Master Control No: 4803

BOOK CONSERVATION AND TREATMENT RECORD
Library of Congress – Conservation Division

Master Control Number:	4803	**Project Number & Name:**	4803 Torat Mosheh
Division:	AMED: Hebraic	**Date In:**	12/28/2020
Division Contact:	Anne Brener	**Date Out:**	mm/dd/yy
Conservator(s):	Laura McNulty (intern) and Claire Dekle (supervisor)	**Examination Date:**	4/23/2021
I.D./Call number:	2007550976/BS1225 .A558 1593		
Title:	משה תורת [Sefer Torat Mosheh]		
Author:	Moses Alshekh		
Imprint:	1593/5 Belvedere		
Alternative Format:			
Existing Container:	None		

Background Information: (significance, provenance, set of volumes, labels, stamps, inscription):

Labels

The Deinard Collection bookplate is adhered to the inside of the front cover.

Stamps

On the verso of the title page, "Gift of/Jacob H. Schiff/1912" is stamped in the center of the page. Near the bottom edge of the flyleaf, "LR S'13" is stamped in blue ink.

Inscriptions

On the verso of the title page, parallel to the spine edge, "I.S. Sefat [?]. 29.13" is written in graphite pencil. On a flyle af at the back of the book, "BS1255/.A558/1593/Copy 1/AMED/Hebr/Cage" is written in graphite pencil in the center of the page, and, along the bottom edge of the same flyleaf, "2007550976" is written in graphite pencil.

There is a small piece of paper inserted approximately one-third of the way into the textblock which has two inscriptions: "97+" in blue pencil and "332" in graphite pencil.

Historical Context

Torat Moshe was written by Moses ben Hayyim Alshekh (d. after 1593), a Talmudist and halakhist, and the text is a commentary on Genesis. Alshekh's commentaries on the whole Torah would be published by his son after his death. Like other commentaries, each section of *Torat Moshe* begins with a series of questions followed by detailed answers. Alshekh's responses stressed the moral and ethical aspects of Torah and his answers were based on Talmudic and midrashic sources (Heller 2004, 825). The book was printed by Joseph ben Isaac Ashkeloni, the operator of the printing house owned by Doña Reyna Nasi in Belvedere, located just outside of Constantinople.

Reyna Nasi (c. 1534 – 1599), the daughter of Doña Gracia Nasi (c. 1510 – 1569) inherited her mother's ideals and established her printing press to cultivate local talent and help the Sephardic culture thrive. In 1536, Doña Gracia and her daughers fled Portugal and traveled to Antwerp. In 1544, the family moved to Venice and, in 1549, to Ferrara. Until their arrival in Ferrara, the family, like many Iberian Jews, had to practice Judaism in secret while appearing to be Catholic when outside of the home. In Ferrara, a large Sephardic community had been established, although many were confined to ghettos (Jewish Women's Archive). Doña Gracia's wealth allowed the family to live among the Catholics in the city instead of the ghetto. It is here in Ferrara that Doña Gracia became an active supporter of the literary and printing activities in the city. In 1553, Doña Gracia and Reyna arrived in Constantinople, fleeing Ferrara due to the

rise of the Counter-Reformation in Italy and an increase in hostilities against Jews. The Ottoman Empire was fairly welcoming to Jews and allowed them to openly practice. Jews in the Empire were subjected to special taxes and regulations, but they were "generally granted great religious and socio-political freedom" (Ray 2009, 62).

Upon their arrival in Constantinople, Doña Gracia quickly assumed a leadership role in the Sephardic community – dispensing charity and aid to Jews fleeing from the Iberian Peninsula, and supporting rabbinic scholars, hospitals, and synagogues throughout the Ottoman Empire. Doña Gracia was a patron of Jewish culture and one contemporary writer caller her the "heart of the body of the Portuguese nation[1]" (Brener 2016). Reyna Nasi inherited her mother's ideals along with some of her wealth which she used to establish a printing press in her house in Belvedere.

Fifteen titles are known to have been printed in the house owned by Reyna. The Library of Congress has five of these titles in their collection. Some scholars have dismissed the works printed in Belvedere as trivial, but "by cultivating 'local talent'…Reyna Nasi may well have sought to create a living Hebrew culture in the best tradition of the great Jewish patrons who once lived in Spain and whose memory continued to inspire their descendants in exile" (Brener 2014). The second half of the sixteenth century in Constantinople was a highly productive time for printers; approximately 120 titles were published in a period of 40 years (Ben Na'eh 80). Scholars have noted that the "Hispano-Jewish immigration actually acted as a catalyst for Jewish intellectual life throughout the Mediterranean" (Ray 2009, 60).

Exiles from Spain and Portugal brought printing technologies to the Ottoman Empire. Some had been exposed while still living in the Iberian Peninsula while others, like Doña Gracia, were introduced to it when in Italy. David and Samuel ibn Nahmias, exiles from the Iberian Peninsula, set up the first printing press in Constantinople in 1493 (Posner and Ta-Shema 1975, 101), predating the first Turkish press by 234 years (Heller 2004, xlv). After Italy, the Ottoman Empire was the second most important source of Hebrew books. In the sixteenth century, more than 320 titles were published in Constantinople (xliii). Compared to Italy and other printing centers in Europe, it was easier for Hebrew books to be printed in the Ottoman Empire because there was no preventative censorship in the Islamic world at this time (Bendowska and Doktor 2011, 27).

Torat Moshe is typical of books printed in 16th-century Constantinople – the title page has no ornamentation, the text is in two columns, and round Sephardic type is used except for the headings where larger, square letters are used (Heller 2004, 825). *Torat Moshe* also represents one of the many consequences of the rise of Hebrew printing and the reactionary censorship by the Catholic Church on the types of Hebrew books that could be printed. Bans in Italy on printing the Talmud and other sacred religious texts resulted in an increase in other types of Jewish books being produced, including commentaries on the Torah such as *Torat Moshe* (Bendowska and Doktor 2011, 39).

In Jewish culture, books have always been respected and to study the history of the Jewish book is to study the history of the transmission of knowledge (Schrijver 2012). Although forbidden to join most professional guilds, Jewish printers gained an elevated social status within Jewish communities and the language of the profession conveyed the sacred nature of the craft. *Melechet ha-kodesh*, the Hebrew for "printing," translates to "the sacred craft." *Melechet shamaim*, or "heavenly craft," was also used (Bendowska and Doktor 2011, 14). Printing, however, was not readily accepted or welcomed by many Jewish religious leaders as printed books increased access to the knowledge contained within the. Before the advent of the printed book, knowledge had been directly transferred from teacher to student which ensured that knowledge was kept within a small circle of scholars (Bendowska and Doktor 2011, 13). With the rise of printed books, rabbis and other scholars could no longer control the interpretation or dissemination of halachic texts (20). On the other hand, some rabbis believed that printed books would have a unifying effect on Judaism. Standardized versions of sacred texts and prayer books could be produced; something that was impossible in a manuscript culture (39). Some religious texts were standardized and those versions continue to be used in synagogues today, but the rise of the printed book resulted in more books being published which did not have the unifying effect some rabbis had hoped it would.

Torat Moshe represents a multitude of histories – the rise and spread of Hebrew printing across Europe and into the Islamic world, the extraordinary movement of Jews across Europe, the contributions of Reyna Nasi and her mother, Doña Gracia Nasi, to the survival of Sephardic Jewish culture, and the expansion of Jewish intellectual life.

