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Edited by
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Emiliano Fiori, Marilena Maniaci,
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COMSt

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Comparative Oriental Manuscript Studies Bulletin welcomes articles, project descriptions, conference reports, book reviews and notes on all topics connected with the written cultures of the Mediterranean Near and Middle East and related traditions or offering a comparative perspective. Contributions should be sent to Comparative Oriental Manuscript Studies, Hiob Ludolf Centre for Ethiopian and Eritrean Studies, Asien-Afrika-Institut, Universität Hamburg, Alsterterrasse 1, 20354 Hamburg, Germany; eugenia.sokolinski@uni-hamburg.de. For submission guidelines and former issues visit <https://www.aai.uni-hamburg.de/en/comst/publications/bulletin.html>.

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Contents

Editorial	5
Articles and notes	
<i>A New Arabic Nautical Manuscript in Lisbon</i> (Juan Acevedo)	9
<i>Comparative Hellenistic and Roman Manuscript Studies (CHRoMS): Script Interactions and Hebrew/Aramaic Writing Culture</i> (Drew Longacre)	37
<i>The Arabic Manuscripts of the Riccardiana Library of Florence and the Retrieval of Alessandro Pini's Allegedly Lost Collection</i> (Sara Fani)	81
<i>On Line Fillers in the Christian Medieval Central Asia Manuscript Tradition</i> (Floriana Marra)	99
<i>Writing and Correcting a Torah Scroll in Germany of the Thirteenth and Fourteenth Centuries</i> (Grzegorz Nehring, Olivier Bonnerot, Nehemia Gordon, Ira Rabin)	123
<i>The Chronicle of 'Āmda Šəyon and the Gadla 'Azqir: Some Linguistic and Philological Considerations</i> (Vitagrazia Pisani)	149
<i>Minbar, Shawl or Teeth? Triangular Tables in Arabic Manuscripts</i> (Lucia Raggetti)	173
Research projects	
<i>Bibliotheca Arabica—Towards a New History of Arabic Literature</i> (Stefanie Brinkmann and Nadine Löhr)	197
<i>An Infrastructure for Texts and Contexts: Qalamos—Connecting Manuscript Traditions</i> (Yoones Dehghani-Farsani, Michaela Hoffmann-Ruf, and Torsten Wollina)	207
<i>Early Jewish and Christian Magical Traditions in Comparison and Contact</i> (Joseph E. Sanzo)	217
<i>Letters to the Sheikh: Political and Economic Transformations in the Indian Ocean World as Reflected in the Letters to the 'Abriyin of al-Hamra' (Oman) during the Long 19th Century</i> (Michaela Hoffmann-Ruf and Johann Büssow)	235
<i>The Chronicle of John of Nikiu: Text-Critical Edition and Digital Research Platform</i> (Daria Elagina)	241
Conference reports	
<i>Networks of Manuscripts, Networks of Texts</i> . Amsterdam (online), 21–23 October 2020 (Gustavo Fernández Riva)	247
<i>Bridging the Gap with Linked Open Data. Linked Open Data for Written Artefacts</i> . Hamburg (online), 25–28 May 2021 (Pietro Maria Liuzzo, Daria Elagina)	252
Errata corrigere	255

Editorial

The first issue of the journal *Comparative Oriental Manuscript Studies Bulletin* (*COMSt Bulletin*) appeared in 2015 as a continuation of the *Comparative Oriental Manuscript Studies Newsletter* (ISSN 2078-3841),¹ which had accompanied the European Science Foundation Research Networking Programme *Comparative Oriental Manuscript Studies* (COMSt), with eight issues published between 2011 and 2014. The *COMSt Bulletin* emerged after the programme had successfully accomplished its main goal, the *COMSt Handbook*,² which has now become a classic of manuscript studies.

Starting from 2016, the continuation of the COMSt network activities (mainly the mailing list and the publication of the *COMSt Bulletin*) has been secured by the funding of the Deutsche Forschungsgemeinschaft through the Centre for the Study of Manuscript Cultures at Universität Hamburg, where the Sonderforschungsbereich 950 (Manuscript Cultures in Asia, Africa and Europe) was based until June 2020, and where the Cluster of Excellence 2176 (*Understanding Written Artefacts: Materiality, Interaction and Transmission in Manuscript Cultures*) has been based since January 2019. The premises of the COMSt editorial office were and remain at the Hiob Ludolf Centre for Ethiopian and Eritrean Studies of Universität Hamburg.

The *COMSt Bulletin* has thus served as a forum for the COMSt network until now. Its twelve six-monthly issues, from 1/1 (2015) to 6/2 (2020)—with one single double issue in 2016—have hosted contributions dealing with the whole spectrum of comparative manuscript studies with a format and from the perspective that has been a successful brand of COMSt. Longer and shorter articles, project presentations, conference reports, and reviews, which discuss or touch upon the codex cultures as their focal point, yet without excluding any closely or less closely related topics that provide input for the comparative approach, be it in the realm of codicology, palaeography, textual criticism, cataloguing, scientific analysis, and digital approaches, have kept on giving flesh and soul to the COMSt network community, that has showed continuous and even growing interest and appreciation for the journal.

1 See <<https://www.aai.uni-hamburg.de/en/comst/publications/newsletter.html>>.

2 A. Bausi, P. G. Borbone, F. Briquel Chatonnet, P. Buzi, J. Gippert, C. Macé, M. Maniaci, Z. Melissakes, L. E. Parodi, W. Witakowski, with E. Sokolinski, eds, 2015. *Comparative Oriental Manuscript Studies: An Introduction* (Hamburg: Tredition, 2015). See also <<https://www.aai.uni-hamburg.de/en/comst/publications/handbook.html>>.

As a part of this development, in some cases, contributions have been grouped in thematic and monographic issues—for example, 4/1 (2018), the proceedings of the conference *Linking Manuscripts from the Coptic, Ethiopian, and Syriac Domain: Present and Future Synergy Strategies* and the forthcoming issue with edited papers from the conference *Neo-Paleography: Analysing Ancient Handwritings in the Digital Age*.

Another development, reflecting the international academic recognition of the journal, has been its inclusion in a series of qualifying journal listings, which also make the publication in the journal particularly attractive for scholars. Thus, it has been included in the catalogue of scientific journals acknowledged by the Italian National Agency for the Evaluation of Universities and Research Institutes (since 2018), the Danish Bibliometric Research Indicator (BFI, since 2019), the Directory of Open Access Journals (since 2021) and in the Scopus® Expertly Curated Abstract & Citation Database (since 2021). It is expected to also be indexed by the Scimago Journal & Country Rank and by the EBSCO Information Services in the coming months.

The editorial board of the journal has also undergone some restructuring due to the actual availability of the editors; beginning with the present issue—in addition to Alessandro Bausi, Paola Buzi, and Marilena Maniaci, with Eugenia Sokolinski as editorial secretary—Javier Del Barco and Emiliano Fiori have joined the board and bring in their ideas, energy, competences, and enthusiasm.

Acknowledgements, expectations, and new ambitions go along with new challenges and standards. Inclusion in authoritative rankings imposes an even more rigorous and systematic editorial process. Therefore it has been decided, beginning with issue 7 (2021), to publish one larger volume yearly (in addition to possible monographic issues, which may be introduced on top of schedule). As before, the journal structure foresees research articles, notes and miscellanea, project presentations, conference reports, reviews and review articles, while broadening the comparative perspective and allowing more articles from fields that are not strictly limited to ‘oriental’ (in the COMSt sense of the term, standing for ‘all non-Occidental (non-Latin-based) manuscript cultures which have an immediate historical (‘genetic’) relationship with the Mediterranean codex area’), or not strictly or exclusively related to manuscript studies.

The *COMSt Bulletin* editorial board is well aware that one of the positive features of the journal has been the quick turnover, resulting in a relatively short gap between submission and publication. In order to avoid any delay with the new format, accepted and peer-reviewed contributions are now pre-published online with a DOI reference and attribution to the yearly issue, in their final layout and with a preliminary pagination, as soon as they have passed all steps of

the review and editorial process.³ All contributions of each issue then receive an additional pagination when the yearly issue is closed and published. As before, in addition to being published online, all journal issues are available as print-on-demand.

We are confident that the new format of the *COMSt Bulletin* will attract even more contributions and that the journal has all the requirements to present itself as a top journal in the field of comparative manuscript studies, which the COMSt initiative has contributed to promote and establish as one of the most vibrant fields of research of the last decades in the humanities. We believe that the present issue is proof that we are on the right way.

The Editors

3 On the Online First service, see <<https://www.aai.uni-hamburg.de/en/comst/publications/bulletin/onlinefirst.html>>.

Articles and notes

A New Arabic Nautical Manuscript in Lisbon

*Juan Acevedo, University of Lisbon**

A previously unstudied Arabic nautical autograph manuscript has been recently brought to light in Lisbon. An early nineteenth-century bundle including at least three distinct works in almost one hundred leaves, it contains stellar route bearings and coastal descriptions, extensive astronomical, geographical, and traverse tables, in addition to a number of Islamic ethical sections and Sufi prayers. While the textual tradition remains inconclusive, authorship rests partly with an 'Abd Allāh b. Aḥmad b. 'Abd al-Razzāq, from Šūr. The main physical and textual features are given here to lay the ground for further study.

Preliminary work by the *RUTTER* project team in Lisbon¹ has brought to light a remarkable Arabic nautical manuscript,² which must count as one of the most valuable in the largely unexplored Orientalia collection of the Biblioteca Nacional de Portugal (BNP). It was acquired by the Library in the early twentieth century and shelf-marked Or. 2. Its content could be characterised as an intermediate stage between fifteenth and sixteenth-century nautical works (Aḥmad b. Māğid; Sulaymān al-Mahrī), and the later eighteenth and nineteenth-century Gujarati *mālam-nī pothīs* ('books of the captain').³ This manuscript stands out as a unique witness to the survival of the Arabic nautical tradition and its gradual incorporation of western techniques. The following pages introduce the manuscript, preparing the ground for further specialised work while drawing attention to passages of particular interest.

Physical description

Ms Lisbon, BNP, Or. 2 is not a codex *stricto sensu* but rather a bundle consisting of an unbound stabbed-sewn⁴ stack of 89 paper folia numbered 1 to 94 (foliation skips from f. 24 to f. 26 and from f. 50 to f. 56; f. 82 is counted

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1 The project *RUTTER: Making the Earth Global* has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement no. 833438).

2 I am most grateful to our colleague Carlos Neves, who brought the manuscript to my attention and took a first set of pictures. I would also like to extend warm thanks to the staff of the Rare Book and Manuscript Reading Room at the Biblioteca Nacional, Lisbon, who have been unfailingly courteous and forthcoming at every step.

