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Interactive Learning in Palimpsest Research*

Among the Vatican Library's exceptionally rich holdings (more than 80,000 manuscript items and more than 100,000 archival units), many contain recycled parchment folios. More than 620 such library items have been identified so far,[1] including those containing writing surface with barely-legible underlying documentary texts which were physically erased prior to reuse.[2]

The number of individual manuscripts whose writing surfaces were recycled in this way is much higher. If a manuscript includes recycled folios, they normally derive from more than one parent manuscript—quite often from four or five manuscripts. This number can be as high as ten in exceptional cases, as in Pal. lat. 24. The undertexts in the Vatican Library include at least 14 different languages (Latin, Greek, Arabic, Church Slavonic, Syriac, Christian Palestinian Aramaic, Coptic, Armenian, Georgian, Gothic, Anglo Saxon, Italian, *langue d'oïl*, and Batak), a fact that on its own shows the great variety in the origins of such manuscripts.[3]

Palimpsest manuscripts have arrived at the Vatican Library since its foundation in the mid-15th century via diverse channels; thus they reflect a rich variety of contexts and circumstances in which manuscripts were reused. To take one well-known example: St. Columban's Monastery in Bobbio, an early Benedictine Abbey in North Italy, can be viewed as a parallel to St. Catherine's Monastery in Sinai, since important ancient manuscripts were assembled and reused in both.

The faint and often invisible traces of discarded texts will perhaps never permit a successful systematic survey: given the scale of the Vatican Library, it is not possible to distinguish all the palimpsest folios and clarify their complex histories. Nevertheless, their number has continuously been growing during the digitization project, which includes a survey phase when each manuscript selected for digitization is carefully checked in the Conservation Workshop: among various aspects of the manuscript considered, it is established whether or not it contains recycled folios.

The manuscripts in which folios with multiple layers of scripts are identified then follow a special path in the digitization workflow. Each palimpsest page with the slightest promise of legibility is normally reproduced in two different scans or photographs, both in exactly the same position, one with natural light and the one with visible fluorescence generated by UV light. At the end of the digitization project, these two—or in exceptional cases three or four[4]—images per page are published on the visualization platform of the Vatican Library to make them easily accessible to interested readers all around the world. This collaborative teamwork between

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* I thank Irmgard Schuler and Carola Fontana for their help with the images of palimpsests reproduced in this article.

1 The most exhaustive list of Vatican palimpsests available in public is by Voicu, Note sui palinsesti with bibliography on previous lists of Vatican palimpsests which were available to him. Voicu's provisional list of shelfmarks reflects the state of research more than ten years ago and does not give helpful clues for the individual items.

2 See, for example, Vat. lat. 815, f. 48r.

3 The Vatican Library possesses erased undertexts in less frequent languages such as Anglo-Saxon (Reg. lat. 497, f. 71), Arabic (e.g. Vat. sir. 623. pt. 2 [*Diktyon* 69457], ff. 115+122, 116+121; Vat. gr. 1456 [*Diktyon* 68087], ff. 150–152, 155–157), Armenian (e.g. Vat. sir. 623. pt. 2, ff. 197+204, 214+215), Christian Palestinian Aramaic (e.g., Vat. sir. 623. pt. 2, ff. 105–114, 173–180, 189–196, 198–203), Church Slavonic (e.g. Barb. gr. 388 [*Diktyon* 64931], passim), Coptic (e.g., Borg. copt. 109, cass. 15, fasc. 53, f. 1), Ethiopic (Vat. etiop. 39, ff. 1–88), Italian (e.g. Vat. lat. 1907, ff. 151–154, 198, 203), *langue d'oïl* (Vat. lat. 5334, ff. 125r, 126r–v), and Gothic (Vat. lat. 5750, pp. 57/58, 59/60 and 61/62). Delio Vania Proverbio recently identified a Mandailing- and Simalungun-Batak script from the Indonesian Island of Sumatra (Vat. ind. 41). I thank him for sharing with me his identification of both overlapping scripts in the same manuscript, which was copied on the bark of a local tree (Aquilaria Malaccensis).

4 See, for example, Pal. lat. 24 (https://digi.vatlib.it/view/MSS_Pal.lat.24 [accessed 01.07.2023]), Vat. gr. 770 (*Diktyon* 67401, https://digi.vatlib.it/view/MSS_Vat.gr.770/ [accessed 01.07.2023]) and Vat. gr. 788.pt.B (*Diktyon* 67419, https://digi.vatlib.it/view/MSS_Vat.gr.788.pt.B [accessed 01.07.2023]).

the conservator, the photographer, the specialist of image processing, and the IT specialist aims to provide scholars with the best possible means to study the Vatican Library's holdings.

Since 2014, I have had the privilege to follow this process from the point of view of the scholar, the target audience of the published images. My main goal was to assist the Library's aim to make the highest possible number of its massive stock of digitized palimpsest pages available to their end users in an easily-manageable way. A joint project of the Vatican Library and Stanford University Libraries has helped me in this activity.

In September 2016, the Vatican Library and Stanford University Libraries began a three-year joint project on the implementation and enhancement of interoperability protocols (IIIF) for digitized manuscripts, supported by a generous grant by the Andrew W. Mellon Foundation and supervised by Paola Manoni, the chief metadata engineer of the Vatican Library.[5] The Vatican Library offered its images already taken according to the criteria described above, and the scientific experience of some of its academic staff, to curate thematic itineraries or pathways. With the generous help of The Andrew W. Mellon Foundation, the Vatican Library hired young scholars to assist the curators' work, edit the thematic pathways, and help the IT group of the Stanford University Libraries and the Vatican Library to develop various software that enable improved functionality of the digital material presented on its webpage. I joined the small group of curators at the Vatican Library and took the responsibility of curating the thematic pathway *Vatican Palimpsests: Digital Recovery of Erased Identities*.[6]

In this paper, I summarize how I used this framework to prepare an interactive learning tool for palimpsest research. Before entering into the details, I give a brief summary on the preconditions: the basic framework for presenting metadata linked to Vatican manuscripts with recycled folios, as well as the principles of imaging palimpsest pages at the Vatican Library.

Today scholars can access Vatican manuscript data online through two main channels. The most important one is the electronic catalogue of the Vatican Library. This catalogue makes a significant part of the Vatican collection retrievable by variables linked to sections of manuscripts that are distinguished by the individual works present in each. Now, the contents of palimpsest folios can also be retrieved together with those of the overtexts of the manuscripts. The metadata present in this electronic catalogue are linked to the other channel, the Digital Vatican Library (hereafter DVL, https://digi.vatlib.it [accessed 01.07.2023]) with IIIF compatibility. It includes all pages of complete manuscripts with the flyleaves, binding, and edges in the sequence in which they feature in each. A retrievable analytic list of contents permits browsing within the manuscripts. The various palimpsests are distinguished as *inf. 1* or *inf. 2*, and the double palimpsests as *inf. 1.1* and *inf. 1.2*, with the abbreviation *inf*. referring to *scriptio inferior*. The thumbnail images of the entire manuscript can be visualized underneath the enlarged version of the image of the selected page.

Let us take a brief look at the practice of imaging palimpsests at the Vatican Library. After the conclusion of the EU project Rinascimento virtuale (2001–2004), the Vatican Library began to digitize its manuscripts with palimpsest folios in 2006, and named this specialized digitization activity the Cicero Project—after its best-known palimpsest, the *Republic* of Cicero (Vat. lat. 5757). For pragmatic reasons, the administration of the Vatican Library decided to capture—with special high-resolution scanners adapted to this task or, when necessary, with special photographic cameras equipped with appropriate lighting systems—and archive two digital versions of each digitized palimpsest page at native resolution and original format, which would remain available for eventual analysis and minimize the future need for new imaging. These images were initially not intended to be published online. After the scans and photographs of many of the manuscripts with recycled writing surface had been assembled, the Vatican Library began to revise and publish them online on the same platform as other manuscripts. The Vatican Library seeks to provide its readers with an additional UV fluorescence image of all pages which cannot be read and analyzed through their natural light images, not only palimpsest pages but also those with faded annotations, water damage or other circumstances. These additional

[5] On the metadata of the Vatican Library, see Manoni, Metadata framework and application profiles. On the collaborative Mellon project, see Manoni, The Mellon Project at the Vatican Library.

