THE REMOVAL OF SECONDARY SUPPORTS FROM WORKS OF ART ON PAPER

The Prints and Photographs Division of the Library of Congress houses a large collection of American book and magazine illustrations known as The Cabinet of the American Illustration. The collection consists of 4,100 original drawings by some 200 American illustrators and cartoonists of the period 1880-1910, including works in gouache and other media. Among the many artists represented in the Cabinet, Charles Dana Gibson and Thomas Nast are among the best known. The drawings are matted and housed in print storage boxes on open shelving or in map drawers for the largest items, arranged alphabetically by artist in four standard mat sizes.

Many of these drawings have been executed on a wide variety of artist's illustration boards. These boards are commercially available products which were, and continue to be, widely used by illustrators since they afford rigid, dimensionally-stable substrates upon which to draw camera-ready work for submission to publishers.

Typically an illustration board consists of a primary support or front facing of better quality paper upon which the drawing is made. Attached to the primary support is a secondary support or core board made of lesser quality stock. Sometimes the back or verso side of the board is also faced with a layer of paper upon which the manufacturer's inscriptions, artist's notes or publisher's remarks can be found.

Given the effects of acid migration in discoloring and embrittling better-quality paper which has come in contact with acidic, lignin-containing stock, paper conservators often choose to separate primary supports from secondary supports and in so doing have cut out an enormous amount of tedious, difficult and time-consuming work for themselves. Traditionally the job has been done by slowly and carefully scraping down through the secondary layer until one comes close to the verso of the primary layer. At that point the local application of water on small areas of the residue is used to remove this last layer of board and any adhesive which might have been used to join the two surfaces.

Over the past 10-15 years alternative techniques have been developed in a number of paper conservation workshops to deal with this arduous task of separation. Many conservators have successfully used these techniques for years. This paper is a review of the simpler, more straightforward backing removal treatments which are regularly undertaken at the Library of Congress. These treatments represent the "ABC's" of backing removal and do not include such additional complicating factors as flaking media, cracking media, adhesive residues along the edges or combinations of several of these problems. These simpler techniques of splitting, sanding, steaming and aqueous residue removal, about to be reviewed, are often incorporated into the treatment of items with some or all of the additional problems mentioned above. Mastering these simpler techniques on simpler objects builds the confidence and experience needed to successfully approach and deal with the more difficult cases of backing removal.

The intention of this paper is to catalog these simpler techniques by reviewing all or portions of four case studies in which they were used. Issues associated with the use of these techniques, such as when and whether or not to remove backings, the loss of structural integrity to the illustration board and the remounting of drawings to archival-quality supports will not be addressed.

The treatment of drawings on illustration board can be broken down into three treatment phases. Phase 1 is dry treatment, Phase 2 is aqueous residue removal and Phase 3 is flatten, mend, inpaint and rehouse. Under Phase 1, dry treatment, three options are presented for removing the drawing from the board. The first, mentioned above, is to shave down the board with a sharp scalpel or other sharp tool of that kind. The second is to split the board with one of a variety of splitting tools and the third is to sand the board down with a hand-held electric sander. These operations can be used singly or in combination, as needed.

Phase 2, aqueous residue removal, includes four options. One is traditional aqueous methods only, mentioned above, in which sections of the residue are wetted out and the softened residue or residue and adhesive removed, revealing the verso of the primary support. The second option is traditional aqueous methods with wet blotter technique. The third is immersion and the fourth is steaming.

Phase 3 is flatten, mend, inpaint and rehouse, some or all of which will be done depending on the needs of the drawing in question.

Splitting tools can be inserted into the center of the board edge or near the top or bottom of the board where attached to the front or back facing papers. Many drawings executed on illustration board are amenable to splitting and others are not, for a variety of reasons. Among the reasons why not are:

1 Fragility, friability or heavy impasto in the design layer which can prohibit splitting at either the top or bottom of the board and/or
2 A board which is itself unamenable to splitting for structural reasons discussed later on.

