

**REPAIR AND PRESERVATION  
OF  
RECORDS**



**NATIONAL ARCHIVES OF INDIA**

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## PREFACE

The increasing awareness of the importance of records for administration as well as for historical research has given rise to a demand for their proper preservation, whether they are in public, semi-public, or private custody. It is felt that those who are entrusted with their care and upkeep must, in order to discharge their responsibilities efficiently, be familiar with the general aspects of records preservation. A scientific knowledge of the physical and chemical properties of record materials and the effect of atmospheric impurities on them will lead to the provision of storage conditions calculated to increase the longevity of the records.

The National Archives of India has been supplying information on the care and repair of records, books, and manuscripts, whenever asked to do so. The number of such enquiries is on the increase and the need has, therefore, been felt for some time for a brochure which would, in simple language, make available to all those interested in the subject the knowledge of the technique of preservation. This brochure, it is hoped, will meet this demand.

Besides discussing the optimum storage condition needed for the preservation of records in the tropical climate, mention has also been made of some common pests injurious to record materials and the methods that should be adopted in record offices and libraries for the control of these pests. Since old and fragile records often need reinforcement in order to be safely handled, some general repair processes have also been described in detail. Further, a few special problems, e.g., treatment of water-soaked records, repair and mounting of maps and preservation of manuscripts on birch bark and palm leaf, have been discussed.

In a small brochure like this it is not possible to envisage and suggest solutions to all the problems which may arise

in dealing with special cases. Solution of such problems may also require expert advice on the spot. Within such limitations it is hoped the brochure in its present form would be found useful by all who are entrusted with the custody of the written word.

It is my pleasant duty to put on record my appreciation of the help given by my colleague, Shri R. C. Gupta, Deputy Director of Archives and the staff of the Preservation Division in preparing the manuscript.

K. D. BHARGAVA  
*Director of Archives,  
Government of India.*

NEW DELHI,  
*Dated the 1st September, 1959.*

## APPENDIX I

### SPECIFICATIONS OF WRITING INK AND PAPER FOR PERMANENT RECORDS

#### Record Ink

Ferrogallotannate, Blue Black Ink containing not less than 0.4 gm of Iron per 100 c.c. of the fluid ink is recommended for permanent records. Specifications for such an ink are given in IS : 221-1950 : *Specification for Fluid Ink for Registration and for Cheques and for Records*, issued by the Indian Standards Institution.

#### Writing Paper For Permanent Records

Detailed specifications have not been so far issued by the Indian Standards Institution. The following tentative specifications have been agreed to by the Quality Control Sub-Committee of the Paper Sectional Committee of the Indian Standards Institution for good grade paper.

##### A. Chemical Requirements

1. Rag content (cotton, linen singly or mixed)	100%
2. Alpha cellulose content	85% minimum
3. Copper number	2% maximum
4. Ash content	2% maximum
5. Rosin content	1.5% maximum
6. pH	5 minimum

##### B. Physical Requirements

1. Burst Factor	25
2. Folding Endurance	Minimum 250 double folds average each direction at 1 K.G. tension under I.S.I. test conditions ( <i>Method of Sampling and Test for Paper and Allied Products, Part I, IS : 1060-1956</i> ).

**C. Ageing Test (Heating for 72 hours at  $103^{\circ} \pm 2^{\circ}\text{C}$ )**

- |   |                   |
|---|-------------------|
| 1. Retention of Alpha Cellulose   | 98% minimum       |
| 2. Increase in Copper Number  | Not more than 0.5 |
| 3. Percentage of the un-aged folding strength retained by the sample after ageing | 70% minimum       |

**D. General Requirements**

The paper shall be uniform in formation, thickness and substance, evenly finished, and free from specks, holes or other blemishes. It shall be suitable for ruling and writing with ink, and shall not show appreciable change in shade after being subjected to ageing test.

## APPENDIX II

### SPECIFICATIONS OF REPAIR MATERIALS

#### Hand-made Paper

Hand-made paper for repair of records shall be all rag, white or cream-toned. If the paper is cream-toned the dyes used shall be fast to light. Its weight shall be 20-22 lbs. (size 20" × 28", 500 sheets) and its pH not less than 5.0.

It shall have a folding endurance of at least 500 double folds at 1 K. G. tension under I.S.I. test condition.

(*Method of Sampling and Test for Paper and Allied Products*, Part I. IS : 1060-1956).

#### Tissue Paper

Tissue paper for repair of records should conform to the following requirements :—

Alpha cellulose content not less than 88%

Weight and size : 6-7 lbs. (25" × 50", 500 sheets).

Ash content not more than 0.5%.

pH not less than 5.0.

The tissue paper shall be free from oily and waxy constituents.

#### Chiffon

Chiffon used in repair shall be fine, pure and white silk gauze, having a mesh count of 83 × 82 per square inch.

It shall have a thickness of 0.0034" (average) and a pH of 6.0-6.5.