[6] Four thematic pathways have been published: Courses in paleography (Greek and Latin, from Antiquity to the Renaissance), curated by Ambrogio Piazzoni and Timothy Janz; The evolution and transmission of texts of specific works: Latin classics, curated by Marco Buonocore; The humanist prince's library: Federico da Montefeltro and his manuscripts, curated by Maria Gabriella Critelli; and The Vatican Palimpsests. See https://spotlight.vatlib.it/ [accessed 01.07.2023].

images are integrated in the manuscript display immediately following the images captured in natural light. The number of digitized manuscripts which include such integrations now number more than 700.

At the launch of the Cicero Project, two colour images, one with natural light and another one with visible fluorescence generated by UV light, seemed to be sufficient in most cases for later decipherment. This digitization practice remained in use, but the technical equipment and the acquisition methods of the Vatican Library underwent a substantial development.[7] In addition to the scans in very high resolution with UV light (365 nm), the photo laboratory of the Vatican Library now has at its disposal photography equipment for imaging with visible light, ultraviolet fluorescence, and infrared radiation at three different wavelengths as well as with the instruments for imaging by trans-illumination. Multispectral imaging with monochrome camera has recently facilitated important new discoveries at the Vatican Library.[8] In 2021, the Library acquired a Phase One camera equipped with two different lighting systems in broad and narrow bands. Most complex palimpsest folios such as double palimpsest or darkened palimpsest folios previously treated with gallic acid are normally imaged with cameras instead of scanners.

Most of these images now get published online, but the photographs of some manuscripts remain accessible only in the Vatican Library's photographic archive for eventual scholarly studies. In fact, the palimpsest images that are published in the Vatican Library's DVL are elaborations done on native RAW or TIFF files; these files are likely to be reinterpreted in the future thanks to new processing approaches. On the publication platform of the Vatican Library (DVL), each manuscript with recycled writing surface is accompanied by a collation of the included gatherings or quires, which enables readers who cannot access the original manuscript to establish the correspondence between the two parts of any of its folded pages.[9] The Vatican Library's approach, as we have just seen, is all-embracing with a constant need of hosting and integrating images produced over a long span of time with diverse methods and often multiple versions of the same page. What I would like to explore in more detail is the interactive presentation of palimpsests.

Instead of trying to give an overall picture of the Vatican palimpsests—an impossible task—I will focus on the thematic pathway *Vatican Palimpsests: Digital Recovery of Erased Identities* (https://spotlight.vatlib.it/palimpsests/ [accessed 01.07.2023]), which has been available to the public since October 2019, and how it seeks to explore new dimensions of presenting palimpsests to a more general readership. Exploring these palimpsests is always a laborious but exciting experiment, where success is not guaranteed. From the reader, it requires an adequate knowledge of the handwriting of ancient texts—assisted by the Bibilotheca Vaticana's parallel Greek and Latin Palaeography Pathway, jointly curated by Ambrogio Piazzoni and Timothy Janz—as well as familiarity with the language of the text to be deciphered, its context, and a great deal of intuition and capacity to make creative conjectures. Such an experiment involves repeated and persistent attempts and failures. Supported by the technical assistance available, successive interactions between the reader and the barely legible text often offer surprising results and certainly develop the reader's experience.

The implementation and enhancement of interoperability protocols (IIIF) for digitized manuscripts, the focus of the joint project between the Vatican Library and Stanford University Libraries, puts efficient tools into the readers' hands, allowing them to practise the interactive exercise of exploring palimpsests, beyond the ivory tower of a few privileged specialists. For this project, the Vatican Library offered its various types of metadata and scholarly narratives as an experiment in order to test and enrich the functions of two software that the IT team of Stanford University are developing.

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[7] On the Cicero Project and the actual practice of palimpsest digitization and photography of challenging manuscripts at the Vatican Library, see Schuler *et al*., Oltre il visibile.

[8] For example, I recently managed to recover—together with Jana Grusková—Dexippus' preface to his *Scythica* in Vat. gr. 73 (*Diktyon* 66704), f. 54r: see Németh, Dexippus in the Excerpta Constantiniana revisited. In addition, in the same manuscript, I completed a fragment from Polybius Book XXXVIII: see Németh, The suicide of Hasdrubal's wife revisited. These results are based on Michael B. Toth's multispectral imaging session at the Vatican in September 2017 and William Christens-Barry's processing of these images. See also the multispectral imaging sessions which EMEL carried out in 2014, 2015, and 2016–2017 on Vat. sir. 623. pt. 2, ff. 211+218, 212+217, which are double palimpsest bifolios with Menander as the oldest undertext, and ff. 115+122, 116+121 (the Arabic translation of Theon's commentary on Ptolemy's *Handy Tables*), f. 227 (the *Syriac Galen*), and Vat. sir. 647, ff. 38–39 (also the *Syriac Galen*).

[9] E.g. Vat. lat. 5757 (https://digi.vatlib.it/view/MSS_Vat.lat.5757 [accessed 01.07.2023]), Pal. lat. 24 (https://digi.vatlib.it/view/MSS_Pal.lat.24 [accessed 01.07.2023]). All the collations that are available at this moment have been established by the author of this article.

(1) *Mirador* viewer (http://projectmirador.org [accessed 01.07.2023]) is the reader's interactive 'exploration laboratory', a IIIF compatible visualization platform which offers didactic and experimental tools. It presents a manuscript as a single linkable entity which is furnished with a full set of metadata. Each *manifest* refers to a sequence of images that are linked to a documentary unit, in this case a manuscript. The pathway of *Vatican Palimpsests* explored *Mirador*'s capacity to integrate these additional identities within the same *manifest* both in terms of adapting the sequence of images to these special manuscripts, as explained above, and the metadata which record and highlight the basic set of information linked to them. As one might expect, *Mirador*'s IIIF compatibility permits parallel visualization of the same *manifest*, i.e. the comparison of multiple variants of the same page or manifests of other manuscripts from anywhere in the world which are published online. *Mirador*'s particular visualization and virtual enhancement tools (rotation, brightness, contrast, saturation, grayscale, inversion, mirror, and return to the default version) are especially useful in deciphering the images of palimpsests that are difficult to read. The mirroring function, for example, was added with the *Vatican Palimpsests* pathway in mind, in order to visualize the results of an accidental transfer of the script when the writing surface was repurposed. It took place at the scriptorium where the parchment bifolios of an old manuscript were washed clean and then recycled in the early 13th century in South Italy (see below Vat. gr. 316 [*Diktyon* 66947]). In the sequence of images, *Mirador* viewer is able to add modified versions of an image which is different from its default version, i.e. parallel visualization of the same page according to the overtext and undertext.[10] Annotations in *Mirador*, which can be switched on and off, serve principally didactic purposes: they highlight and explain various phenomena linked to specific zones on the manuscript page. When a palimpsest page is presented, for example, it is useful to transcribe a portion of the discarded undertext which is most often poorly visible and is oriented in a different way compared to the overtext. Such a transcription assists further decipherment of the same palimpsest. Any aspects of the page can be highlighted and explained. In addition to the text itself, each annotation has an author who created it and tags which make it retrievable by various research criteria.

(2) *Spotlight* (https://spotlight.vatlib.it/ [accessed 01.07.2023]), the second of these two software, can be regarded as the readers' virtual schoolroom. It hosts scholarly narratives in a hierarchical structure between parent and child pages which explain various features of the exhibit items. In addition to the creative integration of these narratives, *Spotlight* offers curators a wide range of options to link and visualize not only static single images but also integrated *Mirador manifests* which function as doors that open to the 'exploration lab' (*Mirador*) with its range of functions listed above. I will give below a few examples of presenting palimpsest pages in *Spotlight*.

These two tools not only improve the presentation and the study of manuscripts with palimpsest writing surface, but also put an interactive learning tool into the hands of students who study palaeography, codicology, philology, book conservation, and indeed anyone who wants to know more about the mysterious and arcane world of palimpsests.

