

A 14/15th Century Parchment Scroll

Preservation, Continuity, and Innovation*

This paper presents conservation of an Ashkenazi Megillat Esther, a 14/15th Century parchment scroll of the Book of Esther, in the context of Judaic scroll production, use, and repair. Conservation has sought to preserve the physical testimony of this singular artifact by mitigating the insults of inherent vice and time so as to retain the traces of history; it has been considered part of the continuum of historical acts shaping the identity of this object. Treatment has been approached in consideration of material and cultural continuities; it incorporates traditional and innovative techniques. Selective change in the practices of both sofrim (Jewish scribes) and conservators, who are among the relatively few artisans working with parchment today, is seen as contributing to evolving techniques for the preservation of cultural materials. Successful conservation treatment is judged in respect to material and historical needs.

Dieser Artikel beschreibt die Restaurierung einer ashkenasischen Megillat, einer Pergamentrolle des Buches Esther aus dem 14./15. Jahrhundert, im Kontext der jüdischen Herstellung von Buchrollen, ihres rituellen Gebrauches und üblicher Reparaturen. Ziel der Restaurierung war, die physische Aussage dieses einzigartigen Objektes zu erhalten. Es sollten Schäden inherenter Art und der Zeit gemildert, die Spuren der Geschichte jedoch erhalten werden. Die Restaurierung versteht sich in der Kontinuität historischer Eingriffe, welche im Laufe seiner Geschichte die Identität des Objektes formten. Die Behandlung wurde angegangen unter Berücksichtigung des Materials und kultureller Kontinuitäten und bedient sich sowohl traditioneller als auch innovativer Techniken. Die gezielte Veränderung in der Arbeit sowohl der sofrim (jüdische Schreiber) als auch der Restauratoren wird als Beitrag zur Weiterentwicklung der Techniken zur Erhaltung des kulturellen Erbes gesehen. Eine erfolgreiche Behandlung ist im Kontext des Materials und der historischen Notwendigkeiten zu beurteilen.

This Ashkenazi *Megillat Esther* (fig. 1), is one of the treasures of the Hebrew Section of the Library of Congress. In Judaic tradition such scrolls are ritual objects which convey holiness. As a cultural artifact in a public institution, this object retains its ritual potential to present the story of Esther—who defied protocol to save her people—and presents its own story as well. The work of both *sofer* (Jewish scribe) and conservator are part of the story in which the play of tradition and innovation in the service of preservation is a continuing theme.

The phrase, *gantse megillab*, might reasonably be read to indicate the provenance of an individual *megillah* or scroll. In fact, this Yiddish phrase means “the whole story”. The shift of focus, between object and story, may signal a shift in preservation priorities related to differing valuations of material and textual continuity. Professional ethics require conservators to consider the cultural origins and traditional care of sacred objects. Treatment can then take place where varying perspectives can be seen to converge.

Although the provenance of this Ashkenazi *Megillat Esther* is shrouded in history, the continuing tradition of Judaic scroll production and use is well documented. Conservators are able to consult contemporary *sofrim* as well as traditional texts to interpret material characteristics of scrolls and to choose appropriate treatment. The most challenging conservation question was whether to retain the scroll format. The challenge was answered through evaluation of material, cultural, and historical demands. The following presentation will frame a detailed description of the treatment within a discussion of ritual and conservation priorities.

The Tradition of Jewish Parchment Scrolls

Jewish life is informed by study and Jewish iconography is replete with images depicting the centrality of the written

word, but it seems destitute of images of scribes. Indeed, Moses (who may be considered the first *sofer*) and Ezra (the first so called) are typically shown upholding the law rather than writing it. Inevitable loss over time and the intentional destruction of Jewish texts over centuries insure that we cannot have the whole picture.

As conveyed in scripture, Jews are enjoined to “... write you this song” (Deuteronomy 31.19). These words were inter-



1 The Ashkenazi Megillat Esther open to Sheet 9: folding between the columns of text and staining/grime at the bottom of the rolled sheet at the right.

preted by rabbinic authorities to mean that “it is obligatory to write a beautiful scroll of the Torah, with choice ink, with a fine reed pen, written by an expert penman on well finished parchment”. The law was expanded to include other sacred texts such as the Book of Esther. This communal behest is the individual responsibility of the *sofer*.

Mention is made of *sofrim* in biblical texts, but what we know of scribal practice comes primarily from redactions of the law contained in *halachic* treatises (such as the *Talmud*, *Mishneh Torah*, and *Shulchan Aruch*), commentaries, and colophons. Although some preventive and reparative measures are recorded in these sources—such as injunctions not to drape scrolls over the backs of chairs and instructions for how to remove wax by flexing the parchment or by warming the back of a wax encrusted sheet with a candle—emphasis is on the identification of allowed materials, formation of letters, configuration of the written page, construction of the scroll, ritual purity of the copyist, and above all, faithfulness to the text. (The word “scribe” is linguistically related to writing. The word “*sofer*” is related to counting and, indeed, the *sofer* must account for each letter of copied text.) The primacy of the text in halachic discourse and the primacy of this discourse in Jewish life affects the production, use, and repair of parchment scrolls. Scrolls are used for study and devotional practice; they are instrumental rather than iconic.

Through the protocols of exegesis and communal practice the extraordinary textual conservatism of Judaism engenders a flexible and responsive body of law. The discursive style of rabbinic discourse displays the dialectic of change. Historically, rabbinic authorities were engaged in the intellectual life of the peoples among whom they lived and, likewise, *sofrim* were conversant in other artisan vocabularies. (The Ashkenazi script of central and northern Europe is influenced by both Latin script and the use of quills.) The history of Jewish parchment manuscript production is a history of change: of materials, technique, and style. The easily water soluble carbon based inks and the acidic/enzymatic preparation of skins for writing, suited to dry, warm climates, were replaced by less soluble metallic sulfate inks and a basic/limewater skin preparation more effective in temperate climates. With the introduction of a soft surfaced parchment, rulings, previously incised with a sharp point, were later also made in ink or with a pencil (typically composed of lead and brass.) Pictorial elements first appear in Jewish manuscripts—over rabbinic objection—as minutely written words wrought to produce micrographic designs and images and later as fully representational drawings, paintings, and prints.