#### Oiled Paper and Waxed Paper

The oiled and waxed paper shall be resistant to water penetration, and shall not show adhesion with dextrine or starch pastes. Its oily and waxy constituents shall not stain the document. Recommended weight is as under :—

Oiled Paper : 50 lbs. (24" × 18", 500 sheets)

Waxed Paper : 40-42 lbs (36" × 36", 500 sheets)



### **Muslin (*Malmal*)**

Muslin used for mounting of maps and charts of medium size (larger than double foolscap) shall be of fine, bleached quality, having an average thickness of 0.004", and mesh count 90×70 (approximately) per sq. inch. It shall be of even weave and free from knots etc., in the threads, and shall preferably be free from sizing materials.

### **Long-cloth.**

Long-cloth used for mounting maps and charts of heavy weight shall be of fine bleached quality, having average thickness of 0.006" and mesh count 90×70 (approximately) per sq. inch. It shall be of even weave, free from knots etc., in threads, and preferably shall not contain sizing materials.

### **Cellulose Acetate Foil**

Cellulose acetate foil for lamination of records is normally available in 42" width, but may also be supplied in sheets cut to desired size.

The formula of the cellulose acetate foil recommended for use in lamination of records by the National Bureau of Standards, Washington, is P. 911, manufactured by M/s. Celanese Corp. of America.

The cellulose acetate foil recommended for lamination should have a thickness of 0.00088", should be flexible, semi-moisture proof and should not change in colour and flexibility when subjected to accelerated ageing at  $103^{\circ}\pm 2^{\circ}$  C for 72 hours. It should be free from nitrate, and should have a stable plasticizer.

## APPENDIX III

### FORMULA AND PREPARATION OF DEXTRINE PASTE

#### Formula

Dextrine	..	5 lbs.
Water	..	10 lbs.
Oil of Cloves	..	1½ oz.
Saffrol	..	1½ oz.
Lead Carbonate	..	2½ oz.

(Lead carbonate can be replaced by barium carbonate).

#### Procedure

Water is kept for boiling in a shallow brass vessel (*degchi*). When the temperature of water has risen to about 90°C, dextrine powder is slowly added to the hot water with constant and vigorous stirring so that formation of nodules of dextrine in water is avoided. After the addition of dextrine is complete (5 lbs. of dextrine may take approximately 30-40 minutes), lead carbonate is added to the paste while stirring. Then oil of cloves and saffrol are added, well mixed with the paste, and the preparation of the paste is completed by cooking over fire for 6-8 minutes only.

### FORMULA AND PREPARATION OF THIN STARCH PASTES

#### Formula

Starch ( <i>Maida</i> )	..	½-¾ lb.
Water	..	10 lb.
Oil of Cloves	..	1½ oz.
Saffrol	..	1½ oz.
Lead Carbonate	..	2½ oz.

(Lead carbonate can be replaced by barium carbonate).

#### Procedure

The same as described above dextrine being replaced by starch (*maida*).

FORMULA AND PREPARATION OF STARCH (*Maida*) PASTE FOR  
GENERAL REPAIR AND BINDING WORK.

**Formula**

Starch	1 pt. by weight.
Water	4-5 pts. by weight.
Copper Sulphate	2.5-3% of starch.
Glycerine	1-2% of starch.

**Preparation**

Small quantities of starch (*maida*) are mixed with water (requisite quantity) taken in a shallow brass vessel (*degchi*) and made into a paste taking care that no lumps or nodules are formed at the base. After the requisite quantity of starch has been so mixed, copper sulphate dissolved in minimum quantity of water (10 c.c. for every 5 gm.) is added to the paste. The paste so prepared is then cooked on fire or electric stove till it starts frothing. During cooking paste is kept well stirred so that there may not be any charring of starch at the bottom due to over-heating. Glycerine is mixed to it at this stage and the paste well stirred.

## APPENDIX IV

### REPAIR EQUIPMENT REQUIRED IN A RECORD OFFICE

1. Repairing table, preferably with glass top
2. Small hand press
3. Paper trimmer
4. Scissors (long)
5. Knives
6. Paring knives
7. Cups (Brass)
8. Dishes (Brass)
9. Brushes (Camel hair, 1" and  $\frac{1}{2}$ " wide)
10. Paper cutting slices (preferably made of horn)
11. Foot-rule
12. Sewing needles (big and small)
13. Bodkin (for piercing holes)
14. Enamelled trays
15. Glass plates
16. *Degchi* for preparing dextrine and *maida* paste
17. Electric iron.

## APPENDIX V

### SPECIAL CARE OF LEATHER BOUND VOLUMES

Good quality vegetable tanned leather is ordinarily a very stable substance, but in adverse circumstances it is liable to be attacked by insects and fungi. It contains waxy and greasy constituents which gradually volatilize in hot climate, and thus leather often loses its flexibility in course of time.