As far as the scope is concerned, the *Vatican Palimpsests* pathway acknowledges the recycled versions of more common and more easily accessible texts which are potentially useful instruments for teaching purposes. Domenico Surace, the editor of the *Vatican Palimpsests* pathway, described the manuscripts in the electronic catalogue of the Vatican Library, uploaded the metadata to the system, and provided annotations and the Italian translation of the scholarly narratives. As a curator, I am responsible for these scholarly narratives, together with the conceptual structure of the *Vatican Palimpsests* pathway.

The twenty-four manuscripts selected for the project include such famous and important items as the unique copy of Cicero's *De re publica* (Vat. lat. 5757),[11] and Pal. lat. 24, which includes the first palimpsest discovered in the Vatican Library, in 1772.[12] It includes nine palimpsests, fragments from nine Late Antique Latin manuscripts, and a Greek one, many of them unique testimonies of the text they contain.[13]

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[10] See, for example, Pal. lat. 24 (https://digi.vatlib.it/view/MSS_Pal.lat.24 [accessed 01.07.2023]), ff. 43v (Seneca), 46r (Fronto). I acknowledge the work of Sean Martin, who implemented these rotated images in the *Mirador* viewer.

[11] See the description of the *scriptio inferior* and the *superior* with up-to-date bibliography in Németh, Recovery of Conflicting Textual Identities.

[12] See the description of the discovery in Cancellieri, In T. Livi fragmentum ἀνέκδοτον praefatio, ii–viii. Németh, Reproducing the invisible: the early observation of palimpsests, 518–520.

[13] Fohlen, Recherches sur le manuscrit palimpseste Vatican, Pal. lat. 24.

The range of the cultural contexts present in the overtexts and undertexts of these selected manuscripts is very wide: lectionaries from different periods, hagiographic texts from special and standard collections, school texts, legal texts, and historiography, as well as philosophical, homiletic, medical, patristic, biblical, and liturgical texts. Some of these recycled manuscripts reveal the original contexts of their production and have undersigning by their scribes. They were copied in various locations that include the Abbeys of Bobbio and Lorsch (?), Grottaferrata, Salento, and the Monastery of St. John Prodromos in Petra (Constantinople). There is plenty of scope for readers to make new discoveries, either in the texts we could not identify or by deepening the study of other palimpsest folios where the text is known but the full manuscript invites further study.

Let us now address the major challenges that may be posed by the integration of manuscripts with recycled folios into a database which was devised for manuscripts without recycled folios and overlapping identities. The multiple identities of these manuscripts do not coincide at a conceptual level and in physical reality. For example, the multilayered texts on a parchment folio which was washed clean and rewritten twice carry three independent identities.[14] Each of these identities belong to different manuscripts and have different histories which came together at a certain point. To the human mind, a text and the book that carries that text normally coincide. It is difficult to talk about the same manuscript which includes fragments of more than one independent identity, or about a textual identity which was diffused across several different objects—books—by recycling.[15] This ambiguity often creates confusion and lack of clarity in discourse relating to recycled manuscripts, and in the presentation and retrieval of such manuscripts. For an insight into the *Vatican Palimpsests* pathway, let us enter the classroom and see the first page in *Spotlight* which provides the general reader with a short set of terminological clarifications.

TERMINOLOGICAL CLARIFICATIONS

The word *palimpsest* is an adjective or an adjectival noun and comes from Greek. It means ‘a manuscript scraped clear for reuse’. The two Greek compounds of this word, παλίν (*palin*; literally ‘again’) and ψάω (*psao*; ‘scrape’) refers to the process of cleaning the writing off the parchment, using a technique similar to the one used for the preparation of the animal skin for its first use as writing material. However, the term is problematic for two major reasons.

First, the concept of removal of texts that the word signifies is misleading, because it does not correspond to the process more commonly used to produce palimpsests. In fact, scraping off the unwanted text was only one of the two main methods available, and was not even the technique most frequently used for the erasure of script. The second method, washing off the unwanted text, without scraping off the written layer of the parchment, was used more often; this is actually why we are able to uncover what was erased, since layers that were physically removed are almost impossible to re-establish. In addition, the term does not completely cover the concept, because not all washed or scraped parchment sheets were reused for writing.

The second reason is that the adjectival noun ‘palimpsest’, which takes its identification from the removed text, often designates in colloquial use the entire manuscript which includes that part. For example, the *Archimedes Palimpsest* is a reference used for the actual manuscript: a Byzantine prayer book that includes the palimpsest fragments from the sole existing medieval manuscript of Hyperides, which were recycled, together with fragments from several other recycled manuscripts, to create this volume.

In order to avoid confusion caused by the ambiguities of the term ‘palimpsest’, I suggest using the term ‘palimpsest’ exclusively as a noun to identify the section(s) of current manuscript(s) which derive from the

[14] See various double palimpsests in Vat. gr. 633 (*Diktyon* 67264), Vat. gr. 788. pt. B (*Diktyon* 67419), Vat. gr. 984 (*Diktyon* 67615), Vat. gr. 1853 (*Diktyon* 68482), and Vat. gr. 1882 (*Diktyon* 68511).

[15] See Simplicius’ commentary on Aristotle’s *Categories* in Vat. gr. 21 (*Diktyon* 66652) and Urb. gr. 154 (*Diktyon* 66621), both of which are included in the Vatican Palimpsests pathway. The Late Antique manuscript of Strabo which was later reused for a Byzantine *nomocanon* manuscript in the 7th or 8th century was recycled in at least three manuscripts: Vat. gr. 2061. pt. A (*Diktyon* 68691), Vat. gr. 2306 (*Diktyon* 68937), and Crypt. A.δ.XXIII (*Diktyon* 17517, in Grottaferrata). Each of these manuscripts also includes other palimpsests.

same discarded manuscript, regardless of their circumstances; that is, regardless of whether the redundant texts were removed by erasure or washing, regardless of whether the various pieces of the discarded manuscripts were recycled in one or more extant manuscripts. By identifying a palimpsest in such a way, I do not identify the entire actual manuscript which contains it.[16]

The other term frequently used is the Latin passive participle *rescriptus* (literally, 'rewritten'). This word implies the end result of the process, which is equally misleading, for two reasons. First, not all rewritten manuscripts or those with multiple layers had previously been treated to remove the unwanted text.[17] Second, not all manuscripts that were pre-treated for the purpose were actually reused for writing.[18] Still, all manuscripts that are called 'palimpsests' or *rescriptus* represent the same phenomenon of recycling the same writing surface for a writing project different from the previous one.

A third expression, the Latin *membra disiecta* ('disjointed body parts') is also used to refer to the result of recycling one or more book(s) to become another book or books; it is 'dismembered' or 'disjointed' because the structural relationships of the 'body part' of the recycled book or books do not correspond to those of the actual book(s) in which the writing surface of discarded books were reused. These distinctions create a fascinating field of study: the archaeology of the book. We shall see two case studies below which will illustrate this method. This is somewhat similar to the concept of *spolia* ('spoils') in archaeology, which refer to archaeological elements that were later recycled in buildings constructed in very different contexts—such as, for example, the columns of the Baths of Caracalla which were transplanted to the Church of Santa Maria di Trastevere in Rome.

The concept of the fragment clarifies the use of the expression *membra disiecta* in the context of palimpsests. Just as the analogy of fragments from ancient objects, inscriptions, and statues led to the abstract concept of a textual fragment that represents the whole text of which it constitutes a part,[19] a small surviving portion of a book can be viewed as a fragment of the whole and as somehow representing it. It is often possible to draw more-or-less precise conclusions concerning the volume, date, nature, contents, as well the contexts of production and the use of the lost ancient books, even from tiny surviving fragments. This is possible thanks to the auxiliary disciplines of palaeography and codicology, which carefully compare the script, contents, and traces of the production of the manuscript. This last aspect makes the study of the palimpsest close to archaeology. At the same time, palimpsests are similar to papyri or incomplete inscriptions, which may be regarded as similar to both jigsaws and crossword puzzles. Like jigsaw puzzles, palimpsests may contain recycled larger folios that are often folded in half or trimmed and cut into smaller sheets, the original structure of which can be reconstructed. The process of deciphering the erased or washed texts is similar to that of solving crossword puzzles, where the textual contents and the legible letters constitute the basis of reconstruction which often includes conjectures about the missing links in order to arrive at a more-or-less clear and consistent picture of what can be drawn from the manuscript which was once dismembered.