Some change appears to have been introduced by the *sofrim* themselves; known for unvarying textual transcription they have been technical and aesthetic innovators. Change, though continuous, has been selective. The use of the codex format has not replaced scroll production, the introduction of paper has not replaced the use of parchment, and printing and electronic technologies have not replaced handwritten texts.

The Megillat Esther

Esther is included among biblical texts called *Ketuvim* (writings). It recounts the preservation of a Jewish community through human courage and strategy. So strong was the appeal of this story that it seems to have been canonized in deference to popular desire.

The status of the *megillat* Esther is reflected in laws pertaining to its construction and customs of use; knowledge of these help to explain material artifacts and provide guidance for conservation. Because it does not have the ritual status of scrolls of the *Torah* (the Five Books of Moses) some of the rules and restrictions have been relaxed for Esther scrolls. A scroll of the *Torah* must be sewn with *giddin* (sinew) but 13th century rabbinic commentary allows that only the first three sheets of a *megillat* Esther need be sewn with *giddin* while the rest may be sewn with *pishtan* (fibre); later opinions permit all joins to be sewn with fibre. While (in the Ashkenazi tradition of central and eastern Europe) the first and last sheets of a *Torah* are attached to wooden rods to facilitate rolling as the text is read, the *megillat* Esther, if attached to a rod at all, is attached only at the last sheet; a letter plays a central role in the story and it is customary during the reading of the Esther scroll to fold the sheets back on themselves, accordion style, to simulate the form of a letter.

Torah scrolls are: intended primarily for communal ritual readings; usually communally owned; made only of parchment, ink, and sinew (and wooden rollers); frequently as large as the skins will allow; and unornamented except for *taggin* (or “crownlets” formed by three very small parallel lines at the top of specific letters.) Esther scrolls are: usually communally and privately owned; typically of modest or small size; and frequently ornamented and incorporating a range of materials. *Megillot* Esther are diversely crafted and ornamented objects incorporating wood, ivory, metal, textiles, paper, and painted and printed media. Many are profusely decorated with illustrations (some depicting popular, but unwritten, expansions on the text.) Others are humble objects whose only “ornamentation” is evidence of use and the passage of time. Textile and paper linings appear as decorative, preventive, and reparative strategies. Sewn and glued repairs are frequently present as are parchment and paper mends. Today, during communal reading of the *Torah* congregants follow in codex format texts; during the reading of the *megillat* Esther, they frequently follow in their own scrolls.

While rabbinic sources indicate that *sofrim* were involved in repairing Esther scrolls, they also suggest that repair work, except in so far as it affected the textual elements, was not a primary concern of religious authorities or ritual workers; this seems to be the case today as well. It is likely that repairs were, and are, made by various individuals concerned with keeping body and soul together, as it were, to prolong the useful life of a scroll.

Conservation of Sacred Objects

The provenance of Judaic objects is often lost to the vicissitudes of Jewish history. In Jewish tradition sacred items declared unfit for ritual use are given ceremonial burial or put away in a *genizah* (or hiding place); such items, items taken from their owners, or items whose owners were taken from them, have found their way to the marketplace. Collections of such items exist in a social space somewhere between the *schul* (the center of communal religious life in Ashkenazi communities) and the *genizah*. While sacred objects in collections are now frequently used in cultural, rather than religious, rituals of study and display, with any luck at all, they are not yet consigned to oblivion; although not necessarily fit for religious use, sacred objects may be presented not simply as memorials to loss, but as testimonies to endurance.

It is understood that some sacred scrolls may have historic significance which overrides any impetus to either return them to religious use or put them away. It then falls to the *sofer* to make a new copy of the text and to the conservator to stabilize and preserve the object. If at all possible, treatment should avoid actions which would preclude restoration to religious ritual fitness at a later date. When treating Judaic objects, it is advisable to avoid; any repairs which obliterate, mask, or otherwise visually compensate loss of textual elements; permanently altering the dimensions of the margins; and incorporating materials from animals proscribed by Jewish law.

Conservation of An Ashkenazi Megillat Esther

This Ashkenazi *Megillat Esther* is an ink manuscript written on fifteen parchment sheets sewn together to form a scroll. On the basis of the type of parchment and the script it is believed to date from the late 14th/early 15th century and to have been produced in what is today southern Germany. It is unexampled, if not actually unique, because of its age, size, and the magnificent austerity of its script.

Although letters are frequently “nestled” closely and fit like puzzle pieces they consistently conform to the prohibition against letters touching. Each sheet has three columns of text and each column has seventeen lines; the only variant is Sheet 13 whose center column is divided vertically into two columns of eleven lines each with each line containing one word. Very faint ink rulings can occasionally be discerned at the right margin of columns of writing and along the top of lines of writing. Letters are routinely contracted or expanded to rectify the left hand margin and form visually full columns of text.

The only pattern of ornamentation is *taggin* (the crownlets usually reserved for these same letters in *Torah* scrolls); in a very few instances strokes are delicately extended to form a curl. Although illuminated Judaic codices survive from the same provenance, it seems that in regard to this scroll rabbinic iconoclasm had not yet been overwhelmed by the seductions of visual imagery.

Conservation treatment has taken place in several phases: In 1983 the scroll was wrapped in lightweight felt cloth and

housed in a sturdy double tray box. Prior to exhibition in the Library of Congress in 1990, Sheet 1 was disbound and housed in a paper folder and the ink on Sheet 9 (to which the scroll was opened for exhibition) was consolidated and mends were applied in small areas of loss to the parchment. In the early 1990s Sheet 11 was disbound, fully treated, and specially housed for a traveling exhibition; during this period all other sheets were consolidated, cleaned, and disbound. In 2002 each sheet was humidified, flattened, and mended. At this time, the scroll was fully assessed; prior treatment was evaluated; the decision to re-sew was made; and new housing designed. Rather than focus on the treatment chronology, which would introduce unnecessary redundancy, I will instead detail each type of conservation intervention including: narrative and photographic documentation; examination; identification and analysis of materials; consolidation of media; disbinding; dry cleaning of the parchment; mending and compensation for loss of the parchment; flattening; re-sewing; and housing.