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[1] "Portuguese nation" is used as shorthand to refer to Jews who were forcibly converted in Spain and Portugal but wanted to return to Judaism.

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Ben Na'eh, Yaron. 1990. "Hebrew Printing Houses in the Ottoman Empire." In *Jewish Journalism and Printing Houses in the Ottoman Empire and Modern Turkey*, edited by Gad Nassi. Piscataway, NJ: Georgia Press. 73-96. https://doi.org/10.31826/9781463231781-005/.

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Further Reading

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DESCRIPTION AND CONDITION:

Cover Dimensions: **Height:** 29.5 **cm** **Width:** 20.0 **cm** **Thickness:** 1.7 **cm**

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Textblock Dimensions: **Height:** 27.5 **cm** **Width:** 18.6 **cm** **Thickness:** 1.0 **cm**

Collation (signatures, format, leaves, pagination, foliation, and inserts):

There are 80 folios in the textblock plus one singleton/single leaf.

Consultations with the Hebraic specialist, Dr. Ann Brener, proved that the order of the leaves as they were bound by the GPO is incorrect in some places and the printed foliation is also incorrect on some of the leaves. Prior to guarding and reforming the textblock, Dr. Brener put the leaves in the correct order based on textual evidence. The order in which she organized the leaves maintains the continuity of the text. Initially, Dr. Brener put the leaves in order based on the printed foliation. However, upon a second read-through of the text, she discovered that some of the foliation numbers are incorrect. For example, there are two leaves with the foliation "80" printed on them. Based on the continuity of the text, one of the leaves with foliation "80" is actually f. 75 and the other is the correct f. 80.

General Description:

Binding:

The textblock was bound in a Government Printing Office (GPO) style binding. The case binding has a half-leather style and the leather is red and blind tooled in the corners and on the spine. The titling information was gilt tooled. The outer faces of the boards are filled with red, grained bookcloth. The binding is a tightback style and has tight joints. The spine is slightly rounded. The pastedowns and made endsheest have a marbled, stone pattern. The endbands are stuck on and made of yellow and green thread. After disbanding, the spine linings were visible and there are several layers of brown, Kraft paper.

Textblock:

The textblock is made of handmade, lightweight, laid paper. The thickness[2] of the paper varies and ranges from 0.11mm to 0.25mm. The bulk of the textblock measures approximately 0.17mm thick. Overall, the paper has discolored to a light tan color and has a rattle due to the sizing. The printing has left a strong impression on the paper and created slight undulations in the paper. Watermarks are visible in transmitted light. At the time of the initial examination, the sewing pattern is not accessible as the opening is very restricted and it is difficult to see into the gutter. The textblock is sewn on 5 single cords. Removal of the spine linings and the reduction of the animal glue on the spine revealed that the textblock is sewn on 5 recessed cords and has an abbreviated sewing pattern. Additionally, the textblock is oversewn.

The text was printed in black printer's ink. There are handwritten inscriptions in black and brown ink. There are approximately 15 inscriptions on the title page, 11 on the last page, and 5 throughout the text, one of which has been cut off when the textblock was trimmed.

General Condition:

Overall, the book is in fair condition.

Binding:

The binding is in good condition. The leather at the fore-edge corners has been abraded and worn away, exposing the board. At the head of the spine, the leather has ripped, exposing the paper spine layer underneath. The binding has a very restrictive opening which makes it difficult to read the text.

Textblock:

On the whole, the paper is in fair condition. The paper does not drape well and tends to vertically flex in the center of the paper, between the two columns of printed text, which has resulted in tears on a few pages. The paper has discolored and darkened overall; the severity of which varies but the most severe discoloration is along and near the edges. There are liquid stains and tidelines throughout the textblock.

[2] Thickness measurements were made using a Mitutoyo Quick Mini digital micrometer with an accuracy of ±0.0254mm.

The stains do not obscure the text. There is minor cockling along the top edge of the textblock. In addition to the staining found throughout the textblock, there are areas of different staining found sporadically through the text. In a few places throughout the textblock, circular, brown-orange colored stains are found in the top half of the pages. There is dark blue/purple/black colored staining near the top edge of the paper near the back of the textblock. Based on the coloring of the stain, it was likely caused by some sort of water-soluble media. Trimming of the textblock has resulted in a loss of printed text on a small number of pages and one instance of marginalia was cut off.

The title page and the last page are the most damaged. Both have large losses at the fore edges, and the repair tissue used has partially separated from the paper, obscures some of the notations and printed text, and has contracted over time which has resulted in severe wrinkling. In addition to the large loss at the fore edge, the title page has 6 small, circular losses above the title and small losses along the top edge. On the recto of the title page, there is a brown accretion near the gutter in the lower half of the page. It is difficult to closely examine the accretion, but it appears to be paper based on visual observation.

In the first half of the textblock, minor pest damage can be observed near the tail edge and into the gutter. There is also pest damage in the second half of the textblock, but is in the upper half of the pages and in the printed text area.

Overall, the media are in good condition. They are well-adhered to the paper and remain legible. There are some areas of smudging, but they mostly likely occurred during printing and did not result from use or handling.

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BOARD

Board:

- ☐ missing
- ☐ wood
- ☒ paste-board
- ☐ waterleaf / pulp
- ☐ binders board
- ☐ other
- ☐ back cornered
- ☐ shaped
- ☐ tying-up marks

Covering Materials:

- ☐ full
- ☒ half
- ☐ quarter
- ☒ bookcloth
- ☐ textile
- ☐ paper
- ☐ cloth sides
- ☐ vellum sides
- ☐ paper sides/dec
- ☐ vellum
- ☒ leather
- ☐ tawed skin
- ☐ calf
- ☐ goat
- ☐ sheep
- ☐ pig

Binding Style:

- ☒ tight back
- ☒ case
- ☐ laced-on
- ☐ laced case
- ☒ tight joint
- ☐ French joint
- ☐ laced-in
- ☐ hollow back
- ☐ baggy back
- ☐ false bands
- ☐ raised bands
- ☐ cords
- ☐ tapes
- ☐ thongs

SPINE

Spine Shape:

- ☐ flat
- ☒ rounded
- ☐ uneven
- ☐ backed
- ☐ concave

Upper Joint:

- ☒ intact
- ☐ broken
- ☐ board loose
- ☐ board detached

Lower Joint:

- ☒ intact
- ☐ broken
- ☐ board loose
- ☐ board detached

Endcaps:

- ☒ folded
- ☐ shaped
- ☐ sewn
- ☐ repaired
- ☐ missing

Diagram(s):

TITLE

Titling Style:

- ☐ none
- ☐ manuscript
- ☒ tooled
- ☐ label

Medium:

- ☐ ink
- ☐ blind
- ☒ gilt

Location:

- ☐ upper board
- ☐ lower board
- ☒ spine
- ☐ edge of textblock

Tooling Style:

- ☐ none
- ☒ blind
- ☐ gilt
- ☐ pigment
- ☐ other

Tooling Location:

- ☒ upper board
- ☒ lower board
- ☐ board edges
- ☐ endcaps
- ☐ turn-ins
- ☒ spine

Title on spine: משה תורת /Comm. On/Genesis/Alshekh/Belvedere/1595

FASTENINGS AND FURNITURE

Fastening Type:

- ☒ none
- ☐ clasps
- ☐ side pin
- ☐ textile tie
- ☐ thongs

Fastening Location:

- ☐ hinges from
- ☐ lower board
- ☐ hinges from
- ☐ upper board

Type of hinge:

- ☐ metal
- ☐ leather strap

Furniture:

- ☒ none
- ☐ corner/center pcs.
- ☐ bosses

Diagram(s):

SPINE LININGS AND ENDBANDS

Spine Lining:	Endbands:	Core:	Decorative elements:	Diagram(s):
☐ none	☐ none	☐ single core	☐ linen thread	
☐ parchment patches	☒ both present	☐ double core	☐ silk thread	
☒ paper	☐ one present	☐ sewn	☐ tawed	
☐ textile	☐ head	☐ tie downs:#	☐ leather	
☐ leather	☐ tail	☒ stuck-on	☐ textile	
☐ cannot see	☐ evidence present	☐ flat/round		
	☐ cut off	☐ tawed		
		☐ tanned		
		☐ cord		
		☐ parchment	colors: Yellow and green	
		☐ paper	endband style: Bead on front	

SEWING

Sewing supports:	Sewing:	Textblock edges:	Textblock:	Diagram(s):
☐ unsupported	☐ original	☒ trimmed	☐ folio	
☐ supported	☐ repaired	☐ untrimmed	☐ quarto	
☐ single	☐ resewn	☐ deckles h/t/fe	☐ octavo	
☐ double	☐ multiple sewings	☐ colored:	☐ other:	
☐ tawed	☐ all-along	☐ gilt	☒ intact	
☐ tanned	☐ abbreviated	☐ speckled	☐ dis-bound	
☐ cord	☐ sawn-in	☐ tooled		
☐ parchment	☐ notched	☐ gauffered		
☐ textile	☐ oversewn			
☐ hemp	☐ silk thread			
	☐ linen thread			
	☐ cotton thread			
	☐ other			

TEXTBLOCK

Textblock materials:	Method of marking:	Media:	Paper condition:	Diagram(s):
☐ parchment	☐ manuscript	☐ iron-gall ink	☐ brittle	
☒ paper	☐ woodblock	☒ other ink, color:	☒ stained	
☐ combination	☒ printed	☐ graphite	☒ tears	
☐ watermark	☐ engraving	☒ printer's ink	☒ losses	
☐ handmade	☐ etching	☐ printer's crayons	☐ accretions	
☐ machine made	☐ lithography	☐ colored ink	☐ tape	
☒ laid	☐ plate mark	☐ watercolor	☒ attachments	
☐ wove	☐ hand colored	☐ gouache	☐ lined/silked	
☐ other	☐ other	☐ other	☐ other	

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ENDSHEETS

Endleaves:	Construction:	Boardsheet:	Joint material:	Diagram(s):
☐ none	☐ hooked	☐ adhered	☐ paper	
☐ same as textblock	☐ whipstiched	☐ not adhered	☐ leather	
☒ paper	☐ sewn gathering	☐ integral endleaf	☐ cloth	
	☒ tipped on	☐ single folio	☐ other	
		☐ other		

TREATMENT PROPOSAL:

1. Written and photographic documentation.
2. Disbind.
3. Surface clean the textblock.
4. Document and photograph water and counter marks.
5. Remove bookplate from GPO binding.
6. Test solubility of media.
7. Wash textblock and remove previous repairs to the extent possible.
8. Mend and fill losses in textblock.
9. Guard and reestablish bifolio connections.
10. Rebind.

Photography:		**Testing:**		**Testing Results:**
☒	BT ☐ AT	☒	pH	The pH of the paper was tested using non-bleeding pH indicator strips (insert brand info). The strips were dampened with deionized water and then placed on the surface of the paper, covered with mylar, and allowed to sit for approximately one minute. The strip was then removed and the pH evaluated based on the scale provided on the container. The paper's pH is 6.0-6.5.
☐	slides	☒	media	Black printing ink on the Deinard Collection bookplate proved stable in deionized water and ethanol. The marbled paper to which the bookplate is attached is soluble in both deionized water and ethanol, more so in the water than the ethanol. The media on the title page and the last leaf were tested for solubility in pH adjusted deionized water (adjusted to a pH of 7.5 with calcium hydroxide), ethanol, 1:1 ethanol: pH adjusted deionized water, and magnesium bicarbonate in preparation for aqueous treatments. The testing results (see Appendix I for testing locations and results) supported the use of a 2:1 pH adjusted deionized water: ethanol mixture to spray out the pages and then washing in a 4:1 pH adjusted deionized water:ethanol mixture to reduce acidic degredation and help swell the adhesives of the repairs so that they could be safely removed from the paper. Solubility testing results also supported washing the pages in a mixture of magnesium bicarbonate and deionized water for the alkalization step.
☒	digital	☐	phloroglucinol	
☒	transmitted	☒	ninhydrin	Using type B gelatin as a known positive, the reagent was first tested to ensure that it was still working. Then, a small piece of blotter was dampened with deionized water and placed on the surface of the paper being tested. It sat on the paper, under mylar, for approximately 5 minutes. A drop of ninhydrin was then placed on the blotter and allowed to dry. A faint pink color was observed indicating that the sizing was proteinaceous.
☒	raking	☒	potassium iodide	Using wheat starch paste as a known positive, the reagent was first tested to ensure it was working properly. Then, a small piece of blotter was dampened with deionized water and placed on the surface of the paper for testing. It sat on the paper, under mylar, for approximately 5 minutes. A drop of potassium iodide was then placed on the blotter and allowed to dry. A strong blue color was not observed which indicates that the sizing is not starch based.

Photographs of the water- and countermarks were taken using transmitted light. Using the Artist multispectral imaging system, photographs of the title page and the last leaf were taken in ultraviolet and infrared radiation. The media did not fluoresce under ultra violet radiation. Under the infrared radiation, only a few areas gave a very slight indication that the media could be iron gall ink.

Textblock: (identify all materials, manufacturers, and solution strengths)

☐	fixing/consolidation	
☒	drycleaning	Soft hake brushes and cosmetic sponges (Fanta Sea cosmetics, latex free, supplied by Burmax Co., Holtsville, NY)
☒	removal of attachments	Previous repairs and residual adhesive on the title page and the last leaf were removed between washing steps. The washing steps are detailed below.
☒	washing	The title page and the last leaf were washed in a 4:1 mixture of pH adjusted deionized

water (adjusted to a pH of 7.5 with calcium hydroxide): ethanol. Both pages were washed on a screen and immersed in the washing solution. The title page was washed for a total of 45 minutes and the last leaf for a total of 60 minutes.

The remaining pages of the textblock were washed in hot tap water for 5 minutes and then washed in two, 15 minute baths in pH adjusted deionized water (adjusted to pH 7.0-7.5 with calcium hydroxide).

☐ bleaching/stain removal

☒ alkalize — The leaves of the textblock were alkalized with magnesium bicarbonate (0.1M stock solution diluted 1 part to 4 parts deionized water). Groups of 5 leaves were immersed in the solution for 30 minutes, drained briefly, blotted, placed between polyester web and felts, lightly weights, and left to dry overnight. The felts were changed the following day.

☒ size — The leaves of the textblock were sized with a 0.25% solution of Type B gelatin (200 bloom, 40 mesh, purchased from Polistini), in deionized water. The leaves were immersed in the sizing solution one bifolio or folio at a time in order to maintain page order and labeling system.

