

# **RESTORATION AND PRESERVATION OF DOCUMENTS**

A Summary of a Report prepared by Churchill Fellow, Jim Bruce

## **PART II**

In the previous issue of **Archives and Manuscripts**, the first part of Jim Bruce's summary of his Churchill Fellowship study on the Restoration and Preservation of Documents was published. This covered his stay at the Public Record Office London. In this issue prominence is given to his course of study at the India Office, and some mention is made of his visit to Wolvercote Paper Mill at Oxford, Guard Bridge Paper Mill in Scotland, the Engineering Branch of the Imperial College of Science and Technology in London, the Scottish Record Office, and the National Archives and Records Service in Washington.

### **WOLVERCOTE PAPER MILL, OXFORD**

During my one-day visit to the mill, I was shown the process of paper-making and the mill personnel gave me every assistance. While this mill makes many acid-free papers, none was used in the actual restoration of documents. The mill management were interested in the effects of ultra violet light rays on their paper, particularly under Australian conditions. Therefore, I brought back with me to Australia samples of eight different alkaline papers of a pH rating of 8, and I shall return these samples to Wolvercote for analysis and evaluation once the test is finished.

### **GUARD BRIDGE PAPER MILL, SCOTLAND**

This mill manufactures acid-free paper which is claimed to be stable for five hundred years. The main interest of the Guard Bridge mill is in the production of long-life paper for printing purposes, not for document restoration.

### **INDIA OFFICE RECORDS**

#### **1. Programme**

The India Office Library and India Office Records offer a number of courses in restoration, including:

- (a) Documents
- (b) Maps
- (c) Pictures
- (d) Artifacts
- (e) Weapons
- (f) Lamination.

Again, because of the limited time available, it was decided that I undertake the restoration of documents and of maps only, for a total period of three weeks. The reason for concentrating on documents and maps was that completely different techniques are used from those employed at the Public Record Office. For example, for nineteenth century documents (comparable to those held in the Queensland State Archives), the India Office Records uses Japanese tissue as the restorative base, whereas the Public Record Office uses the Bodleian process involving British hand-made paper.

## **2. Conditions and equipment**

Working conditions are very modern with plenty of natural light, hot and cold water, air conditioning and central heating. The work benches are standard with light table incorporated and have deep drawers and high back stools. Fluorescent lighting and swing table lamps illuminate all benches. Fire extinguishers and smoke detectors provide fire protection. All restoration work is carried out in the one room, the bindery being a separate unit.

There is a special plant for producing distilled water. There is also a special plant for the production of calcium hydroxide, the deacidification agent in use. A laboratory provides supplementary chemical services. Other equipment includes a guillotine, book presses, paper trimmers, and stainless steel stands for holding and drying documents. A fume extraction unit is used when the work involved the use of dangerous substances. The Office has three Ademco Regal laminating presses, and a nine feet by nine feet map table, two feet high, with a nine feet by four inches steel straight edge lodged along the table side in a slot. Fumigation, as at the Public Record Office, is by means of an atmospheric pressure thymol cabinet. A full range of pH meters and indicators is available.

## **3. Hand restoration**

As in the Public Record Office, the entire work process is controlled by the foreman's job sheet. The sheet includes details of the document, nature of required repair, classification, dates repair commenced and completed. The document is then inspected for brittleness, dirt adherence and pH level, and a decision made as to which of the following restorative processes would be used:

- (a) Bodleian repair
- (b) Japanese tissue repair
- (c) Map restoration
- (d) Reversible procedure
- (e) Torn page procedure

### **(a) Bodleian repair**

After inspection and an ink stability test, the document is brushed over with a two per cent solution of soluble nylon to hold it together. Deacidification is by the use of calcium hydroxide. The adhesive is a mixture of carboxy methyl cellulose and Clam paste, allowing a pliable paste mixture.

Polythene is placed on the glass light table and the deacidifier is sponged in until the paper is relaxed. Silk is then placed on the document and the paste gradually brushed in from the centre towards the sides. Then the polythene is placed on top and smoothed down with a sponge. The paper is placed on top of the polythene and marked out on the edge nearest the lettering with a needle. The surplus paper is removed, then the polythene lifted with the repair paper from the document and placed on another piece of polythene, then replaced on to silk and smoothed down. Perspex is laid on the bench and smoothed terylene placed on top of it. The document is then placed on the terylene with the polythene on top. Another sheet of repair paper

is moistened and placed on the polythene and marked out with a needle around the edge of the document. Surplus paper is removed and the repair paper placed on the document. Then it is smoothed down and pasted gently all over. The perspex sheet is removed to a drying rack and left to stand for twenty-four hours. After that time, the document is removed from the rack and taken off the perspex and terylene, trimmed down to size and placed in a book press.