Some of the splitting tools commonly used at the Library of Congress are:

1 A conventional stainless steel spatula
2 A wide, flat single-ended Teflon spatula shaped and smoothed on grinding and buffing wheels to yield a thin, flexible, translucent tip with rounded corners
3 Thin bamboo spatulas made using a variety of techniques from lengths of bamboo pole stock or bamboo toaster tongs
4 A double-edged bone knife, acquired with a shipment of Japanese lining paper and tools from Tokyo.

In the first two case studies a thin bamboo spatula was used to split apart the primary and secondary supports.

The first drawing is a 1917 portrait of Booth Parkington measuring 13 1/2 x 11 1/2", executed in tempera or gouache by Edward Penfield. The drawing

was made for an article on Tarkington which appeared in Collier's Weekly in April 1918.

This object can be schematically broken down into five parts:

1 The design layer at the top.
2 The primary support or front-facing of richly textured, cream colored artists' paper.
3 The secondary support of densely-packed gray woodpulp, several times thicker than the primary support.
4 A back facing of the same cream colored artists' paper, and
5 The inscriptions, notes and publisher's remarks written on the back facing.

A first step in approaching these backing removals is assessing the particular board structure under consideration and determining whether or not the structure is such that splitting is the method of choice. This is determined simply by investigative work with the splitting tool at one corner. When splitting from the top is possible, as in this case, it is obviously the most desirable method of the three outlined for the dry treatment phase, since it is relatively quick and easy to do and removes the bulk of the board from the drawing without having to scrape or sand ones way through it. In general, the thicker the primary support the easier the splitting operation will be, as the thinner the primary support, the greater the danger of accidentally breaking through it with the splitting tool. Splitting from the top also preserves the verso of the board and the notations on it, often important for curatorial reasons.

Frequently a grain direction is noticed in the board during splitting, making it easier to draw the tool through in one direction than the other, although the largest factor in the ease of splitting is the composition of the board itself. The type of material used to make the board and its method of production determine how easily the tool will pass through it, since the separation is made between the top two layers of the board and not at the interface of board and drawing.

We have noticed that the boards tend to have either a layered, laminated, multi-ply structure or an amorphous, densely-packed, non-layered structure. Boards are made of different types of woodpulp in various shades of gray, white/cream or a reddish-tan color, reminiscent of conventional woodpulp papers which have aged and darkened, such as newsprint. The gray boards tend to delaminate well by splitting, as do the less frequently encountered white/cream boards, while the red/tan boards are generally of the amorphous, non-layered structure and are less amenable to splitting. For these red/tan boards, the hand-held electric sander is sometimes used in the dry treatment phase.

The treatment sequence on this piece proceeded as follows. Dry-cleaning on the non-image area with grated vinyl eraser and cleaning of the edges with Magic Rub, was followed by solubility testing of each pigment to determine potential

sensitivity to water. In this case all pigments were quite water-stable although I suspect that the red would let go with prolonged exposure to water.

Viewing of the first (test) corner after splitting and the residue of gray fibers on the verso, revealed that there are actually two gray layers, one opaque and one translucent, and a few small white areas, where the board had not been attached to the drawing at all. The use of transmitted light from the bench lamp makes the distinction between the two gray layers quite visible.

The fiber residue is now ready to be removed in Phase 2, aqueous residue removal. This involves the application of water to small sections of the residue, followed by a specific period of waiting while the residue wets up, followed by mechanical removal of the residue or residue and adhesive.

Traditionally scalpel blades of various shapes and degrees of sharpness have been used for scraping, although overly sharp tools are dangerous to use since they can easily cut and and scrape off the damp, softened fibers on the verso of the primary support, in the process of removing the residue. Alternatively we have used a surgical cartilage knife, the blade of which is rounded and smoothed, and can be further rounded and dulled on a grinding wheel if needed. This tool is therefore more controllable for residue removal than the sharper scalpel blade and also has been used at the Library for many years. In the past few years we have come to favor the use of a stainless steel dental tool known in the dental trade as a "wax carver", one end of which is a small, curved blade with a rounded, permanent edge, similar to the cartilage knife head only smaller and easier to hold. The smaller size of the head is such that the scraping away of residue is extremely localized and therefore highly controllable, and the degree of sharpness and permanence of the blade edge are perfect for the job. Additionally the dental tool is stainless steel and the cartilage knife is not.

