

Preservation and Care of a Philatelic Collection

by Mr. Joseph Schirò

Conservation encompasses 3 explicit functions:

1. **Examination** which is the preliminary procedure taken to determine the original structure and materials comprising an artefact and the extent of its deterioration, alteration and loss.
2. **Preservation** which is action taken to retard or prevent deterioration or damage in cultural properties by control of the environment and/or treatment of their structure in order to maintain them as nearly as possible in an unchanging state.
3. **Restoration** which is action taken to return a deteriorated or damaged artefact as nearly as is feasible to its original Form, Design, Colour and Function with minimal further sacrifice of aesthetic and historic integrity.

Conservation Phases:

Conservation of artefacts has two phases:

1. preventive conservation, including cleaning and repair of artefacts and environmental controls in display and storage spaces, and
2. conservation intervention, which is more treatment oriented and can be expensive.

What is paper?

Paper may be defined very simply as fibres that have been reduced to pulp, suspended in water and then matted into sheets.

During the hand papermaking process suitable fibres are soaked in water, macerated or beaten so that fibres flatten out and are added to a vat of water.

A paper mould is dipped into the vat and when it is lifted out the caught slurry on the mould is the formed paper sheet.

Fibres

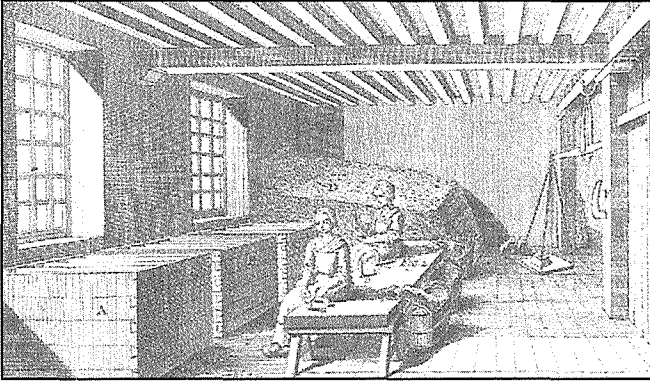
The fibres used for papermaking are chosen for their specific qualities i.e. strength, softness, flexibility, texture, natural colour and absorbency.

Paper

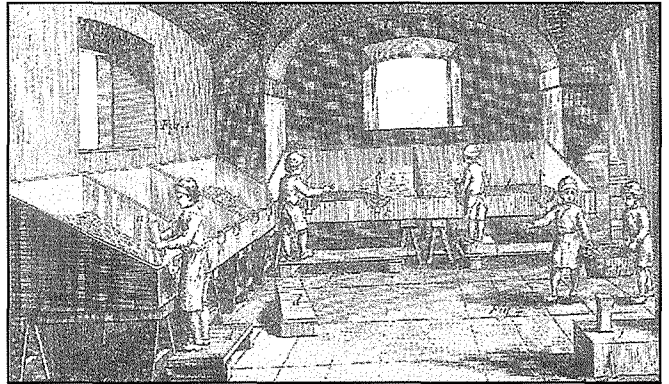
Cellulose is the main constituent of paper. However other substances are also present in the paper:

Sizing which allows the use of aqueous inks, by making cellulose less hygroscopic,

Fillers that add opacity and texture to the paper sheet, and
Dyes and Inks.



Women graded and sorted cotton and linen rags according to quality.



Sorted rags were broken down by hand-stamping the fibres.

