

# Preservation Practices



by Hugh Phibbs

## *Which of These Things Don't Belong...?*

When clients bring in an assortment of materials to be framed together in a shadow box, the preservation framer should be prepared to advise them on which items will suffer if they are exposed to light for long periods, as well as which ones should not be placed together in a frame. The fact that exposure to light may cause color change or loss of strength in some materials makes them poor candidates for permanent framing. Items that release harmful gases can change other items in their vicinity and therefore should be isolated.

The issue of how light affects different materials is quite complex. Some substances are more profoundly changed by ultraviolet, while others may react to the blue portion of the visible spectrum, and still others may interact with infrared wavelengths.

In paper with black ink on it, all of these reactions may occur. Lignin in the paper may darken in response to exposure to UV light, while the cellulose may be bleached by the blue portion of the visible spectrum (which is near the UV range). The black ink on the surface of

the paper may be heated by the infrared light that falls on it. Since any heating accelerates chemical reactions, change may occur in the ink, but it would be difficult to observe and this issue remains largely untested.

The cellulose in fabric can be expected to react to light much as the cellulose in paper would, but loss of strength caused by photooxidation becomes more dramatically critical when one considers fabric.

In paper, the fibers are protected from both light and oxidizing gasses by the compacted physical structure of their arrangement and by sizing in the paper. Fabric is much more open to the air, allowing atmospheric pollution and light to penetrate more completely. The

woven structure of fabric allows the stress of gravity to be more acutely focused on the fibers as they weaken.

For silk in particular, all of these problems are compounded by the extreme vulnerability of the protein in the fibers to light, which means that any items that contain silk should be regarded as unsuitable for framing. Antique military and civic decorations which have

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silk in them are a prime example of yet another dilemma which confronts the framer.

Silk has a slight sulfur component and any item which comprises both silk and silver has a self-destructive potential. (The sulfur escaping from the silk can cause the silver to tarnish.) Wool is a much more significant source of sulfur and should not be included in a frame that contains anything which is sensitive to sulfur. Metals and silver-based photo materials are additional examples of sulfur-sensitive substances. This problem also arises when parts of wool uniforms are considered for inclusion with other materials.

Early plastics and woods are also prime examples of substances which can affect other materials. Cellulose nitrates and acetates will give off nitric and acetic acids as they age. These aerosol acids will weaken papers and fabrics and can contribute to the corrosion of metals. These same plastics may have plasticizers that can migrate to their surfaces and stain anything which touches them. Rubber-based items are a major source of sulfur and should always be isolated from anything else in a frame.

Some more recent plastics can pose the problem of chlorine pollution. Polyvinyl chloride (PVC) is a plastic commonly found in plumbing pipes in its rigid, unplasticized form. Since water in these pipes already contains chlorine, the presence of this in the plumbing pipe does not matter. However, if such plastic were included in a frame, the chlorine

could be released and its highly reactive nature could pose a problem. This same material has been modified with plasticizers to make it flexible. Some older sleeves for card, stamps, and photos have been made from PVC and they should be discarded.

As some other plastic materials degrade their chainlike polymer structure, they emit singular molecular pieces called monomers. The effect of these monomers on other materials is not fully understood beyond the fact that they can affect other plastics. All plastics are vulnerable to degradation in ultraviolet and should only be framed with UV-filtering glazing.

Woods can produce tannic, formic, and acetic acid as well as peroxides. This makes them especially hazardous to metals. As woods age, their potential to off gas diminishes. Thus, a composite object such as a gun will have fewer problems if it is older but it is probably unwise to seal it too tightly without introducing scavenging materials that can take up the pollutants of the wood.

When an object that has self-destructive potential is framed, materials which can absorb pollution such as activated charcoal, sacrificial silver or copper, or zeolites should be included in the frame. The charcoal and zeolites can be found in papers and matboards, while the silver and copper can be obtained in silver cloth or polyethylene which has been impregnated with copper.

As metals oxidize, they can contaminate the materials in contact with them. Few other minerals

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are likely to cause significant problems for other items in a frame. Hides, bone, and teeth are also safe if they have not been altered. Tanning makes leather a more troublesome candidate, since its potential for emitting tannic acid can never be dismissed.

Even after they have been offered sound advice, some clients may still insist that items affect each other should be included in the same frame. Next month, we will look at strategies that may allow them to have the frame they want without sacrificing the preservation of their valuables. ■