In the first step a small test patch of water is applied, allowed to wet up for a few moments, then scraped away. The knife blade is cleaned off on a blotter square and the test area is allowed to dry. The amount of surface area to wet up at one time, the amount of water used to do the wetting and the precise time interval most effective for the wetting up, need to be determined empirically with each individual residue removal and are important factors in the efficiency of the treatment. Too little water will not allow for clean removal of the residue and too much might soak through and disturb the design layer.

Next a larger test area is wet up. The more opaque layer of residue will appear darker and the thinner layer lighter, making the distinction between the two areas easily visible. As the thinner areas wet up and are ready for removal before the thicker ones, they are scraped away first. Once larger patches are being cleaned, the timing involved becomes critical. Cleaning off the blade edge more quickly therefore becomes advantageous, as the wet residue tends to stick to the blade and

temporarily dulls it. It is necessary to clean the blade quickly, and return to the next area for scraping before it dries out. One method for doing this is to wipe the blade on a wet cotton pad which simultaneously removes the residue and cleans off the edge completely. This is more effective than using the blotter square for the same job.

More water can obviously be brushed on at any point but the idea is to get the timing down, so that the water need only be applied once and the scraping of a given area accomplished without the need for rewetting.

Frequently however, there are tiny traces of residue which do not sufficiently wet-up and rewetting is done as needed to remove them. In the case of this item there was also a thin layer of adhesive or sizing -- invisible to the naked eye until wet -- which needed to be removed. This second stage wetting solubilized the adhesive and prepared it for removal with cotton. The localized removal of these stubborn fiber residues is done with the dental tool in one hand and cotton on which the blade is wiped in the other. In the next step the cotton is stretched out, folded over on itself and a clean surface used to wipe up the soupy gray liquid adhesive residue. If needed, more cotton is used to wipe up the excess and locally dry the paper somewhat so that the liquid will not penetrate into the design layer. A combination wiping and daubing motion with the cotton simultaneously picks up last traces of gray fibers and removes the wet adhesive. This second stage of cleaning is a relatively quick moving operation and again the correct amount of water to use is important and needs to be worked out on a case-by-case basis. A surprising amount of rubbing can be done with the cotton on many artist's papers but is stopped at the first sign of abrasion or "pilling" as it is sometimes known.

The incandescent bulb of the bench lamp gives off a small amount of heat when placed at the appropriate distance from the damp surface of the paper. This heat can be used to accelerate the drying of the area and reduce the cockling produced during treatment. The bench lamp is also very useful for generating raking light which makes the removal process much easier to see at each step of the sequence described above.

At this point a juncture is reached and the option of introducing the wet blotter technique comes up for consideration. The materials and equipment needed for the wet blotter technique are: water, blotters cut to size for the item in question, cotton, brushes, scraping tools and a tray for the pad of wet cotton.

The tacking iron used is the "Sealector" model made by Seal Products, Incorporated. It is thermostatically controlled, comes with a large Teflon heating surface and retails for around $20.

The first step in the wet blotter technique is pre-wetting of an area of residue with water, as mentioned above in the traditional method. One end of a small piece of blotter is then wet up in the beaker of water, drained and placed over

the pre-wetted area. The dry end of the blotter is held in one hand and the heated tacking iron briefly placed on the wet end. A sizzling sound is heard as the hot Teflon contacts the cold water in the blotter. When the sizzling stops, the iron and blotter are lifted off and the scraping immediately begins.

When this technique is working most efficiently, the wet residue will sheet or peel off in whole layers rather than need to be scraped or pushed off as in the traditional method. However, the primary support must be thick enough and impermeable enough to handle the extra moisture.

As with the traditional method, the thinner areas are treated first, leaving more time for the thicker areas to wet-up. After most of the residue was removed from the Tarkington drawing with the wet blotter technique, tiny flecks of fiber again remained to be removed, and across the center a horizontal tidemark had formed on the verso but not on the recto side of the sheet. This sort of tidemark can occur from overwetting of an area of residue or overwetting along the interface of treated and untreated areas due to prolonged or repeated wetting. If a tidemark occurs, the working technique should be adjusted to prevent others from forming. Both the fibers and tidemark are removed in the next steps.