Beating

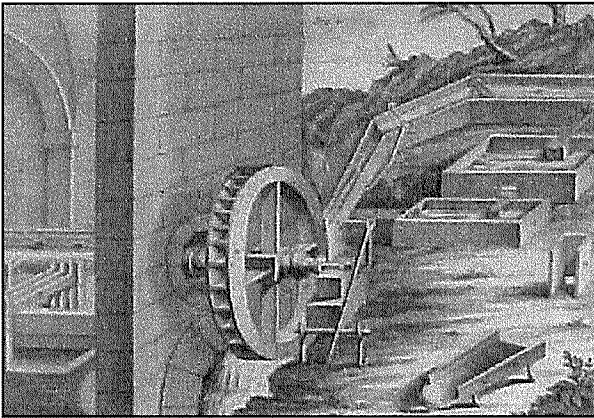
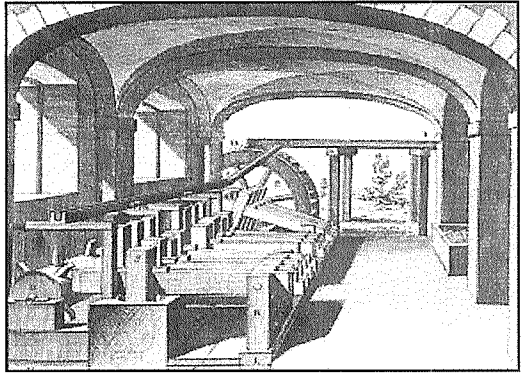
Beating serves to break the thin outer wall of the fibres and to fray the delicate elements exposed, thus producing fibrils.

The fibrils, being of much smaller diameter than the fibres are more flexible and more capable of bonding together. Many more points of contact between fibre and fibre are formed, so that the paper becomes stronger.

In the early days of papermaking, fibres were manually treated. China, for example used wooden mallets. In Europe, Fabriano used water-power driven hammers (the stamper).

The Stamping Mill

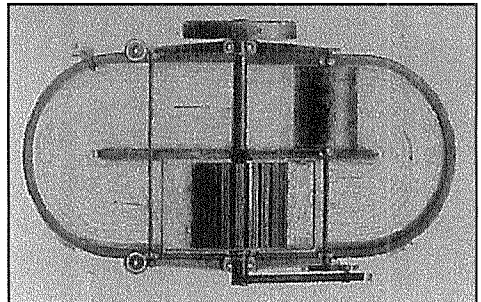
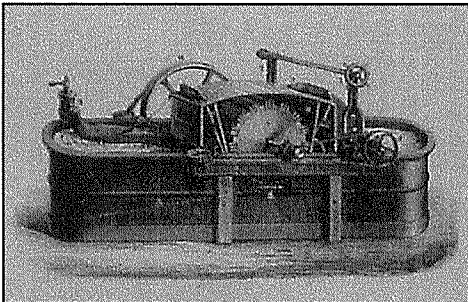
The stamping mills consisted of rows of big wooden hammers or mallets, which were caused to rise and fall by means of a series of cams on a stout axle. These hammers or pestles operated up and down in troughs into which the rags were placed.



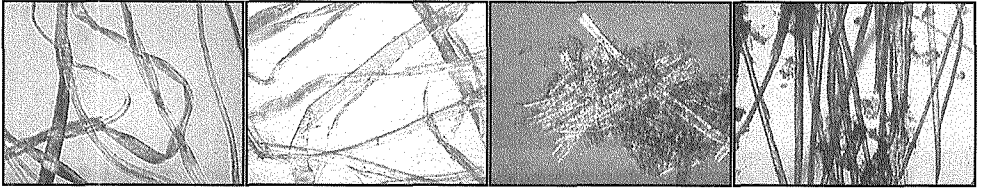
The engraving shows how water turned the wheels which in turn activated the hammers.

The Hollander Beater

The most significant development in the technology of hand paper making was the invention in Holland of the beating machine in the 17th century using windmills as a source of power.



Fibres (Cotton, Gampi, Wood pulp and Linen).



Cotton fibres

Gampi

Wood pulp

Linen fibres

Moulds

The “Wove” Mould. It seems that the first mould used by Ts’ai Lun (China 105 A.D.) and his helpers was only a square of coarsely woven cloth held with a four-sided bamboo frame.

This kind of mould could have been used in two different methods. The first method being when dipping the mould perpendicularly into the water in which macerated fibres floated and turned up horizontally under the fibres, to lift the matted fibres as in a sieve. The water would drain through the meshes of the cloth.

