc.)

Poultices: in methyl cellulose
in agarose gel

Spot treatments with enzymes

Suction table

Neutralization techniques

Washing techniques

Bibliography:

Special Considerations:

22. Bleaching

Oxidation or reduction of discoloration within paper supports.

Purpose:

Factors to Consider:

Damage to cellulose, media or sizing

How to judge/determine original color tone of paper

Residual chemicals left in paper

Whether discoloration is superficial or penetrates sheet

Safety hazards of bleaching method

Materials and Equipment:

Treatments:

Local or immersion bleaching with:

Sodium Borohydride

Sodium Formaldehyde Sulfoxylate (antichlor)

Sodium sulfate (antichlor)

Sodium thiosulfate (antichlor)

Sodium hydrosulfate

Chlorine Bleaches: chlorine dioxide, chloramine-T,
hypochlorites

Hydrogen Peroxide

Permanganate

Gas phase bleaching:

Chlorine dioxide

Hydrogen peroxide

Light Bleaching (artificial and natural)

Bibliography:

Special Considerations:

23. Consolidation / Fixing/ Facing/Sizing

Materials used to secure loose or friable media or surfaces either as an interim measure during treatment or as a permanent measure to ensure the long term integrity of the insecure surface.

Purpose:

Factors to Consider:

Adhesive adhesion and cohesion

Media compatibility

Media saturation

Reversibility

Effect of solvent choice on appearance of consolidant

Media solubility in chosen solvent

Materials and Equipment:

(See 46. Adhesives)

Starch

Parchment Size

Gelatine

Cellulose Ethers

Cellulose Acetate

PvOH's

Acrylics

Treatments:

Brush application

Spray application

Spray application on suction table

Removal of "facing" type consolidants on suction table

Bibliography:

Special Considerations:

24. Backing Removal

Removal of auxilliary supports which are structurally, chemically or aesthetically deleterious to the object.

Purpose: to remove sources of strain or stress and to stabilize the object.

Factors to consider:

Sensitivity of media to: pressure, moisture, steam

Speed

Strength of support

Adhesive removal

Artist's intent

Provenance considerations

Materials and equipment:

Treatments:

Removal by:

Floating

Soaking

Scraping

Splitting

Steaming

Sanding

Hot spatula

Freezing

Enzymes

Bibliography:

Special Considerations:

25. Mending (See PROTOTYPE)

Locally joining splits or tears in a paper support using an adhesive material.

Purpose:

Factors to consider before mending:

Materials and equipment:

Treatments:

Bibliography:

Special Considerations:

26. Filling and Compensation

Filling losses in a paper support with paper inserts, paper pulp or full linings with paper or paper pulp.

Purpose: To preserve the physical integrity and restore the aesthetic intent by replacing lost segments of the artwork.

Materials and Equipment:

Fill material

western paper (old or new)

oriental paper

paper pulp

Adhesives

Toning material

pastel

watercolor

acrylic

dyes

Factors to consider:

Color match

Fill color fastness to water and light

Differences in paper hygroexpansivity, strength

Treatments:

Fills shaped from dry paper

Pulp fills cast in situ

Pulp fills cast with template

on suction table

on leaf caster

Bibliography:

Special Considerations:

27. Humidification (See PROTOTYPE)

Introduction of moisture directly or indirectly into the design and/or paper support.

Purpose:

Factors to Consider:

Materials and Equipment:

Treatments:

Bibliography:

Special Considerations:

28. Drying and Flattening (See PROTOTYPE)

Drying is the process of removing moisture from paper.

Flattening involves reordering the fibers in a sheet so that the sheet lies predominantly in one plane.

Purpose:

Equipment and Materials:

Treatments:

Bibliography:

Special Considerations

29. Lining and Mounting

Providing auxilliary structural support by adhering a backing material to the original support.

Purpose: To stabilize and support the object.

Factors to Consider:

Compatibility to support

Fragility of support and media

Handling or use

Materials and equipment:

Adhesives (aqueous, heat-set)

Lining material

Mounting material

Ragboard

Ragboard honeycomb

Aluminum honeycomb

Treatments:

Lining with Japanese Tissue

Lining with Fabric

Mounting on Rigid Support

Bibliography:

Special Considerations:

30. Inpainting

Compensating for design or media losses in an artwork.

Purpose:

Factors to Consider:

Materials and Equipment:

Treatments:

With Watercolor

With Pastel

Bibliography:

Special Considerations:

31. Collage and Composite Pieces

Def.

Purpose:

Factors to Consider:

Materials and equipment:

Treatments:

Bibliography:

Special Considerations:

- 40. Matting and Framing
- 41. Encapsulation
- 42. Lamination and Impregnation
- 43. Environment
- 44. Exhibition/ Storage
- 45. Transportation/ Packing
- 46. Adhesives
 - Aqueous
 - Starches
 - Pvas
 - Gelatine
 - Cellulose Ethers
 - Heat-set
 - Acrylic
 - Elvace
 - BEVA
- 47. Materials/ Tools/ Equipment
 - Materials
 - Tools
 - Teflon Spatula
 - Bamboo Spatula
 - Honed Microspatula
 - Heated spatula
 - Inverted mini solvent chamber
 - Equipment
 - Vacuum Suction Table
 - Theory
 - Techniques
 - Leaf Caster
- 48. Mold/ Foxing
 - Causes and Characteristics
 - Fumigation
 - Removal