Water is brushed on the areas needing attention with a smaller brush and when wet-up the fibers removed with the dental tool, which is wiped off on the cotton as done previously. Finally the area is wiped clean with dry cotton.

Various degrees of cockling are generated by the aqueous residue removal, depending on the reactivity of the primary support to water. This cockling is removed by humidification and flattening later in the process. Glass, Plexiglas or blotter strips are used to hold down the edges and protect them from damage while working.

After completion of the residue removal the strength of paper texture on the verso appears to be much the same as that on the recto. Reaching this stage in the treatment is extremely satisfying since the appearance is clean and the design layer, recto and verso qualities of the sheet are generally unchanged.

After completion of the residue removal the item is rephotographed, matted and hinged. The remainder of the illustration board is returned to the curator along with the matted drawing. If the board could not be saved during treatment, a photograph of the verso is returned instead.

The work of backing removal is carried out on a smooth-surfaced paper such as silicone release or acid-free glassine to minimize abrasion of the design layer during the course of treatment. The paper is taped to a piece of 4-ply mat board or acid-free corrugated board with a layer of blotter in between, to form the working surface for the drawing during treatment.

During the splitting operation, whether the drawing is split from the top or bottom, the board is held in a fixed position by placement of lead weights against its edges. This is done to eliminate the need for downward pressure on the object otherwise exerted with the hand to hold the board in place. During local wet work when the item is face down, it is held in place with light weight placed above a flat area of the design layer to avoid any damage to media. The item is checked frequently on the recto during local wet work, to prevent or minimize the offsetting of media. Should any offsetting have occurred the working technique is adjusted accordingly. This may mean using less water or less downward pressure while scraping, or shifting away from the hot blotter technique back to the traditional aqueous method.

The second case study to be reviewed is the treatment of a drawing entitled Three Children in the Snow by Otto Bacher. It was executed in tempera or gouache with pencil underdrawing and outlines of pen and ink and measures 8 1/2 x 9 1/2".

In this case the structure was slightly different than the Tarkington drawing, for here the back facing is a thin, dark-tan wove paper while the primary support is a thick, cream-colored artist's paper. The secondary support is a creamy-white, multi-ply board about one-third as thick as the gray board on the Tarkington drawing.

The bamboo splitting tool rode easily through the board to effect the separation of primary support from core board. After splitting the piece was turned over, a test area of residue wet-up and the softened residue scraped off. A larger area was then pre-wet for the hot blotter technique which worked most effectively. This residue removal process proceeded much more quickly and easily than the Tarkington drawing leaving little or no residue behind for second stage cleaning, clearly demonstrating the difference in bonding strength between these two pairs of primary and secondary supports.

After residue removal the verso and recto qualities of the drawing appear unaffected by treatment other than the cockling of the primary support. Both this item and the Tarkington drawing were humidified for several hours in a humidity chamber and flattened to remove the cockling. In the flattening setup the damp, relaxed drawing is placed between two sheets of Hollytex, a non-woven polyester web, which in turn are surrounded by blotters and quarter-inch thick felts, all placed under a rigid board and light weight. The Hollytex prevents sticking of the blotters to either side of the damp item but is porous enough to allow for drying with the blotters. Photography and rehousing complete the treatment of this piece.

The third technique for dry removal of secondary supports is the use of a hand-held electric sander. The sander is used when the board is not amenable to splitting for some or all of the reasons outlined above.

A drawing of A Seated Man by Edward Penfield done in ink wash with blue pencil highlights was executed on a board which could not be split. The dimensions are 11 3/4 x 16 1/2" and the piece is undated. This was a classic example of the red core board with front and back facings of thin, white wove paper with all the layers firmly pressed together.