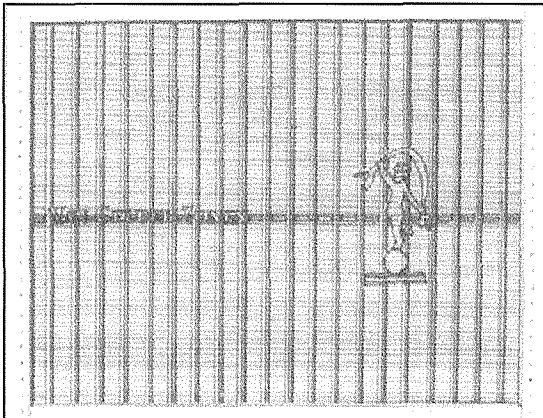
The “Laid” Mould

An ancient artisan conceived the idea of a mould from which the wet sheet of paper could be removed while still moist.

For this purpose the mould covering had to be constructed of a smooth and firm material from which the wet sheet could easily be removed.

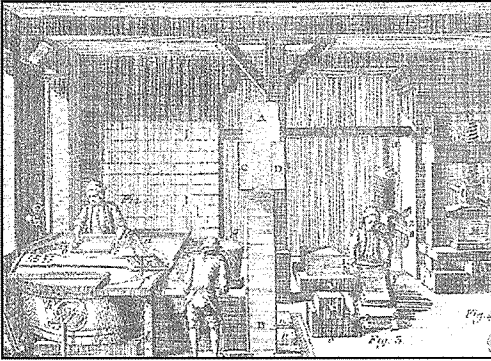
European Moulds

In place of the Oriental flexible laid mould cover which was removable from the mould frame, the European papermakers adopted the “rigid” mould.



Metal wires replaced bamboo and horsehair. The laid mould cover was secured to a wooden frame or to a metallic frame (mould frame). Frame and mould were inserted in another frame from which they could be removed.

A paper mould.



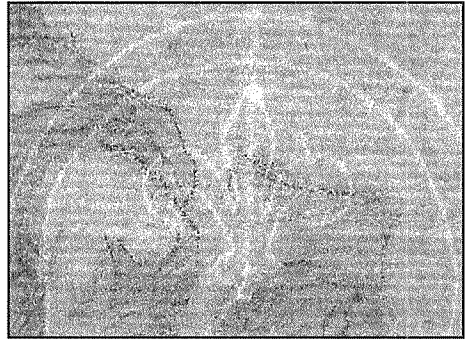
A vatman prepares to dip a paper mould into pulp Fibre. Heavy presses used to remove the remaining water from the paper are in the background.



An engraving of a papermill



The watermark was a piece of brass which was stitched to the mould.



Two chiaroscuro watermarks. Queen Elizabeth II and Madonna and Child

“Velin” type of Mould

In the middle of the 18th century a woven mould was reinvented, but instead of using a cloth, a woven brass screen was employed which formed a firm and rigid surface.

The Vat

This is a large waterproof vessel used to hold the diluted pulp during the paper making process. In the 15th century, a vat was a round or oblong wooden tub. The vat must obviously be bigger than the mould and was narrower at the bottom than at the top. If made of wood, a vat had to be lined in lead to ensure that it was waterproof. Some vats have been found made of stone.

An important aspect during the manufacture of paper is circulation of the water and the suspension of the fibres. The vatman used to do this by simply stirring with a pole.

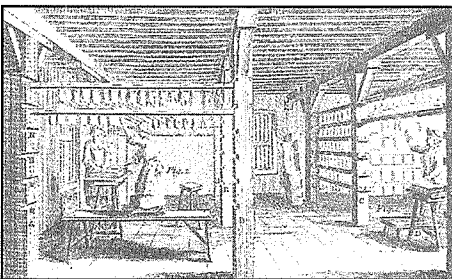
The mould, together with the correct pulp, a good vatman and a good coucher, make up the four essential requirements for producing a good sheet of paper.



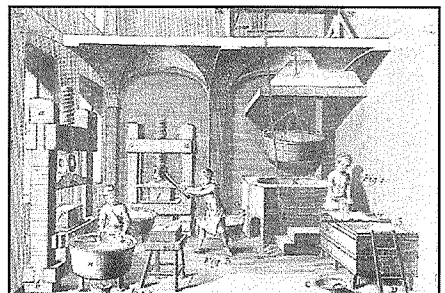
An early woodcut of a papermill

Sizing

Vegetable sizing was used in China and the Arab World. Gelatine was used for the first time in Europe by Fabriano and these substances did not induce any chemical damage to the paper.



