

**BOOK CONSERVATION AND TREATMENT RECORD**  
**Library of Congress – Conservation Division**

|                               |  |                                   |                          |
|-------------------------------|--|-----------------------------------|--------------------------|
| <b>Master Control Number:</b> | <u>3981</u>  | <b>Project Number &amp; Name:</b> | <u>3981 1508 Ptolemy</u> |
| <b>Division:</b>              | <u>Geography and Map</u>   | <b>Date In:</b>                   | <u>1/5/2017</u>          |
| <b>Division Contact:</b>      | <u>Ed Redmond</u>  | <b>Date Out:</b>                  | <u>mm/dd/yy</u>          |
| <b>Conservator(s):</b>        | <u>Katherine Kelly, Heather Wanser</u>   | <b>Examination Date:</b>          | <u>1/25/2017</u>         |
| <b>I.D./Call number:</b>      | <u>G1005 1508; <a href="https://lccn.loc.gov/50001441">https://lccn.loc.gov/50001441</a>; Phillips 357</u>   |                                   |                          |
| <b>Title:</b>                 | <u>In hoc opere haec continentur Geographiae Cl. Ptolemaei ...</u>   |                                   |                          |
| <b>Author:</b>                | <u>Ptolemy, active 2nd century.</u>  |                                   |                          |
| <b>Imprint:</b>               | <u>Rome : Impressum per Bernardinu[m] Venetu[m] de Vitalibus : Expe[n]sis Eua[n]gelista Tosino Brixiano Bibliopola, anno Virginei partus 1508.</u> |                                   |                          |
| <b>Alternative Format:</b>    | <u>2 other copies of this edition at LC, 1 copy of the previous edition, also with the Ruysch map</u>  |                                   |                          |
| <b>Existing Container:</b>    | <u>Cloth covered clamshll box</u>  |                                   |                          |

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

The G&M curator, Ed Redmond stated that this is a low-use, but extremely valuable item and very important to the collection.

This volume is a 1508 edition of Ptolemy's *Geographia*, printed in Rome. The volume contains text and 34 maps: 27 of which were reprinted from earlier Ptolemy editions, 6 new maps of Europe and the Middle East, and 1 new world map.

The significance of this book largely rests on the Ruysch Map of the World (map #2 in this volume) which bears the title: *Vniversalior Cogniti Orbis Tabula Ex Recentibus Confecta Observationibus*. As Swan notes in his 1951 article on the map, "It is important because for nearly 400 years it was held to be the earliest published map displaying the western discoveries". Its primacy has since been superseded by the Waldseemuller Map and the Contarini-Roselli Map, but the Ruysch Map is still the topic of numerous scholarly publications. A selection of these is given below.

The title page leaf includes Library of Congress ownership marks: graphite pencil annotations, black ink stamps and "LC" perforation.

The following exhibition numbers are written in pencil on the back pages of the volume. No exhibit or treatment records were found to correspond to these numbers.

- 2.99.237.20.1
- 2.97.237.20.1
- 2.00.237.20.1 T12
- 2.93-215.58

There are three errors in the OPAC record for this volume: the maps are copperplate, not woodcuts, not all the maps are mounted, and most importantly, the Ruysch map is in McGuirk's 2-B state, and not in the first state by any of the various systems discussed below.

Sabin, Joseph. 1886. *Biblioteca Americana: A Dictionary of Books Relating to America, from Its Discovery to the Present Time*. Vol. 16. 50-51. <https://books.google.com/books?id=H7HfAAAAAAAJ>

Our 1508 edition is Sabin 66476; Sabin 66475 is the 1507 edition. The description was written by Wilberforce Eames who at this point distinguishes two states of the map. The G&M copy of the map does not have the inscription "Plisacvs Sinvs" that is used to distinguish the 2 states.

Library of Congress. Map Division. 1909. *A List of Geographical Atlases in the Library of Congress: With Bibliographical Notes*. Washington: Govt. Print. Off. <https://babel.hathitrust.org/cgi/pt?id=uc2.ark:/13960/t7gq7686x;view=1up;seq=133>

The G&M copy is listed as Phillips 357.

Swan, Bradford F. 1951. "The Ruysch Map of the World (1507-1508)". *The Papers of the Bibliographical Society of America*. 45(3). 219-236. <http://www.jstor.org/stable/24298738>.

Discusses the significance of the map, with particular reference to this copy and the other copies at LC. Swan explains that, after the Sabin catalog above, Eames changed his assessment to distinguish 3 states of the Ruysch map. Swan expands this to distinguish 5 states of the map and refers to the G&M copy ("Copy A") as being in the 3<sup>rd</sup> state. Swan also discusses the conjugate nature of the leaves in the Rosenwald copy.

Library of Congress. 1977. *The Lessing J. Rosenwald collection : a catalog of the gifts of Lessing J. Rosenwald to the Library of Congress, 1943 to 1975*. Washington : Library of Congress : [for sale by the Supt. of Docs., U.S. Govt. Print. Off.,]. [http://lcweb2.loc.gov/cgi-bin/ampage?collId=rbc3&fileName=rbc0001\\_2007rosecatpage.db&recNum=164](http://lcweb2.loc.gov/cgi-bin/ampage?collId=rbc3&fileName=rbc0001_2007rosecatpage.db&recNum=164)

Incorrectly describes G&M volume as having the Ruysch map in the first state. This is not supported by any of the other resources listed here. Correctly describes the collation of the G&M volume, including the 3 missing leaves. This catalog appears to be the source for the incorrect description in the OPAC. The entry is Rosenwald #760.

McGuirk, Donald L. Jr. 1989. "Ruysch World Map: Census and Commentary" *Imago Mundi* 41. 133-141. <http://www.jstor.org/stable/1151139>.