☒ mend

☒ guard — Untoned kozo tissue adhered with wheat starch paste was used to guard the bifolia. If the untoned kozo tissue was a good color match, toned (60:40 yellow ochre:raw umber, Golden arylics) kozo tissue was used instead.

☐ line

☐ leaf cast

☐ flattening

Binding:

☐ endpaper construction

☐ sewing

☐ textblock consolidation/spine shaping

☐ endbands

☐ spine linings and adhesives

☐ board attachment and shaping

☐ covering

☐ finishing

☐ Housing

Titling information:

Enclosure: Object:

TREATMENT:

Before treatment photographic and written documentation were completed.

The red GPO binding was removed from the textblock. The hinges were carefully cut with a small scalpel and the sewing threads and cords were cut with small scissors. The Kraft paper spine layers were first mechanically reduced with a microspatula and then remaining further reduced with a poultice of 5% methylcellulose. The thick application of animal glue was reduced with the same 5% methylcellulose poultice. Reducing the spine linings and the animal glue required several applications of the methylcellulose, and each application was left to dwell for approximately 7-10 minutes. After about 5 minutes, the linings and glue were checked to see if they had softened enough to be mechanically removed from the spine without damaging the spine folds of the textblock.

The textblock was then disbound. This process was difficult due to the complicated sewing. It was difficult to determine the gatherings because the folds were badly damaged from past sewing and bindings.

The surfaces of the textblock were cleaned first using a soft, Hake brush and then latex-free cosmetic sponges. On the whole, the surface texture of the paper was not altered, but some heavily stained areas felt softer to the touch following surface cleaning.

Per the curator's request, the Deinard Collection bookplate was removed from the inside front cover of the GPO binding. This was done by scoring around the bookplate with a scalpel and then using a thin microspatula to lift the bookplate from the board. The media on the bookplate and the marbled paper were then tested for solubility in deionized water and ethanol. Solubility tests were done in the following manner: one drop of the solvent (deionized water or ethanol) was placed on the media being tested then immediately blotted, the next drop was allowed to sit for 5 seconds and then blotted, and the last drop was allowed to sit for 10 seconds and then blotted again. The area tested was then allowed to dry under light weight for a few minutes. There was media offset from the marbled paper following the application of both deionized water and ethanol. So, the marbled paper is soluble in deionized water and ethanol. However, the media is more soluble in deionized water than ethanol. The black printing ink used on the Deinard Collectin bookplate is stable in both solvents. Tidelines did not form during any of the tests.

The Deinard Collection bookplate was separated from the marbled paper after being humidified in a Gore-Tex package for 30 minutes. The humidification step swelled the adhesive sufficiently and the bookplate was easily separated from the marbled paper. To remove residual adhesive on the back of the bookplate, it was washed using a capillary method. Blotter was saturated with pH adjusted deionized water (adjusted to a pH of 7.5 with calcium hydroxide) and the bookplate placed on the blotter. After 20 minutes, the bookplate was removed from the blotter and the small amount of residual adhesive was removed by gently wiping the back with cotton dampened with the pH adjusted deionized water. The bookplate was placed back on the saturated blotter for another 20 minute bath. It was then placed between blotters to dry.

In preparation for washing the title page and the last leaf, the media were tested in pH adjusted deionized water (adjusted to a pH of 7.5 with calcium hydroxide), ethanol, and mixtures of the pH adjusted deionized water and ethanol. The testing locations and results of the tests can be found in Appendix I. Most of the media were stable in all the testing solutions. Testing results supported the use of a 4:1 mixture of the pH adjusted deionized water and ethanol for the washing solutions.

The title page and last leaf were sprayed with a 2:1 deionized water: ethanol mixture to help the paper wet out and then washed in a 4:1 mixture of pH adjusted deionized water and ethanol. Both pages were placed on a screen and immersed in the washing solution. The screen was used to minimize the amount of movement of the pages in the bath. During solubility testing, some of the media proved to be friable and minimizing agitation in the baths would help to minimize the risk to the friable media. Following 20 minutes in the bath, the previous repairs and a majority of the adhesive were gently removed with a microspatula. The last leaf was washed for another 10 minutes, after which the more tenuous repair materials that did not readily release from the paper after the initial 20 minute bath were removed. The leaf was washed for another 10 minutes and then given a final rinse for 15 minutes in fresh washing solution. The title page was washed for an additional 10 minutes and then given a final rinse for 15 minutes. The title page was bathed for a total of 45 minutes and the last leaf for a total of 60 minutes. The pages were then put between felts to dry. Once dry, residual adhesive was locally reduced using cotton swabs

dampened with the pH adjusted deionized water and mechanical action.

In preparation for the alkalization step, the media which were soluble in the testing prior to washing were tested for solubility issues with the magnesium bicarbonate solution. Inks that were thought to potentially contain iron were also tested with bathophenanthroline indicator paper (see Appendix I for full testing results). None of the inks that were tested proved to be soluble in the magnesium bicarbonate. The inks that were tested for free iron ions also tested negative.

The title page and the last leaf were bathed in a solution of magnesium bicarbonate to deposit an alkaline reserve in the paper. A stock solution of magnesium bicarbonate was made (5.7g of magnesium bicarbonate in 1L deionized water) which was then diluted with deionized water to a 4:1 mixture. Both pages were sprayed with 2:1 deionized water:ethanol mixture and then immersed in the alkalization solution. After 20 minutes, the pages were removed and placed between felts to partially dry. The pages finished drying between blotters.

The remaining textblock leaves were first washed in a bath of hot tap water (approximately 40°C) for five minutes. The elevated temperature of the water facilitated the reduction of animal glue on the spine folds and made it possible to safely separate the leaves. Repair tissues were removed following this bath. The leaves were then washed in pH adjusted deionized water (adjusted to pH 7.0-7.5 with calcium hydroxide). The leaves were first sprayed with a 1:1 ethanol:deionized water mixture and then immersed in the washing solution for two, 15 minute baths. The leaves were dried between polyweb and felts under light weight.

Following washing, adhesive residue remained on two pages. The residue was treated locally with a protease solution (Sigma Protease p5147, Lot #SLB6732, from *Steptomyces griceus*, dissolved in deionized water adjusted to pH 7 – 7.5 with saturated calcium hydroxide solution, warmed to approximately 37°C). A warm water jacket ensured that the protease solution was kept near the optimum working temperature while the residue was brushed gently with a soft brush. The residue proved to be both adhesive and paper, likely skinned from an adjacent page when the text was rebound. The enzyme was deactivated by spraying the pages with ethanol, bathing them in deionized water adjusted to pH 7 – 7.5 with saturated calcium hydroxide solution.

The textblock, excluding the title page and the last leaf, were alkalized. Bifolia in groups of 5 were immersed in a magnesium bicarbonate solution (0.1M stock solution diluted 1 part to 4 parts deionized water) for 30 minutes, drained briefly, blotted, placed between dry polyester web and felts, lightly weighted, and left to dry overnight. The felts were changed the following day.

The textblock, again excluding the title page and the last leaf, were then sized. A 0.25% solution of Type B gelatin (200 bloom, 40 mesh, supplied by Polistini) in deionized water was used. To preserve the order of the folia, one folio at a time was sized. This was done first by brushing the sizing onto the folio. To do this step as efficiently as possible while maintaining textblock order, it was decided to immerse one folio into the sizing solution at a time. The folia were immersed for a minute or so, drained, blotted, placed between dry polyester web and felts, lightly weighted, and left to dry overnight. The felts were changed the next day.