3 Sheikh 2009, 68. For a recent overview, see Acevedo and Bénard 2020.

4 On stabbed-sewn manuscripts, see Scheper 2015, 71.



Fig. 1. MS Lisbon, BNP, Or. 2: block on the left (f. 94v), first detached folium (f. 1r) at the centre, inset bifolium on the right.

twice) plus six detached leaves. Of these latter, two are illustrations detached from the main block, two are what I call here ‘flyleaves’, and two are a bifolium which I call ‘the inset’ (fig. 1). That is, in total, 95 folia of text and illustrations.

The trim size of the textblock is 290×188 mm. The outer edges show signs of having been trimmed with a power cutter, damaging and making unreadable some of the fortunately infrequent marginalia. The inset bifolium page measures 310×210 mm and its edges are untrimmed.

In spite of the size differences, the paper used in the bundle is all equally watermarked with the *tre lune* motif (fig. 2), except for the flyleaves which use swan watermarked paper (fig. 3), and ff. 76r–82v, which have a coat of arms mark. The texture of the inset is slightly more felty, and the hand and the ink are different from the main textblock—it seems evident that it did not originally belong to the block.

The *tre lune* or ‘three crescents’ watermark (Arabic *waraq hīlālī*),⁵ indicates broadly an origin after the sixteenth century.⁶ This particular design looks very similar to the production of an eighteenth-century Toscolano paper mill.⁷ I have not been able to identify the sharp-beak swan of the flyleaves.

The textblock written area is framed with double red lines about 10 mm off the paper edge. Pages have normally 26 lines of text, going down to 24 and

5 See Bloom 2008, 50.

6 Lewincamp 2012, 99–100.

7 Information from the Bernstein Project portal, s.v. ‘tre lune’ (<www.memoryofpaper.eu/BernsteinPortal/>).

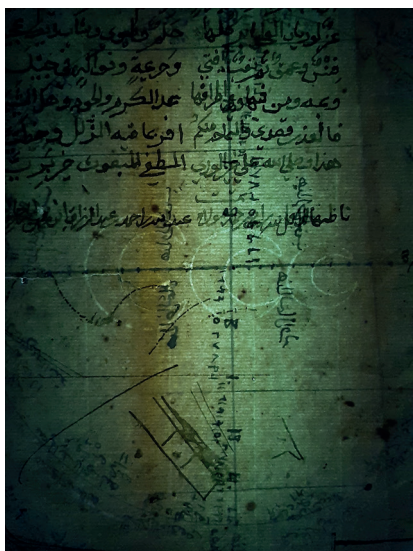


Fig. 2. MS Lisbon, BNP, Or. 2, f. 94r, 'three crescents' watermark.

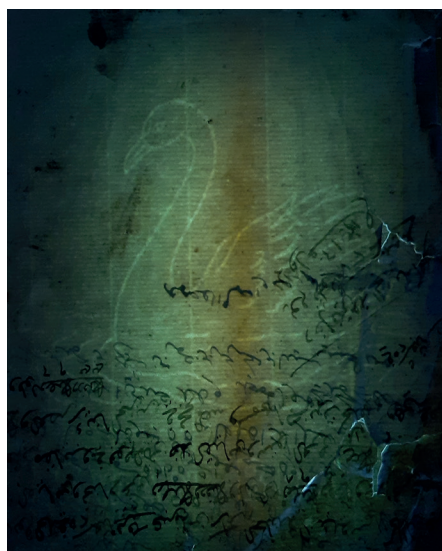


Fig. 3. MS Lisbon, BNP, Or. 2, flyleaf 1 watermark.

up to 28 lines on occasion. The foliation looks modern, written with pencil in European numerals; I would assume it was added upon acquisition by the BNP.

There are frequent smudges throughout the text, and occasionally stains of a greasy substance, but readability is seldom impaired.

Palaeography

Five different hands can be identified in the bundle: one in the textblock (including the two loose folia), one in the flyleaves, two in the inset, and one in an interpolated set of tables (76r–82v). The first four are in a somewhat coarse plain Naskh, with rubrication throughout, mostly for sectioning and to highlight tabulated information, but also haphazardly ornamental. The flyleaves are in a hurried and lighter Naskh hand, and I shall comment on them later.

Letters are occasionally lacking diacritical dots and only rarely display vocalization in red. *Tā maftūḥah* instead of *marbūṭah* is prevalent (e.g. *pas-sim*, *ḡazīrat* for *ḡazīrah*), just as *alif ṭawīlah* is often found instead of modern spelling *maqṣūrah* (fig. 4).

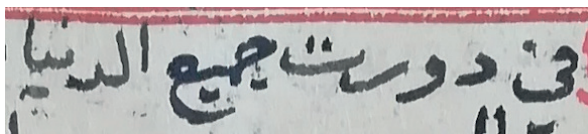


Fig. 4. MS Lisbon, BNP, Or. 2, f. 4r: *tā maftūḥah* example: *fi dawrat ḡamī' al-dunyā*.

Contents

There is no title page proper in the manuscript, but we have three ‘first’ pages where a title is given (1r, 31r which bears a little decoration, and 84r), and five colophons (10v, 11v, 28r, 90v, 94v). This discrepancy, as will be shown later, already alerts us to the fact that the manuscript bundle is far from being a coherent textual plurality. Breaks in the page sequence are apparent; it is obvious that to a certain extent there has been mispagination; and my preliminary attempts at reconstructing the page sequence make me strongly suspect that some pages are missing. It is in good part thanks to the well-sewn folia with their late-pencilled foliation, and thanks to the neatly trimmed edges that a unitary impression is conveyed; the other part of this impression is rightly owed to the mostly homogenous handwriting. My assumption is that we deal with a collection of three or more works of practical nautical, geographical, and religious use, which were copied together in the early nineteenth century. They must have been only bound together some time after they had been in use, certainly before their arrival at the BNP in the early twentieth century, which would explain the damage to the spine of the textblock. In contrast, the good state of the block edges seem to indicate that the trimming was done around the time of acquisition by the Library.

I have not tried to unravel the composition conundrums posed by the manuscript, since that would have demanded a study beyond my remit. What I shall do now is to give an overview of the contents in some detail, discussing some of the most interesting authorial and bibliographic issues raised.

Starting from the current arrangement of the material and staying close to it, while also introducing some expositional ordering, I will start with the detached folia, and then use as headings and sectioning references the three titles mentioned in the manuscript, namely (1) *Salwat al-mahmūm wa-al-‘iṭr al-mašmūm fī ‘ilm al-mubārak ‘alā al-‘alāmāt wa-al-mağārī wa-al-nuğūm* (‘The Solace of the Distressed, and the Fragrant Perfume on the Blessed Science of Seamarks, Routes and Stars’), ff. 1r–30v; (2) *Farağ al-sā’ilīn wa-qiblat al-muṣallīn* (‘The Relief of Those Who Ask and the Qiblah of Those Who Pray’), ff. 31r–83r; (3) *Ḍaw’ al-qamarīyah* (‘The Radiance of the Moon’), ff. 83v–90v.

Flyleaves

Both flyleaves have similar contents, yielding precious information about the manuscript. Because they are both similar, it is easy to imagine them as the two ends of what must have been a somewhat unitary bundle of sailing instructions, hence my calling them flyleaves. They have the same paper, as mentioned above, different to the sewn textblock, and they are by the same hurried hand (fig. 5).

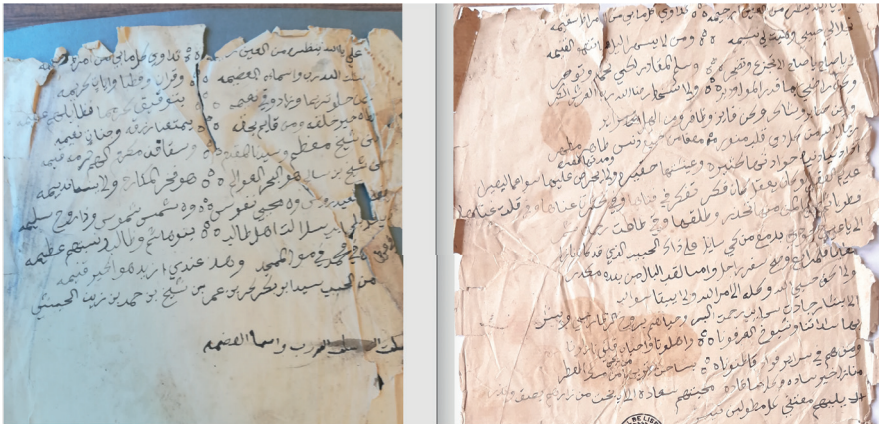


Fig. 5. ms Lisbon, BNP, Or. 2, flyleaves 1r and 2r: Sufi prayers.

Flyleaves are both badly creased on the edges, partly broken and stained. On the recto, each one has verses from a well known Yemeni Sufi prayer, *A-lā yā Allāh bi-nazrah min al-‘ayn al-rahīmah* (‘O dear God for a glance of your merciful eye’). This devotional *qasida* by the Yemeni Sufi master ‘Abd Allāh b. ‘Alawī al-Ḥaddād (1634–1720) has been popular for centuries and it is still sung today throughout the Indian Ocean shores, from Aden to Indonesia.⁸ This very well attested authorship is one of several chronological indicators, setting a useful *terminus post quem* for the flyleaves.

One of the verso pages (flyleaf f. 2v) contains six lines of text mentioning a passage in the month of Šawwāl 1317 (*c.* February 1900),⁹ from Ras Madrakah, Oman, to Mumbai, with coordinate values given using Greenwich longitude, unlike all other longitudes in the manuscript, which use a westerly ‘Ptolemaic’ prime meridian. This date, *c.* 1900, is the latest of the several dates given in the manuscript. An unusual table of twelve rows and the following thirteen columns: 1–days of the week, starting on the first row with *yawm al-arba‘ā* (Wednesday); 2–month (*šahr*, possibly lunar day); 3–*rūz* (‘day’ in Persian,¹⁰ values obtained by adding thirteen to the previous cells); 4–*nayrūz* (the values, around 180, would seem to be the count of days in relation to the beginning of the year); 5–inclination (*al-mayl*); 6–sextant (*kamāl*); 7–??

8 al-Ḥaddād n.d., 258–261.

9 I shall be using henceforth the date converter created by J. Thomann and hosted at the University of Zurich (<<https://www.aoi.uzh.ch/de/islamwissenschaft/hilfsmittel/tools/kalenderumrechnung/hegira.html>>).

10 With thanks to Razieh-Sadat Mousavi (Humboldt-Universität zu Berlin) for various helpful suggestions reading this table.

Fig. 6. MS Lisbon, BNP, Or. 2, flyleaf f. 2v: table.

