PAPER CONSERVATION CATALOG

Saturday, May 19, 1984
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.

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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 visiting 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
11. Fumigation
12. Dry Cleaning
13. Washing
14. Solvent Treatments
15. Alkalization and Neutralization
16. Enzyme Treatments
17. Bleaching
18. Consolidation/ Fixing/ Facing/ Sizing
20. Mending
21. Filling and Compensation
22. Humidification
23. Drying and Flattening
24. Lining and Mounting
25. Inpainting
26. Collage and composite pieces
27. Matting and Framing
28. Encapsulation
29. Lamination and Impregnation
30. Environment
31. Exhibition/ Storage
32. Transportation/ Packing
33. Adhesives
34. Materials/ Tools/ Equipment
35. Mold/ Foxing

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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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PAPER CONSERVATION CATALOGUE

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
   Artist’s 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 Flourescence
  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 Absorbtion (AA)
  Plasma Spectroscopy
  Lasar Microscopy

10. Spot Tests
  Starch - potassium iodide
  Protein - ninhydrin
  Lignin - pholorglucinol
  Alum - aluminon
  Alum Rosin - Raspail

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
  Paradicholorobenzene
  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.

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:
- Auxiliary 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:

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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. **Backinng 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 auxiliary 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

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