Following aqueous treatment and consultations with the Hebraic specialist, Dr. Ann Brener, the following structure of the gatherings was determined - 17 gatherings each with 4 folia, 1 gathering with 6, and 1 with 8 (see Appendix II). The structure was determined based on the location of bifolia which were still conjoined.

Using both toned and untoned kozo tissue, the folia were guarded and gatherings reconstructed by joining folia to create bifolia. The guards were adhered with wheat starch paste and to the inside of each bifolia. The decision was made to guard on the inside to allow for flexibility in deciding the sewing and binding structures.

Appendix I: Solubility Testing Results

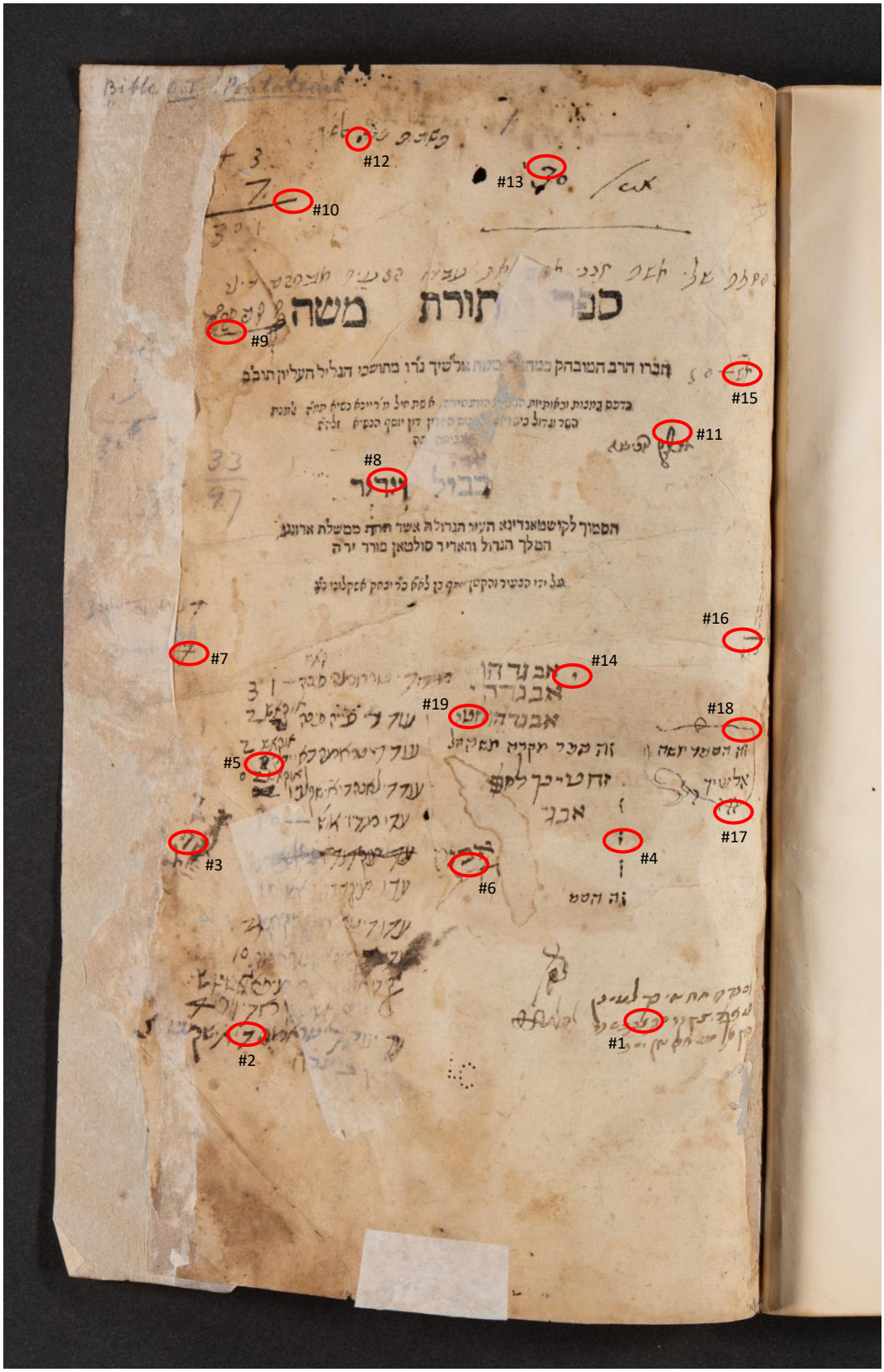
Location	Deionized water adjusted to pH 7.5 with calcium hydroxide	Ethanol	1:1 Ethanol: adjusted DI water	Other ratios of adjusted DI water: Ethanol	Iron (II) test	Magnesium bicarbonate
Results from front side of title page						
1	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble		Negative	Not soluble and no noticeable color change
2	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
3	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
4	Immediately: Soluble 5-10 seconds: Not tested Extended exposure: Not tested	Not soluble	Not soluble	4:1 Very slightly soluble 3:1 Not soluble 2:1 Not soluble		Not soluble
5	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble, but friable			
6	Immediately: Slightly soluble 5-10 seconds: Not tested Extended exposure: Not tested	Not soluble	Not soluble	4:1 Very slightly soluble 3:1 Not soluble 2:1 Not soluble		Not soluble
7	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
8	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
9	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble		Negative	Not soluble and no noticeable color change
10	Immediately: Not soluble 5-10 seconds: Not soluble	Not soluble	Not soluble		Negative	Not soluble and no noticeable color change

Location	Deionized water adjusted to pH 7.5 with calcium hydroxide	Ethanol	1:1 Ethanol: adjusted DI water	Other ratios of adjusted DI water: Ethanol	Iron (II) test	Magnesium bicarbonate
	Extended exposure: Not soluble					
11	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
12	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble, but friable			
13	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
14	Immediately: Not soluble 5-10 seconds: Not soluble, but friable Extended exposure: Not soluble	Not soluble	Not soluble, but friable			
15	Immediately: Not soluble 5-10 seconds: Not soluble, but slightly friable Extended exposure: Not soluble	Not soluble	Not soluble			
16	Immediately: Not soluble 5-10 seconds: Not soluble, but slightly friable Extended exposure: Not soluble	Not soluble	Not soluble			
17	Immediately: Soluble 5-10 seconds: Not tested Extended exposure: Not tested	Not soluble	Not soluble	4:1 Slightly soluble 3:1 Slight soluble 2:1 Not soluble		Not soluble
18	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
19	Immediately: Not soluble 5-10 seconds: Not soluble, but friable Extended exposure: Not soluble	Not soluble	Not soluble			