(*ṣāfiʿ*??); 8–divider/partition?? (*fāsil*??); 9–departure (*masāğ*);¹¹ 10–longitude (*tūl*);¹² 11–load?? (*himla*??); 12–?? (*naklī*??); 13–a formula is repeated in every cell of this column: *Allāh a‘alam bi-l-ṣawwāb* (‘God knows best with precision’; fig. 6). The impression is certainly not that of an astronomical or geographical table, but rather that of some type of captain’s or general shipping log.¹³

The other verso page (flyleaf-1v) mentions in the central text a trip from Koyilandy, just north of Kozhikode (Calicut), to the island of Kalpeni in the

11 Al-Hijji 2013, 38. See also below, under Traverse Tables.

12 The values given are not longitude values in our geographical understanding of the term, but they might refer more literally to the length of distance travelled, or the length overall of a vessel.

13 I am most grateful to José Manuel Malhão Pereira, Henrique Leitão and other colleagues from the RUTTER project, and to Joaquim Alves Gaspar of the Medea-Chart Project, who have generously offered their time to help me make sense of these and other intricacies of the manuscript which are beyond the knowledge of a landlubber.

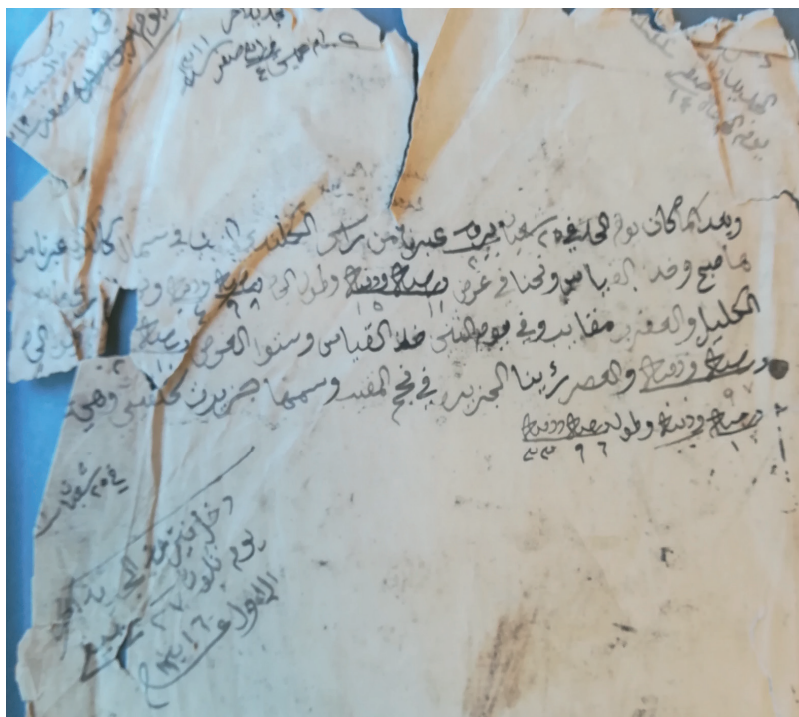


Fig. 7. MS Lisbon, BNP, Or. 2, flyleaf f. 1v before restoration.

Lakshadweep archipel, taking ‘the route between Iklīl and Scorpio’, i.e. between SW and SbSW according to the Arabic stellar compass rhumbs;¹⁴ the year is illegible. Notes on the corners give some more dates of interest: 1–‘the new Nayrūz¹⁵ entered for the next year on 4 Safar 1311’ (24 August 1893); 2–‘on 25 Ša‘bān 1311’ (3 March 1894); and 3–‘the new Nayrūz entered on Tuesday 27 Rabi‘ al-Awwal 1316’ (15 August 1898).

My current assumption, given the state of the paper, the quality of the handwriting, and the contents, is that these two ‘flyleaves’ were at some point used as wrappers or soft covers for the textblock. If such were the case, they would be a testimony, and indeed a dated testimony, to the practical nautical use of the manuscript over a period of time, from 1893 to 1900 (fig. 7).

Inset

This bifolium contains in the inner spread (ff. 1v–2r) a remarkable set of colour illustrations of the relative positions of the boat and the sun, giving the

14 Staples and Al Salimi 2019, 400.

15 About these and similar Nayrūz dates, see my notes below under End Matters.



Fig. 8. MS Lisbon, BNP, Or. 2, bifolium illustrations: solar altitude guidelines.

basics of a ‘regiment of the sun’—solar altitude guidelines. There are four frames on each page, with two panes each and a central dividing line, and varying possible positions. Each frame has an explanatory headline. On the outer margin there are some calculations or values labelled *al-kamān* (a sextant)¹⁶ with columns for degrees and seconds (fig. 8).

The first frame, by way of example, reads: ‘When the sun is north of the line and the boat south of the line from you, you have to deduct the inclination from the sextant (*kamān*), and the remainder is the latitude you want’.

The first recto of the bifolium presents us with what appears to be a modern-day traverse table and instructions for its calculation, with the heading: ‘Knowledge of the usage of the constants (*qawā'id*), made clear by the table for the calculation of the advance (*mašāt*)’.

The last verso is a full running text page commenting on the solar positions as per the illustrations above.

Salwat al-mahmūm

The full title of this treatise presents us with a conundrum. Brockelmann registers a suggestively similar title in Mosul, *Fikrat al-humūm wa-al-ḡumūm wa-al-‘iṭr...* (‘The Reflection on Sorrows and Afflictions, and the Fragrant Perfume...’), listing it among the works of Aḥmad b. Māḡid, the doyen of pre-

16 For this instrument, and its identification with the *kamāl*, see De Hilster 2018, 129–134.

modern Arabic nautical literature,¹⁷ but I have been unable to find any mention of it anywhere else, even though there is a sizeable body of Ibn Māğid related literature by now. More remarkable still is that the most likely source for Brockelmann in this case, the Iraqi scholar Dāwūd Çelebī, mentions what must be a copy of our *Salwah* in a 1931 article titled *Abnā' Māğid al-nağđīyūn* ('The Two Nağđi Ibn Māğids').¹⁸ Çelebī describes a manuscript collection of nautical writings, observing that 'it seems to be an important work'; moreover, he quotes a few lines of the text which match the contents of our manuscript¹⁹ and which parallel the contents of chapter 9 of Ibn Māğid's *Fawā'id fi uşūl 'ilm al-baħr* ('Useful Notes on the Principles of Maritime Science'). The text described by Çelebī matches the description and excerpts of a manuscript he had mentioned earlier in his comprehensive survey of manuscripts in the region.²⁰ Unfortunately, I have not been able to confirm the existence of this manuscript in Mosul after the ravages of 2015. If the identity between our text and that of the Mosul manuscript seems warranted by Çelebī's description, the attribution to Ibn Māğid seems much more difficult to establish with certainty, but I shall leave further authorship considerations for my conclusion, once I have presented in more detail the contents of the manuscript.

Apart from this Mosul witness, and as I shall mention below, there seems to be a second closely related manuscript in Cairo, for which we have a catalogue entry without title. Finally, as a fourth witness to a similar text, Ḥasan Şāliħ Şihāb published in 1984 a small book on a Kuwaiti manuscript with a very similar title, *Furğat al-humūm wa-al-ğumūm fī al-'alāmāt wa-al-masāfāt wa-al-nuğūm* ('The Relief of Sorrows and Anxieties by the Seemarks, Distances and Stars').²¹ Şihāb explains that only 35 leaves are extant and he gives a summary of the contents, which parallel the contents of our manuscript closely, even in the fact that they include sketches and tables. Unfortunately, I have not been able to identify, in the pages reproduced by Şihāb, any passage in MS Lisbon, BNP, Or. 2. I wonder if the differences in the title wording, and perhaps also in the contents, might not indicate that both Arabic texts are translations of an original in another language. This would be an extremely interesting case—unlikely when we remember that the formal and thematic precedents for this literature in this region are precisely Arabic-language precedents—but I would not discard this possibility without first examining at least the Cairo manuscript.

17 Brockelmann 2012, 239.

18 Çelebī 1931, 1–5.

19 Digital edition of the journal at <<https://al-maktaba.org/book/32106/5829>>.

20 Çelebī 1927, 280, par. 67.

21 Şihāb 1984. I am grateful to the Library of the Oxford Centre for Islamic Studies, who granted me digital access to this title in the middle of the Covid pandemic.

The text on f. 1 starts abruptly in the middle of what seems prefatory material, speaking about the wonders of the natural world and tracing the origins of nautical sciences and geography to Noah. Worthy of note, as one of the spelling oddities found in the text, is the mention of Gog and Magog as *Ġāḡūḡ wa-Māḡū* (initial *ḡīm* and final *‘ayn*). On line 18 the title of the work is given, and then the topics to be treated are mentioned in more detail:

... the science of seamarks, of stars, routes; the calculation of the famous lunar stations; the zodiac signs mentioned in the book of God; the months and days and hours, and the increase of night and day and the movement of the sun in the tropic; the calculation of the four seasons; knowledge of the four cardinal directions, and the apportioning of latitude and longitude for all countries.

This synoptic introduction is wrapped up at the end of f. 1v with a Qur’ānic citation and a hadith, then eleven verses beginning *Ammā al-manāzil wa-al-burūḡ qad dukirat* (‘The lunar stations and the zodiac signs have been mentioned’), and a request for prayers from the reader.

The first pages give, in brief sections (*abwāb*), basic astronomical information, such as the sequence of the zodiac signs, their correspondence with the seasons, and an enumeration of the 32 rhumbs of the stellar compass used by the Arab sailors. On f. 4r there is an obvious break, evidence of either lost folia or mispagination which I have not been able to rectify. The following pages start listing sailing routes ‘throughout the world’, and in this, as mentioned above, they follow very closely Chapter 9 of Ibn Māḡid’s *Fawā’id*;²² this means they start from Ras al-Hadd on the Omani coast, go down the Yemeni coast to Bab el-Mandeb and along the Red Sea coast, even mentioning Suez as the northern limit. The East African coast down to Ethiopia, with an excursus on the African peoples, and another on the general boundaries of the Mediterranean. Then the ports around the Persian Gulf are mentioned. On f. 7r, routes are described in some more detail, e.g. from Ṣūr (Oman) to Basra, giving indications regarding the stellar rhumbs. From f. 8r indications for routes to the Swahili Coast are given, then towards Madagascar and the Khambayat coast (Madhavpur, Surat) and down to Mumbai. On f. 10r we have again a sort of ‘sun regiment’, instructions to determine the ship’s position by using a sextant (*kamān*) to measure the solar altitude. Very interestingly, right after these instructions we find a reference to Abū ’l-Fidā’ (d.1331) and to al-Mas’ūdī (d.956), who certainly did not possess the same kind of instrument.²³ On f. 7v, we have finger (*banān*) measures of the Polar Star altitude for vari-

22 See Ibn Māḡid 1971, 265–288; Tibbetts 1981, 204–207.

23 There is some historical conflation between a wooden quadrant and the modern sextant proper, both called *kamāl/kamān* in Indian and Arabic sources; see De Hilster 2018, 134.

ous locations; starting with Basra and ending with Hirab on the Somali coast, near Mogadishu. It should probably be considered relevant in terms of dating that the Hirab Imamate had its heyday between late seventeenth and late nineteenth century.