Let us look now at a manuscript which can be used as an example to illustrate the series of challenges presented by manuscripts with palimpsests.

CASE STUDY: VAT. GR. 984

On 20 May, 1354 the second scribe of the overtext of Vat. gr. 984 (*Diktyon* 67615) finished the *opera omnia* of Flavius Josephus, the famous Jewish historian.[20] This scribe used fragments of three palimpsests, of which two are important. The bulk of Vat. gr. 984 was copied onto the remains of a very large systematic collection of saints' lives, arranged by their feast days. The other significant manuscript used is a double palimpsest.

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[16] On the reinvention of terms palimpsest and *rescriptus* in early antiquarian philology, see Németh, Reproducing the invisible: the early observation of palimpsests, 511–517.

[17] See below the flyleaves of Vat. gr. 316.

[18] E.g., Vat. lat. 1715, ff. 74–124.

[19] Most, Fragments.

[20] Vat. gr. 984: (ff. 1r–173r) *Jewish Antiquities*, (ff. 173v–184v) *Life of Josephus*, (ff. 186v–344v) *Jewish Wars*, (Vat. gr. 1882, ff. 89v–92v, 100r–v, 97–104) *Maccabees*. At the end of the codex (Vat. gr. 1882, f. 103v), an Easter table was added for the years from 1354 to 1370. See the undersigning of the second scribe on f. 344v (Fig. 1) who copied ff. 4v lin. 20 – 197v, 141r–344v, and also corrected f. 240v; his colleague copied ff. 1r–4v, lin. 20, 198r–140v. Turyn, *Codices graeci Vaticani*, 149–150, Tab. 123–125, 195c.

This manuscript of Flavius Josephus suffered a small accident during the course of classification and relocation in the Vatican Library, where it arrived before the end of the 16th century. It was initially classified as belonging to the group of manuscripts of secondary importance and was stored in a box.[21] The last 12 loose folios of Vat. gr. 984 were separated and joined the group of manuscript fragments of diverse origins in the 17th century. Mons. Paul Canart discovered them, and only now has it become possible for the two parts of the same object to be unified virtually on the *Mirador* viewer.

(1) On the basis of its pure and very regular miniscule script, the large recycled manuscript of saints' lives can be dated to the early 10th century.[22] The saints' lives were copied in two columns with 30 lines in each, measuring ca. 32.5 × 6 cm, and large margins (ruling type: 46D2). The codex contained the lives of saints whose feasts fall from June 1 to 17 (or later, depending on the feast day of Hypatius). It probably belonged to a collection of saints' lives with two volumes per each month.[23] [Tab. 1] This is the most ambitious collection of the genre that has survived, and predates the organizational project undertaken by Symeon Metaphrastes some decades later.[24] In fact, it sometimes contains the lives of more than one saint for the same day. For example, June 11 has both the translation of the body of St. Bartholomew of Armenia to Lipari and Benevento and another text, the *encomium* of St. Barnabas written by the monk Leontius. This vast collection of saints' lives was almost certainly copied in Constantinople, as shown by the emphatic presence of saints linked to Constantinople (Metrophanes, Alexander, Nicephorus, and Hilarion the New) and Hagia Sophia (the text written by Joseph *skeuphylax*), as well as some saints who bore witness to icon veneration in the period of iconoclasm, as did Hilarion the New (770–845) and Nicephorus I, Patriarch of Constantinople (ca. 758–828).

June 1	Justin martyr and his fellows (*BHG* 973)
June 2	Nicephorus I, Patriarch of Constantinople by Ignatius (*BHG* 1335)
June 3	Lucillianus martyr (*BHG* 998y)
June 4	Metrophanes and Alexander, bishops of Constantinople (*BHG* 1279)
June 5	Hilarion the New, Abbot of Dalmation by Sabas (*BHG* 2177)
June 6	Dorotheus martyr (*BHG* 565?)
June 7	Theodotus of Ancyra (*BHG* 1782a)
June 8	Theodorus stratelates martyr (*BHG* 1750)
June 9	Cyril of Alexandria
June 10	Timotheus of Prusia (*BHG* 2460)
June 11a	Translation of Apostle Bartholomew to Benevento and Lipari by Joseph, *skeuophylax* of Haghia Sophia (*BHG* 229)
June 11b	Apostle Barnabas by Leontius (*BHG* 226d)
June 12	Onuphrius
June 13	Aquilina martyr (*BHG* 163)
June 14	Elisaeus by Basil of Seleucia (*BHG* 582)
June 17	Hypatius of Bithynia (*BHG* 760)

Tab. 1: The contents of the recycled *menologion* in Vat. gr. 984 and Vat. gr. 1882 (June, first part)

[21] Vat. gr. 984 (its old number was 258) belonged to the group of codices (Vat. gr. 867–1142) which were put in chests in 1591 when the Vatican Library was transferred to its present building. Janz, Lo sviluppo dei vaticani greci, 512 and 530. Vat. gr. 1882 was assembled from 24 fragments in the 17th century. See the description by Canart, *Codices Vaticani Graeci*, 472–488.

[22] The minuscule script of the menologion reused in Vat. gr. 984 does not include infiltrated majuscule letters. Abbreviations are few. Accents are breathings and are accurate. Iota adscript is absent.

[23] See Ehrhard, *Überlieferung*, 650–654 with previous literature.

[24] Høgel, *Symeon Metaphrastes*, 51–59.