Discusses the significance of the map and gives the most complete description its various states up to this point. The four LC copies are listed in the census with information about watermarks and plate states. The G&M copy is accurately describes as having the 2-B state of the Ruysch map with no watermark.

McIntosh, Gregory C. 2015. *The Johannes Ruysch and Martin Waldseemüller World Maps: The Interplay and Merging of Early Sixteenth Century New World Cartographies*. Second Edition.

This examination of the Ruysch map uses McGuirk's classification of the states of the plate and goes into more depth about its significance. The LC copies are not mentioned.

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#### DESCRIPTION AND CONDITION:

|                              |                |             |           |               |             |           |                   |            |           |
|------------------------------|----------------|-------------|-----------|---------------|-------------|-----------|-------------------|------------|-----------|
| <b>Cover Dimensions:</b>     | <b>Height:</b> | <u>42.6</u> | <b>cm</b> | <b>Width:</b> | <u>30.0</u> | <b>cm</b> | <b>Thickness:</b> | <u>5.5</u> | <b>cm</b> |
| <b>Textblock Dimensions:</b> | <b>Height:</b> | <u>41.5</u> | <b>cm</b> | <b>Width:</b> | <u>28.5</u> | <b>cm</b> | <b>Thickness:</b> | <u>4.2</u> | <b>cm</b> |

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

[284] p., [68] leaves of plates : ill., maps; 45 cm. (fol.)

2<sup>o</sup>: A-C<sup>8</sup> D-E<sup>6</sup> F-O<sup>8</sup> a<sup>6</sup> b<sup>8</sup>, 34 maps on double leaves, Aa-Bb<sup>8</sup> Cc<sup>4</sup> (G1 'H')

Missing: O8, a1 (stub evident), Cc4

G1, labeled 'H' begins with "Cap: II / Tabula prima europae."

H1, correctly labeled 'H' begin with "Ebodrum."

Leaves numbered in Conservation in 2018. Leaves 108, 109, and 142 are the missing ones.

**General Description:**

The volume is comprised of printed text and maps in an early 20<sup>th</sup> century binding, with graphite and iron gall ink annotations. The volume has been rebound multiple times.

**Binding:**

The volume is currently bound in a GPO-style binding with half red goatskin leather and red cloth sides, marbled paper end sheets, and leather hinges. There is a binder's ticket inside the back cover (Library of Congress, Branch Bindery, 1903). There are stuck-on red and white end bands.

**Text:**

The text is printed in black ink on hand-made, laid paper. There are iron gall ink annotations throughout and a few graphite pencil annotations. Watermarks on the text paper include possible peacock and bird watermarks (e.g. A5, H2). The text block is not square: text block and boards are significantly taller at the fore edge than the spine

**Maps:**

The maps are printed in black ink from copperplate with iron gall ink annotations. Some, but not all of the maps are numbered in graphite pencil. Each bifolio map appears to be formed from two separate leaves. Some are silked and cloth-lined, others cloth-lined, and most unlined. The linings appear to extend across the center fold, but this is not always clear. A woven pattern on some of the maps (e.g., Map 32) may be a remnant of the paper-making process. (This pattern is also found in both RBSC copies.) All the maps have a narrow cloth hinge at the center fold. Some maps have folded-in fore edges. (The maps are described in more detail in Heather Wanser's attached condition and treatment report).

**Map Attachment:**

Each map is tipped to a guard on the right side (maps 1-14, 16-34) or the left side (map 15) of the bifolio. In each case, the point of adhesion is between the cloth reinforcement hinge on the map's center fold and the cloth side of the cloth-reinforced paper guard. The guards place the center of the maps out from the gutter by approximately 20mm. This roughly corresponds to a ½" compensation stub, and 1" attachment stub with ¼" adhered overlap of map and attachment stub.

The map section has both compensation guards and map attachment guards. The compensation guards consist of two nested machine-made paper guards with no attachments. The stubs are cut flush and extend out approximately 19mm. The map attachment guards are formed of four paper-cloth laminate stubs, approximately 30mm wide, whip stitched together with thin thread. This overcasting forms the gathering which is then sewn along with the rest of the book.

**Binding Structure of Map Section:**

The binding structure of the map section is described below. The maps and their condition is described in Heather Wanser's attached condition and treatment report.

2 nested, sewn-in compensation guards (4 stubs)

Map 1: No title, Europe/Asia/North Africa

Map 2: VNIVERSALIOR COGNITI ORBIS TABVLA (Ruysch Map of the World)

Sewing through map attachment guards

Map 3: TABVLA MODERNA PRUSSIE...

Map 4: PRIMA EVROPE TABVULA

2 nested, sewn-in compensation guards (4 stubs)

Map 5: SECVNDA EVROPE TABVULA

Map 6: TABVLA MODERNA .... [Iberian Peninsula, title trimmed off]

Sewing through map attachment guards

Map 7: TERTIA EVROPE TABVLA

Map 8: TABVLA MODERNA FRANCIE

2 nested, sewn-in compensation guards (4 stubs)

Map 9: QVARTA EVROPE TABVLA

Map 10: TABVLA MODERNA POLONIE...