The end of this folium (f. 10r) is important in relation to the authorship of the manuscript. We have here the first of several ‘colophons’ (or some sort of colophon material) mentioning the name which comes up repeatedly as the copyist or compiler or even author of the text, ‘‘Abd Allāh ibn Aḥmad ibn ‘Abd al-Razzāq ibn al-Šayḥ Muḥammad ‘Abd al-Malik ibn ‘Abd al-Ḥaqq Abā Raḡā’, Ġaḥfalī by family name, Šafi‘ite, dwelling in Sur, the pilot (*al-mu‘allim*)’. The only record I have found for a person with this name comes from an encyclopedia of Shiite scholars, where ‘Abd Allāh ibn Aḥmad ibn ‘Abd al-Razzāq, characterised as in our manuscript, is mentioned as the author of *al-Mawlidīyah*, a collection of songs for the Prophet composed in AH 1254 (c. AD 1838).²⁴ This year tallies, as will be seen, with the different dates given through MS Lisbon, BNP, Or. 2, and it is the most direct historical reference we have. In fact, on f. 10r he appears as a copyist, his name introduced by the customary *bi-ḥaqq*, ‘by the writing of’, and a date is given at the end: Šawwāl 1239 (c. June 1824). An almost identical ‘colophon’ ending is given on f. 11v, after a section on anchorages. These two final-looking pages include some advice for pilots:

to be successful on a boat trip, the first thing is to consider the bad and the good traits of the people on board... the destination star upon which you calculate your rhumb... precaution and attention to trouble with the cargo... Some ships were lost because they did not have judgment, like an undiscerning child... then fear comes and shakes the heart like a leaf under the wind.

From f. 12r to f. 27r we have an uninterrupted series of geographical tables, under the heading, ‘Name, latitude and longitude of the locations of the Arabs and East Africa’. There is no f. 25, but it looks like a simple foliation mistake. The first entry is Ra‘ṣ Ḥawr al-Bašrah, ‘the head of the bay of Basra’, and the last one is Šiḥr, on the southern coast of Yemen. Latitudes are usually off modern values by only 10–20 minutes, but longitudes are off by 22°–23°, i.e. they use some sort of Ptolemaic prime meridian; the values above would indicate Cape Verde.²⁵ I have done a preliminary and very partial collation of latitude and longitude values, and the coordinates given in general are not Ptolemaic, and they also are not in agreement with any of the astronomical manuscript sources gathered by Edward Stewart Kennedy and Mary Helen

24 Tehrani n.d., 104–105.

25 Regarding generally this question of the meridian used by Arab navigators, see Mercier 2020.

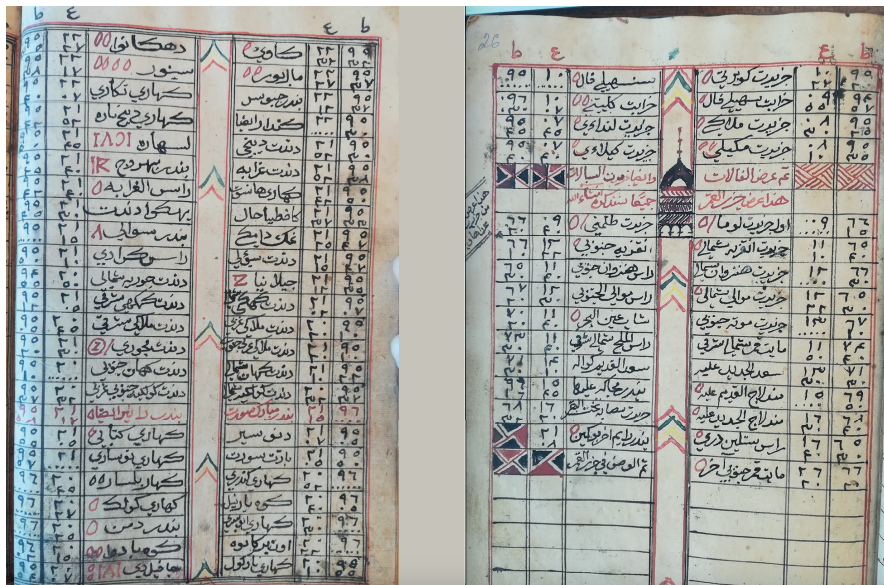


Fig. 9. MS Lisbon, BNP, Or. 2, f. 21v and 7. 26r, geographical tables.

Kennedy.²⁶ The values in our manuscript seem to be fresh measures, or perhaps they simply belong to a nautical corpus which has yet to make it to some sort of systematic catalogue. Perhaps—and I speculate on the practical usage of the manuscript—some cells in the tables are empty as if waiting to be filled during a trip. In any case, as the illustration shows, the tables have occasional decoration and profuse rubrication throughout, excepting the last two pages (ff. 26v–27r) which are in black ink only (fig. 9).

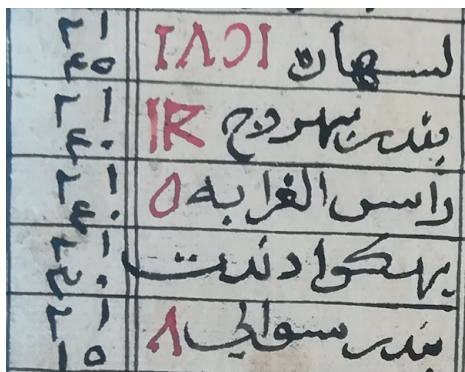


Fig. 10. MS Lisbon, BNP, Or. 2, f. 21v, un deciphered table figures.

26 Kennedy and Kennedy 1987.



Fig. 11. ms Lisbon, BNP, Or. 2, f. 30r, perim contours vs. Google Earth image (N is down).

F. 21v is notable for the enigmatic signs found in several cells next to the location names (fig. 10). They are in red ink and look like variants of Indo-Arabic numerals.²⁷ The question raised is why use them in this way, right next to the fully functional set of numerals used for all the coordinate values? Nothing in the cell contents seems to warrant the difference.

After the geographical tables, from f. 27v, we have seven pages with mixed contents: determination of anchorages on the Malabar Coast, a section on seamarks near Goa, astronomical indications for routes involving Mumbai and other locations on the Konkan Coast. On f. 30r there is a description of a trip near Aden, with a sketch of Perim Island including depth soundings (fig. 11).

Finally, f. 30v presents us with a truly remarkable glimpse into the transmission of scientific knowledge through Indian Ocean cultures. This page has the heading *Ṣifat kitāb al-anqrīz ḥisāb wa-‘adaduhum* (‘Description of the English writing, its reckoning and its numerals’)²⁸ and it is a basic introduction to the shapes of European Indo-Arabic numerals and to the names of months and weekdays, not only comparing them with Arabic but also with Gujarati (fig. 12).

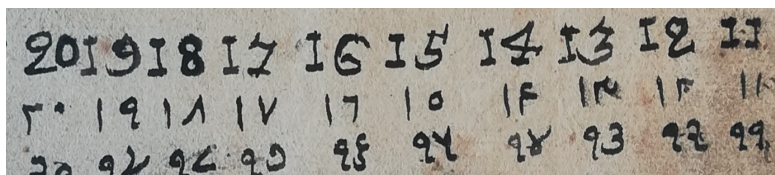


Fig. 12. ms Lisbon, BNP, Or. 2, f. 30v, ‘English’, Arabic, and Gujarati numerals from 11 to 20.

27 I am grateful to Charles Burnett of the Warburg Institute for his help with this particular set of symbols.

28 Regarding the highly unusual *anqrīz* or *anqarīz* for ‘English’, possibly influenced by Gujarati and Hindi, see ‘Ubūdī 2005, II, 319–320.

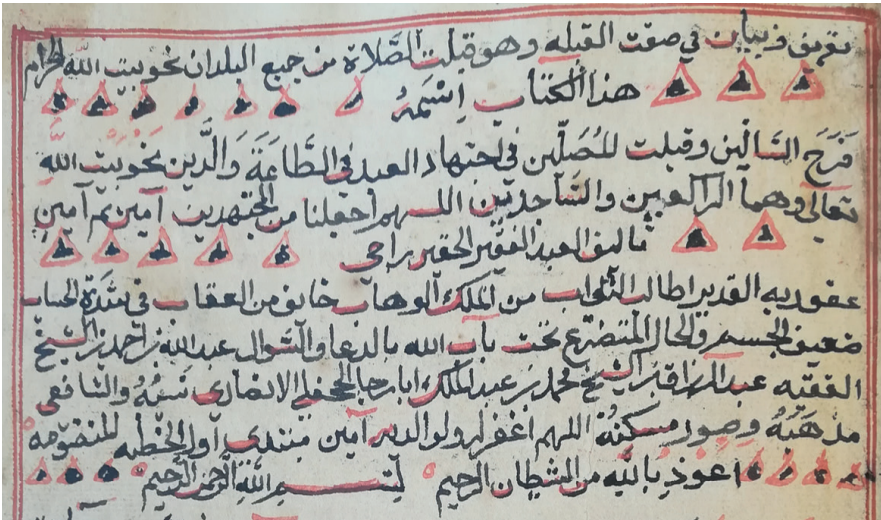


Fig. 13. MS Lisbon, BNP, Or. 2, f. 31r, *Farağ al-sā'ilīn*, title page.

Standing alone within the manuscript, this page contents is barely related to the remaining folia other than as a key to reading the data. However, it is a striking testimony to the particular historical period of authorship and also to the geographical sphere of activity. The now mildly amusing fact of calling European numerals ‘English’ would indicate a period of redaction around the major British expansion in the region; we may remember that the rule of the East India Company on the Indian subcontinent dates from *c.* 1757, and that the Persian Gulf Residency began in 1763. Bringing into focus Gujarati numerals, months and weekdays testifies, much more than other general hints found in the manuscript, to the intensity of relations of every kind between the Arabian Peninsula and Gujarat. I expect that detailed comparative work shall bring to light numerous commonalities between our manuscript and the as yet little studied traditions of Gujarati *mālam-nī pothīs*,²⁹ or pilot manuals, and others such as Malayalam nautical literature.³⁰

Farağ al-sā'ilīn

This is the only title page proper in the bundle, and the only work of clearly explicit authorship by ‘Abd Allāh ibn Aḥmad ibn ‘Abd al-Razzāq (fig. 13).