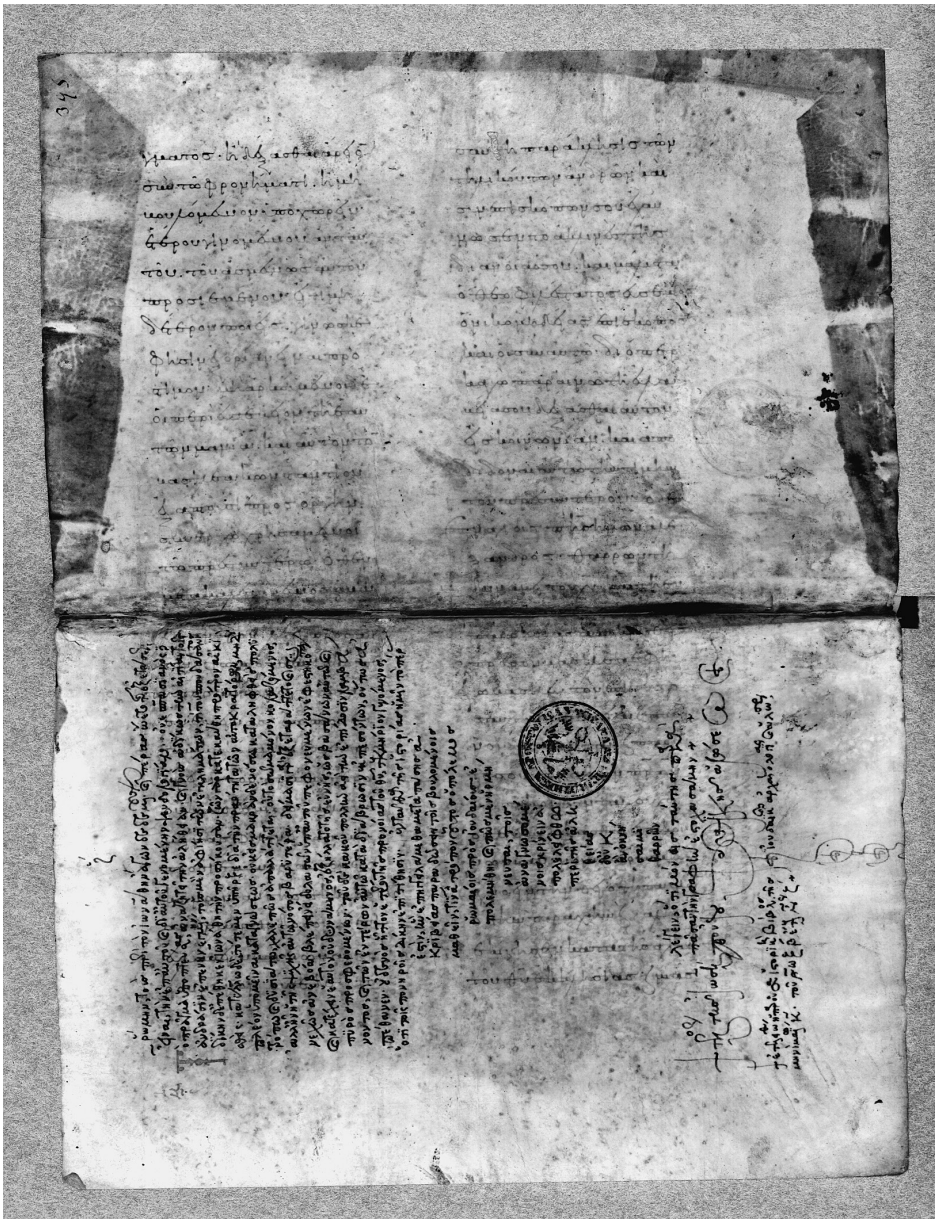

Fig. 1: Vat. gr. 984, ff. 344v+345r, rotated 90°:
Vita Metrophanis et Alexandri (*BHG* 1279), p. 179,6 (προστά>[column 1]γματος ἢ δέξασθαι Ἄρειον| σὺν τῶ φρονήματι. ἢ μὴ| ... οὔτε δὲ ἡ το>[column 2, 179,17]σαύτη παράκλησις| τῶν τηλικούτων ἀνδρῶν... [179,28] κατὰ τῆς ἁγίας| τοῦ Θεοῦ ἐκκλησίας· καὶ μιᾶς
(© Vatican Apostolic Library)

(2) Four bifolios remain from the other important palimpsest, which was recycled and rewritten twice.[25] The fragments of the oldest undertext contain a fragment of John Chrysostom's Homily on Pentecost, as well as a part of a homily on the Dormition of the Virgin Mary (15 August) written by Germanus I, Patriarch of Constantinople (ca. 634 – ca. 733). The other fragments, which are almost illegible, remain to be identified; they were probably part of a homiliary from the 9th century. The bifolios of this old codex were recycled for a medical text in the late 12th or early 13th century. In his medical text, entitled *De locis affectis*, Galen of Pergamon (129–216) describes a method that allowed the physician of antiquity to identify internal diseases that were not directly visible; the work thus represents a landmark in medicine. This informal cursive hand is a very early testimony of this work by Galen.

[25] Vat. gr. 984, ff. 162+157, 170+168 and Vat. gr. 1882, ff. 89+92, 90+91.

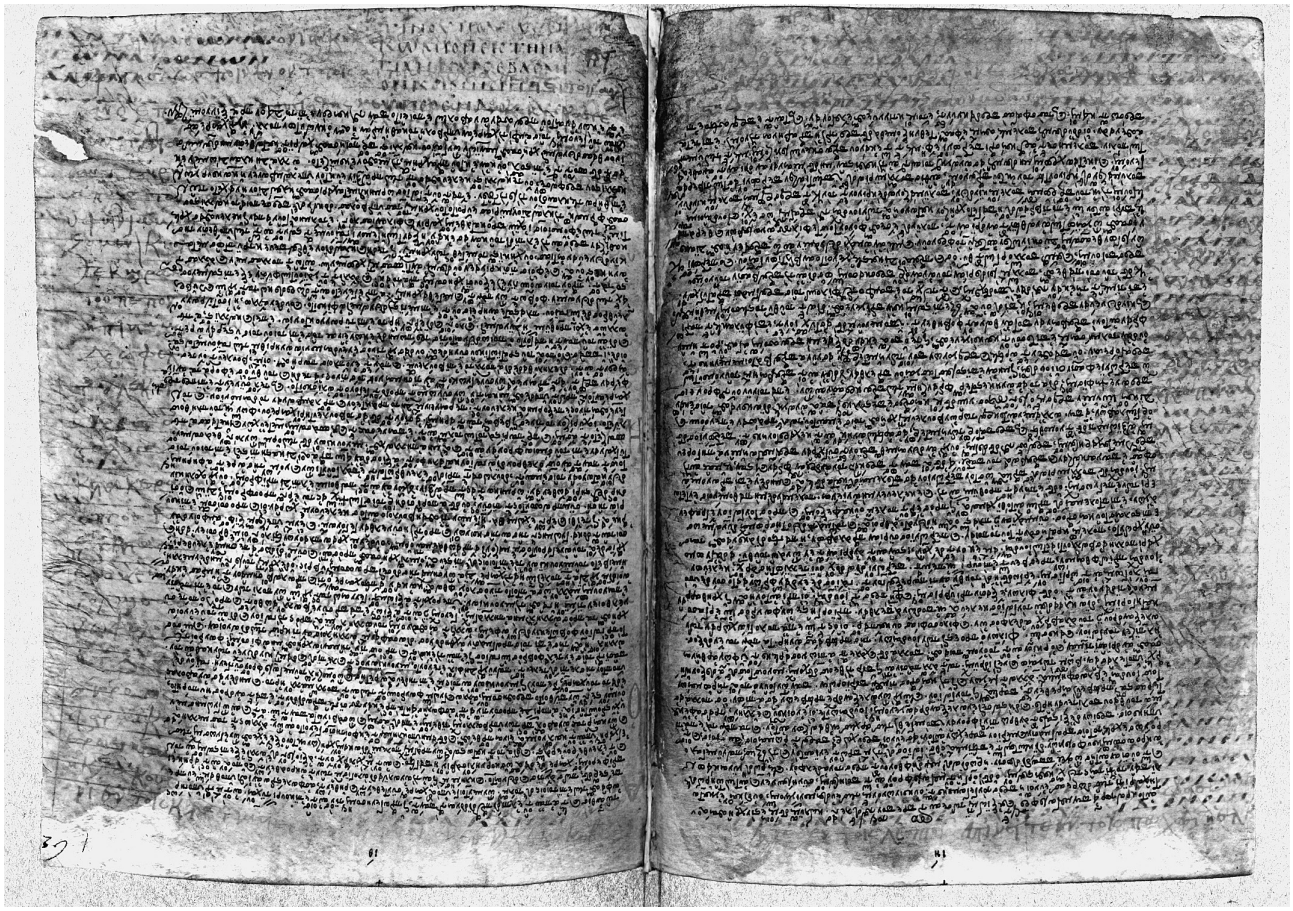

Fig. 2: Vat. gr. 984, ff. 162r+157v, rotated 180°:
Double palimpsest: Germanus, *Homily on the Dormition of Virgin Mary* (9th century, majuscule undertext) and Galen, *De locis affectis* (12th–13th century, minuscule undertext) under Flavius Josephus, *Jewish Antiquities* (1354, overtext)
(© Vatican Apostolic Library)

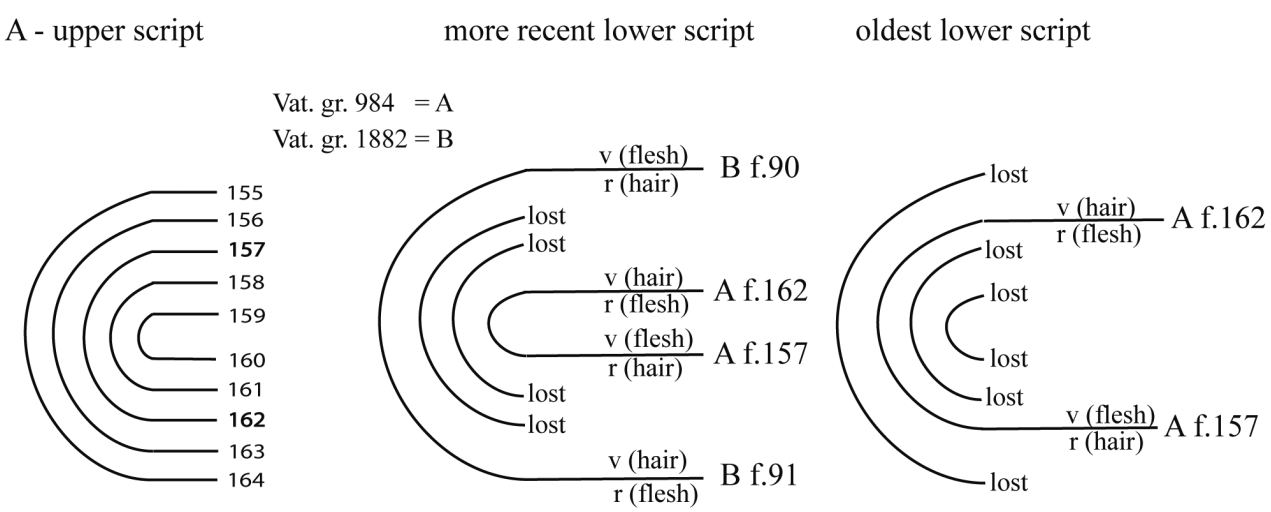

Fig. 3. *Membra disiecta*
The position of a bifolio (Vat. gr. 984, ff. 162r+157v) in three different manuscripts of the overtext and the two undertexts (cf. Fig. 2)