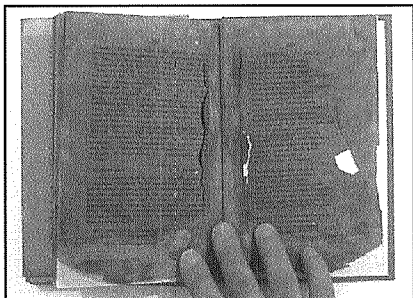
Women and a male apprentice at work in the drying loft. After processing, the paper sheets were hung to dry on waxed ropes woven from cow or horse hair.



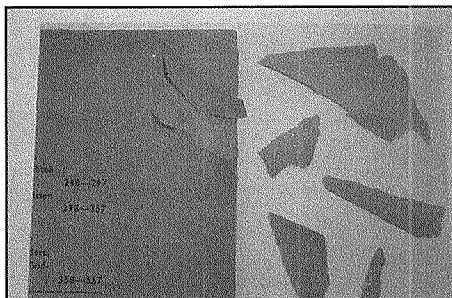
Newly-made paper is burnished to remove unevenness and pressed for a final time.

In the 17th century alum, which gives acidic hydrolysis was added to gelatine to harden it and reduce penetration and spreading of aqueous inks.

In the middle of the 1800's "vat sizing" with rosin and alum was introduced. This kind of sizing induces acidity into the paper (ph goes down to about 4.5 and even lower).



Acidity coming from poor quality woodpulp paper Alum rosin sizing.

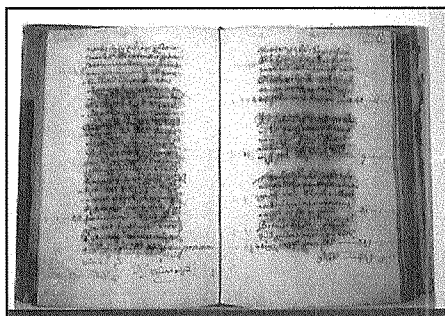


The deterioration could be a combination of wood pulp Paper and rosin sizing.

Metal in Paper

1. They can be present in the wood from which modern paper is obtained.
2. They can come from the machinery used in paper fabrication.
3. They can be present as impurity in water.
4. They are the main components of inks for manuscripts and of many pigments for illumination or graphic art.

Foxing



Iron-gall ink used on manuscripts was usually acidic.

Foxing is a phenomenon which is the result of high humidity and impurities in the paper during manufacturing.

Causes of Deterioration and some solutions

Composition of the Postage Stamp

A postage stamp is commonly composed of several layers including the adhesive,

the fibrous paper,

a coating or sizing on the printed side,

the printing ink itself,

and frequently a phosphorescent tagging overlay.

a cancelled stamp.

a further element which can sometimes be a factor is the proximity of the stamp to (or even over) ink used for writing.

All of the above elements can dramatically affect the preservation of the stamp.

Factors that affect deterioration of collections are:-

A. Inherent Causes or Vice – nature of the paper itself, nature of the ink used.

B. Biological Causes –

- Insects
- Rodents
- Mould

C. Human Causes – theft or vandalism

D. Mechanical Causes – improper stacking, shelving, overfull cabinets and poor storage systems.

E. Environmental Causes:

- Fire
- Water
- Pollutants
- Light
- Uncontrolled temperature
- Relative humidity

Temperature and Humidity

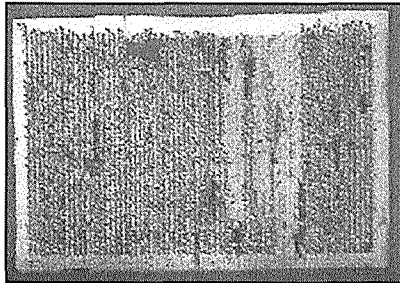
Philatelic collections should be stored at a temperature under 18°C and with relative humidity of between 55 and 60%. Recent research has shown that gummed and perforated material is under less stress at these slightly more moist conditions than had previously been recommended. Dampness is probably one of the main dangers to paper and especially to gum. Ventilation of a room or storage container is likely to reduce the level of moisture.