Sewing through map attachment guards

Map 11: QUINTA EVROPE TABVLA

Map 12: SEXTA EVROPE TABVULA

2 nested, sewn-in compensation guards (4 stubs)

Map 13: TABVLA NOVA... [title cut off, Italian Peninsula]

Map 14: SEPTIMA EVROPE TABVLA

Sewing through map attachment guards

Map 15: OCTAVA EVROPE TABVLA

Map 16: NONA EVROPE TABVLA

2 nested, sewn-in compensation guards (4 stubs)

Map 17: DECIMA ET VLTIMA EVROPE TABVLA

Map 18: PRIMA AFRICAE TABVLA

Sewing through map attachment guards

Map 19: SECVNDA AFRICAE TABVLA

Map 20: TERTIA AFRICAE TABVLA

2 nested, sewn-in compensation guards (4 stubs)

Map 21: QVARTA AFRICAE TABVLA

Map 22: PRIMA ASIAE TABVLA

Sewing through map attachment guards

Map 23: SECVNDA ASIAE TABVLA

Map 24: TERTIA ASIAE TABVLA

2 nested, sewn-in compensation guards (4 stubs)

Map 25: QVARTA ASIAE TABVLA

Map 26: TABVLA MODERNA TERRE SANCTE

Sewing through map attachment guards

Map 27: QVINTA ASIAE TABVLA

Map 28: SEXTA ASIAE TABVLA

2 nested, sewn-in compensation guards (4 stubs)

2 nested, sewn-in compensation guards (4 stubs)

Map 29: SEPTIMA ASIAE TABVLA

Sewing through map attachment guards

Map 30: OCTAVA ASIAE TABVLA

Map 31: NONA ASIAE TABVLA

4 compensation guard with sewing in the middle

Map 32: DECIMA ASIAE TABVLA

Sewing through map attachment guards

Map 33: VNDECIMA ASIAE TABVLA

Map 34: DVODECIMA ET VLTIMA ASIAE TABVLA

4 compensation guard with sewing in the middle

**Sewing:**

Gatherings are sewn all-along on 7 recessed sewing stations (5 linen cord supports and 2 kettles). The sewing continues into the map section and includes the center-folded compensation guards and overcast map attachment guards.

Once the paper and mesh cloth spine linings were removed, it was revealed that there are overlapping cord sewing supports. In the front, the support starts out as a double thickness. After gathering F, one of the cords is fanned out against the spine and the other continues. After the map section, the remainder is fanned out against the spine and a new support begins. This may have been the result of the book sections being reordered after a first attempt at sewing, but the sewing appears to be continuous, so this is not clear.

**Evidence from an earlier binding with guarded maps:**

Evidence is visible of now-discarded head and tail, green, red, and yellow, sewn-on end bands (at head of C5 page opening and through the first guard, H5 page opening). Because this thread passes through the machine-made paper guards and over the main sewing thread, the 1903 rebinding may have left an earlier sewing structure in place. The earlier sewing structure would have included the existing sewing, the existing machine-made guards, and now-missing sewn-on end bands.

**Evidence from an earlier binding with the maps as nested bifolios:**

Swan's 1951 article suggests that the Rosenwald copy is in its original binding and that the maps here called 2 and 3 are nested conjugates in that copy. This in turn suggests that all the copies were originally produced with four nested bifolios that were sewn through the fold to produce four 2-leaf maps in sequence. Although the maps in this copy are no longer conjugate, the pattern of watermarks strongly supports the four nested bifolios as being the original pattern. The last two maps would have been two nested bifolios that were sewn through the fold to produce two 2-leaf maps in sequence

The position of worm holes (e.g., Map 34) indicates that the maps were at one point bound with center fold near or at the gutter.

The edges of the text block are a faded green color. This coloring is present on the now-protected folded-in fore edges of the maps, indicating that the edge decoration dates from a binding where the maps had only the center fold. Similarly, offset from some of the maps indicates that at one point, they were bound without the folded in fore edges.

**Previous Repairs:**

There are tissue paper mends that may date to the 1903 rebinding. Repair since the 1903 rebinding consists of minor paper

mends with kozo paper and possibly heat set tissue to front and back end papers, a colored kozo tissue bridge mend under the front joint, and a toned cloth reinforcement to the front hinge, stitched through the shoulder and folded back. The sewing was also reinforced by stitching through one of the first gatherings. The leather corners and caps were consolidated with shellac or glue. These repairs lead to the failure of the back hinge and partial failure of the front joint.

#### **Other Volumes:**

Katherine Kelly and Heather Wanser examined the two other copies of this edition and the one copy of the 1507 edition.

**1507 edition, G&M:** Binding is not original but probably from before 1800. Maps show evidence of wear, followed by lining with paper, and then sewing into the current stiff board vellum binding. The arrangement of the maps differs from the G&M copy and the sewing pattern is quite irregular. 6 leaves from 4 maps have been cut out. An email detailing the missing maps was submitted to the curator on April 4, 2017.

**1508 edition, RBSC Thatcher collection (#A841):** Resewed all-along on recessed cords, ~19<sup>th</sup> century covers. Maps are in the same sequence as the G&M copy, but are placed at the end of the volume. Maps are un-lined, and appear to be in their original arrangement, sewn through the fold with 4 nested bifolios, though the sewing pattern is not obvious at the end of the volume. On most of the maps there is a 5-8 mm gap between the printing on the two map halves. Woven texture is visible on map paper. None of the edges are folded in, though some maps are trimmed into the text area (e.g. 22a, 13a, 13b).

**1508 edition, RBSC Rosenwald collection (#760):** Contemporary vellum binding over wooden boards, possibly with endpapers replaced. Sewing and map arrangement appear to be original: Large, raised, double cord supports laced on heavy wooden boards. Baggy back and broken endbands. The map order is the same as the G&M copy, but they are sewn through the fold with 4 nested bifolios. The sewing pattern of the final 6 maps in the Rosenwald copy differs from the G&M copy, but the watermarks in the G&M copy support the Rosenwald order as the original order of the G&M copy. The Rosenwald copy has maps 29-32 conjugate and sewn as 4 nested bifolios. Map 33 and 34 are conjugate and sewn as two nested bifolios. On most of the maps there is a 5-8 mm gap between the printing on the two map halves. Woven texture is visible on map paper. A few of the maps have folded in fore edges (3b, 13a, and 13b).