As we have seen, the recycled folios of these two ancient codices had multiple histories according to the individual manuscripts from which they derive. The scholarly narrative in *Spotlight* introduces each of these manuscripts with their overlapping stories in the section *Important Palimpsests*. *Mirador* viewer enables the reader to study each of these manuscripts separately. For example, one side of the bifolio 157v+162r (measuring 35 × 25 cm), which is a double palimpsest, is presented with annotations. This bifolio has three independent identities according to the three manuscripts it belonged to (*membra disiecta*) (Fig. 3). In the manuscript as it exists today, it contains sections from Flavius Josephus' *Jewish Antiquities*, B. 18–19 (upper script) from the 14th century, and makes the third and the eighth folio of a quinio, a gathering made up of five bifolios.[26] The more recent lower script (12th–13th century), which was copied in one column and ca. 35 lines per page, is legible if rotated in 180 degrees. It contains sections of Galen's work mentioned above and constituted the central bifolio of a quaternio, a gathering made up of four bifolios.[27] It is possible to reconstruct the precise position of the four surviving bifolios in this recycled manuscript (Fig. 3). The older undertext was probably a homiliary and it is legible in a few places in a position rotated in 180 degrees. It was copied in the 9th century in the Palestinian type of Sloping Ogival Majuscule and in two columns, measuring 6 (inner column) – 6.5 (outer column) × 21.5 cm each, in 40 lines per column. The title of the homily on the Dormition of Virgin Mary on f. 157v, which seems to exceed the written space in the upper margin, was written in Upright Ogival Majuscule.[28] I have not been able to identify the text on f. 157r and the lower part on f. 162r, column two, where Germanus' homily finishes and a new text begins, which continues on f. 162v. The most likely reconstruction seems to be that this bifolio made up the second and seventh folio of a quaternion, for two reasons.[29] First, the quantity of text missing between f. 157v and f. 162r supports this hypothesis. Second, the practice of mediaeval book production also supports it: a gathering normally begins with the flesh side of the parchment folio and its flesh side was followed by the flesh side and its hair side by the hair side. The annotation and the collation of the folios present in *Mirador* viewer encourage the reader to continue the process of decipherment on his or her own and make new discoveries.

THE RECYCLING OF THE PHILO MANUSCRIPT IN SOUTHERN ITALY

As we have seen before, the removal of unwanted or waste texts normally took place by washing rather than rubbing. Although some recipes survive,[30] we do not know exactly how it was carried out. The disbound parchment folios selected for reuse were normally already old objects and they had to be soaked for long enough to render the ink less visible and enable the parchment to host new texts. Such parchment sheets sometimes circulated separately in trade, and the reuse did not necessarily coincide with the place where the old discarded manuscript had been used.[31] However, it was perhaps more often the case that the old manuscripts were prepared for reuse in the scriptorium itself. In the process of the preparation of the parchment, small accidents sometimes happened. Vat. gr. 316 preserves an interesting piece of evidence of this.

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[26] Flavius Josephus, *Antiquitates Iudaicae* 18. 254–272; 19. 44–70 (ed. Niese), IV 186–189 and 218–223, (f. 157v) αὐτόκρατορ, εἶπεν,... ×... ταῦτ' ἐπράσσετο ἐπὶ (f. 162r) τῷ αὖθις καὶ τῇ ἀπ' αὐτοῦ ... ×... ἐπιτήδειον πράξει νομίζων.

[27] Galenus, *De locis affectis* (ed. Gärtner) *in media linea inc*. ἐπιστη>μονικήν p. 272,4, *expl*. κεκαῶσθαι 272,27, (f. 157v) *inc*. τὸ 272,27, *expl.* ἕλκωσις 274,22, (f. 157r) *inc*. οὐδέ>πω 274.22, *expl.* ἐκκρινομένων 276,16.

[28] Vat. gr. 984, ff. 162r+157v. *Encomium ad S. Mariam Deiparam a S. Germano archiepiscopo Constantinopolitano scriptum* (*BHG* 1119) in *PG* 98, coll. 340–348. (f. 162r, column 2): <Τοῦ ἐν ἁγίοις Πατρὸς ἡμῶν Γερμανοῦ ἀρχιεπισκόπου Κωνσταν>τινουπόλεως ἐγ|κώμιον εἰς τὴν ἁ|γίαν καὶ σεβάσμι|ον κοίμησιν τῆς| ὑπερενδ<όξ>ου ε<ὐ>|λογημένης Δεσποί|νης ἡμῶν Θεοτό|κου καὶ ἀειπαρθέ|νου Μαρίας… × (f. 157v, column 1) μεθ' οὗ καὶ σὺ συ<ν>|διάγωγος οὖσα |Θεοτόκε οὐκ ἀ|ποχωρίζη τ<ῆς>…

[29] The alternative option is that it was the second and ninth folio of a quinio. However, early codices more often consisted of quaternios. The quantity of the missing text is difficult to assess but it seems to have occupied at least four folios, i.e. two bifolios.

[30] Reed, *Ancient Skins and Leathers*, 156–157.

[31] Tchernetska and Wilson, The palimpsest in context, 260 and 265 fn. 88.

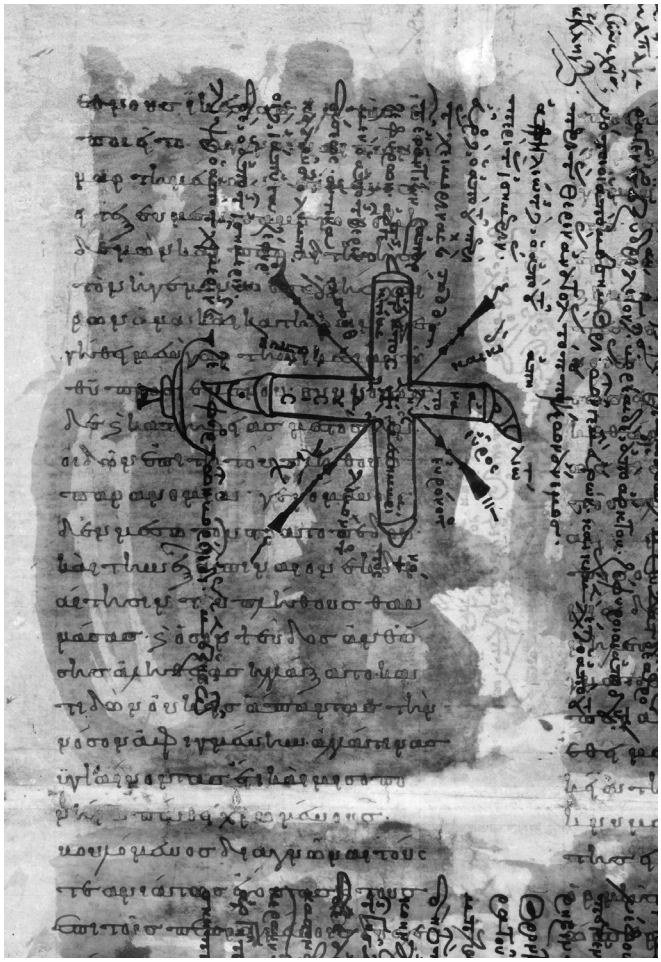

Fig. 4: Vat. gr. 316, f. 152v, rotated -90°, undertext (horizontal):
Philo, *De vita Mosis II*, 166–167 (ἔθνους ἱκεσίας… ἐπὶ τοῖς πεπραγμένοις δυσχε<ραίνοντας>, ed. Cohn, 238–239)
(© Vatican Apostolic Library)