- Many of the **harmful chemical reactions** that speed up the deterioration of paper are both temperature and water dependent.
- Library and archival materials including stamps are **hygroscopic**, readily absorbing and releasing moisture.
- They respond to daily and seasonal changes by **expanding and contracting**.
- **Dimensional changes** accelerate deterioration.
- **Natural ageing** is a slow and inevitable process. While measures can be taken to slow natural ageing by providing a **sympathetic environment**, it is impossible to halt it altogether.
- The rate of deterioration is dependent upon the **inherent chemical stability of the material**, in combination with external influences such as the environment, storage conditions, and handling procedures.
- Some organic materials will age more quickly than others stored in exactly the same environment as a result of their **chemical make-up**, which may be **inherently unstable**.

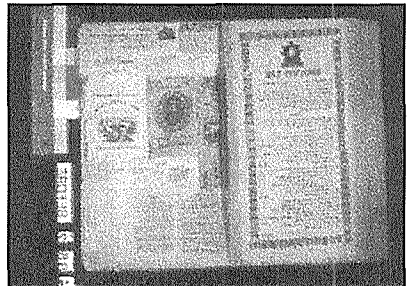
Why do Collections Deteriorate?

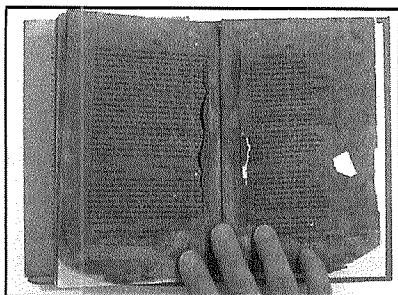
Inherent Causes

- Old writing ink such as iron gall ink can be so acidic that it “burns” through a sheet of paper.
- Others may have faded or become illegible.



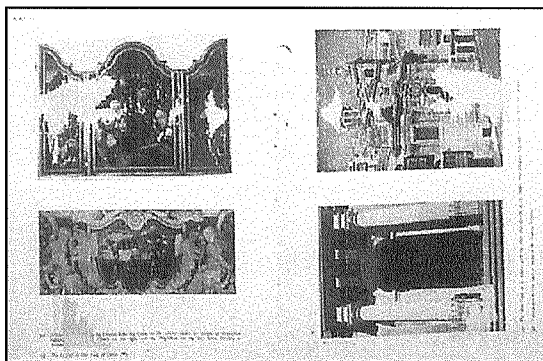
- Papers composed of wood pulp may turn yellow and brittle in just a short period of time.



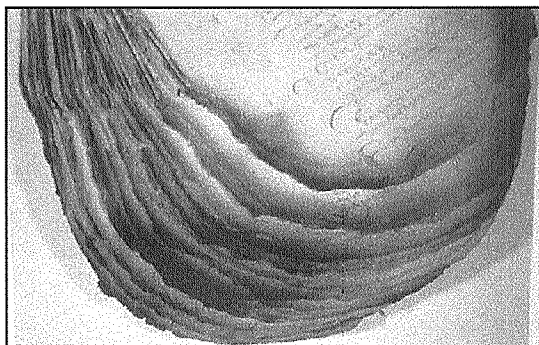


- Poor quality woodpulp paper was the main cause of this deterioration.
- This kaolin coated paper caused the pages to stick together during the printing process whilst the ink was still wet.

- While archivists can do little to alter the natural characteristics of record materials gathered into collections much can be done to control **external factors** that can accelerate the ageing process.
- **Environmental factors** that can hasten the deterioration of paper and other materials include **temperature, humidity, light, pollution** and **biological agents**.



- Independently, each of the above factors, if uncontrolled, can cause specific types of damage to record materials, but they also have **distinct relationships** to one another.
- For example, the rate of many chemical reactions is dependent on both **temperature and water**. Thus, the combination of high temperature and high humidity accelerates the action of alum-rosin sizing to generate sulphuric acid in paper.
- Other actions include **abuse** and **mismanagement**, as well as **disasters**, which can cause untold damage or utterly destroy collections in a brief span of time.