‘Some of my brothers have asked me to explain what would provide ease and solace from among beneficial writings, and the answer to that is the knowledge of the direction (*qiblah*) of the House of God, the sacred Kaabah,

29 Goswamy 2006.

30 Varadarajan 2004.

which is the direction of the canonical prayer'. In tune with these opening lines, the treatise is a gazetteer of geographical coordinates and qiblah bearings for a long list of locations, starting with the coordinates of Mecca, going down the Red Sea coast and then turning to the Persian Gulf shores. Being part of a genre which exceeds the geographical boundaries of the Indian Ocean pilots and their nautical gazetteers, our listing then reaches as far north and inland as Cairo and Jerusalem. Locations on the southern Yemeni coast are also included, then as far south as Zanzibar and Madagascar, and finally Indian locations: Rajapur, Kozhikode, Sri Lanka. And so this small and specific work, 'by the pen of the author himself 'Abd Allāh ibn Aḥmad ibn 'Abd al-Razzāq', comes to a close with a colophon on f. 35r, dated in Ramadan AH 1243 (around AD April 1827).

The next page contains what might be seen as an end-poem by the author; nineteen verses praising God and admonishing against unbridled passion. It begins, *A 'uḍu bi-llāh min al-šayṭān * min al-'ayn akbar al-'udwānī...* ('I take refuge in God from Satan, from the evil eye, greatest enemy...'), and ending: *fa-dhammahā al-khāliq huwa al-gharad al-qalā * fa-innahā dār al-hānah wa-al-balā* ('The creator has reproved it [vice], and he [the devil] is the aim of loathing * for it is the abode of degradation and affliction').

F. 36 is likely misbound, or else something is missing before it. It contains some paragraphs on Socotra, with a sketch, followed by a description of Persian Gulf islands and locations from Bushehr to the bay of Basra, and anchorages in Persia.

Traverse tables

Ff. 37r to 64r contain 43 three-column traverse tables,³¹ showing the relations between the values of *masāğ* (departure, in nautical miles, probably), *'arḍ* (difference in latitude, given in arc minutes, probably) and *tūl* (distance or longitude, also in arc minutes; fig. 14). In this context, departure means the distance travelled in EW or WE direction, and it is put in relation with changes in latitude and a knowledge of course angle or the distance travelled.³² Departure values go from 1 to 100, then in hundreds to 400, so every table has 103 rows. The 45 tables correspond to the 45 degrees (*nukat ḥann*, rhumb notches) of one single quadrant of the compass, and so they would be used for all four quadrants, switching as needed the column values and the 'sign' of the degrees. Each of the main divisions is under the heading of the star corresponding to the traditional rhumb, e.g. Polaris for due north, Capella for

31 I am particularly grateful to Eric Staples and Samuel Gessner for their help with these tables. As mentioned above, there is a pagination jump from f. 50v to f. 56r, with no loss—a likely pagination error.

32 Al-Hiğgi 2013 *passim*.

The image shows a manuscript page with three columns of tables. Each table has three columns: 'طول' (Longitude), 'ارتفاع' (Elevation), and 'مسافة' (Distance). The tables are arranged in a grid-like structure with decorative borders. The headers are written in Arabic script. The numbers are written in black and red ink.

طول	ارتفاع	مسافة
٠٠٣	٧١٠	٧١
٠٠٣	٧٢٠	٧٢
٠٠٣	٧٣٠	٧٣
٠٠٣	٧٤٠	٧٤
٠٠٣	٧٥٠	٧٥
٠٠٣	٧٦٠	٧٦
٠٠٣	٧٧٠	٧٧
٠٠٣	٧٨٠	٧٨
٠٠٣	٧٩٠	٧٩
٠٠٣	٨٠٠	٨٠
٠٠٣	٨١٠	٨١
٠٠٣	٨٢٠	٨٢
٠٠٣	٨٣٠	٨٣
٠٠٣	٨٤٠	٨٤
٠٠٣	٨٥٠	٨٥
٠٠٣	٨٦٠	٨٦

Fig. 14. ms Lisbon, BNP, Or. 2, f. 37r, first page of the traverse tables.

NE, and so on. In this usage of modern trigonometrical calculations, which imply the use of a sextant while retaining the stellar names of rhumbs, we find a remarkable hybrid technique, still with one foot in the ancient tracks of the early modern nautical masters of the Arabian Sea.

Quite notably, these tables are practically identical to the tables found decades ago by David A. King in ms Cairo, Dab al-Kutub al-Misraya (DM), 570, 'an Ottoman compendium of unknown provenance, apparently compiled in the nineteenth century'.³³ A detailed comparison between these two compendia is promising and it would be of high priority towards answering at least some of the textual questions raised by our manuscript.

Quadrennial sun declination tables

From f. 64r to f. 72r we have a set of four solar tables with degrees and minutes columns for each zodiac sign. Worth noting, because of its uniqueness among other comparable tables found in medieval and early modern astronomical texts, is that the highest solstitial value recorded is $23^{\circ} 32'$.³⁴

33 King 1986, 194, 214, 317.

34 The degree of the solstice in astronomical tables is often used to establish relations of interdependence between documents of different provenances.

Fig. 15. MS Lisbon, BNP, Or. 2, f. 82v, declination tables.

More traverse tables

Ff. 72v to 75v contain an additional set of traverse tables with minor variations from the previous set. Each of these is assigned to a pair of rhumbs between *al-Farqadān-al-Sunbār* (The Guards–Achernar, i.e. N by E–S by W) and *al-Turayyā-al-Ġawzāʾ* (Pleides–Orion, i.e. E by N–W by S), thus covering one quadrant and applicable by adaptation to all directions. The titles of the three columns are more explicit in these tables: 1) *haḍā al-masāğ al-līk*, ‘This is the departure in leagues’ (*līk*, or rather *līg*, is once again a Persian borrowing); 2) *haḍā al-ʿarḍ daqīqī*, ‘This is the latitude in minutes’; 3) *haḍā al-ṭūl daqīqī* ‘This is the distance³⁵ in minutes’. The departure values only go up to 90 in these tables.

More quadrennial tables

This second set of solar declination tables from f. 76r to f. 82bis-v³⁶ is remarkable for being written in a different hand, on a different paper, more felty with a coat of arms watermark, and also for its decoration (fig. 15). However, the solstitial maximum values are the same as above, 23° 32′, indicating a shared technoscientific background for both sets of tables. Another notable feature

35 In this context I do not think ‘longitude’ is the right translation.

36 ‘82bis’ because two consecutive folia are numbered 82.

is that the headings of the first columns on the left, for the day of the solar month, sometimes read the anomalous *yām*, for *yawm*, day, and sometimes the Persian equivalent, *rūz*. I shall have occasion to mention the issue of Persian influence in my conclusion below.

Rather unexpectedly, f. 83r contains a description of ‘harbours in the lands of India, every city...’, starting with Ḥawr Miyān, on Kathiawar west coast, just north of Porbandar. This contents ties in well with some of the previous pages, and I suspect the tables of the preceding folia are more or less independent of the surrounding material. This is where a comparison with the Cairo manuscript might shed some light. The page ends with a squashed *tammāt*—‘it is complete’, signalling that something else is coming.

Ḍaw’ al-qamarīyah

On f. 83v, a series of prefatory invocations and the declaration of authorship, again by ‘Abd Allāh ibn Aḥmad ibn ‘Abd al-Razzāq, lay the ground for the new title on f. 84r, ‘The Radiance of the Moon’, ‘on the calculation of the celestial stations’. Five verses follow, praising God for the lunar stations, and then starts a brief description of the asterisms of the lunar stations, starting with Šaraṭān, and ending next page with ‘and this description of the stations has been completed on Šawwāl 1239’ (c. February 1824). This and the next page, f. 85r, explain the correspondences between lunar stations and zodiac constellations, dwelling also briefly on the virtues of stations and stars, and closing with a *ḥamdala*.

F. 85v opens consequently with the customary opening *ta’awwud* and *basmala*: ‘This is an explanation, precis, indications and descriptions of locations, for the increase of the sea-traveller in the knowledge and the evidence of the experiences (*tağārib*)... and this is a relief for the soul from the anxieties (*humūm*) of the traverses (*‘ubūr*)’. The reference to the anxieties, and the odd organization of the material, make it possible to think that all these pages might find a better place near the beginning of the manuscript. In any case, now the author turns to an unexpected matter: marriage counselling and, suitably, character traits (*aḥlāq*), both major topics of Islamic ethics literature.

These conjugal themes run until f. 90v, with prose and verse on choosing a good wife, and a poem touching on conjugal bed pleasures and kissing (f. 87r). Naturally, there are some verses too on the calamities brought about by evil women (f. 87v) and then, wrapping the matter, ‘the best of people are those who are friends with their spouse, children and servants, their parents, closest of kin, the orphan, the neighbour, and Muslim brethren’ (f. 89r). This is followed by a list of the hundred ‘Beautiful Names of God’ (*asmā’ Allāh al-ḥusnā*) as often recited in Sufi orders, in a different hand and irregular and lighter ink, and then by some apotropaic lines, ‘By the truth of these names,

Fig. 16. ms Lisbon, BNP, Or. 2, f. 90v colophon.



oh God, protect the carrier of my book...’ with some magical repetitions of the Qur’ānic ‘detached’ letters *Hā-Mīm*.

After several successive closing *tammāt*, f. 90v has a proper colophon with a rather confusing attribution, ‘Thus is completed the speech of Ibn al-Wardī, and God the Answerer spoke through the words of the poor in God, ‘Abd Allāh ibn ‘Abd al-Razzāq’ (fig. 16). After the repeated mention of Ibn ‘Abd al-Razzāq as author, what shall we make of this unexpected mention of Ibn al-Wardī, a name which might refer to a famous geographer? Once again, the evidence gathered so far seems inconclusive.

The following page has ten verses of a famous poem by Abū Nuwās (c. AD 756–814), *Labbayka inna al-ḥamdu laka*.

End matters

From f. 91v to f. 94v we find a number of practical observations related to navigations presumably undertaken with the manuscript in hand. There are sketches of the Ras al-Hadd coast, the Kathiawar Peninsula, and one of the



Fig. 17. MS Lisbon, BNP, Or. 2, f. 92r, Kathiawar peninsula (N is left) vs Google Earth.

Gulf of Khambhat (Cambay), all with depth measures and a grid of coordinates. It is remarkable that in spite of the relatively late date of our manuscript, and though it is known that European maps with bathymetric curves were circulating around the Indian Ocean from around the eighteenth century (in Dutch maps particularly), the sketches, occasional rhumb lines and coast-line profiles we find here have a visual affinity with earlier European maps and charts of the sixteenth century.³⁷

The handwriting of the following pages is generally more cursive, and some pages look like notes scribbled hurriedly, or perhaps simply with exclusively practical recording purposes, as in a logbook of departures and destinations. I copy below some examples of great calendrical interest.

‘When we were on Friday, 15 of Raġab, 1254 (4 October 1838), 36 Nayrūz on Libra at the start of the deep sea (*al-luġġah*), aiming for Mumbai...’