Documentation

A narrative report of the scroll's general characteristics and condition, accompanied by diagrams showing specific features, and augmented by an extensive photographic record consisting predominantly of 35 mm slides (Kodak Ektachrome 64T), but also including 4 x 5 color transparencies, digital images, and B/W negatives and prints, has been produced for documentary and study purposes. The scroll has been photographed rolled and opened. The recto and verso of the sheets have been photographed at various stages of treatment. An attempt was made to standardize the 35 mm record: a 105 macro lens was used; a pair of 500 watt quartz lamps set at 68 inches from the floor for regular lighting and with one at 68 inches and the other at 43 inches for raking light; f stops of 8 and 8.5 were used; for some details the camera was suspended 15 inches over the sheet and for closer details at 9 inches. A set of significant features of the scroll were identified and photographed. They are: fractured ink with minimal or significant loss; minimal or significant ink damage/loss in areas showing abrasion and in areas of staining; ink on striations; ink on folds; ink on mends; ink on horny parchment; hair follicles; original/early mends; LC conservation mends; and other miscellaneous features (wax drops, rulings and markings, char-edged holes, and off-set ink). A polyester film (polyethylene terephthalate, PET, DuPont Mylar D) map was made of each sheet outlining the location of examples of these features. Representative photographs were taken and can be collated with the maps for future assessment of the scroll's condition. A set of digital and printed images will be provided to the Hebraic Section for use by researchers.

Examination

The scroll was examined (fig. 2) to identify and record: features of the materials (parchment, ink, *giddin* or sinew used for sewing, fibre used for sewing, and adhesives); technical features of the production (joins, mends possibly preceding

writing of the text, rulings); and artifacts of use of the scroll (damage to the ink and parchment, repairs, accretions). The goal of examination was to identify and interpret the material characteristics of the scroll in order to: understand its past and predict the impact of proposed use; and to inform conservation strategies to secure its future.

Visual examination included: unassisted viewing; microscopic analysis; and viewing under regular lighting, raking light, transmitted light, and with UltraViolet light. Tactile examination entailed extensive handling of the scroll and individual sheets. Specific analyses and testing will be described in discussion of the condition of the various components of the scroll: parchment, ink, and sewing.

Overall the scroll was found to be relatively well preserved. The texture of the parchment, characterized overall by fibres standing on end or curving above the surface, has contributed to preservation of the text by providing a greater surface area for ink to adhere to. The text is complete and fully legible although there are some areas of severe ink loss and there are some instances of parchment loss in text areas. The parchment was generally flexible enough to permit rolling without cracking or splitting. However: the scroll was very dusty and, in some places, grimy; the parchment had significant, and in some areas, extreme, planar distortion and some embrittlement; the ink was very friable and exceedingly vulnerable to continuing loss; and poor sewing was damaging both support and media.

Characteristics of the Parchment Support

A striking feature of the entire scroll is the large size of the parchment sheets which on average are 62 cm wide x 78 cm high. The skins have been extensively worked to obliterate the difference between hair and flesh sides. There are no patterns of features to associate hair side and flesh side of the skin with recto and verso of the manuscript. Some sheets have markings consistent with the use of scraping tools. The preparation has

obliterated features which could aid in identifying the genus of animal with which the skins originated; hair follicles and veining can rarely be seen even with assisted methods of examination. The sheets have a pronounced “nap” of raised fibres without directional orientation, show a good degree of flexibility, and are within a moderate range light tan in color—some cooler, some warmer and some lighter, some darker. On the basis of the size of each sheet, the soft feel, the “drape” of the parchment, the range of color, and by a process of elimination based on comparison with known samples of skins, it is believed to have been made from deerskin.

It is not evident whether these are split skins. (In current practice split skins are frequently used with the stronger (hair) side used for the large sheets of *Torah* scrolls and the weaker (flesh) side used for small scrolls and other ritual objects.) The skin at the top of each sheet seems tighter, thicker, more dense, and in some cases, stiffer than at the bottom; this may indicate that the orientation of the sheets top to bottom match the orientation of the skin head to tail. Along the top of the sheets the thickness is generally around 0.32-0.34 mm with the mid area identified with the spine measuring 0.45-0.58 mm; along the bottom of the sheets the thickness is 0.28-0.30 mm with the mid area identified with the spine measuring 0.34-0.35 mm. The side margins of each sheet have two semi-circular areas (one part way down from the top and one part way up from the bottom) which are stretchy, spongy, and of a more open fibre than the rest of the parchment and which correspond to axillae areas of the animal. At the very edges of the side margins of some sheets there are irregular areas typical of sheets which have been cut to make use of the full skin (including areas where the legs join the body). In some of these areas the parchment is also horny, translucent, and stiff; these features are associated with compressing wet skin and are typical artifacts of knotting and clipping for tension drying on a frame during parchment manufacture.

A curious feature of undiscovered origin is the overall presence of horizontal ridged striations characteristic of expansion and compression of some fibrous structures (fig. 3); they



2 Examining disbound sheets: Sheet 13, with its atypical text configuration (center).



3 Features of parchment including: striations; creasing; pleating; and “burn” hole.

are more numerous in the lower portions of the sheets (which may be attributable to the relatively lighter weight of the skins in that area.) The striations may be an artifact of rolling compounded by storage rolled in the upright position. It has also been suggested that they are stretch marks and artifacts of pregnancy; contemporary leather makers frequently cannot use the skins of female animals because of similar features. These irregularities may be areas of weakened material integrity and of vulnerability to further damage and possibly failure (through separation and/or splitting.)