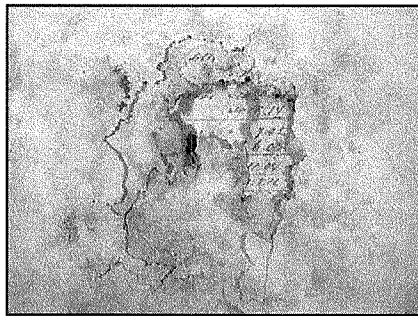
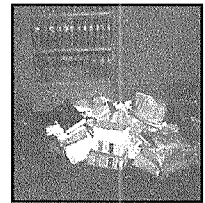
Although this manuscript was damaged in a fire the damage would have been much worse if it were made of parchment

Biological Agents

- Biological agents that can damage archival materials include **mould, insects and rodents**.
- **Mould spores** are always present in the air. They will grow whenever environmental conditions (*temperature* generally above 40°C and *moisture* relative humidity above 60°C), **darkness** and **little air circulation** encourage the growth of mould.
- Mould will **weaken** and **permanently stain** paper, causing both physical deterioration and cosmetic damage. If left unchecked, mould can obliterate **images** or **text**.

Mould

- In their dormant state, low populations of spores pose little threat. But if humidity levels are high (70% RH or higher) or if collections get wet from flood, leaks, seepage etc, and the moisture goes unchecked, mould growth is inevitable.
- Other factors that contribute to mould growth are high temperatures, stagnant air and darkness.



Fungal activity leads to complete loss of paper structure and consequent loss of text.

- Under conditions of high humidity + high temperature, the growth of mould and mildew is increased, and insect infestation is increased.
- Under conditions of extremely high humidity, water soluble inks can offset and coated papers can stick together.
- Low relative humidity causes materials to become dry and brittle. Paper that is dried out can break and crumble if it is handled and flexed.
- Bound items, composed of a variety of materials will suffer more damage than will unbound single sheets.

Solution

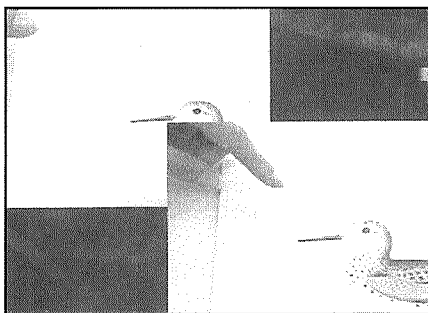
- **Controlling air quality** is difficult and complex.
- **Good housekeeping** and a regular schedule of maintenance is essential.
- **Good air exchange** is recommended but ensure that air vents are not located near sources of heavy pollution.
- Keep exterior **windows closed**.
- Where possible **store materials** in archival quality enclosures.
- Keeping a stable temperature not higher than 24°C and a relative humidity no higher than 60% and monitoring them.
- Dimensional changes can be buffered by certain types of storage enclosures.
- Installation of adequate climate controls and operation of them, maintain preservation standards.
- Routine building maintenance.

Light

- Light, or **radiational energy**, also effects the longevity of collection materials.
- Light speeds up the oxidation of paper and thus its **chemical breakdown**.
- Light has a **bleaching** action: it can cause paper to whiten and to cause coloured papers and inks to fade.
- Exposure to light can radically alter some photographs and other **light-sensitive images** such as blueprints.
- Upon exposure to light, lignin reacts with other compounds in paper, causing it to **darken**.

UV Light

- **All light** is potentially damaging, but ultraviolet radiation, **which we cannot see**, is most active and thus causes serious damage.
- The **shorter the wavelength**, the more active or energetic the radiation (measured in nanometers).
- Primary sources of ultraviolet radiation are sunlight and fluorescent light; sunlight may contain as much as 25%, while fluorescent light may emit 3 - 7% radiation.
- Radiation is cumulative and chemical reactions continue even after the light source is removed.