The durability and longevity of leather can be greatly enhanced by the application of leather preservative dressing to leather bound-volumes. Many varieties of leather preservative dressings are available. However, a mixture prepared with the following formula has been found quite satisfactory :—

- |                      |    |                |
|----------------------|----|----------------|
| 1. Lanolin anhydrous | .. | 9 oz. (Avoir)  |
| 2. Bees-wax          | .. | ‡ oz. (Avoir)  |
| 3. Cedarwood oil     | .. | 1 oz. (Fluid)  |
| 4. Benzene           | .. | 11 oz. (Fluid) |

Benzene is slightly heated and the wax is dissolved in it. Cedarwood oil is added next and then lanolin, which should be previously softened by warming. The mixture should be thoroughly shaken before using.

The reasons for combining these ingredients in this leather dressing are as follows : Lanolin is an animal fat which is easily absorbed by leather, and does not become rancid. At ordinary temperature it is in the form of a thick grease and its use will be difficult. Its application is made easy by mixing it with the liquid dressing. The wax will assist in polishing and providing a thin surface film and will reinforce any powdery or cracked portion of the leather. The cedarwood oil is a good preservative and is useful in forming a bond of union between the lanolin and wax in the leather. Benzene is chosen as a convenient "thinner" as it readily dissolves bees-wax.

Since acidity in the leather or in the atmosphere is injurious to it, and accelerates its decomposition, treatment of leather with

a buffer salt (sodium benzoate) prior to application of preservative dressing is recommended. The process of treatment is as follows :—

Superficial dust particles are first cleaned from the leather binding with a clean and soft cotton cloth. A wet swab dipped in 1-2% sodium benzoate solution is applied to it and allowed to dry. After the leather is dry, leather preservative dressing is applied to it with a brush and the volume is again left to dry (overnight). The leather dressing is then well rubbed in with cotton or cloth pad. Leather so treated retains its natural shine and flexibility.

The mixture is highly inflammable and should be kept away from fire.

## APPENDIX VI

### SELECT BIBLIOGRAPHY ON PRESERVATION AND REPAIR OF RECORDS

1. Back, E.A.                      *Book Worms, The Indian Archives, Vol. 1, No. 2, 1947.*
2. Basu, Purnendu                *Common Enemies of Records, The Indian Archives, Vol. 5, No. 1, 1951.*
3. British Records Association, *Technical Section Bulletin 16, London, 1946.*
4. Chakravorti, S.                *Vacuum Fumigation : a New Technique for Preservation of Records, Science and Culture, No. 11, (1943-44).*
5. Cockrell, D.                    *Book Binding and the Care of Books; Sir Isaac Pitman & Sons, London.*
6. Diehl, Edith                    *Book Binding—its background and technique; Rinehart and Company Incorporation, New York, 1946.*
7. Evans, Dorothy, M.            *Protection of Books against Insects; Printing, Packing and Allied Trades Research Association, Leatherhead, Surrey.*
8. Goel, O. P.                      *Repair of Documents with Cellulose Acetate on Small Scale. The Indian Archives, Vol. 7, 1953.*
9. Grant, Julius.                 *Books & Documents : Dating, Permanence and Preservation; Grafton & Co., London, 1937.*
10. Gupta, R. C.                 *How to Fight White-Ants, The Indian Archives, Vol. 8, No. 2, 1954.*
11. Kathpalia, Y. P.               *Care of Books in the Libraries, The Indian Archives, Vol. IX, No. 2, 1955.*

12. Kimberley, A. E. and Hicks, J.F.G., Jr. *A survey of Storage Conditions in Libraries relative to the Preservation of Records*, National Bureau of Standards, Miscellaneous Publication No. 128, Washington, 1931.
13. Kimberley, A.E. and Scribner, B. W. *Summery Report of National Bureau of Standards Research on Preservation of Records*, National Bureau of Standards, Miscellaneous Publication No. 154; Washington, 1937.
14. Langwell, W. H. *Conservation of Books and Documents*; Isaac Pitman & Sons London, 1957.
15. LeGear, Clara Egli *Maps: Their Care, Repair and Preservation in Libraries*; The Library of Congress, Map Division Washington, 1949.
16. Lydenberg, H. M. and Archer, J. *The Care and Repair of Books*; R. R Bowker Company, New York U.S.A.
17. McKenny Hughes, A. W. *Protection of Books and Records from Insects*, *The Indian Archives*, Vol VII, No. 1, 1953.
18. Minogue, A. E. *Care and Preservation of Records* Technical Bulletin No. 5, National Archives, Washington, U.S.A.
19. National Archives, Washington *Buildings and Equipment for Archives*, Technical Bulletin No. 6.
20. Plenderlith, H. J. *Conservation of Prints, Drawings and Manuscripts*; Oxford University Press, London.
21. Ranbir Kishore *The Preservation of Rare Books and Manuscripts*, *The Sunday Statesman*, March 1, 1959.
22. U. S. Government Printing Office, Washington. *Theory and Practice of Book-Binding*. (Apprentice Training Course).
23. Weiss, H. B. and Carruthers, R. M. *Insect Enemies of Books*; The New York Public Library.



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