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#### **General Condition:**

In the text block, the title page and first few leaves are the most damaged, with water stains, tears, patch mends, and evidence of previous mold damage. The rest of the text block has occasional iron gall ink bleed through and drop out (e.g. *l.* 31, 42, 57, 118, 120), a red smear/stain on leaf 53, an accretion over text (*l.*30), water staining, and minor tears. There is a large patch repair on leaf 93.

The maps and their condition is described in Heather Wanser's attached condition and treatment report.

As noted above, the binding has failed, been repaired, and then failed again. The front leather joint is partially broken and the back hinge is entirely broken, leaving the case partially detached. The sewing has also broken before the map section, leaving a pronounced opening.

**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

**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:

PTOLEMÆI / GEOGRAPHIÆ

**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):**

**ENDBANDS**

| Spine Lining:                                  | Endbands:  | Core:   | Decorative elements:                  | Diagram(s): |
|--|--|---|---------------------------------------|-------------|
| <input type="checkbox"/> none                  | <input type="checkbox"/> none                        | <input type="checkbox"/> single core            | <input type="checkbox"/> linen thread |             |
| <input type="checkbox"/> parchment patches     | <input checked="" type="checkbox"/> both present     | <input type="checkbox"/> double core            | <input type="checkbox"/> silk thread  |             |
| <input checked="" type="checkbox"/> paper      | <input type="checkbox"/> one present                 | <input checked="" type="checkbox"/> sewn        | <input type="checkbox"/> tawed        |             |
| <input type="checkbox"/> textile               | <input type="checkbox"/> head                        | <input checked="" type="checkbox"/> tie downs:# | <input type="checkbox"/> leather      |             |
| <input type="checkbox"/> leather               | <input type="checkbox"/> tail                        | <input checked="" type="checkbox"/> stuck-on    | <input type="checkbox"/> textile      |             |
| <input checked="" type="checkbox"/> cannot see | <input checked="" type="checkbox"/> evidence present | <input type="checkbox"/> flat/round             |                                       |             |
|  | <input type="checkbox"/> cut off                     | <input type="checkbox"/> tawed                  |                                       |             |
|  |  | <input type="checkbox"/> tanned                 |                                       |             |
|  |  | <input type="checkbox"/> cord                   |                                       |             |
|  |  | <input type="checkbox"/> parchment              | colors: _____                         |             |
|  |  | <input type="checkbox"/> paper                  | endband style: _____                  |             |

**SEWING**

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

**TEXTBLOCK**

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



**ENDSHEETS**

| <b>Endleaves:</b>                          | <b>Construction:</b>                          | <b>Board sheet:</b>                         | <b>Joint material:</b>                      | <b>Diagram(s):</b> |
|--|---|---|---|--------------------|
| <input type="checkbox"/> none              | <input type="checkbox"/> hooked               | <input checked="" type="checkbox"/> adhered | <input type="checkbox"/> paper              |                    |
| <input type="checkbox"/> same as textblock | <input type="checkbox"/> whipstitched         | <input type="checkbox"/> not adhered        | <input checked="" type="checkbox"/> leather |                    |
| <input checked="" type="checkbox"/> paper  | <input type="checkbox"/> sewn gathering       | <input type="checkbox"/> integral endleaf   | <input type="checkbox"/> cloth              |                    |
|  | <input checked="" type="checkbox"/> tipped on | <input type="checkbox"/> single folio       | <input type="checkbox"/> other              |                    |
|  |   | <input type="checkbox"/> other              |   |                    |

**TREATMENT PROPOSAL:**

On February 15, 2017, the conservator met with the curator, Ed Redmond to present several treatment options, ranging from stabilization of the existing binding to a more extensive disbind and repair option. He selected the extensive treatment option:

Extensive treatment (joint project between book and paper conservator, multi-year: Examination and testing in FY 2017)

- Disbind.
- Dry clean as necessary.
- Wash text block and maps, with phytate treatment as necessary.
- Remove silk and cloth lining from maps and reline and resize as necessary.
- Mend.
- Resew and rebind in new binding structure. Consider binding options that recreate original nested bifolios with conjugate leaves.

The treatment of the maps was assigned to paper conservator Heather Wanser, who completed the map treatment in FY18 and returned them to Katherine Kelly, who completed treatment of the text block and rebinding in FY19.

**Photography:**

☒ BT    ☒ AT    ☐ pH

**Testing:**

**Testing Results:**

Tested media with water, ethanol, and water-ethanol mixtures. IGI in text block offset in 100% water and was stable in 100% ethanol. Results varied across the text block, but a light brown soluble offset was generally visible after 5 seconds of contact in mixtures of as low as 50:50 water:ethanol. Printing ink was stable in 100% water, but gave a strong, black, particulate offset in 100% ethanol. This offset was visible after 5 seconds of contact in mixtures of up to 50:50 water:ethanol. This result was consistent across the text block and is suspected to be the result of the binder in the printing ink being soluble in ethanol and water:ethanol mixtures. As the IGI offset significantly with water-based mixtures, and since the exact nature of the solubility of the printer's ink was a mystery, the conservator decided that it was too risky to wash the entire text block, as it might result in an unstable, friable printing ink.

Testing on title page and first gathering: No particulate offset of printing ink under moderate abrasion. Water caused no offset in printing ink, but did cause significant movement in yellowness of paper. Ethanol caused particulate offset from printing ink. Water caused no noticeable offset in IGI inscription (bottom of H in "Orthonett"). Water caused particulate offset and yellow stain offset from severely degraded inscription on p.4, but no noticeable lightening of the inscription. Fe2 test negative on leaf 4 inscription and ink blot. As this was the most stained and damaged gathering, and because the limited amount of iron gall ink was mostly stable in water, the conservator decided to wash this gathering, but not the rest of the text block.