Condition of the Parchment Support

Sheet 1 is in significantly different condition than the rest of the scroll and requires individual description. Despite sewing holes with remnants of *giddin* along its outer edge, it is the outermost sheet of the scroll and has served as a “wrapper” for some time; the verso of the sheet is differentially darkened corresponding to the area exposed when the scroll is closed. Mechanical removal of adhesive residues from the surface of the verso has revealed areas which are significantly lighter and probably indicative of the parchment’s original color. It is extensively stained, discolored, and somewhat embrittled. There are two areas of loss at the top edge of the sheet. The profile of the larger loss suggests that the parchment was cut rather than torn. (It is not unheard of for parchment to be cut from borders to be used for repair patches.) A large curved tear in the top margin formed a flap and extends into text. Extensive tears (fig. 4) in the center of the sheet were previously mended with large parchment patches adhered with glue to the verso of the sheet. The patches are of thinner, more smooth surfaced parchment than the sheet. The condition of the parchment and text suggest that these are very early repairs. They are of sufficient historical interest and are sufficiently well aligned, well adhered, and well functioning to leave in place. A small loss (of a few centimeters) appears, on the basis of adhesive residues, to have been mended at one time but the

mend is missing. There are small parchment (1-2 cm) mends on the verso which appear (by evidence of microscopic examination of ink continuing from the sheet onto one mend) to have been made prior to the writing of the scroll; this parchment is very similar to the parchment of the sheet. The characteristics of the losses—small, round, regular edges—are consistent with artifacts of wounds, such as insect bites, sustained by the live animal. On the verso there are embossed deformations and animal glue adhesive residues (in the side margins) from heavy, smooth surfaced, cream colored parchment strips traditionally adhered horizontally across the joins to reinforce the sewing; a remnant of one such strip initially remained partially adhered to the sheet.

The other sheets have a generally clean appearance although some amount of dirt is visible along the top and bottom margins and dirt and debris were present in the folds of the joins; the presence of light amounts of dirt became evident, particularly on the versos, during cleaning. Most staining is discrete, although there are some patterns of staining where liquids seem to have penetrated through rolled layers of parchment. The most significant staining is along top edges where the parchment is sometimes stiffened and/or grimy as well as discolored; contraction in these naturally more dense areas may have introduced stresses causing planar distortion (cockling) in other areas of the sheets. There are a few instances of media offset on the verso of sheets which align with text on the recto when the sheet is rolled (indicating the rolled configuration at the time of offset.) There are some stains consistent with wax droplets and on several sheets such droplets (fractured but adhered) are still present. The most curious staining appears on the verso of the sheets where there

4 Sheet 1 recto (transmitted light): early mends on verso; striations; parchment loss; fold between columns of text; staining; and relatively intact ink deposits considering severity of damage to the support.



5 Loss of parchment characteristic of damage in areas of ink deposit: napped surface of parchment and taggin (three parallel lines at top left of central letter).

is darkening with puddle-like characteristics (defined, irregular, rounded) in areas which are inked on the recto. We had never seen “sinking” of media like this, but a visiting *sofer* was able to somewhat reproduce the effect with iron gall ink applied with a quill to contemporary deerskin parchment. It is hypothesized that the amount of ink it took to write such large letters, the method of application, the drying time, and the qualities of the parchment resulted in these unusual stains. There are some stains associated with adhesive residues; the most extensive is along the left margin of the last sheet where a piece of relatively stiff, smooth surfaced, cream colored parchment had been fully adhered along the length of the sheet. (This incompatible attachment was mechanically removed during treatment.)

There is relatively little damage or loss on most of these sheets. Some losses, because of their location and profile, (fig. 5) can be associated with ink deposits. It is remarkable that there is so little damage to the support in text areas. There are a few “original” parchment mends adhered to the versos of some sheets; some edges and corners have been patched with parchment. On a few sheets adhesive residues in areas of damage or loss suggest previous mends which have been lost. In one or two instances sewing holes around a small constricted incision may be evidence of the parchment maker’s securing the edges to prevent enlargement during tension stretching and drying. Some sheets have holes with charred edges; the first column of Sheet 3 has significant loss of this kind. Throughout the scroll there are scattered “pin holes” visible only with transmitted light; they are of unknown origin and cannot be associated with ink damage, markings, or rulings of any identifiable kind.

The sheets are distorted along the edges associated with the re/sewn joins and there are patterns of abrasion associated with the hard edges of the joined sheets. A unexplained feature is prominent vertical creases between the columns of

text. The creases are discolored by dirt deposits. They are not associated with any discernable rulings marking the configuration of the text. They do not seem to be artifacts of ritual use.

Characteristics of the Writing Medium

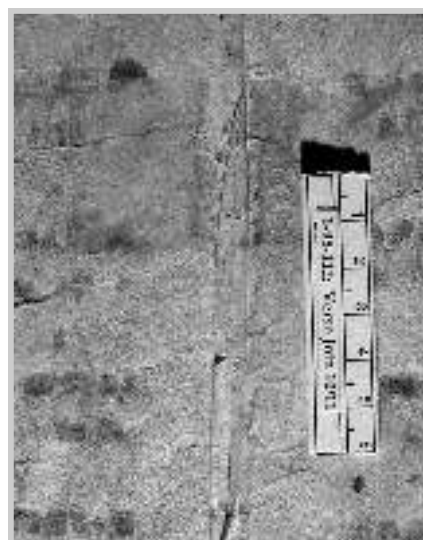
The (black-brown to brown) medium is iron gall ink. This is confirmed by scanning electron microscope x-ray diffraction. The ink shows a profile similar to those of known iron gall ink samples (with relatively high amounts of sulfur and iron). Testing with bathophenanthroline indicator strips (ICN Iron Gall Ink Test Paper) confirms the presence of FeII. The identification is also consistent with historical and traditional inks.

Condition of the Writing Medium

On initial examination it was noted that small, loose, particles of ink “peppered” the surfaces of the sheets, were present in the folds of the sewn joins and the housing materials, and fell out of the scroll when it was opened. There is a wide range of media conditions present; some letters appear fully intact while others show almost complete loss with only the impression of a stroke, some differentiation of surface texture and color, or a few particles of ink remaining (fig. 6). Some deposits are very “dimensional” (mounding above the surface of the parchment) while others are very flat. Microscopic examination reveals cracking and loss along cracks. Where the ink is fragmented it appears particulate and granular rather than flaking. There is evidence of loss of cohesion which may be attributable to desiccation and/or other degradation of ink components and inherent vice may also contribute to loss of adhesion; although adhesion is no doubt complicated by the hygroscopicity of parchment and resultant dimensional instability of the sheets as well as mechanical artifacts of use and repair. Although there are significant areas of liquid staining on some sheets there is little evidence of associated solubilization of media; there are just a few instance of what appears to be dissolved ink and few instances of smeared ink. In some stained areas the ink actually looks very “fresh”, as though it had been consolidated by the liquid.