**(b) Japanese tissue**

A template is made up with two thin strips of black cover paper pasted onto the light table in the form of a T. The pages are then placed squarely onto this template. A small margin is allowed for the fold. A thin paste is then made up. Carboxy methyl cellulose powder is gradually mixed into a bowl of warm water to the consistency of honey. This mixture is then added to a Clam paste solution to make it a more pliable finish. Then another bowl is filled with the deacidifier, calcium hydroxide (seven grams to one gallon of water). A little carboxy methyl cellulose, diluted in water, is kept aside in a small bottle for use in the score of the document with a draftsman's ruling pen.

Polythene is then placed on the top of the light table allowing the template to show through. The document is then placed on the table and thoroughly relaxed with the deacidifier. It is then placed onto the template into the correct position. Another sheet of polythene is placed on top of the document. Japanese tissue is then placed on top of the polythene with an overlap of one inch allowed all around the document. The draftsman's ruling pen is then dipped in the solution of carboxy methyl cellulose and a mark is made around the printing on the tissue. After this has been completed, the tissue is lifted up and the surplus tissue is pulled away from the mark by forefinger and thumb. The fibres of the Japanese repair tissue are then evenly frayed out. The Japanese tissue has a very good fibre strength. The document itself is then pasted and the repair tissue is laid on the top and smoothed down with the flat of the fingers, at the same time working the paste in evenly. Any holes in the document are repaired at the same time. The document is then reversed and the other side strengthened along the edges and down the fold. It is lightly pasted all over and placed on a piece of terylene attached to perspex. Then it is placed into a rack overnight for drying. It is removed from the rack the next morning by carefully easing the terylene off the document, *not the document off the terylene*. The document is then trimmed to size and placed in a book press.

**(c) Map restoration**

Inspection is carried out as in document restoration. The sample map to be restored was thirty-six inches by twenty-four inches with writing in black ink in one corner. The ink proved stable, the map was mounted on mould made paper thirty-two pound weight. The deacidifier used is calcium hydroxide. Moistened terylene is laid on the map table and all the air bubbles are smoothed out. The map is then placed on the terylene, moistened and deacidified. The map is lifted off the terylene and placed to one side. Then backing paper is

cut with a one inch margin all round. The backing paper is placed on the terylene, moistened and pasted with a mixture of carboxy methyl cellulose and Clam paste. The moistened map is then placed on the backing paper. Polythene is then laid on top and all the air bubbles smoothed out by using a fairly dry sponge. The polythene is then removed. The repair paper is cut, deacidified, pasted and placed around the edge of the map. This is then scored around and the surplus paper is pulled away. The map is then pasted over with a fine paste wash and left to dry overnight on the table. Next morning it is removed from the table and trimmed.

All maps are stored flat in the India Office Library.

**(d) Reversible procedure**

This is carried out on a hand restored document that has *not* been properly repaired.

A layer of polythene with the document on top is placed in a shallow tray of warm water and is left to soak. Then the layer of repair paper is removed from one side only. The polythene with the document is then removed from the tray and laid on the table and the paste removed. Then another piece of polythene is laid on top and the document reversed, the first piece of polythene is then removed and once again the document is placed in the tray. The repair paper on this side is then removed and all the paste washed off the document. If this surplus paste is left on, it would leave a dull finish to the document. Procedures then continue as for the original repair.

**(e) Torn page procedure**

A piece of thin perspex one-sixteenth inch thick is placed under the sheet to be repaired, and then the dry repair paper is placed over the whole page and torn out to a shape around the printing or writing. Then the page is moistened very slightly to relax it on the perspex. The torn page is then fitted together and silk is placed over the whole page and pasted. Repair paper is then dampened slightly, pasted, and then placed into position on the page. Polythene is then placed over the top and the page is turned over and the perspex removed to check that the tear is set in the correct position. A piece of terylene is placed on the perspex and very lightly pasted. The polythene is removed from the page and the page placed on the terylene. Polythene is laid on the page and smoothed down. Blotting paper is then inserted to absorb the moisture and then the document is allowed to dry in an open position.

N.B.: *To hand repair torn page on a cheap edition, repair by running polyvinyl acetate along the tear.*

**IMPERIAL COLLEGE OF SCIENCE AND TECHNOLOGY  
(ENGINEERING BRANCH)**

Scientists at this institution carry out research into the basic materials used in restoration work, and how they are applied. Different methods of lamination are tested, as well as paper chemicals, the strength of paper fibres, and fold resistance. Very adequate laboratory facilities are available. Mr James Lewis is on the Committee of British Conservationalists who are doing research into the best methods and

materials for use in the restoration of archival and library materials. He was very helpful in that he allowed me to use his library of books on the restoration of documents, and I obtained from him many samples of acid-free papers.