Vat. gr. 316 contains various works of John Italus (11th century), a Byzantine Neoplatonic philosopher of Calabrian origin who later made his career in Constantinople.[32] Based on the characteristics of the writing style (*minuscola barocca*), this collection of puzzling philosophical questions and their solutions was copied in Salento (South Italy) in the early 13th century, together with another manuscript with almost identical contents.[33] The anonymous scribe recycled one codex into the new one in both cases.[34] The entire codex body of Vat. gr. 316 was copied on folded parchment sheets. All parchment folios of the codex body derive from a massive late 9th–early 10th-century codex which contained a full edition of Philo of Alexandria (ca. 20 BC – ca. 45 AD) (Vat. gr. 316, *inf.* 2), as the numbers next to the titles of each work demonstrate.[35] In the surviving fragments of Philo's works (*De vita Mosis*, *De decalogo*, *De specialibus legibus* I–II, *De migratione Abrahami*, *De Iosepho*), two hands can be distinguished.[36] Both used a very pure and elegant minuscule script from the late 9th or early 10th century. Majuscule letters do not infiltrate the script, accents and breathings are careful and systematic, iota adscript is not used. Philo's text was arranged elegantly in two columns (ruling type: 00C2),

[32] On Vat. gr. 316, see Mercati, *Codices Vaticani graeci*, I, 467–474. Arnesano, Aristotele in Terra d'Otranto, 153–155 with earlier literature. The most important studies on Philo's palimpsest are by Cohn, Ein Philo Palimpsest (on the script see 37–38); Mercati, Appunti dal palinsesto.

[33] On Vat. gr. 316, see above n. 32. The other manuscript is Marc. gr. 265 (*Diktyon* 69736). See its description by Formentin, I palinsesti greci, 160–162.

[34] The undertext of Marc. gr. 265 contains the homilies of Gregory of Nazianzus in minuscule script. *ibid*.

[35] Mercati, Appunti dal palinsesto, 489–493.

[36] Scribe one (Vat. gr. 316, ff. 94–101) and scribe two (all the rest).

measuring 7–7.5 × 25 cm each, with large margin (outer margin: 6.5–7 cm, inner margin: 2.5 cm), 35 lines in each column. As far as the quality of the text is concerned, the discarded works of Philo are very important, and constitute the earliest surviving witness to all the texts it contains.[37] The quality of the script, the parchment, and the text all lead to the conclusion that the recycled Philo codex was copied in Constantinople. The protective flyleaves of Vat. gr. 316 seem to be contemporary to the overtext of the codex body, and are also a palimpsest. The parchment bifolio that was added to the front of the codex (ff. III–IV) contains a letter of George Bardanes, the Metropolitan of Corfu, to Emperor Frederic II (1194–1250).[38] It seem that the scribe did not make much effort to remove the old text, but copied the new one right on top of it and produced something which is, strictly speaking, not a palimpsest but a rewritten (*rescriptus*) bifolio. At the end of the codex, another letter (f. 167) was inserted as a flyleaf, containing the story of a refugee from Calabria to the Greeks.[39] Interestingly enough, the text of one side was not removed and not rewritten (f. 167r) unlike the other side (f. 167v). Nevertheless, we can consider these two letters as testimonies for double recycling. Both were first recycled in the 13th century when the overtexts were copied onto parchment sheets that derive from a 10th-century manuscript that contains passages from the Old Testament.[40] Their second recycling served a protective purpose, probably when the manuscript was first bound in South Italy.

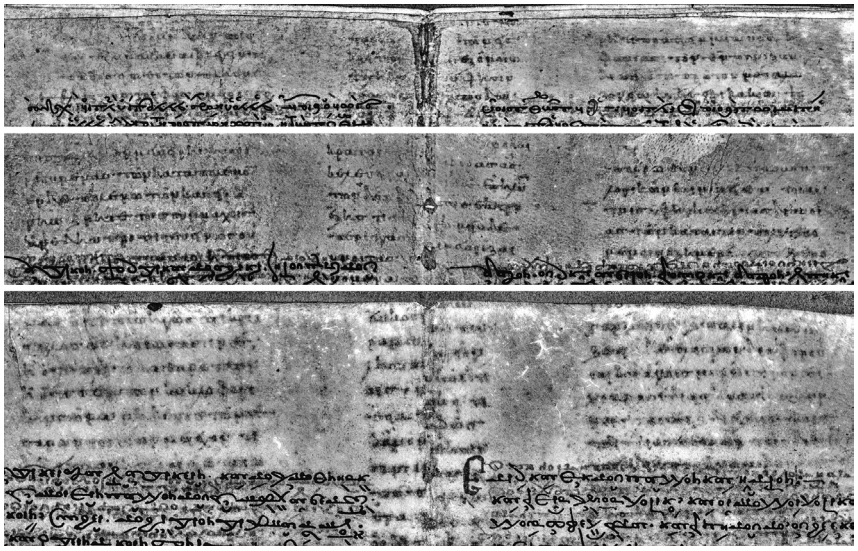

Fig. 5: The offset scripts in Vat. gr. 316 on the lower margins with 180° rotation (Top image: ff. 101v+94r, middle image: ff. 95v+100r, bottom image: ff. 96r+99v). Cf. transcriptions on Table 2 (© Vatican Apostolic Library)

In addition to recycling, Vat. gr. 316 offers a very illustrative case study of various methods used to facilitate the reading of the discarded texts. Angelo Mai used gallic acid to revitalize the faded lower script of Philo's texts—very often with success. We can see from the traces of Mai's intervention that the manuscript remained bound during his chemical intervention. In 1904, Vat. gr. 316 was disbound. Its bifolios were cleaned and treated with gelatine in many places to stabilize the condition of the manuscript, which had suffered damage from Mai's intervention. Eventually, the open bifolios of Vat. gr. 316, each comprising a folio of the recycled Philo manuscript (37.2 × 27.1 cm), were rebound following the sequence of the quires of the overtext, resulting in a disturbed textual order both for the overtext and undertexts.[41] The purpose of rebinding Vat. gr. 316 was mostly to facilitate the study of Philo's texts, especially in the folding where textual sections remained covered by the former binding but free of the effects of Mai's reagents. Today, the visualization option of *Mirador* viewer can help in reading both the overtext and the undertext according to the correct order of each. The correct order of the undertext, as in many cases, is included in the description of the contents of the undertexts. The collation of the actual manuscript also helps the reader.

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[37] Cohn, Ein Philo Palimpsest, 36–52; Id., Prolegomena, in: *Philonis Alexandrini*, v–vii; Mercati, Appunti dal palinsesto, 541–555.

[38] Acconcia Longo, Per la storia di Corfù, 210, 213–219, 224.

[39] Quaranta, Un'inedita fuga a Bisanzio.

[40] Vat. gr. 316, ff. IVr–v, IIIr–v: Amos 9, 11 (αἱ) - 15; Mic 1, 1–3, 11 (αὐτῆς); (f. 167r–v): Ezek 22, 22 (μέσω) – 23, 12 (στρατη<γοὺς>).