6 Variations of parchment and ink at boundary of axilla area of skin (right): The open texture of the skin is associated here with significant ink loss.



7 Join of Sheets 10 and 11 verso: irregular sewing, unused sewing holes, and embossed rectangular area (top, center) with adhesive residues in site of parchment strip reinforcement; unusual “puddling” discolorations in text areas.

Characteristics and Condition of the Joins

The joins are associated with folds 0.5-0.75 cm from the edge at the right and left sides of the sheets. The folds go from recto to verso and run the length of the sheet. The sewing holes/slits are along the crease of each fold or in very close proximity to it. There is no overlapping of the sheets when viewed from the recto; when viewed from the verso the joins are irregular. Sometimes the sheets overlap and sometimes they abut; frequently different configurations are present in one join because of inconsistencies of the sewing.

When received, the sheets were sewn together with doubled linen thread so that two strands of thread went through each sewing hole. This was probably a relatively recent sewing as evidenced by: how clean the thread was; that the sewing holes are not particularly worn or dirty and hug the thread closely; and most significantly by the evidence of sewing holes with remnants of *giddin* (no actual stitches of *giddin* remain intact). The sewing “holes” in many instances are more accurately slits in the skin (rather than punctures) and are in good condition for the most part although in some areas of very thin or open fibred parchment (axillae areas) the holes are stretched and torn. The earlier sewing was done with sets of two holes relatively close together, a gap of about 2-3 cm, and then another set of holes. The later sewing is an irregular stitching which sometimes loops over the edges of the sheets and sometimes forms a running stitch; this is associated with misalignment of the sheets and “bunching” in some areas and possibly with abrasion and attendant loss of media (fig. 7).

At one time the sewn joins were reinforced with relatively heavy parchment strips adhered perpendicular to the sewing; on the evidence of adhesive residues and parchment remnants three such “bands”, evenly spaced along the length of the sheet, were adhered over each join. (The use of such reinforcements persists in scroll production today.) These reinforcements also contributed to distortion of the parchment and abrasion of both parchment and ink.

Treatment

As noted above, despite the depredations of inherent vice, use, and time, the scroll retained its material integrity. However continuing loss of friable ink and actual and potential damage to the parchment support were a threat to the scroll's future. The primary conservation concerns for prolonging the existence of the scroll and facilitating safe use were: the inherent instability of parchment and the tensions (introduced after production of the parchment) distorting the sheets; areas of current damage vulnerable to destructive future damage; and the condition of the ink. In this case, stabilization was the primary goal and the aesthetics of visual wholeness did not apply (because of the importance of preserving historical features and the religious significance of damaged textual elements). Preliminary treatment of Sheets 9 and 11 served as prototypes for developing a range of treatment protocols for the entire scroll.

Ink Consolidation

The choice of consolidant was based on: known compatibility with the support and medium; good long term aging characteristics; working properties; and potential for controllable application. Gelatin was considered, but testing, proved parchment size more effective in this case. Areas of similar condition were consolidated with either gelatin or parchment size. The areas were examined under magnification and cohesion/adhesion was tested by probing with a fine brush and with a needle. Areas consolidated with gelatin remained more friable than areas consolidated with parchment size.

The parchment size was produced by soaking small pieces of modern parchment in water overnight. The soaked parchment was strained, thoroughly rinsed, and then placed in calcified (Calcium oxide, FisherChemicals Certified [Low In Fluoride]) water. The proportions were 100 grams of dry parchment to 900 ml of water. The pH was 9. This mixture was simmered over a low heat for several hours. The use of a magnetic stirrer facilitated the preparation by promoting even heating. Monitoring was necessary to prevent overheating which could scorch and brown proteinaceous components of the solution. The resultant viscous liquid was strained, placed in sterilized jars, and refrigerated.

The consolidant was produced by diluting parchment size with a solution of 1 part water to 1.5 parts isopropanol (2-Propanol, HPLC Grade, FisherChemicals). First the parchment size was liquified in a graduated cylinder suspended in a water bath inside an Erlenmeyer flask supported on a small hot plate. The diluent was then added until the desired viscosity was achieved. Depending on the conditions of the media and support, dilutions of 1 part parchment size to 1.5 parts diluent through 4 parts diluent were used.

Warm consolidant was stippled onto the ink; where there was resistance to absorption isopropanol was applied immediately before applying parchment size. Any application or wicking of parchment size beyond the exact margins of the inked areas resulted in a color shift of the parchment. These stains could be “chased” with diluent and reduced but the certainty of staining and the uncertainty of successful stain reduction dictated extreme caution in application and precluded overall application techniques (such as the use of an ultrasonic humidifier or vapor pen.) The application of parchment size was allowed to partially dry and the consolidated ink was lightly “burnished” initially using a bone folder and silicon release paper and later a Teflon “bone” folder. The application of pressure was to enhance the benefits of applying consolidant. The Teflon bone folder was a good immediate test of the efficacy of the consolidant because the electrostatic charge would attract very small friable particles (which could be flushed back onto the area with the next application of size). It also avoided the possibility of relatively larger amounts of media adhering to the silicon release paper. The application process was repeated once or, rarely, twice. After some experience and refinement of technique, consolidation could be done without the aid of a microscope. Cohe-

sion and adhesion were periodically tested under magnification.

