

## Cellulose Supports

by Hugh Phibbs



The relationships of supports made of cotton or linen to the media used on them is quite a complicated subject. These and other cellulosic fibers are found in two basic forms, either woven fabrics or in papers. The physics of these two forms differs fundamentally. Woven materials comprise helically wound threads which can slip past each other to some extent making the fabric quite flexible. Papers are nonwoven composites of interlocked fibers. These may vary in consistency from examples which are almost entirely composed of fibers like Japanese handmade papers (*washi*) to papers which have a large portion of fillers such as clay-coated papers. The former are very flexible while the latter can suffer permanent disruptions of their surfaces from even the slightest physical abuse. Fiber-rich papers tend to have open surfaces into which media can penetrate, while coated papers will hold media on their surfaces, producing finer details. The physics characteristic of each type of support material is essential to the consideration of their interaction with dif-

ferent media.

Woven cotton and linen are usually encountered as primed supports for oil or acrylic paintings. The vulnerabilities of the glue layer in traditional grounds to extremes in humidity was covered in last month's column. They can also suffer from pressure applied to the back of the fabric which can cause cracks in the paint layer or even flaking. The fabric's flexibility may allow it to resist tearing but it contributes to the dislodging of the less flexible paint layer. These fabrics are often stretched and their tension can cause vibration if they are transported. Both problems, the blow from behind and vibration can be ameliorated by the inclusion of a backing board behind the stretcher.

Pressure-activated media such as charcoal or pastel are not usually done on a woven support. If the fabric is left uncoated, it will allow the medium to penetrate its surface, but it will not permit the rendering of much detail. If the fabric is coated, these media will not adhere to it and it is unlikely you will encounter such works. Some pastels have been done on paper which has been mounted onto fabric and here you encounter the physical dissimilarity of these two support materials. The

fabric's ability to flex without disruption combined with the paper's relative inflexibility may produce a delamination of the paper if the combination is pushed from behind. The tension which holds the fabric in place may not accommodate the expansion of the paper in conditions of elevated humidity resulting in cockling of the paper as it pulls away from the fabric. When a pressure-activated work has been done on this kind of composite, it must be carefully guarded from physical damage or extremes of climate since conservation treatment of this sort of work is very difficult. Antique posters which have been mounted on thin linen or cotton fabric are a more commonly encountered example of this sort of laminate. They can be framed without stretching the fabric, thus avoiding much of the problem.

Beyond the open or coated nature of the surface of a paper, the conditions under which it is made will also affect the manner in which it will accommodate different media and its reactions to agents of change.

Handmade papers which are dried under low tension can be expected to be less reactive to moisture and minor physical insult than machine-made papers which are formed under heat, pressure, and tension.

Pre-nineteenth-century papers are generally made of linen and are less reactive since they were not made under tension. Those which are not coated can hold pressure-activated media well. The strong linen fibers can stand up to the oil-based inks found in prints. Iron gall ink can be acidic enough to challenge even these fibers and documents or drawings which appear to be done in a brown or sepia ink and should be handled with special care since

the ink can eat through the paper. Papers of this period were sometimes prepared or coated with a smooth ground so they could be drawn on with a pointed piece of silver or other metal. Such prepared papers vary in color but should all be regarded as objects which can not be bent even slightly or receive any physical insult to their coated surfaces. Papers of this period which are in good condition tend to be robust and easy to hinge. It is unfortunate that more examples are not in circulation so framers could experience their quality.

During the nineteenth century, expansion of mechanization made cotton and then wood pulp available as fibers for paper making. Cotton papers of this period share many of the good qualities of the linen papers which preceded them. Their surfaces are open enough to hold on to pressure-activated media and they can stand up to the oils in printing inks. The nineteenth century saw the rise of watercolor painting as we know it and increasing use of glue sizing in paper to hold the paint on the surface. The sizings may change color and affect the tone of the paper but they may serve to keep pollution away from the fibers and thereby defend the integrity of the sheet. UV

filtration can slow down the discoloration of the sizing. The sized paper may be somewhat more reactive to changes in relative humidity than an unsized sheet of the same sort would and the watercolor can crack in areas in which it is generously applied. Where such works can be overmatted the gentle restraint of the overmat is helpful. When they must be floated the hinges should be placed on those parts of the sheet which would normally be in contact with the back mat so no tension is applied to the sheet by the hinges.

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Nineteenth-century wood pulp paper is hazardous to handle regardless of the medium which may have been employed on the surface. The lignin in these papers produced peroxides and organic acids which weakened the fibers. These papers were often sized with alum rosin which also attacked the fibers. These papers are often so

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degraded that hinges applied to them will shear off, taking away a layer of fibers with them. Even if the item is carefully supported by its edges, the continued exposure to light will condemn it.

These works should be photographed and stored flat in the dark surrounded by conservation quality materials while the photograph is framed. Indeed, these papers are so fragile that they may not be brought to the framer as often as another form of wood pulp from this period, the ligneous boards. Here too, even the most careful handling can cause damage and such items should be reproduced and stored flat in the dark while the reproduction is framed. One exception to this cautionary tale are the gray pulp boards produced in parts of Europe in the late nineteenth and early twentieth centuries. These boards can be quite strong and durable and that fact should be easily evident when they are first handled. Such boards can be supported by their edges and will accommodate all media well.

Next month we will examine more modern papers. ■