Examined first gathering under UV light. Nothing very notable – general yellow glow (degraded size), offset halo from IGI on facing page, strong wet-dry boundary around stains at page edges.

☐ slides                      ☒ media  
☒ digital                      ☐ phloroglucinol  
☐ transmitted              ☐ ninhydrin  
☐ raking                      ☐ potassium iodide

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

The treatment of the maps is described in Heather Wanser's attached condition and treatment report. Also attached is the report Ms. Wanser requested from Preservation Research and Testing on the material washed out of the maps during treatment.

As noted above, the maps came to conservation as bifolios attached to guards. To allow the maps to be sewn through the fold, Ms. Wanser separated the bifolios and joined each leaf to its original conjugate with a 1/4" blank gutter margin inserted.

☐ fixing/consolidation  
☒ drycleaning  
☒ removal of attachments

Dry cleaned all text pages with Staetler Mars eraser crumbs, avoiding printed and annotated areas. Accretion partially removed mechanically from leaf 30.  
 Spine cleaned mechanically and with multiple poultices of WSP. Gatherings disbound.

|  |   |
|--|---|
|  | GPO binding, sewing, and guards retained and returned to custodial division. Tipped on stub and endpaper remnant removed from last page with poultice of methyl cellulose (4% A4M, Bookmakers)  |
| <input checked="" type="checkbox"/> washing      | First gathering only: Humidified and then washed in 3 slightly calcified 20 minute water baths. Adhesive, accretions, and old mends removed in the bath.  |
| <input type="checkbox"/> bleaching/stain removal |   |
| <input checked="" type="checkbox"/> alkalize     | First gathering only: 20 minute bath of magnesium bicarbonate, saturated solution diluted 1:4. Allowed to air-dry almost to completion, followed by sizing.   |
| <input checked="" type="checkbox"/> size         | First gathering only: Pages were sized in 0.75% gelatin (Polistini, 200 Bloom, Type B, 40 mesh) in a warm (40-50°C) bath. Gelatin was prepared by mixing 15g gelatin in 2000 mL of cool water, letting sit refrigerated for 1 hour+, followed by mixing and heating until 50° C. Used immediately at 40-50°C and discarded. |
| <input checked="" type="checkbox"/> mend         | Text block mended and guarded with wheat starch paste (WSP) and untuned kozo tissue (RK-0, HM-01, and HP-04 usui usimino). Areas of IGI dropout were mended with ethanol-applied 5% Klucel G precoated RK01 tissue.   |
| <input checked="" type="checkbox"/> guard        | Loose guards of kozo paper and WSP, (Hiromi, HM-35) around the first and last gathering.  |
| <input type="checkbox"/> line                    |   |
| <input type="checkbox"/> leaf cast               |   |
| <input type="checkbox"/> flattening              |   |

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**Binding:**

|   |  |
|---|--|
| <input checked="" type="checkbox"/> endpaper construction                 | New endpapers constructed from MacGregor Cobscook Laid handmade paper, 2014, ~80 gsm. Single folio tipped to double folio, wrapped with an aerocotton hinge.   |
| <input checked="" type="checkbox"/> sewing                                | Sewn all-along unsupported single hole link stitch with 25/3 linen tread. Sewing used the 7 existing sewing stations in the text block and new matching holes in the map center fold margin. Sewing was designed to open very well, allowing maps to be viewed fully.  |
| <input checked="" type="checkbox"/> textblock consolidation/spine shaping | Text block lined with a barrier layer of kozo paper and WSP. Rounded and gently backed.  |
| <input checked="" type="checkbox"/> endbands                              | New sewn-on endbands. Core: Triangular profile, alum tawed leather laminated to vellum, wrapped in kozo paper (HM-35). Primary sewing: back bead, 25/3 linen thread, tied down through the center of each gathering. Secondary sewing: front bead, green and off-white silk thread (#31 and #159). Endbands were made large to counter the trapezoid page shape. |
| <input checked="" type="checkbox"/> spine linings and adhesives           | Overhanging, bias-cut, aerocotton spine lining adhered with PVAc. 1-on, 2-off hollow tube made on the book of handmade western paper (Cobscook Laid ~90 gsm) adhered with PVAc.  |
| <input checked="" type="checkbox"/> board attachment and shaping          | Boards are "split board" style, as described in Verheyen 2004, "Vellum Over Hard Boards" article. 0.90" blue/green binders board laminated to 40 pnt board with PVAc. Tipped at spine edge with PVAc to 20 pnt board. Wrapped with machine made western paper ~90 gsm (Andrews/Nelson/Whitehead).  |
| <input checked="" type="checkbox"/> covering                              | Covered with goatskin parchment (~0.010" thick) as a case binding. 10 pnt cardstock spine stiffener and 80# paper bonnet. Boards filled in with Cobscook wove handmade paper and PVAc.   |
| <input checked="" type="checkbox"/> finishing                             | Labels stamped in gold on green goatskin leather with 12 pnt Centaur Type (16 pnt. for date). Adhered to spine with PVAc.  |

**Master Control No: 3981**

☒ Housing

Existing housing reused, with added padding and a pressure flap to control for swell of the vellum.

The conservator constructed a model of this text block with the new map configuration and a stiff-board parchment binding. This model will be retained in the Conservation Division.

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**Titling information:**

Enclosure:

Object: PTOLEMAEUS / GEOGRAPHIAE / A PLURIMIS /  
UIRIS / ROME 1508 (Per email communication with  
curator 3/12/2019, title is same as on existing clamshell  
box).