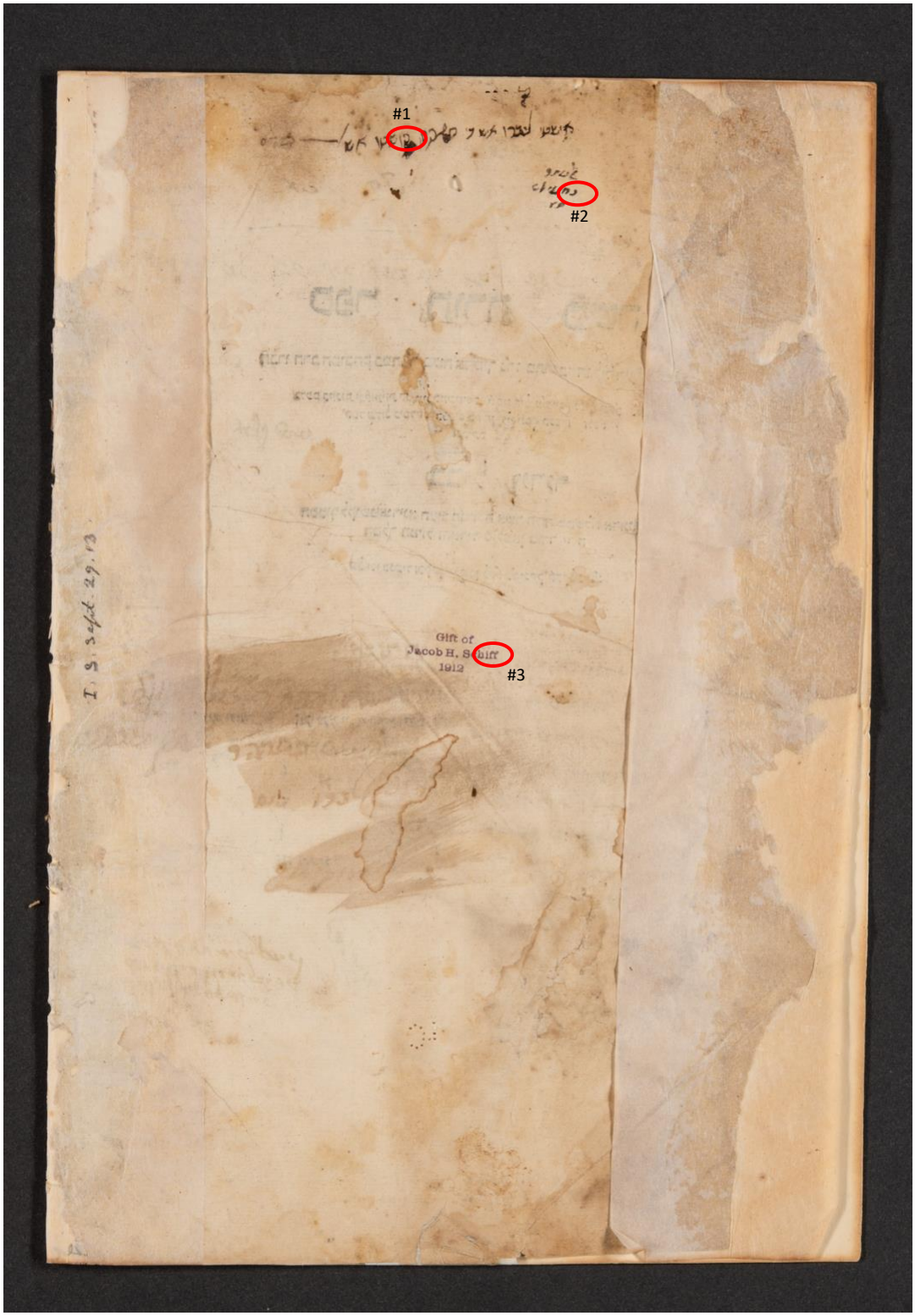
Location	Deionized water adjusted to pH 7.5 with calcium hydroxide	Ethanol	1:1 Ethanol: adjusted DI water	Other ratios of adjusted DI water: Ethanol	Iron (II) test	Magnesium bicarbonate
Results from back of the title page						
1	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
2	Immediately: Soluble 5-10 seconds: Not tested Extended exposure: Not tested	Not soluble	Not soluble	4:1 Not soluble 3:1 Not tested 2:1 Not tested		Not soluble
3	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			Not soluble and no noticeable color change
Results from last leaf						
1	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
2	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
3	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
4	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
5	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
6	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Slightly soluble	Not soluble	Not soluble	4:1 Not soluble 3:1 Not tested 2:1 Not tested		
7	Immediately: Not soluble 5-10 seconds: Not soluble	Not soluble	Not soluble			

Location	Deionized water adjusted to pH 7.5 with calcium hydroxide	Ethanol	1:1 Ethanol: adjusted DI water	Other ratios of adjusted DI water: Ethanol	Iron (II) test	Magnesium bicarbonate
	Extended exposure: Not soluble					
8	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
9	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
10	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
11	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
12	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
13	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
Results from marginalia in textblock						
Pg. 1	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
Pg. 150	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			
Pg. 153	Immediately: Not soluble 5-10 seconds: Not soluble Extended exposure: Not soluble	Not soluble	Not soluble			

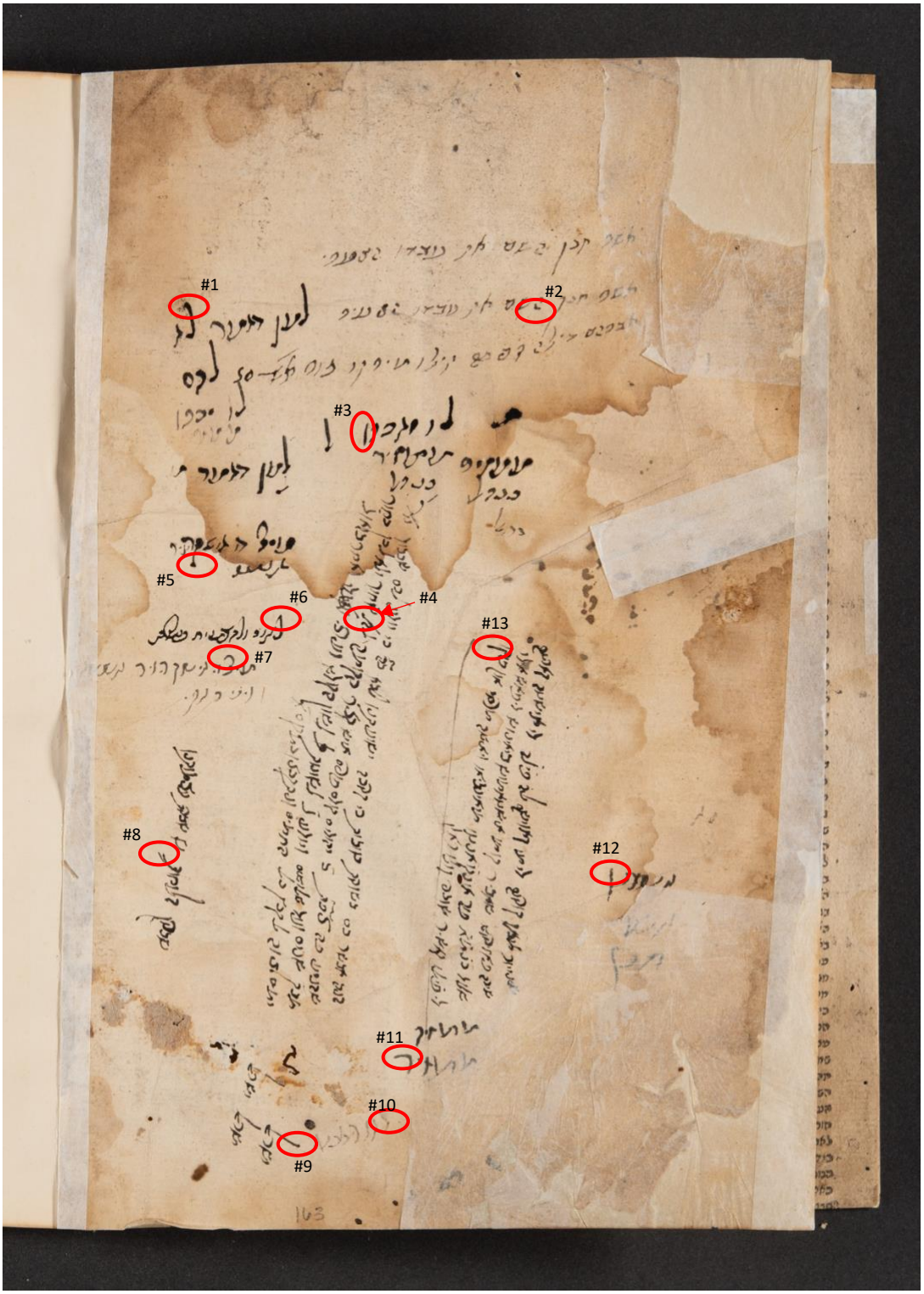
Testing locations on title page (recto)