Mr Lewis said that there was great scope for investigation of material and restoration methods. He was interested particularly in the problems that are typical in Australian archival circles.

### **SCOTTISH RECORD OFFICE**

The Scottish Record Office concentrates on hand restoration which includes:

- (a) Documents
- (b) Parchments
- (c) Resizing
- (d) Registers
- (e) Maps.

As I had only two days' visit to the Scottish Record Office, I concentrated on resizing and the restoration of registers.

The restoration room, bindery and sewing room are separate rooms located in the basement of H.M. General Register House. The map restoration work is carried out in the new West Register House, which is a building that has been constructed within the shell of the old St. George's Church, burnt out some years ago.

The equipment includes light tables with standard table lamps incorporated on work benches, fire detectors and extinguishers, guillotine, paper trimmers and presses, stainless steel sinks, hot and cold water, central heating and a drying rack.

#### **Hand restoration**

(a) *Resizing* — Documents are deacidified and then resized. A mixture of one ounce of gelatine to one quart of water is brushed on to one side only with a small wide fine hair brush. Care is taken to brush the mixture on evenly to obtain best results. The rack consists of a wooden frame with plastic coated curtain spring wires strung between. This is a very easily built frame set on castors.

(b) *Registers* — When a register needs restoring the back is removed by rubbing paste into it, and then the back is heated over a stove or hot plate until the old glue melts. This makes it easier to take apart the sections of the register without tearing them. If the original is considered too large, it is restored in a manner suitable for easier handling by breaking it into manageable parts, and this on its own makes the binding last longer.

### **NATIONAL ARCHIVES AND RECORDS SERVICE, WASHINGTON**

#### **Equipment and Conditions of Work**

The restoration room is situated in the basement of the building with no natural lighting, but with air conditioning and central heating. There is a large photographic laboratory with special equipment for

identifying forgeries in old documents, and a chemical laboratory attached to the restoration room, with a full-time chemist in attendance. There is also a small bindery. The humidifier is set in a special room, with an extractor for fumes. A large fumigation plant, similar to the Degesch unit used in the Queensland State Archives, using ethylene oxide as the fumigant, was constantly in service.

In the restoration room there is one large steam laminator, two Simplex dryers, two paper guillotines, two paper trimmers, a drilling machine, a sewing machine, two large stainless steel sink trays (30" x 24" x 8") with four smaller stainless steel sinks (24" x 18" x 8") for documents. All these sinks had the plug holes set in their centres, and over the sinks were constructed rust proof racks to place fibre glass mesh on, to drain. There is tremendous merit in having these racks. Fibre glass pieces are cut to size, to fit the documents and maps. Two deacidifying plants are constructed above the sinks so that the chemical could be fed by gravity (by hose) into whatever sink it is needed to fill. A magnifying glass is set on the head of each table lamp. An electric iron is available. The bench tops all have one quarter inch plate glass on top with a light table underneath and a special bench with rollers set at the end to cut up materials for lamination.

A three-rail throw-over stand set on castors stands at each bench for holding material that has been cut.

#### **Restoration procedure for documents**

The following notes refer to the procedures used for lamination. Documents are sent in with a work sheet which lists the name of the owner-department, plus a time sheet for the restorer to complete. The National Archives works on a standard pH reading of 8. This allows for any acidity that may be introduced during restoration. Examination of documents is carried out and the usual procedures applied. Dirt is cleaned off with a ball of gutta percha or cleaning dough, and the document is washed on fibre glass mesh in warm water. When rinsed, but while still wet, they are lifted into the deacidifier solution and soaked for 30 minutes. After soaking, they are removed and placed on a sink to drain, then fed through the Simplex dryer, inserted between blotting paper and then sorted out by page number. The lamination procedure follows. Acetate and Japanese tissue are cut to the size of the platen on the Arbee laminator and placed on the throw-over stand. After enough material has been cut for the job, acetate is then laid on a glass-top bench. Then the documents are placed on and tipped down with acetone. This prevents the documents from moving in processing. The very fine camel hair brush used is carefully cleaned and has a chisel end to pick up dog ears. After all the documents have been laid and tipped between acetate the whole is reversed and another sheet of acetate placed on top of the Japanese tissue and once again it is tipped down all round. The sandwich is then ready to laminate.

With the sandwich in between teflon, the heat being already established at 176°C (350°F), the lamination machine is started and the sandwich pressed and rolled through, then it is removed and the documents trimmed down ready for restoring in the document cases.