## CONDITION AND TREATMENT RECORD

Library of Congress - Conservation Division

Master Control Number: 3981

Title: In hoc opera haec continentur Geographiae...

Object: Atlas

Date/Period: 1508

Division: G&M

Catalog Number: G1005 1508, Phillips 357

Date Received in CD: 2017

Conservator: Heather Wanser and Katherine Kelly

Date Completed: Sept. 2018

### PHOTOGRAPHIC RECORD

Idoc images on the "N" drive under project ID 3981

### General description:

The treatment of this atlas is a joint project with Katherine Kelly, Senior Book Conservator, who will submit her own report on her study of the book structure and compare it to two other identical atlases in the Rare Book Division. She will also treat the text block and be responsible for rebinding the atlas.

This report documents the treatment of the 34 engraved maps in the atlas. They are printed in black ink and only a few of the maps have iron gall ink annotations. Some of the maps are numbered in graphite.

After studying the two other original copies of the 1508 Ptolemy Atlas in the Rare Book Division Katherine discovered that the 20<sup>th</sup> century treatment of this copy had radically altered the original configuration of the maps. Originally, the maps were not printed as a whole map on the same sheet of paper as one would expect, but the left and right halves printed separately and sewn into the binding in a manner that united it with its geographic partner. In contrast, the maps in this atlas had been removed, cut in half, a ¼ inch strip of paper was cut away, and the two geographic halves were adhered together with strips of Western paper and cloth. The goal of this treatment is to restore the maps to the way they were originally printed and bound.

Katherine generated a conjugate page listed (filed as a PDF) that will be a guide for reassembling the maps in their original configuration.

The maps are printed on Fabriano paper that have a cross bow watermark. Generally, the maps are in relatively decent condition considering their age with the exception of maps # 1 & 2 that have numerous tears, skinning (revealed in transmitted light) and small losses. Some maps have fore edges that are folded-in causing weakness along the fold line.

Another unusual observation is that the most of the maps are more discolored on the recto (yellowed) than the verso. One theory is that the maps were brushed with a sizing agent of some kind (gelatin?) possibly to prepare them for hand coloring. Analysis of the yellow agent is pending.

There is a great deal of ink offset and smeared ink that seems to have happened sometime after the maps were printed. This suggests that the binder of the ink has failed. The stability of the ink was tested by lightly brushing inked areas with a tiny soft brush, and the brush picked up enough black particles that were transferred to a blotter indicating that the ink is friable.

Four of the maps have a heavy white fabric lining (maps 1; 2; 3; &4), and three of these maps (maps 1; 3; &4) have a layer of silk chiffon on the recto. This extra treatment was to address the paper's fragile condition.

Surface pH readings were taken on a sampling of maps (recto/verso) with Merck no-bleed ColorpHast pH indicator strips and the readings were consistently pH 5.3-5.5. There was only a small elevation of pH after washing so placing an alkaline reserve in the paper is likely.

There is a series of worm holes in maps 21-34. There is one wormhole in map 21 that increases to ten worm holes in map 34. The wormholes are not registered with each page implying that the damage occurred before the atlas was rebound in the early 20<sup>th</sup> century.

### **Condition notes of each map:**

**Map 1:** No title, Europe/Asia/North Africa

Watermarks: there is a crossbow watermark on both halves.

This map is lined with white fabric and there is a silk gauze on the recto. Both the left and right edges are folded in. There are iron gall ink inscriptions (faded) along the right edge recto. There are two tears long the lower edge and tear along center left edge, verso that is evident under the silking. Skinning of the paper is noted along lower right tear, recto.

**Map 2:** VNIVERSALIOR COGNITI ORBIS TABVLA (Ruysch Map of the World) 1507

Watermark: no watermark in either side.

Written in pencil on the verso: '9301 Map Div., Lib. Of Cong.'

This map is lined with white fabric. Transmitted light reveals a wide paper patch in the center area plus an additional paper strip along the bottom edge of the left side recto.

It has a centerfold that is to the left (recto) of the original fold line (once centered between the two halves) thus creating the need for a wide fold-down along the right edge. There is evidence of earlier folding patterns where both the left and right sides had folded-in fore edges.

There is an iron gall ink notation in the margin along the right edge recto; there is skinning of engraved image in the center area bottom edge, recto; there are some small losses in the center area.

There is considerable damage to the paper substrate that explains the reason for the lining. There is adhesive residue along top edge of the cloth lining on the verso.

**Map 3:** TABVLA MODERNA PRUSSIE...

Left: crossbow watermark, '3' in pencil on verso over the cloth lining, rust stain (from paperclip?) on verso over the cloth lining

Watermark: there is crossbow watermark on both halves

This map is lined with white fabric and there is a silk gauze over the recto. Numbered "3" in pencil on the back of the left sheet over the cloth lining

Both edges are folded in; there are two long tears along the left edge and small tears and a loss along the right edge.

**Map 4:** PRIMA EVROPE TABVULA

Watermark: no watermark on either half.

This map is lined with white fabric and there is a silk gauze over the recto. Both the left and right edges are folded in.

**Map 5:** SECVNDA EVROPE TABVULA

Watermark: there is a crossbow watermark in the left half

Unwashed pH: 5.3-5.5 recto (pH strip 4-7\*); 5.5 (5-10); 5 (0-14); verso 5.3-5.5 (4-7).

Both the left and right edges are folded in. The black printing ink is smeared in some areas and offset is also noted.

**Map 6:** TABVLA MODERNA .... [Iberian Peninsula, title trimmed off]

Watermark: there is a crossbow watermark on both halves.

Both edges are folded in.