[41] On the date of rebinding of Vat. gr. 316, see Mercati, Appunti dal palinsesto, 544 fn. 2.

f. 101v (rotation 180°), offset, 1st column	f. 101v (rotation 180°), offset, 2nd column	f. 94r offset (rotation 180°), 1st column	f. 94r (rotation 180°), offset, 2nd column
Philo, *De virtutibus* 163, ed. Wendland, 317	Philo, *De virtutibus* 165, ed. Wendland, 318	Philo, *De virtutibus* 168, ed. Cohn, 319	Philo, *De virtutibus* 171–172, ed. Cohn, 320
<ποιεῖται> τῶν μὲν ἀναφλέγειν τὸ πάθος εἰωθότων, πλησμο<νῆς>	<illegible> <illegible> ψυχὴ <δὲ εὐχάριστος> <illegible>	<μηδὲν παραλιπόντα> τῶν εἰς <τὴν ἐνδεχομένη>ν ἐξομοίω- <σιν. ἐπειδὴ τοίνυ>ν, φησίν, <ἔλαβες ἰσχὺν παρὰ> τοῦ δυν- <ατωτάτου, μετάδος> ἄλλοις	… ὃς ἂν ἐγχει- ρῇ τι πράττειν μεθ’ ὑπερη- φανίας, “τὸν θεὸν παροξύνει” [172] διὰ τί; ὅτι πρῶτον μὲν ἀλα- ζονεία ψυχῆς ἐστι κακία, …

f. 95v (rotation 180°), offset, 1st column	f. 95v(rotation 180°), offset, 2nd column	f. 100r (rotation 180°), offset, 1st column	f. 100r (rotation 180°), offset, 2nd column
Philo, *De virtutibus* 153, ed. Cohn, 314	Philo, *De virtutibus* 155–156, ed. Cohn, 315	Philo, *De virtutibus* 157–158, ed. Cohn, 315	Philo, *De virtutibus* 160–161, ed. Cohn, 316
καὶ τὰς πόλεις, ἐν μὲν εἰρήνῃ προ- νοουμένας τῶν κατὰ πόλεμον, ἐν δὲ πολέμῳ τῶν κατ᾽ εἰρή- νην, καὶ μήτε τοῖς συμμάχοις ἀνέδην προπιστεύειν ὡς οὐ	…κραται<οτέραν δύναμιν.> [156] κελεύει γὰρ <τὰ νεόφυτα> τῶν δένδρ<ῶν ἐπὶ τριετίαν> ἐξῆς τιθη<νεῖσθαι τάς τε> περιττὰς <ἐπιφύσεις…>	<πρὸ καιροῦ πονηθῆναι> φοραῖς, ἃς <αἱ πάλαι κληματί>δες ἐπηχθ- <ισμέναι ῥίζαις αὐτ>αῖς ἐκτρύ- <χουσι τὰ στελέ>χη. [158] μετὰ δὲ <τριετίαν, ὅταν αἱ μὲν> ῥίζαι	πόρρωθεν <ἀναδιδάσκεται> λογικῶν ἐπιμελεῖσθαι. [161] τοιαύ- ταις ὑφηγήσεσι τὰς διανοί- ας τῶν κατ᾽ αὐτὸν πολιτευο- μένων ἐξημερώσας <ὑπεροψίας.>

f. 96r (rotation 180°), offset, 1st column	f. 96r (rotation 180°), offset, 2nd column	f. 99v (rotation 180°), offset, 1st column	f. 99v (rotation 180°), offset, 2nd column
Philo, *De somnis* 1.21, ed. Wendland, 194	Philo, *De somniis* 1.23, ed. Wendland, 194–195	Philo, *De somniis* 1.26–27, ed. Wendland, 195	Philo, *De somniis* 1. 28.3, ed. Wendland, 196
<εἴποιμεν>; ὅτι πεπηγώς ἐστι κρύ- σταλλος, ὡς ἠξίωσάν τινες; ἢ ὅτι πῦρ τὸ καθαρώτατον; ἢ ὅτι πέμπτον κυκλοφορι- κὸν σῶμα, μηδενὸς τῶν τεσ- σάρων στοιχείων μετέχον; τί δ᾽; …	ἐν κόσ<μῳ σώματος ὄντα, οὐ-> ρανοῦ, <ἄδηλα καὶ ἀκατά-> ληπτα, <στοχασμοῖς καὶ εἰκασί-> αις, οὐ <παγίῳ λόγῳ τῆς ἀληθείας,> <ἐφορμοῦντα· ὥστε > κἂν ὁμ<όσαι τινὰ θαρρή-> σαντα, <ὅτι θνητὸς οὐδεὶς> πώποτε <ἰσχύσει τούτων> ἐναρ<γῶς …>	<… γηράσ>κει, τε- <λευτᾷ, [27] διαλύεται, σα>φῶς <ἴσμεν…>	ἀνάρμοστος, καὶ πάλιν ἡ μὲν μεί- ζων, ἡ δὲ ἐλάττων· διαφέρου- σαι καὶ ἄλλοις μυρίοις, γένεσι, χρώμασι, <διαστήμασι, συνημμέναις…>

Tab. 2: Transcriptions of the offset scripts in Vat. gr. 316 (cf. Fig. 5)

Vat. gr. 316 also offers a riddle which has not so far been solved. In the detailed description of Vat. gr. 316, Giovanni Mercati and Franco de' Cavalieri noted that three bifolios of Vat. gr. 316 were double palimpsests and included an older and illegible layer under Philo's work which had been erased in the 13th century to make space for the work of John Italus.[42] Actually, this phenomenon is present in the entire quire ff. 94–101, which has fragments from the portion of the manuscript which preceded quires 37–46 and was copied by a similar but not identical hand. (The fact that all materials of a consecutive portion of a manuscript—in this case quires 37–46—are reused in another manuscript, namely in Vat. gr. 316, is a very rare case in palimpsests.) When studying these pages, I discovered that the third layer of minuscule texts which can be seen in three columns perpendicular to Philo's text are legible in offset. It is very difficult to read and identify these texts because the form of the letters is not sharp and only a few places allow precise textual identifications. I was able to identify fragments from Philo's three works (*De somniis*, *De mutatione nominum* and *De virtutibus*, cf. Tab. 2).[43] The few lines in the upper margins which allowed themselves to be identified seem to have been written by the same hand as the one which copied Philo's washed text on these four bifolios, and derive from the first—now lost—part of the original Philo codex. As it follows after the bifolio ff. 101v+94r, *De mutatione nominum* was followed by *De virtutibus*. After the process of washing the parchment writing surface—in my view,—the bifolios were left to dry on a horizontal surface, probably a table or a desk. The scribe of John Italus' texts apparently put the already-folded parchment sheets which had been recycled from the Philo codex right on the top of the open—and probably still wet—bifolios. One of the two writing surfaces (that of John Italus' text or that of Philo's underlying texts) was wet. The fact that the upper script is very stable makes it more a plausible hypothesis that the underlying writing surface was wet, since it is very difficult to copy onto wet parchment. Perhaps a liquid poured onto this surface or the cold and humid weather prevented the treated parchment sheets from drying as fast as the scribe expected. The disturbance of the unwanted transfer of ink did not compel the scribe to change the rhythm of copying in this quire. However, other quires of the same codex do not exhibit this phenomenon, although the scribe of the overtext is the same. As we have seen from the sophisticated contents and the very elegant script, the Philo codex came probably from Constantinople, but it may have arrived in Salento much earlier than the production of the actual manuscript as well. This discovery inspired the Stanford IT group to include the option of mirroring the current image as one of the image enhancement tools. This function will enable readers of the digitized Vatican manuscripts to read analogous phenomena.[44]

CONCLUSIONS

The pathway *Vatican Palimpsests: Digital Recovery of Erased Identities* makes manuscripts with recycled parchment surface more easily accessible to a wider readership. I hope that the scholarly narratives on palimpsests and the case studies presented in *Mirador* viewer will encourage deeper study of palimpsests in the Vatican Library and elsewhere. The online interaction between the reader and the images of manuscripts may produce other sets of interactions: dialogues between scholars of different backgrounds, and collaborative projects in which participants combine their expertise, as we have seen in the exemplary collaboration between scholars and IT experts in the Sinai Palimpsests Project.

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[42] Mercati, *Codices Vaticani graeci*, I, 474: 'ff. 94r, 101v, 95v, 100r, 96r, 99v iam paullo ante scripta fuerunt tribus columellis scripturae perpendiculatis: quid vero scriptum sit non adsequor.'

[43] The offset of an illegible one column Greek text in the bottom margin of Vat. gr. 316, f. 97v may derive from another codex.

[44] See, for example, the offset imprint of the ink from the lost fragment that had served as the earlier pastedown on the inside of the lower board of the previous binding in Vat. lat. 1116, f. 297v.

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