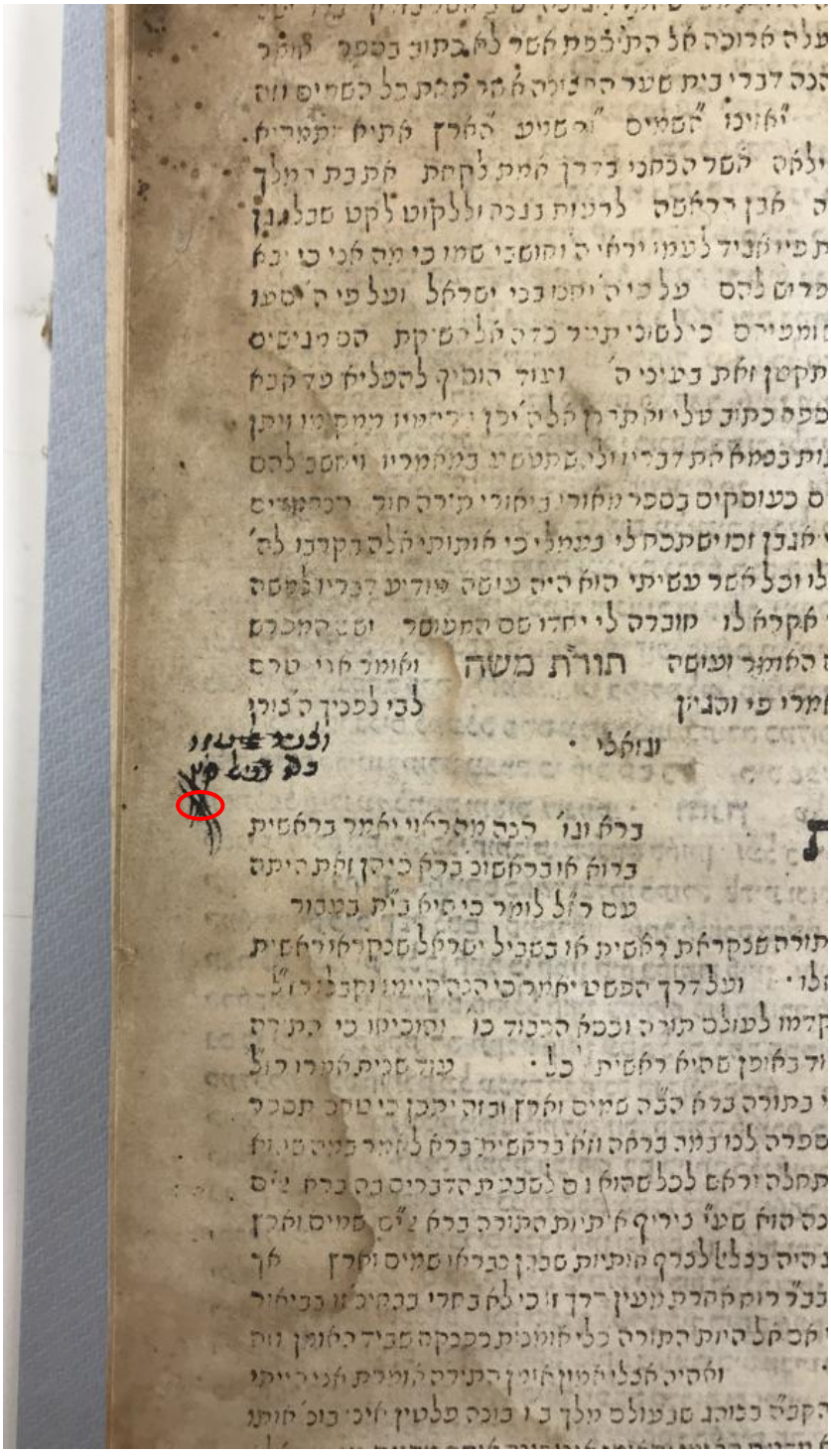
Testing locations on title page (verso)