‘And we left from Šūr on 23 Ša‘bān 1257 (10 October 1841), year of the famous drought.’

‘... on the New Nayrūz, Thursday 14 Ša‘bān 1260 (29 August 1844).’

‘... on the New Nayrūz, Friday 25 Ša‘bān 1261 (29 August 1845).’

‘... 6 Ramaḍān 1262 (28 August 1846).’

‘Date of the day of return 26 Rabī‘ al-Ṭānī 1265 (18 March 1849).’

We have here another witness of an established route between Oman and north-west India, and above all we have an important specification of the elusive concept of *Nayrūz*, as used since at least the times of Ibn Māġid (late fifteenth century) by Arab pilots.

37 See a 1580 example in Moreno Madrid and Leitão 2021, 134–137.

The Persian-origin word *Nayrūz* crops up frequently as a basic term in classical Arabic nautical literature. It is used to mean the solar new year, and it was essential knowledge for pilots, as it would complement the Hijri lunar calendar, giving them a much needed seasonal reference—to sail with the monsoon winds, for instance. When speaking of lunar stations, a basic time reference is to give the number of days after *Nayrūz* when a certain asterism would be seen rising at dawn; you would say, ‘The Pleiades rise at dawn on the 182nd day from *Nayrūz*’. It is quite evident that the word is a borrowing from Persian *Nowruz*, precisely the vernal equinox celebration of the Persian solar calendar, and this is clear in the Arabic sources, which speak of the ‘Persian year’. However, the historical development of a number of more or less different Persian calendars complicates this simple initial picture. Since some of the Persian calendar variants allowed for a gradual shift of the new year date, it is at first unclear, based only on the fifteenth-century nautical literature, which *Nayrūz* date exactly they were using. Now, if we know at what date the Pleiades, for example, were rising at dawn in the Arabia of the fifteenth century, we can work backwards the *Nayrūz* date, and corroborate it with many other observations. This is partly how, with the aid of astronomical software, Eric Staples has determined the ‘classical’ nautical *Nayrūz* to have been around 11 November, and to correspond to the Sassanian Yezdegird calendar.³⁸ All this to say that the term *Nayrūz* is decidedly a thorny question in Indian Ocean nautical studies.

Now, back to our folia and leaving aside the log entries, our manuscript is giving us several Hijri dates corresponding to the same solar calendar date, 28/29 August. This is important because 29 August is, in the Julian Calendar, the 1st of Thouth, or first day of the Coptic calendar, called *Nayrūz* in Egypt since about the seventh century (Boles 2015). The oddly differing dates for *Nayrūz* given on flyleaf-f. 1v, namely 15 and 24 August, would still need to be accounted for. In any case, how and why these Arab pilots, travelling the immemorial routes of their ancestors, would end up using as solar reference the Coptic New Year is nothing short of enigmatic, and certainly a fascinating subject which exceeds the scope of this article.

Detached gems

I have left for the end the two most visually appealing folia of the whole bundle, one of which is in fact used as the ‘cover’ of the pack preserved in Lisbon.

F. 95 has become detached of the main textblock. The recto contains ten verses followed by an authorship line, again ‘Abd Allāh ibn Aḥmad ibn ‘Abd al-Razzāq, and a sketch of a boat at the bottom. The verso page is remarkable

38 Staples and Al Salimi 2019, 488.

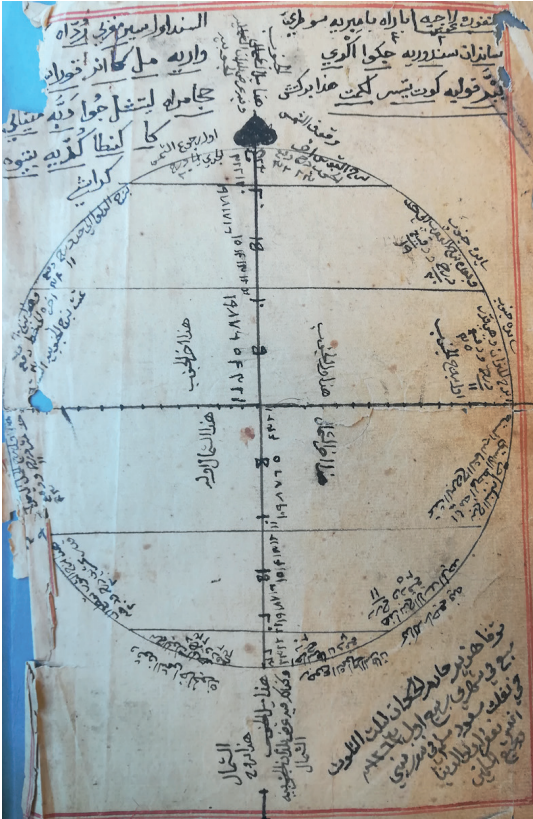


Fig. 18. ms Lisbon, BNP, Or. 2, f. 95v – projection of the ecliptic.

for a stereographic depiction of the ecliptic, with S on top and N at the bottom, divided in six zones with the equator at the middle and marks along the central axis at 10, 20, and $23^{\circ} 32'$ (fig. 18)—note that this latter figure agrees with the solstitial values in the declination tables, and is thus useful to verify the unity of the manuscript bundle, or at least some of it.

To add to the linguistic tapestry of the manuscript, on top of the page there are two columns in what seems to be Balochi with some elements of Sindhi, including mention of ‘belonging to Sindh’. This brief text is awaiting a specialist who is able to unravel its relation to the accompanying diagram.

Finally, the unnumbered titular folium of the manuscript, which contains on the verso a list of places along the eastern Red Sea shores, south of Jeddah (fig. 19). The recto contains a sidereal compass rose of 32 divisions in four concentric circles or rings, shown here.

North is at the top, marked on the outermost circle by a fleur-de-lis with a black and white top petal. At the centre, inside the innermost circle, is a

Fig. 19. MS Lisbon, BNP, Or. 2, f. 1 (?), sidereal compass rose.



representation of the Kaaba, showing its actual orientation, roughly along the NW–SE axis. The second circle looks like a decorative layer with a serrated pattern in black. The first and second circles have radial lines of 16 directions, but on the outermost circle there are triangular arrowheads for all the 32 divisions. On the inner side of the outermost edge, every direction has a little empty black rectangle touching on the left the corresponding radius. The eight principal winds are marked with thick arrowheads: black for the cardinal directions, with individual cut-out patterns each (inviting further iconographic study), and the four ordinal directions in red, with a repeated cut-out rhomboid pattern. The eight half-winds are marked by thinner blue arrowheads. Inside the third ring there are diametrically oriented numerical labels for half- and quarter-winds; the corresponding values for principal winds are outside the rings along with the usual names of the stellar rhumbs: al-Farqad, al-Na'ṣ, al-Nāqah, etc. The little texts on the four external corners simply summarize the progression of the rhumbs for each quadrant. This diagram is yet another

example of the cultural interactions embodied by the content of MS Lisbon, BNP, Or. 2: it has the characteristic fleur-de-lis of Mediterranean wind-roses, but the Kaaba at its centre, and the intriguing cut-outs which resemble geometric motifs found in the handicrafts around the Persian Gulf and Sind.

Conclusions

One surely cannot disagree with David A. King in that ‘mixed manuscripts containing more than the standard single treatise can be a royal pain in the neck for cataloguers and researchers, but they frequently offer unexpected rewards’.³⁹ Our present document is far from a standard collection and all the richer and fascinating precisely because of this heterogenous nature. By way of conclusion, I shall comment briefly on those points which seem to be of major interest for future research, and on possible ways forward.

After this preliminary study, and taking into consideration all the different factors, I feel we may confidently accept the dates given in ff. 10r and 83v as those of both the composition and the copying, meaning that the author was at work in 1824; I see no reason to not consider this manuscript an autograph of ‘Abd Allāh ibn Aḥmad ibn ‘Abd al-Razzāq, a Shafi‘ite pilot from Ṣūr, in Oman. At the same time it is evident that some leaves present a separate codicological layer. There is the question of ascribing part of their content to Aḥmad ibn Māğid, since a good part of the *Salwah* follows chapter 9 of his famous *Fawā’id*, but given Ibn Māğid’s pre-eminence in Arabic nautical literature, and also given the general structure of what we have here, I feel inclined to attribute the similarity to a simple borrowing from such an authoritative source as Ibn Māğid.

In attempting to pin down a specific origin for this complex manuscript, we must come to terms with the irrelevance and the inadequacy of applying contemporary boundaries to the traditional Indian Ocean cultural continuum. That Persian influence is rife in Arabic nautical literature since very early times is well known,⁴⁰ though not yet studied in detail, and it is known that commercial routes have been criss-crossing the Arabian Sea since antiquity, from Malabar to Zanzibar, from Jeddah to Basra, to Sri Lanka and to China and back to Yemen and Somalia.⁴¹ In this historical context, MS Lisbon, BNP, Or. 2 is simply a representative of a pre-modern culture which has become a rarity in our days. As we have seen, MS Lisbon, BNP, Or. 2 entices us with a range of languages and even iconographic pointers, almost as an invitation to open up to a truly interconnected history. Speaking of Persian influence,

39 King 2018, 2. I am grateful to Prof. King for directing me to several important sources in his generous online library.

40 Hourani 1995.

41 See *in extenso* Sheriff and Ho 2014.

therefore, acquires a different meaning, as does also speaking of Yemeni Sufi or of Gujarati influences. Some aesthetic features of the manuscript, like the colour palette used for the decoration of some pages (notably the second set of quadrennial tables), would surely yield precious insights into its origins and originalities.

Naturally, one concrete pending question is how the manuscript ended up in Lisbon, and in what ways its dating may be related to a period of waning Portuguese influence in the Indian Ocean. This is a bibliographical enquiry which may also open up new avenues of research.

The condition of the manuscript is relatively good in spite of the damage suffered prior to acquisition, and now very stable. A desirable step forward in the study of the text would be to produce a digital surrogate. Based on a close reading, this would make it possible to reconstruct the original order of the text and to determine—also by comparison with the Cairo, Kuwait, and ideally Mosul, manuscripts—how much is missing. Such a digital reproduction would be a firm basis for any future work.

A separate study of the values in the extensive tables of the manuscript would be a great contribution both to geographical and nautical studies. A first necessary step would be to transcribe the geographical data, and eventually to feed it to existing initiatives of georeferencing and related disciplines.

Finally, some consideration should be given to the possibility that this bundle was really a handbook, and that it may have been in use for a period of about 70 years, doing the rounds of the Indian Ocean routes it describes. If such were the case, then this would be one of the earliest witnesses we may ever have of the legendary Arab nautical manuals, the *rahmanağ* mentioned from medieval times and by the classical authors.⁴² It is the conveyor of a centuries-old tradition of technoscientific achievements, fully integrated into the lives of its creators and users, and fully in tune with the multicultural ambience from where it came.