**Map 7:** TERTIA EVROPE TABVLA

Watermark: no watermark on either half. pH, washed: 5.5

The black printing ink is speared in some areas and offset is also noted indication friable ink.

**Map 8:** TABVLA MODERNA FRANCIE

Watermark: there is a crossbow watermark on the left section only. Both edges are folded in  
There is iron gall ink notation on the right half.

**Map 9:** QVARTA EVROPE TABVLA

Watermark: there is a crossbow watermark on both halves.  
The right edge is folded in. Offset of the ink in noted.

**Map 10:** TABVLA MODERNA POLONIE...

Watermark: there is a crossbow watermark in the right half. pH readings, unwashed: recto 5.3-5 (4-7 range); 5.5.5 (0-14 range).

Both edges are folded in.

The paper is very discolored and soft (no sizing); there are a number of small tears along the bottom edge; UV light exam reveals a pattern that suggests mold exposure

There are iron gall ink notations along the left side and there is a small loss from ink corrosion in the top word.

**Map 11:** QUINTA EVROPE TABVLA

Watermark: there is a crossbow watermark in the right section, recto.

Both edges are folded in

UV light exam reveals a pattern that suggests mold exposure

Offset of the ink in noted.

**Map 12:** SEXTA EVROPE TABVULA

Watermark: there are no watermarks in either half.

Both edges are folded in



**Map 13:** TABVLA NOVA... [Title cut off, Italian Peninsula]

Watermark: there is a crossbow watermark in the right section, recto.

Both edges are folded in

The paper is darkly discolored compared to the other maps. There are numerous iron gall ink additions; there is printing ink offset on the verso along the top edge.

**Map 14:** SEPTIMA EVROPE TABVLA

Watermark: there is a crossbow watermark in the left half section.

Both edges are fold in.

Image offset is noted.

**Map 15:** OCTAVA EVROPE TABVLA

Watermark: there is a crossbow watermark in the left half section.

Both edges are folded in

**Map 16:** NONA EVROPE TABVLA

Watermark: there is a crossbow watermark in the right half.

The right edge is folded in

**Map 17:** DECIMA ET VLTIMA EVROPE TABVLA

Watermark: there is a crossbow watermark in the left section

**Map 18:** PRIMA AFRICAE TABVLA

Watermark: there is a crossbow watermark in the left section

The right edge is folded in

Image offset is noted.

**Map 19:** SECVNDA AFRICAE TABVLA

Watermark: there is a crossbow watermark in the left section

Both edges are folded in

**Map 20:** TERTIA AFRICAE TABVLA

Watermark: there is a crossbow watermark in the left section.

pH washed: 5.8 (4-7 range); 5.5-6 (0-14 test strips range)

Both edges are folded in

**Map 21:** QVARTA AFRICAE TABVLA

Watermark: there is a crossbow watermark in the left section

Both edges folded in

There is a line drawn in iron gall ink drawn along the bottom half of the map, recto.

Offset image is noted. There is a wormhole in the right section (recto).

**Map 22:** PRIMA ASIAE TABVLA

Watermarks: there are no watermarks in either half.

pH unwashed: <5 (0-14); 4.4-4.7 (4-7); 5 (4-7)

Both edges are folded in and the right half (recto) is noticeably darker than the left half and the discoloration is consistent on the verso.

There are two wormholes, one in each section, opposite each other along the bottom section.

**Map 23:** SECVNDA ASIAE TABVLA

Watermark: there is a crossbow watermark in both the left and right section

The right edge is folded in. The paper in the right half (verso) is noticeably darker than the left half.

There is a grey haze over the entire plate suggesting that the plate was poorly cleaned of ink before printing. There are two wormholes, one in each section, opposite each other.

**Map 24:** TERTIA ASIAE TABVLA

Watermark: there is a crossbow watermark in the left section. Both edges are folded in.

Offset image is noted. There is a faint tide line along the bottom edge.

There are two wormholes, one in each section, opposite each other.

**Map 25:** QVARTA ASIAE TABVLA

Watermark: there is a crossbow watermark in both sections, and both edges are folded in.

There is a tear in the lower left edge, recto. There are two wormholes, one in each section, opposite each other.

The paper is slightly darker along the center fold.

**Map 26:** TABVLA MODERNA TERRE SANCTE

Watermark: there is no watermark in either section

There are two wormholes, one in each section, opposite each other.

Both edges are folded in. There are iron gall ink linear strokes along the top right edge, recto.

Ink offset is noted. There is a faint tide line along the bottom edge.

**Map 27:** QVINTA ASIAE TABVLA

Watermark: there is a crossbow watermark in both sections

Both edges are folded in. There are two wormholes, one in each section, opposite each other.

Ink offset is noted. There is a faint tide line along the bottom edge.

**Map 28:** SEXTA ASIAE TABVLA

Watermark: there is no watermark in either section. Ink offset is noted.

Both the left and right edges are folded in. There is a faint tide line along the bottom edge.

There are two wormholes, one in each section, opposite each other (holes are not registered with each other suggesting that the worm holes were created before the atlas was rebound).

**Map 29:** SEPTIMA ASIAE TABVLA

Watermark: there is a crossbow watermark in both sections

Both edges are folded in. There are two wormholes, one in each section, opposite each other (holes are not registered with each other).

Ink offset is noted. There is a faint tide line along the bottom edge.

**Map 30:** OCTAVA ASIAE TABVLA

Watermark: there is a crossbow watermark in both sections. Ink offset is noted.

There is a grey haze over the entire plate suggesting that the plate was poorly cleaned of ink before printing.

There are four wormholes: two along the top edge, and two opposite each other in the bottom half of the map.

There is a pronounced tideline along the bottom edge.