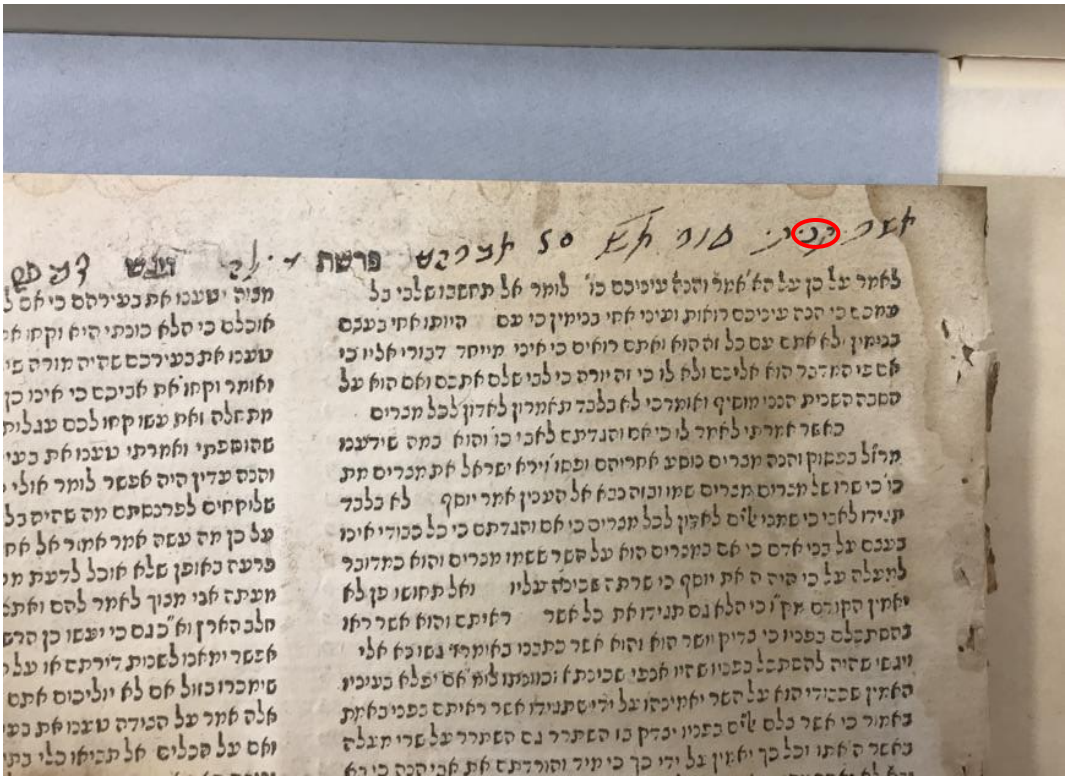
Testing locations on last leaf



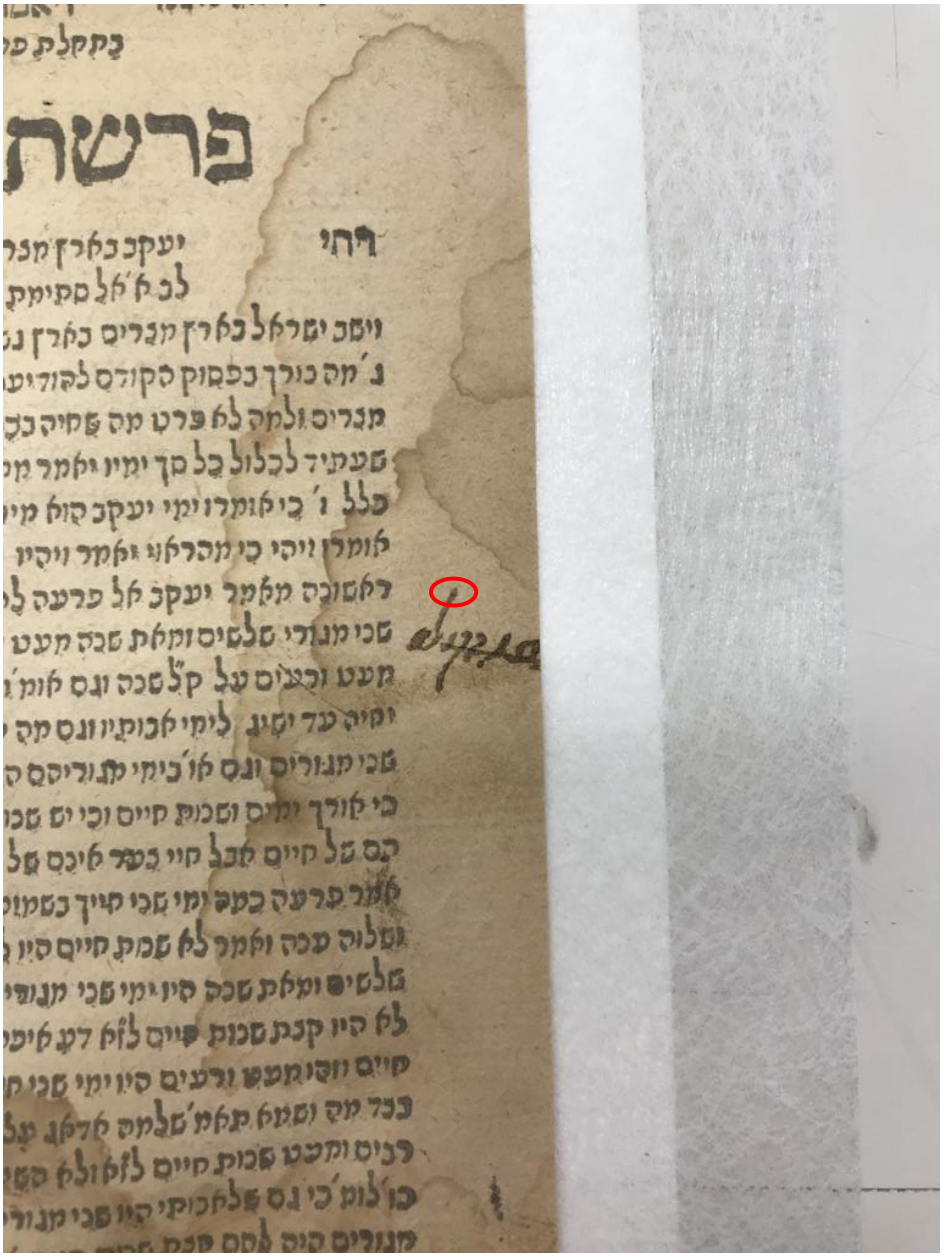
Testing location on Page 1



Testing location on Page 150

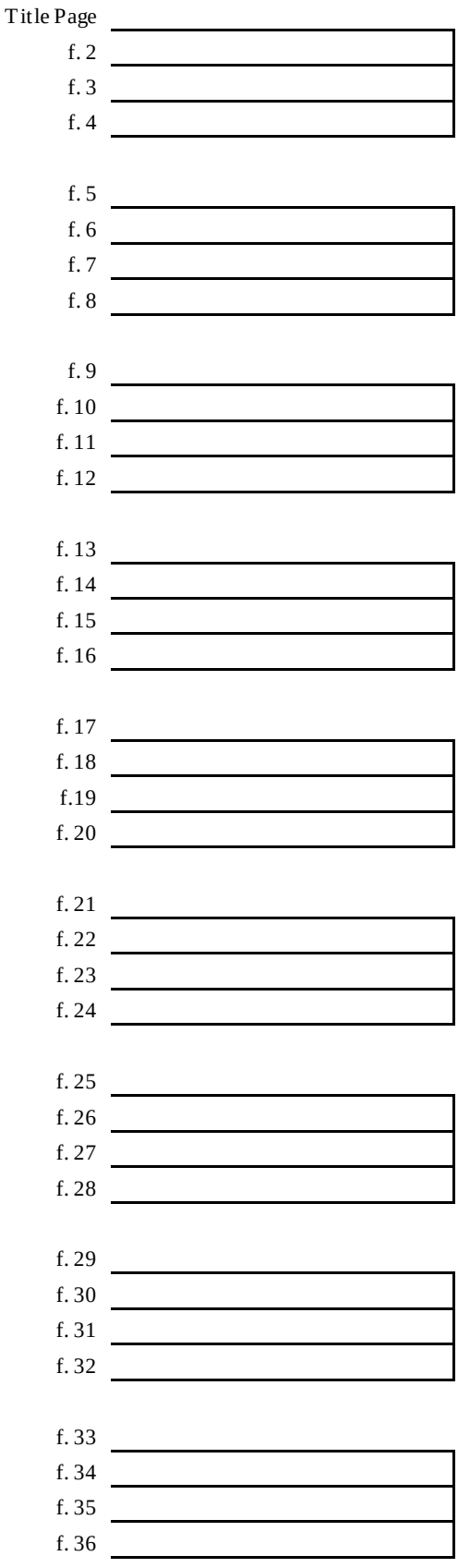


Testing location on Page 153



Master Control No: 4803

Appendix II: Gathering Diagram



Master Control No: 4803

f. 37
f. 38
f. 39
f. 40

f. 41
f. 42
f. 43
f. 44

f. 45
f. 46
f. 47
f. 48

f. 49
f. 50
f. 51
f. 52

f. 53
f. 54
f. 55
f. 56

f. 57
f. 58
f. 59
f. 60

f. 61
f. 62
f. 63 (singleton)
f. 64
f. 65
f. 66
f. 67
f. 68

f. 69
f. 70
f. 71
f. 72

Master Control No: 4803

f. 73
f. 74
f. 75
f. 76

f. 77
f. 78
f. 79
f. 80
f. 81
Counting of verses