Consolidation of the medium needed to be accomplished without altering the visible reflective characteristics and flexibility of its support surface, that is, without introducing sheen, cloudiness, discoloration, or stiffness; this was particularly challenging in areas of extreme ink loss. Testing and evaluation showed which dilutions were most appropriate and effective; experience gave some degree of predictability. While overall consolidation was completed with few instances of change to the appearance of the ink, in some areas of ink loss securing the last particles resulted in some surface change to the immediately proximate parchment; this was particularly true of very worn areas where the effect was unavoidable if a precariously “perched” ink particle was to be preserved. This procedure was followed for every letter of the scroll. As can be imagined, this process took much time, however, it also provided an opportunity to become familiar with ink characteristics, condition, and working properties, as well as, parchment characteristics and condition. Applying liquid to these lines with a triple zero brush taught great respect for the *sofer* who originally produced them with a reed or quill.

Disbinding

After in-house exhibition, the scroll was returned to the laboratory for assessment for travel. It was decided that even with full consolidation of the ink, the scroll would still be too vulnerable to travel without prohibitively complex and expensive travel housing. A compromise was reached for one representative sheet (Sheet 11) to travel (fig. 8). The decision to disbind the scroll was supported by the fact that the current sewing was not the primary sewing and was actually damaging the scroll. The joins were photographed (recto and verso) and diagrammed. The sheet was detached, working from the verso, by cutting the linen threads with a pair of fine embroidery scissors so that only the smallest fragments needed to be gently “teased” out through the sewing holes. This protocol was later followed for all joins. All remnants of *giddin* have been left in place, as evidence of what may be the original sewing.

Cleaning

The sheets were “dry cleaned” by localized brushing (in non-inked areas) with a very small Japanese stippling brush and removal of the loosened dirt using a variable suction vacuum cleaner (Nilfisk GM 80) with a small customized nozzle. Additional cleaning was done with the soft, ragged edges of small pieces of torn blotter; cleaning was discontinued when the blotter retained its light color after “brushing”. In a few areas of significant grime, in areas of dense parchment structure, reduction also employed use of an eraser block (Staedtler Marsplastic); however, in general, use of eraser blocks or crumbs was avoided for concern about altering the surface characteristics of the parchment by altering the fibre orientations and fear of trapping particles in the open fibred structure.

Humidification and Flattening

Parchment has a profound “memory” of curvature. One of the ways of identifying hair and flesh sides of parchment is to observe which way a sheet curls upon exposure to moisture; frequently the sheet curves from the spine as though it were going wrap around its animal; similarly, after being rolled into a scroll, parchment “wants” to stay rolled. The scroll had originally been rolled very tightly placing great stress on the sheets, especially when they were unrolled. In addition to reducing local planar distortion, humidification and flattening can “relax” the sheets, increase their flexibility, allow them to be rolled into a wider scroll, and reduce the amount of stress they would be subject to during rolled storage and unrolled use.

Although there were concerns about potential damage to the ink from the expansion and contraction of the parchment during humidification, flattening, and drying, it was decided that the long term benefits for the ink outweighed the risks; overall tensions present in the sheets would become more uniform and result in lessened stress. It was also thought that overall humidification would enhance the ink consolidation and result in improved cohesion and adhesion.

Parchment is extremely reactive to water and over-humidification can permanently alter a parchment sheet by allowing irreversible reorientation of fiber bundles. Under-humidification impedes flattening. It is necessary to continually evaluate the amount of moisture being introduced. This is done primarily by assessing the changes in temperature, dampness, and flexibility of the parchment. Judgments include accounting for time exposure but it is courting disaster to rely on duration as a primary indicator; even the most uniform seeming sheets can respond idiosyncratically. During humidification media must also be monitored carefully; if the media starts to “glisten” humidification must be stopped and the sheet slightly dried prior to being covered (as in the drying pack.)

Because of the very worked and open quality of this parchment it was necessary to use a very controllable and gradual humidification strategy. A Gore-Tex (Gore, PTFE, polytetrafluoroethylene) pack was chosen because it allows good



8

Sheet 11
being housed
for travel and
exhibition.

control of the introduction of water vapor. Although this process goes more slowly than some others, the stages and degrees of humidification can be more carefully monitored. It also allows an ease of access for sequenced manipulations of the sheets to reduce cockles, creases, folds, and other distortions.

The humidification pack was “built” layer by layer as follows: mylar (for greater surface attraction for the wet blotter to prevent the pack from sliding); uniformly wet out blotter; Gore-Tex ; spun polyester webbing (Hollytex); the parchment sheet face up; spun polyester webbing; Gore-Tex; uniformly wet out blotter; plastic sheeting (for greater flexibility in partially rolling open the pack for access during humidification); and a moderately thick, dense felt.

Monitoring initial humidification closely (every 10 minutes or so) is recommended to evaluate the reactivity of a specific parchment. This parchment seemed to take up water quickly in the first minutes and then the rate of dampening seemed to decrease—as based on observations of rates of increased coolness, dampness, and flexibility. Humidification was considered accomplished when the sheet was moderately damp and cool to touch, draped easily but not limply, and planar distortion could be reduced through various manipulations: lightly pulled, smoothed, unfolded, or otherwise flattened. Most sheets required under an hour of humidification; several sheets required additional overall or local humidification with small Gore-Tex packs.

Drying and Flattening

The parallel aligned structure of skin fiber bundles characteristic of parchment is achieved and stabilized through a process of wetting and tension drying. Flattening needs to mimic the production processes to maintain the characteristics. Many conservators prefer a drying process using tensioning techniques, however sometimes drying under even and moderate pressure is both appropriate and effective, particularly in the case of thin, relatively open structured sheets which might be vulnerable to tension induced deformation with detrimental implications for support and media or tearing.