Solutions

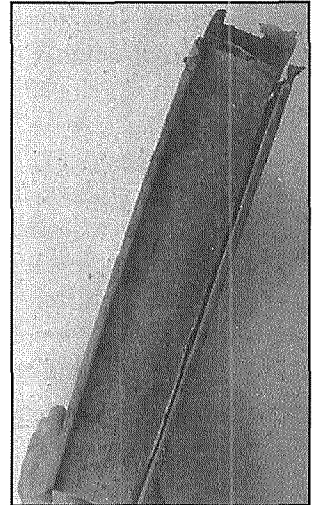
- Light should preferably be from **incandescent source** but remember they generate heat.
- Light levels should be as **low** as possible.
- **Exposure** should be for the shortest time possible.
- Windows should be **covered** by drapes, blinds.
- **UV filtering** can be used for windows and tubes.
- **Permanent exhibitions** of materials should be avoided.

Physical Damage

That care should be taken in handling material should not be taken for granted. Clearly material should be handled with clean hands, but even so the moisture and oil on all skin will transfer to the stamp or cover. This is why in libraries and archives, rare materials are often handled with **cotton** gloves.

Particulates

- Dirt, dust and other solid particles can damage materials through **abrasive action**. Not only are the surfaces of paper and photographs damaged, but over time, the particles become **embedded** in the paper fibres, causing them to break down.
- Dirt and dust, when viewed under a microscope, appear with **sharp cutting edges**.
- In the presence of moisture, dirt and pollen can cause **permanent** stains.
- Oily soot is especially **disfiguring** and difficult to remove.
- Dirt and other solid particles also **absorb acidic gaseous pollutants**.



This book shows years of neglect with dust accumulating on the top edge. This book is supposed to have a gilt edge.

Plastics

A great deal has been written about plastics in philately which are used as mounts and protectors. Top museums, libraries and archives only use polyester (**Mylar** and **Melinex** are commercial names) without any anti static coatings with paper or similar materials.

PVC is not used because it can ooze plasticisers and forms acid as it decomposes.

Stamp Hinges

Stamp hinges if applied correctly are safe to use. In any event minimal moisture should be used and the hinge should only be applied to the very top of a stamp. Plastic mounts are a safe alternative if made of polyester. These should be stored in conservation quality boxes with a waterproof buckram covering, and kept upright on the shelf.

The writing in pencil on covers of a price by dealers and others should be avoided as every time it is removed by eraser it will damage the paper.

Insects

Insects which damage archival collections can be divided into two groups namely,

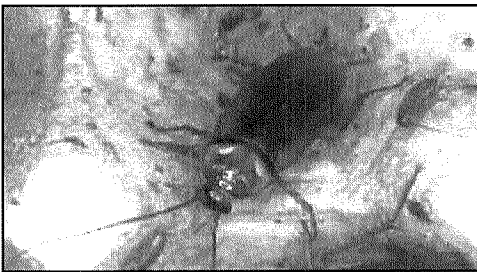
1. 'habitual' visitor, lives on archival material and eats paper, glues, leather and parchment, and
2. 'occasional' visitor which usually lives on other materials (wood, fabric, etc) and infest only occasionally.

Occasional visitors are unlimited. At the National Library the occasional visitor was a pigeon which came in through a window. A dead pigeon was once found behind a shelf.

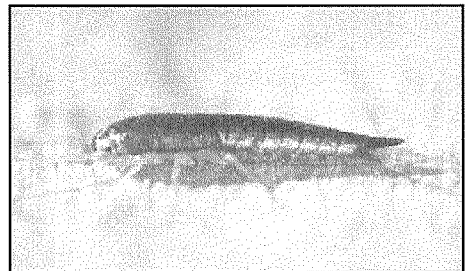
Insects (Biological Causes)

It is important to learn to identify conditions that are conducive to infestation, and take measures to prevent and control problems before they become widespread.

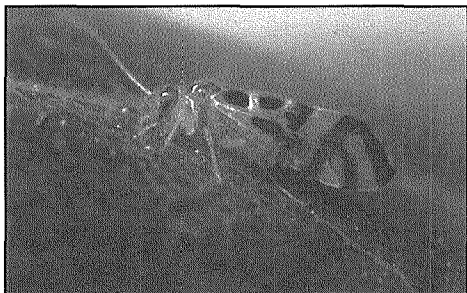
More than 70 different species of insects have been identified as enemies of paper – the most common affecting library and archive materials being silverfish, booklice (psocids) and cockroaches.