**Map 31:** NONA ASIAE TABVLA

Watermark: there are no crossbow watermarks in either section

The plate was poorly cleaned of ink before it was printed as there is a grey haze over the entire plate.

There are a total of five wormholes, one in each section plus an additional hole in the right section, (holes are not perfectly registered with each other).

Ink offset is noted. There is a pronounced tideline along the bottom edge.

**Map 32:** DECIMA ASIAE TABVLA

Watermark: there are no crossbow watermarks in either section

The right edge is folded in. Ink offset is noted. There are six worm holes, three pairs.

There is a tideline along the bottom edge. When the map is folded the holes are not registered with each side.

**Map 33:** VNDECIMA ASIAE TABVLA

Watermark: there is a crossbow watermark in both sections

The right edge is folded in. Ink offset is noted. There is a tideline along the bottom edge.

There are nine wormholes in this map: four on the left side, five on the right side. When the map is folded the holes are not registered with each side.

### **Map 34:** DVODECIMA ET VLTIMA ASIAE TABVLA

Watermark: there is no watermark in either side. Ink offset is noted.

There are a total of ten wormholes, five on each side. When the map is folded the holes are not registered with each side.

### **TREATMENT:**

#### **General description of the treatment for all 34 maps:**

The maps were washed in DI water adjusted to pH 7-7.5 with the addition of a saturated solution of calcium hydroxide to elevate the pH. The maps were washed for 20 minutes or longer in order for the adhesive of the guard strip to soften enough to allow removal. The adhesive residue from the guard strip and the strip of paper that connected the two halves, was removed with a micro spatula and cotton wool. The yellow discoloration that was more noticeable on the recto was readily dissolved causing the initial wash bath to be quite discolored compared with subsequent baths that were clear. The maps were dried between Hollytex under felts with light pressure.

The maps were given an alkaline reserve of magnesium bicarbonate (3 part DI water/ 1 part saturated solution of magnesium bicarbonate). They were immersed in the solution for 20-25 minutes, then drained on a blotter.

Once the majority of the water was drained off each map, it was placed in a .75% solution of gelatin (Polistini B) for at least 20 minutes. Each map was removed and drained on a blotter for 15 minutes or so to allow some evaporation of the water before placing it between Hollytex and felts and light pressure (no weights).

The tears were mended with Japanese tissue adhered with wheat starch paste, and weak areas were reinforced with sheer Japanese tissue or RK 2 tissue.

The map halves were reunited to their original configuration using ¼ inch strip of heavier weight Japanese tissue toned with acrylic paint. The strips were adhered with wheat starch paste. The pairing of the map sections were guided by the conjugate page list generated by Katherine.

### **Map 1,2,3&4:**

These four maps are the only ones that have a heavy white fabric lining and three of these maps (maps 1; 3; &4) have a layer of silk chiffon on the recto. Map 1 & 2 were particularly fragile with evidence of tears and skinning. The maps were initially soaked in a bath of pH adjusted DI water for at least 1 hour in order to soften the adhesive of the cloth lining and the silk facing. The

water bath was kept warm by running a hose of hot tap water under the tray. I tried to soften and reduce the adhesive that adhered the silk gauze by gently rubbing my fingers over the silk until the silk started to float off the paper. The silk acts as a barrier that protects the soft paper while massaging away the adhesive. The silk was safely removed but enough adhesive remained and the paper was too fragile to remove it without risk to the printing ink. Therefore alpha amylase enzymes (Sigma a-Amylase from Bacillus sp. A6380) was used to break down the remaining adhesive (a tiny spatula-tip of enzyme powder was added to 500 ml of DI water). The enzyme solution was brushed over the map while the map was between Hollytex sheets and placed in a tray with a Plexiglas cover to contain the heat as warm water flowed under the tray. The enzyme also helped to remove the cloth linings and adhesive.

After 30 minutes the adhesive was dissolved on the recto and the cloth lining was easily removed. The maps were washed in two changes of pH adjusted DI water for 20 minutes each in order to remove the enzymes.

These maps were given an alkaline reserve (as described above) and resized with .50% gelatin.

Weak areas were reinforced with RK-1 Japanese tissue.

## **Map 2: VNIVERSALIOR COGNITI ORBIS TABVLA (Ruysch Map of the World, 1507)**

This map had small losses along the center fold, mostly in the center area on section 2B, and the bottom right corner of section 2A (near the center fold) was poorly aligned. Both areas were badly skinned. The proper realignment of the lower section was achieved after the initial washing of the map and the removal of the lining. The area was realigned by locally wetting the skinned layers and gently teasing them apart to achieve separation. A photocopy of the area made from a facsimile copy in G&M was used to guide the correct realignment of the image.

Once the area was realigned they were adhered with a 50/50 mixture of A4M and wheat starch paste to avoid any greying at the edges. An area of loss was created with the realignment that was infilled with laminated layers of Japanese tissue toned with acrylic paint and pastel. The paper substrate was weak with multiple tears and skinned areas so the map was lined with RK-1 Japanese tissue adhered with a mix of wheat starch paste and A4M methyl cellulose (2/3-1/3) to give the paper much needed support.

## **Reservation Research and Testing Division request for analysis**

A request was made to PRTD (Project #: RT\_0118\_0249) to analyse the agent responsible for the yellow tone on the recto of the maps. A selection of unwashed maps were submitted to be analyzed along with a Whatman filter that captured some of the unknown agent. The filter was half submerging in a used wash bath (very yellow) for over a week. The unknown yellow agent wicked into the filter paper that was amber colored, hard, and somewhat translucent that had the appearance and qualities of gelatin. The analysis of the printing ink and the unknown yellow agent was performed by Lynn Brostoff in March of 2018 and her report is filed on the N drive.