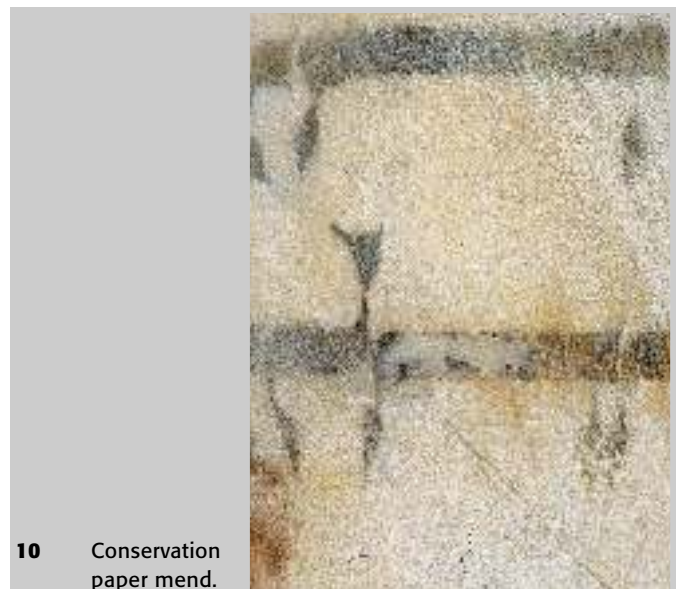
When a fully humidified parchment sheet was removed from the humidification pack (still sandwiched in the Hollytex) it was quickly placed between blotters, and felts and moderately weighted with acrylic sheeting and lead weights. After a few hours the sheet was removed from the first drying stack and sandwiched between fresh blotters and placed in a second drying stack of blotters and felt weighted heavily with 1/2 inch acrylic sheeting and lead weights. The next day the blotters were removed. The sheets were then left in the drying stack for several weeks to allow for moisture and tension equalization.

Mending

The choice of mending materials and strategies was made after careful consideration of traditional mending techniques and the characteristics of this relatively unusual parchment. The need for a modified mending strategy was prompted by the unusual worked characteristics of the parchment whose mechanical and aesthetic features would have been difficult to match by preparing modern parchment or gold beaters’ skin. The fact that even minute applications of parchment size changed the visual characteristics of this parchment, possibly through compacting or even gelatinization of degraded fibers, raised serious application and reversibility concerns for the use of collagen and water based adhesives (even if applied relatively “dry”).

Mending was done with Japanese paper (light weight Tenjugo) coated with ethanol (Pharmaco, USP Ethyl Alcohol, Dehydrated, 200 proof) activated acrylic resin dispersion adhesives (Rhoplex AC 73/AC 234) and toned with acrylic paint (Liquitex) to match the parchment support. This strategy is less invasive and less visually intrusive. While providing a strong and secure attachment which will hold up to predicted use, it nonetheless is weaker than the original material and would be more likely to fail under stress than stronger mending materials which might tear surrounding areas rather than failing themselves.

Although somewhat unconventional for parchment repair



(because of the use of paper and synthetic adhesives) this strategy, initially intended as temporary mending for short term exhibition needs, proved remarkably successful and relatively easily reversible (fig. 9 and fig. 10). Mends somewhat larger than the loss were adhered to the verso of the sheet and mends only very slightly larger than the loss profile were adhered to the recto.

Testing was done by dipping a small mend into ethanol and slightly blotting the front of the mend and then applying it to the parchment and also by placing the mend on the parchment and brushing it with ethanol. The “dipping” method was preferred because this allowed for a drier application of the adhesive with less pressure (a significant factor in areas near ink deposits.) Brushing introduced too much ethanol into the parchment with the attendant potential of solubilized adhesive being driven into the fibers and of tide-line staining caused by the movement of ethanol solubilized elements. Small mends were held in place under pressure with a Teflon “bone folder” until fully adhered and larger mends were lightly “burnished” and sometimes (when not near ink deposits) dried under non-woven polyester webbing (Hollytex), blotter, small rectangles of acrylic sheeting (Plexiglass), and small lead weights.

Most mends were applied in very small areas of loss or extreme degradation in areas of ink deposits. Some compensation for loss in burn hole areas or other larger loss areas was done by building up layers of mending paper to create a laminate mechanically and visually compatible with the parchment. Strips of mending tissue were applied along areas join edges; 10 cm strips were applied rather than a continuous strip. In addition, thin, worn, degraded axillae areas were reinforced with patches of mending tissue primarily for protection, but also to improve flexibility and create a dimensionally more continuous and stable sheet.

Evaluation

Several (10) years after consolidation and initial mending all sheets were assessed prior to humidification and flattening. The earlier interventions were evaluated; the sheets were re-evaluated after humidification and flattening.

Ink consolidation

Particular attention was given ink cohesion/adhesion. This was an opportunity to assess the long term effectiveness of the consolidation. During examination the sheets were rolled and held vertically over a clean sheet of paper to see if any ink particles detached; on unrolling the parchment was also examined for loosened or detached media. During the process of mapping characteristic features of the scroll clean polyethylene terephthalate polyester sheeting (PET, Dupont MylarD) was placed over each parchment sheet and when lifted examined for ink particles. In each case only a few pin-point sized particles were found to have detached. Tactile assessment, pressing lightly on ink (with a bare finger), showed that in some instances pin-point sized particles detached. Overall the consolidation of the ink is considered successful but the ink

remains vulnerable to mechanical damage from abrasion, from planar distortion of the parchment, and from use involving touching text areas.

Mending

Even after being subjected to the stresses associated with examination, photodocumentation, consolidation, disbinding, cleaning (and in the case of Sheet 11, humidification and flattening, and housing for extensive travel), the initial mends were found to be fully intact. They retained their material integrity, mechanical functioning, and aesthetic properties. Mends applied prior to humidification and flattening of the other sheets also remained intact and retained their material integrity

Humidification and Flattening

After a few years of travel Sheet 11 was examined for planar distortion; during travel it was in housing which kept it somewhat restrained and somewhat protected from fluctuations of relative humidity. After being removed from exhibit housing, it was stored in a paper folder which was placed in a Mylar folder. Despite exposure to some changes in relative humidity, it has remained flexible, flattened, and relatively free of planar distortion. Humidification and flattening of the other sheets has resulted in similar very satisfactory improvements, but it is too soon to fully assess the long term benefits. It is hoped that long term improvements to Sheet 11 will prove predictive to the value of this treatment for the other sheets.

Resewing

If the only consideration were preserving the material integrity of the parchment and ink then the choice might be to house the sheets separately. Flat storage would: mitigate introduction of non-uniform tensions into the sheet; reduce the potential for planar distortion and thus reduce the potential for associated stresses on and damage to the ink; and reduce the risk of damage from abrasion. It would also facilitate access to the text without rolling and thus use of one sheet would not impact every sheet as it would in scroll form. The only material disadvantage of such storage is the potential for detached sheets to accidentally become permanently dissociated.