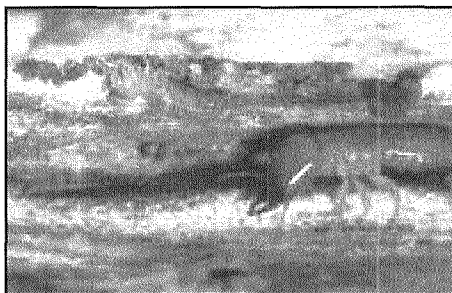
Blattidae or cockroach. Eats mostly the surface and is particularly fond of starch. Leaves excrement which is difficult to remove and clean.



Lepisma saccharinum or silverfish. This insect eats the surface of the paper and consequently eats also through the printed areas causing loss of text.



Corrodentia (psocoptera) or booklice.
Creates very small holes.

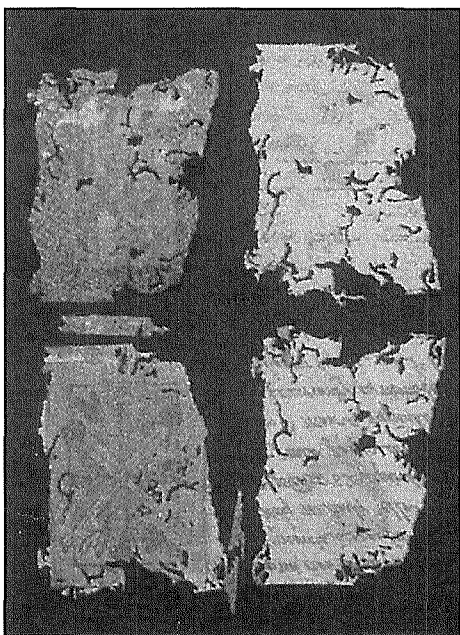


Isoptera or termites.
Imported into Malta recently.

Insects generally prefer dark, warm and damp environments and usually will be **active at night** when people are not present.

The damage they cause is irreversible. **Silverfish can eat the whole surface of a picture** and rodents can nibble away at collections and eat them in their entirety.

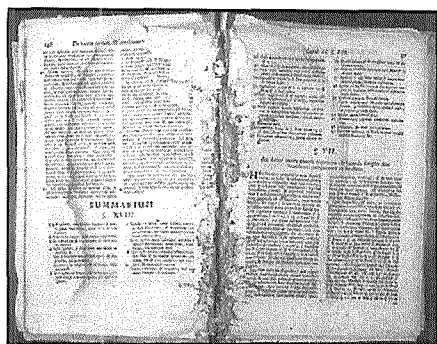
Rodents like to use shredded paper as a nesting material. Their **droppings** are also corrosive and can leave permanent stains.



These heavily wormed cards together with the inner cores were found inside a book which was attacked by insects.



This is a rat nest. You can note the teeth marks around the borders of the eaten pages.



This is a urine stain. A cat?, A dog?, A mouse?

The Dont's

To preserve and conserve our philatelic treasures, **DO NOT USE:-**

1. Ballpoint pens.
2. Cellophane or plastic (Scotch) tape.
3. Rubber cement.
4. Paper clips and other metallic paper fasteners.
5. "Magnetic Albums". These are adhesive coated pages with plastic covers. Most are made out of PVC plastic and acidic adhesives.
6. Rubber bands.
7. Masking tape.
8. Peelable labels used on stock sheets and album pages. Some types of these adhesives labels deteriorate over time and materials from them migrate into the album page.

Treatment

Philatelic material that needs any kind of treatment should be shown to a paper conservator. Not all treatments are advisable, indeed some will cause damage. This may not at first be apparent but it may emerge in time. The bleaching of items is not recommended and many of the methods or techniques carried out in the past have ruined stamps and covers. **Do not be tempted to do it yourself. Consult a professional conservator.**

General Note

The captioned heading was the subject of a talk given by Mr. Joseph Schiro' at a meeting of the Society's members held at St. Publius Hall, Floriana on Wednesday, 5th March 2008.

Mr. Schiro' is a Manager and Lecturer at the Department of Books and Paper, Textiles and Paintings Conservatory at Heritage, Malta's Conservation Division at Bighi.

The above notes were prepared by Mr. Schiro' and are published with his authorisation.

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