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Comparative Hellenistic and Roman Manuscript Studies (CHRoMS): Script Interactions and Hebrew/Aramaic Writing Culture*

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Writing is an expression of culture and is subject to intercultural influences. In this comparative study, I argue that Egyptian and Judean Hebrew/Aramaic scripts from 400 BCE to 400 CE were heavily influenced by Greek and later Latin writing cultures, which explains many previously inexplicable phenomena. Jewish writers in the third century BCE adopted the Greek split-nibbed reed pen, which dramatically changed the appearance of Hebrew/Aramaic scripts. At the same time, the normal size for Hebrew/Aramaic scripts shrank considerably, the pen strokes became mostly monotone and unshaded, and the scripts became more rectilinear, angular, bilinear, and square. Each of these features appears to be due to direct imitation of contemporary Greek formal writing. Beginning in the first century BCE, Hebrew/Aramaic writers began to decorate their formal scripts with separate ornamental strokes like those of contemporary Greek and Latin calligraphic scripts. And from the second or third century CE, Hebrew/Aramaic calligraphic scripts seem to be increasingly characterized by horizontal shading, parallel to the contemporary rise of Greek and Latin shaded scripts. Furthermore, in the late Roman period, the traditional Hieratic-derived Aramaic numeral system was replaced by an alphabetic numeral system under the influence of the Greek Milesian alphabetic numerals.

1. Introduction

Writing is an expression of culture, and it is affected by change mechanisms common in cultural interactions.¹ The impact of cultural encounters on late

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1 Sirat 2006, 310, helpfully elucidates the individual writer's relationship to progressively larger cultural spheres, 'An individual's writing system is nested in another system, which includes other persons writing at the same time in the same culture. Every personal system is a part of this writing style, which characterizes a

antique and medieval writing cultures has been well-documented recently by the Comparative Oriental Manuscript Studies (COMSt) research network.² The recent volume *Contatti di lingue—Contatti di scritture* also explores the value of comparative studies across a broad spectrum of writing cultures.³ On a smaller scale, the ongoing ERC project ‘Contexts of and Relations between Early Writing Systems’ (CREWS) under Philippa M. Steele examines relationships between earlier writing systems in the Eastern Mediterranean from around 2000–600 BCE.⁴ Nevertheless, comparative studies of similar scope are conspicuously absent for the study of the manuscript cultures of the ancient Mediterranean during the pivotal Hellenistic and Roman periods from roughly 400 BCE to 400 CE.⁵ I attribute this lack both to the uneven distribution of sources and strongly entrenched disciplinary boundaries. Scientific study of the ancient manuscripts requires extensive linguistic and technical expertise, which has led to ever-increasing specialization and compartmentalization into discrete culture-specific disciplines. Thus, scholars have described in great detail developments within their respective writing traditions, but they rarely address in any detail the intercultural dynamics of writing as both technology and art. The result is that scholars often lack compelling reasons to explain observed developments, which in fact had complex social causes.

In this article I propose a new intercultural research paradigm—Comparative Hellenistic and Roman Manuscript Studies (CHRoMS)—for investigating the history of writing in the ancient and multicultural Mediterranean world from *c.*400 BCE to *c.*400 CE. I suggest that many developments observed in culture-specific writing traditions in the ancient Mediterranean world cannot be explained by gradual, automatic processes in isolation, but rather resulted from complex intercultural dynamics. I propose that these social interactions can be elucidated by tracing parallel developments in contemporary writing traditions with attention to evident cultural contacts. This, in turn, will help explain sudden and intentional changes within certain writing traditions

period and cultural setting, and cannot be studied outside this larger system. This period-cultural system is in turn nested in another system, that of the particular species of writing; e.g. Cuneiform, Egyptian, or some alphabet. It is also part of a larger style that encompasses different writing systems, such as the Gothic style common to Latin and Hebrew.’

2 Bausi et al. 2015.

3 Baglioni and Tribulato 2015.

4 <<https://crewsproject.wordpress.com/about/>>.

5 Given the strong tradition of classically trained palaeographers, the encounters between Greek and Latin scripts have received much greater attention than other script interactions, e.g. Norsa 1946; Bassi 1957; Marichal 1950; Morison 1972; Seider 1967–1990 and 1972–1981; Cavallo 2008 and 2009.

and facilitate the global study of ancient writing and bookmaking as technology and art. This new direction in research could pave the way for a wave of comparative research on the history of writing and bookmaking in the ancient Mediterranean. As a proof of concept, I will document here a number of plausible interactions between the Greek and Hebrew/Aramaic scripts from 400 BCE to 400 CE, which should, of course, be fleshed out in much greater detail in future research. I will emphasize formal scripts on soft writing supports, which are often endowed with particular cultural significance.

2. Cultural Contacts

An important preliminary step in determining the plausibility of script changes due to cultural transfer is to demonstrate encounters or contacts between writing cultures. This is easily done for the Greek and Hebrew/Aramaic writing cultures in this period. From the conquest of Alexander the Great through the end of the period, both Egypt and the Levant were subject to Greek and later Roman political dominance, and Greek culture (including writing) was especially widely disseminated throughout the eastern Mediterranean. Greco-Roman cultural influences are readily evident in nearly every area of contemporary Jewish culture, such as language, art, and architecture. The Greek language was adopted by most Jews in the diaspora, and documented evidence suggests it made major inroads in Judea and surrounding areas—especially among educated elites—yielding a multilingual society.⁶ From the third century BCE onwards, numerous Greek compositions and translations of Hebrew religious texts reflect the importance of Jewish Greek literature in both Egypt and Judea. Greek documents and literature are well-attested from Judea in close contact with Hebrew/Aramaic texts, often within the same collections.⁷ In a number of cases, Greek and Hebrew/Aramaic are even found on the same textual artefact (e.g. a bilingual Aramaic-Greek ostrakon from Khir-

6 Even in the highly nationalistic circles of the Bar Kokhba rebels, one (Nabatean?) commander wrote in Greek, saying, ἐγράφη δ[ε] Ἑλληνιστὶ διὰ τ[ὸ] ὄρ[μ]αν μὴ εὐρηθ[ῆ]ναι Ἑβραεστὶ γ[ρά]ψασθαι ‘[This letter] is written in Greek, because it was impossible to find someone who could write in Hebrew’ (P.Yadin 52). This multiculturalism was, of course, not limited to Greek and Hebrew/Aramaic. Judean writers were also in close contact with other neighbors like the Nabateans, and possible interactions between Jewish and Nabatean scripts are also worthy of further investigation (cf. Birnbaum 1956; Yardeni 2000).

7 In addition to the Greek and Hebrew/Aramaic documents found in caves throughout the Judean desert, the numerous ostraca excavated from Hellenistic Maresha are illustrative, with Greek outnumbering Aramaic by a considerable majority; see Kloner et al. 2010.

bet el-Kôm [277 BCE?],⁸ a bilingual Aramaic-Greek inscription from Sia in the Hauran region of Southern Syria [105/104 BCE],⁹ a votive inscription from Tel Dan [c. second century BCE],¹⁰ numerous bilingual ossuary and other assorted inscriptions,¹¹ and legal documents as in Figure 1). In one interesting case, Cleopas son of Eutrapelus signed the Hebrew document Mur29 in Greek, but he signed the Aramaic document Mur33 in Aramaic.¹² In this milieu, educated biliterate writers who could read and write in both Greek and Hebrew/Aramaic could plausibly have served as cultural mediators.¹³ The evidence discussed below suggests that this is exactly what happened.

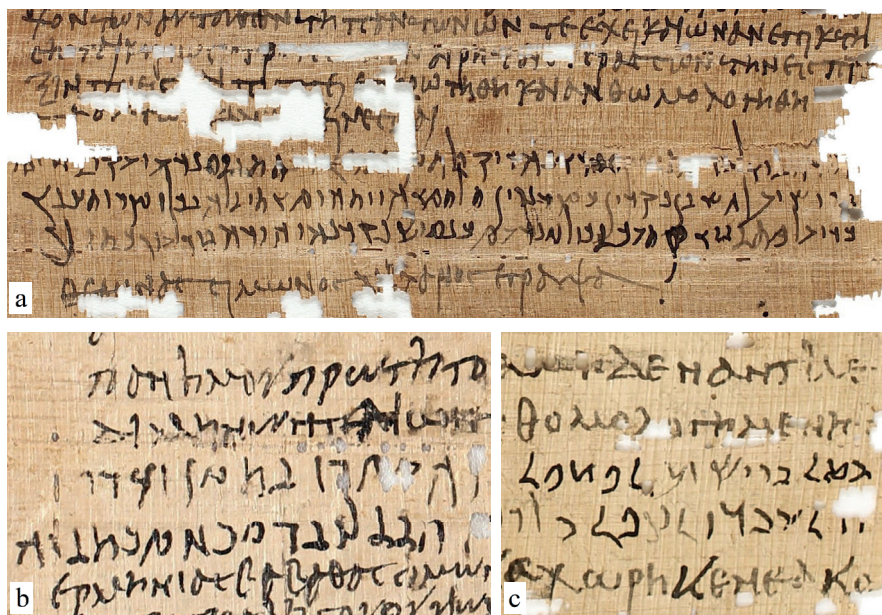


Figure 1. Greek and Hebrew/Aramaic scripts on the same manuscripts. (a) 5/6Hev17 (128 CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-497986>>; (b) 5/6Hev27 (132 CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-497994>>; (c) 5/6Hev20 (130 CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-508233>>.

8 Geraty 1975.

9 Milik 2003.

10 Biran 1976, 204–205.

11 See especially Ameling et al. 2010; Cotton et al. 2010.

12 Wise 2015, 82, 94.

13 For a recent survey and reflections on Judean bilingualism and biliteracy, see Popović 2018. Other possible explanations could be imitation of public inscriptions or collaboration between writers trained in different writing systems.

3. *Script Switching*

At times in the history of writing, cultures have completely changed scripts, sometimes in conjunction with changes in the language used. For example, the impact of Greek in Hellenistic and Roman Egypt and Judea is readily apparent. In Ptolemaic Egypt, Greek became the language of royal administration and an ever-increasing proportion of the population. From the third century BCE onwards, Egyptian Jews predominantly used the Greek language, and the latest pre-Christian evidence for the Hebrew/Aramaic script among Jews in Egypt dates from the second century BCE (the Nash Papyrus, Cambridge, Cambridge University Library, MS Or. 233).¹⁴ In Persian Yehud(/Judea), Aramaic replaced Hebrew for administrative purposes under Achaemenid political dominance and became widely spoken throughout the land. In the Hellenistic and Roman periods, Greek also came to play an important role in administration and literature in the multilingual Judea.