11 Sewing the sheets together.

Sewn joins increase the potential for damage. Actual damage consistent with the stresses of previous rolling and rolled storage has already been noted and some additional damage concomitant with restoring the scroll format is inevitable. The condition of Sheet 1 renders it particularly vulnerable to such damage. However, when we ask what is it we are preserving, the answer is obviously not simply parchment and ink. Conservation of the *megillab* itself, in fact, takes priority over optimal preservation of its separate material constituents.

Following this thinking, it was decided to sew the sheets back together to form a scroll (fig. 11). To mitigate some of the stresses and potential for damage introduced by sewn joins, the earlier folded joins were not restored. Observed patterns of abrasion raised concern of the effects of a folded configuration with double flaps of parchment along the edges of the sheets. The thickness, stiffness, and reactive nature of the parchment prevent the flaps from lying flat. These raised phalanges “scrape” along parchment and ink with any movement. To reduce this source of damage, the folds were removed during flattening and the sheets were sewn without folds. Sheets were overlapped creating a relatively flat join. Although there are ritual questions about visible sewing on the recto of sheets, there are also many historic examples of Esther scrolls with such visible sewing. The sewing is easily reversible if ever the scroll were to be ritually restored.

Single strand linen thread was used as even the finest *gid-din* is too rough surfaced and too strong to use in open fibred areas or damaged areas of the parchment. Existing sewing holes/slits were evaluated for use and a pattern of sewing was chosen to create a strong attachment with evenly distributed stresses. Some damaged sewing holes/slits were mended or reinforced. No new holes/slits were made. There is evidence of prior sewing all along the edges and initially the sewing was done along the full length of the join. However, in rolling the joined sheets it was seen that this full sewing was too constricting and might result in planar distortion; indeed, observation of the movement of these joined sheets could explain patterns of creasing previously observed. Thus it was decided

to extend the stitching just slightly past the text areas, leaving the corners of the sheets free to move during rolling and unrolling and to find an equilibrium in the rolled state that would minimize stress and planar distortion.

Housing

With the sheets re-sewn into a scroll, preservation holding, housing, and handling strategies will have to compensate for the stresses inherent to the materials, format, and use of the object (fig. 12). It is proposed that the scroll be rolled around a hollow, rigid, lightweight core (to provide stability and prevent flexing of the rolled sheets) and then wrapped in a covering to help to keep it rolled. At this time we are investigating the possibility of sewing a sheet of compatible deerskin parchment at each end of the scroll. The inner sheet, attached to the last sheet of the scroll, would provide additional support at the core and the outer sheet, attached to the first sheet of the scroll, would provide a protective wrapper as well as serving as a secondary core during unrolling. Evidence for such precedents are the incompatible heavy parchment sheet previously adhered to the last sheet and sewing holes with remnants of *gid-din* on the outer edge of the first sheet.

A sturdy cloth covered box has been constructed to support and protect the scroll. Compartments have been built into it to house associated materials. A set of surrogate images of the scroll and sheets will be provided as study aids for researchers. Safe handling guidelines and a form to track use will be stored in a separate compartment of the box. Routine periodic assessment of the scroll will be included in the custodial division's annual conservation plan.

Conclusion

Historically, in accordance with religious law and cultural tradition, this Ashkenazi *Megillat* Esther was produced, used, and maintained as scroll. It has survived for centuries subject to degradation processes associated with inherent vice and exacerbated by history; this could be considered either proof of its hardness or proof of its vulnerability. (Is endurance a sign of ample or depleted resources and/or resilience? This question poses material and philosophical challenges which cannot be answered here.) The best preservation practices are not necessarily the appropriate conservation choices. We are rarely called on to secure materials; we are routinely called on to save objects. It can be reasonably argued that the testimony of the object itself informs the best conservation decisions. This *Megillat* Esther is, in its very name, identified as a scroll. Through its text, and through its very existence, it testifies to risk taking and unlikely endurance. It is undeniable that returning these materials to their original format may compromise their material preservation; but it is also undeniable that a well designed preventive conservation plan and sound conservation treatment practices can preserve the cultural identity and historical testimony and prolong the material existence of sacred objects.



12 The scroll and new housing.

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Materials and Equipment

Archivart, 7 Caesar Place, Moonachie, NJ 07074, USA, www.archivart.com

BookMakers, 6701 Lafayette Avenue, Riverdale, MD 20737, USA, boomkrs@aol.com

Fisher Scientific, P.O. Box 1546, 9999 Veterans Memorial Drive, Houston, TX 77251-1546, USA, Tel. +1-281-405-4000, Fax+ 1-281-878-2407; Fisher Scientific GmbH, Im Heiligen Feld 17, D-58239 Schwerte, Tel. +49-2304-9325, Fax +49-2304-932950; etc.; www.fishersci.com

HiroMi Paper International, 2525 Michigan Avenue, G-9, Santa Monica, CA 90404, USA, www.hiromipaper.com

Nilfisk Advance America Inc., 300 Technology Drive, Malvern, PA 19355, USA, www.nilfiskamerica.com

Preservation Equipment Ltd., Vincennes Road, Diss, Norfolk, IP22 4HQ, UK, www.preservationequipment.com

Talas, 568 Broadway, New York, NY 10012, USA, www.talasonline.com

University Products, Inc., P.O. Box 101, 517 Main Street, Holyoke, MA 01040, USA, www.universityproducts.com

Annotation

- * This contribution was held as a lecture during the Parchment Conference of the Austrian State Archive from 20th to 22th November 2002 at Vienna, and is revised for print.—This paper is an updated and revised version of a preliminary report presented at the Book and Paper Specialty Group Session, AIC 25th Annual Meeting, 1997. A version of that presentation appeared in the Book and Paper Group Annual, Vol. 16 (1997). The Book and Paper Group of the American Institute of Conservation for Historic and Artistic Works has allowed me to publish this version of the earlier publication.

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