The bamboo spatula could not be inserted in the center of the board as no layer existed along which it could effect the splitting. Frequently splitting will seem possible along the edges of a board but once the spatula gets an inch or so in towards the center the splitting comes to an abrupt halt. This ease of splitting along the edges is a curious phenomenon which I cannot explain, although I suspect that oxidation of the cellulose along these edge areas may be responsible for it.

The media were tested for water-solubility and found to be quite stable. Three treatment options then suggested themselves:

1 Immerse the board and hope to be able to remove the primary support from the board after soaking had facilitated separation
2 Sand the board down and then with only a residue remaining immerse the piece and mechanically remove the residue with the piece still wet
3 Sand the board down and locally remove the residue using the traditional aqueous method, with or without the wet blotter technique.

Direct immersion is always somewhat risky to media even when testing indicates stability in water. It is even trickier with primary supports as thin as this one, which become extremely fragile when wet and are therefore difficult to remove from the board without skinning or tearing of any kind. One or two experiences of this type can lessen ones enthusiasm for the immersion method quite quickly.

Having determined that splitting would be impossible for this piece, I chose to sand down the board for the dry treatment phase and then determine which residue removal technique to use once the board had been sanded off.

In order to ascertain that the residue could be readily removed from the verso after sanding, a test corner was selected prior to sanding and the residue scraped down with a small scalpel. When the last layer of residue was reached, water was locally applied with a small brush and the softened residue removed with the dental tool.

One sander we have used is the Rockwell Speed Bloc-330 Model, a 4 1/4 x 4 1/2" orbital sander weighing 4.1 pounds and costing approximately $60. A 1/4" thick felt pad is attached to the base of the machine by the manufacturer. The sandpaper is wrapped around the felt pad and held in place with sturdy metal clips. These felt pads occasionally need replacing to maintain a cushioned contact between the machine and work of art. Another sander we have used with twice the bed size of the Rockwell model is included in the supply list. This larger sander is useful for oversized items.

A piece of 4-ply mat board or acid-free corrugated is wrapped with silicone release or acid-free glassine to form the working surface for sanding. The drawing is taped along all four edges of the verso with pressure-sensitive tape. Each strip of tape overlaps the board by about a quarter inch. The taping must completely seal off the board so that no sanding dust can get beneath it and form a raised area which would be dangerous to sand over.

Work now moves to a fume hood or dust extraction area of the workshop where the sanding is actually done. The materials and equipment needed for the process are: the sander, a range of sandpapers, lead weights to secure the covered mat board and drawing in place during sanding, a small incandescent lamp to create raking light during sanding for easier viewing of the work, a scalpel for making "test bores" during the successive stages of sanding in order to ascertain how much board remains to be removed, a face mask to protect the conservator from dust inhalation, a drafting brush to remove dust from the board during sanding and a vacuum cleaner to remove dust from the surfaces of the fume hood when the sanding is completed.

The scalpel is now used to make a series of "test bores" across the surface to be sanded. These test bores act as depth guides during the sanding process allowing the conservator to know when an even layer of board has been removed.

A coarse paper is inserted in the sander for the initial stages of sanding since too fine a paper will slow the work down unnecessarily. The sanding is begun, evenly guiding and directing the sander with both hands across the entire surface. The sander tends to float across the board and is surprisingly light and easy to hold. Downward pressure must be applied with both hands to actually effect the sanding. This is what makes the technique so controllable. Periodically brushing off the sanding dust allows for even contact of the sander with the working surface.

When sanding nears the edges, the pressure-sensitive tape will be knicked and cut by the sander but this is not a problem. Finer sandpaper is used as the work nears completion. Generally a color change will be noticed as the differing color of the primary support paper begins to gradually show through the remaining residue as it is being thinned down. This is obviously the signal to stop sanding.

When the entire surface has been sanded down to an appropriate layer of residue, the tape is removed from one edge, which is then sanded to the same level as the inner area. The sanded edge is then retaped and the process repeated on the other three sides. When all the sanding has been completed, the surface is thoroughly brushed off, the tapes are removed, the piece turned over, and any particles of dust gently removed from the recto with a soft brush. The piece is then returned to the bench and the wet work undertaken.

In the case of the Penfield drawing the traditional aqueous method was initially chosen for residue removal as the primary support was too thin for safe use

of the wet blotter technique and the residue which remained after sanding was too thin to require it. Additionally, the conservative approach of not immersing the design layer seemed sensible at the beginning of the residue removal stage in spite of the insolubility of the media during testing. However, local work proceeded with great difficulty as the residue was very firmly bound to the primary support. This situation suggested switching from local work to immersion for removal of the remaining residue given the stability of the media. Immersion was therefore undertaken and completed quickly and easily in a shallow bath.

After residue removal the piece was lined with Japanese tissue and wheat starch paste as the primary support was too thin to withstand storage without reinforcement. Photography and rehousing completed the treatment of this piece.

The use of an electric sander may seem dangerous or uncontrollable upon first considering the idea or imagining oneself using it, as it would seem that brittle, fragile objects could easily be damaged by the abrasive effect of the machine. In order to become more comfortable with the technique one can practice on blank pieces of illustration board or mat board which has been faced over a pulp core. This will build confidence in handling the sander. I invite you to try this technique for yourself and see if you do not find it safer and much more controllable than local scraping with scapels which this method makes obsolete in many cases. In addition, the time saved with the sander easily justifies the expense of purchasing the machine. It also has a variety of other uses in a conservation workshop.

Recently we have begun to work with steaming techniques for residue removal after splitting and/or sanding has reduced the residue to a layer thin enough to permit penetration of the steam. The unit we are using is the Norelco "Travel Care" Clothes Steamer, Model TS60 available in department stores for approximately $17.

A small section of residue is pre-wet with water as with the techniques discussed above. The steamer is held in front of and below the wetted area and the sizzling sound is heard as the steam rises and penetrates the wet residue, which is then scraped off with a dental tool or Caselli spatula. The Caselli spatula is an Italian product made of cast iron with a thin head and relatively sharp edges, which can slip beneath the residue to effect the separation rather than push the residue off as is done with the dental tool. Caselli spatulas are available in a variety of shapes from TALAS in New York.

More steam can be used to soften any remaining residue or adhesive, followed by wiping with cotton. As with the other residue removal techniques, care must be taken not to overwet the piece to avoid adverse effects to media. After residue removal the piece is humidified and flattened in the manner described above.

In summary, I reiterate a point made earlier on. The treatment of drawings on illustration board exists across a wide spectrum of difficulty, from the relatively straightforward to the exceedingly complex and problematic, depending upon the interplay of various factors. My intention in presenting these case studies was to review the simpler sorts of problems, as distinct from the more difficult ones, and thereby refine our overall thinking about, and approach to, the treatment of drawings of illustration board.

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The Washington Conservation Guild Three-Ring Circus Meeting
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AIC Book and Paper Group Specialty Group Meeting
May 25, 1985, Washington, D. C.

Tenth Anniversary Conference, "New Directions in Paper Conservation"
April 15, 1986, Oxford, England

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Sealector Tacking Iron
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With Thermostatic Control and Teflon Base
Seal Products, Incorporated
550 Spring Street
Naugatuck, Connecticut 06770
(203) 729-5201

Caselli Spatula

TALAS
213 West 35th Street
New York, New York 10001-1996
(212) 736-7744

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Acid-Free Glassine Paper

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Long Island City, New York 11101
(718) 937-7100

Teflon Sheeting for Spatulas

Read Plastics, Inc.
12441 Wilkins Avenue
Rockville, Maryland 20852
(301) 881-7900

or other plastics supply house

Read Plastics sells Teflon by the square inch in a range of thicknesses. Their white Teflon is the "TFD" stock and the clear Teflon is the "FET" stock. Spatula used by author is 1/8" thick.

Electric Sanders

Rockwell Speed Bloc 330 Model
Porter-Cable Company Corporation
Youngs Crossing Highway
P. O. Box 2468
Jackson, Tennessee 38302
(412) 963-2414

Dual Action Sander, Catalog #4743A11
McMaster-Carr Supply Company
P. O. Box 4355
Chicago, Illinois 60680
(312) 833-0300

Steamer

Norelco "Travel Care" Clothes Steamer
Model TS60
Department Stores