In addition to complete language switches, there are also cases in Egypt and the Levant in this period where writers switched the scripts characteristically used to write certain languages. While native Egyptian Hieroglyphic, Hieratic, and Demotic writing traditions continued in parallel to the Greek writing tradition in Ptolemaic and Roman Egypt, in rare cases Egyptian texts were transcribed in the Greek script.¹⁵ By the second–fourth centuries CE, the native Egyptian scripts had largely been replaced by the new Coptic script, which adopted and adapted a version of the Greek alphabet for writing Egyptian texts.¹⁶ Another fascinating but isolated example is P.Amherst 63 (fourth cent. BCE), an Aramaic literary collection transcribed in the Demotic script.¹⁷ There is also a parchment fragment from Elephantine with Egyptian text transcribed in Aramaic script.¹⁸ One final example, P.Oxy. XXXVI 2772 (11 CE?), is a letter giving instructions to a banker in the Greek language but the Latin alphabet.

Such script switching is also evident for Jewish writers from the period. Starting in Persian-period Yehud, the old Hebrew script was gradually replaced by the Aramaic script even for Hebrew texts, a switch which was only completely accomplished in Jewish circles in the second century CE.¹⁹ The

14 Later examples of Hebrew/Aramaic scripts in Egypt may reflect reintroduction from Palestine.

15 Depauw 1997, 44–45.

16 Quack 2017. This development was likely reinforced by religious change in the Christianization of Egypt.

17 Depauw 1997, 40–41.

18 Vittmann 2003, 117–119; Quack 2017, 29.

19 The Samaritans continued to use a version of the old Hebrew script.

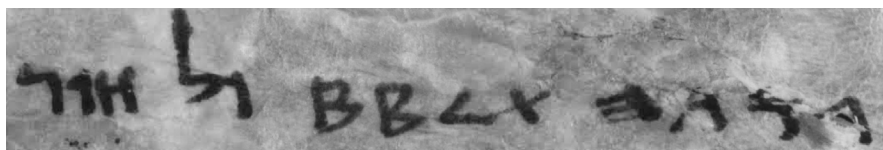


Figure 2. Mixed script. 4Q186 (first cent. BCE/CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-370745>>.

coexistence of Palaeo-Hebrew and Square scripts created a limited digraphia,²⁰ where Palaeo-Hebrew was reserved for only some Hebrew religious and nationalistic texts. An idiosyncratic example of rapid script switching can be seen in 4Q186, which is written left-to-right in a hybrid script consisting of Hebrew/Aramaic, Greek, Palaeo-Hebrew, and cryptic letters (Figure 2).²¹ The Cologne *Ketubah* (Papyrussammlung Inv. 5853; 417 CE) is written in a combination of Aramaic and Greek in the Hebrew/Aramaic script. One fragment from Oxyrhynchus has a list of commonly used Latin and Greek words in Hebrew/Aramaic script (British Library Or 9180 C; fourth century CE?).²² And notably, the Christian church father Origen of Alexandria produced his multi-column Hexapla in the third century CE, which included the Hebrew biblical texts in both Hebrew characters and Greek transcription.

4. Material Changes

4.1 Writing implement

In addition to complete language and/or script switches, I argue that some major material changes also affected the Hebrew/Aramaic writing tradition in this period. The most important was probably a change of writing implement from the rush brush to the reed pen.

The rush brush—made from species of the genus *Juncus*—was traditionally used by Egyptian scribes (Figures 3 and 4).²³ The diameters of the rushes

20 For an important attempt at constructing a typology of types of digraphia (and more broadly ‘biscryptality’), see Bunčić et al. 2016. Some writers also used cryptic or Nabatean scripts, further complicating the picture.

21 The text of Figure 2 can be transcribed as $\text{רור לו בבית האור} \text{ } \text{BB}\Delta\text{X} \text{ } \text{אאזג} = \text{רור לו בבית האור}$ *rwh lw bbyt h'wr*. The letters can be identified character-by-character according to scripts, namely Hebrew/Aramaic (H), Greek (G), Palaeo-Hebrew (P), and cryptic (C): HHH HH GGCP PGPP. See Popović 2007, 25–26 for further discussion.

22 Sirat 1985, 115–116.

23 For the characteristics of the Egyptian rush brush, see especially Tait 1988; Clarysse 1993; Kidd 2013; Angles 2019. For an extensive catalogue and discussion of the archeological finds of Egyptian writing materials, see Pinarello 2015. Rush brushes have been found in large numbers in excavations from Egypt, made from both species *Juncus rigidus* Desf. (<<https://www.gbif.org/species/2701397>>) (aka *Jun-*

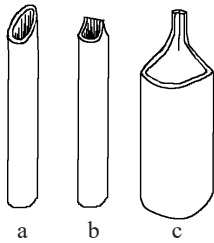


Figure 3. Different possible pen cuts: (a) oval-shaped rush tip; (b) chisel-shaped rush tip; (c) split nib of a reed pen.



Figure 4. Egyptian scribal palette and rush brushes (c.1045–992 BCE), <<https://www.metmuseum.org/art/collection/search/545113>>, © Metropolitan Museum of Art.

vary from around 1.5–2.5 mm, which can affect the thickness of the strokes. According to some scholars, the thin stalk could be cut at an angle to produce an oval-shaped tip (Figure 3a), which was crushed to separate the fibers into a brush-like structure.²⁴ Alternatively, the tip of the rush could be cut from both sides to produce a flat, chisel-shaped nib (Figure 3b).²⁵ The brush was held with the scribe's hand elevated above the writing support, allowing for great flexibility in the direction of motion. This type of writing implement facilitated writing large scripts with soft curves and strong contrast between thick and thin brush strokes.

The reed pen (or calamus), on the other hand, was cut from the thick stalk of the *Phragmites australis* (Cav.) Steud. (<<https://www.gbif.org/species/5290149>>, aka *Phragmites communis*) (Figures 3c, 5, and 6).²⁶ It was cut to a tip of varying width (either fine-tipped, square-cut, or oblique; see Figure 5) and split to allow more ink storage. Cut to a fine tip, the reed pen produces the monotone thin strokes characteristic of most Greek handwrit-

cus arabicus) and *Juncus acutus* L. (<<https://www.gbif.org/species/2701632>>); see Germer 1985, 200–201; Angles 2019, 382, 384. Many writers state that the type of rush used was the *Juncus maritimus*; e.g., Černý 1952, 12; Lucas and Harris 1962, 365. This may, however, be a misnomer for the *Juncus rigidus/arabicus*, which has sometimes been classified as a subspecies or variety of the species *Juncus maritimus*. The species *Juncus maritimus* Lam. (<<https://www.gbif.org/species/2701869>>), however, is common in temperate climates north of the Mediterranean, but is not native to Egypt (Germer 1985, 200).

24 Černý 1952, 12; Haran 1980, 82; Child 1985, 1–2; Tait 1988, 477; Clarysse 1993, 189; Kidd 2013, 242.

25 Lucas and Harris 1962, 365; van der Kooij 1986, 26; Yardeni 1990, 236; Ashton 2008, 48; Lehmann 2020, 84–87.

26 Germer 1985, 205–206.

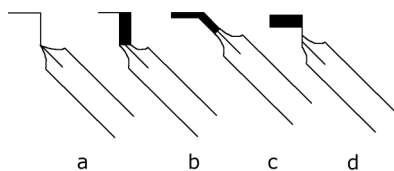


Figure 5. Possible cuts of split-nibbed reed pens: (a) fine-tipped; (b) right-oblique; (c) square-cut; (d) left-oblique.



Figure 6. Roman-period split-nibbed reed pens from Oxyrhynchus: (a–b) fine-tipped pens, <<https://www.metmuseum.org/art/collection/search/568214>>; (c) oblique-cut broad-nibbed reed pen, <<https://www.metmuseum.org/art/collection/search/568209>>, © Metropolitan Museum of Art.

ing of the period. A broad-nibbed reed pen, in contrast, naturally produces contrasting thickness between thick and thin strokes in different directions, depending on the cut of the nib and the pen hold. In lieu of direct archaeological attestation, it is often difficult to determine the precise type of pen used by writers based on the graphic products alone.

The typical implements for writing Hebrew/Aramaic texts in ink from the late Iron Age through the Persian period seem to have been rush brushes of the genus *Juncus*.²⁷ Neo-Assyrian reliefs and paintings often show Aramaic scribes writing with elevated hands and implements that are thinner than the reed styli of the cuneiform scribes (Figure 7).²⁸ The thin writing implements visible in the scribe's case in the Bar Rakib III inscription from Zincirli similarly suggest the thinner rush (Figure 8). After thorough palaeographic study of the North-West Semitic scripts of the period, Gerrit van der Kooij concluded that the ink was typically brushed onto the surface with a fibrous rush cut to a chisel-shaped nib.²⁹

Under the Persian administration in the fifth–fourth centuries BCE, Aramaic scribes as widespread as Egypt, the Levant, Mesopotamia, and Bactria

27 Haran 1980, 82; van der Kooij 1986; Lehmann 2020, 84–85.

28 For a catalogue of visual representations, see Reade 2012.

29 van der Kooij 1986, 26, 76–77, 88–90, 235–244; so also Lehmann 2020, 84–87, who opposes the chisel-shaped rush pen to the Egyptian rush brush as a new invention.

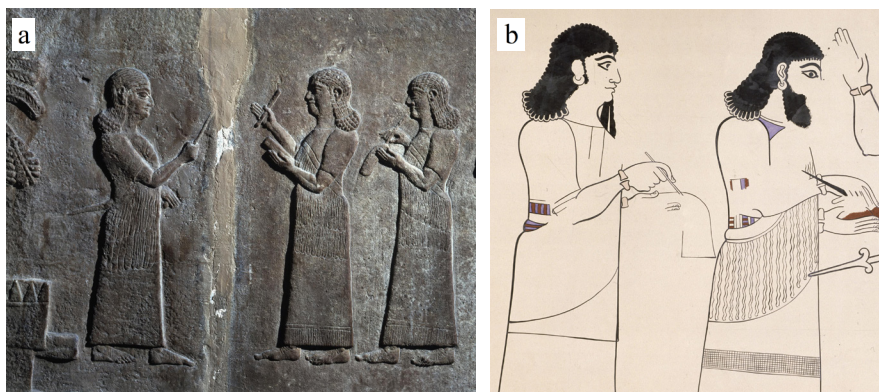


Figure 7. (a) Wall relief from the palace of Tiglath-Pileser III in Nimrud, British Museum 118882 (728 BCE), <<https://www.britishmuseum.org/collection/image/324947001>>, © The Trustees of the British Museum; (b) Copy by Lucien Cavro of a fresco from Til-Barsip (eighth cent. BCE), © RMN-Grand Palais (musée du Louvre) / Les frères Chuzeville.



Figure 8. Detail of the Bar Rakib III inscription with rush brushes in the scribe's case, SMB Accession Number VA 2817 (eighth cent. BCE), © Staatliche Museen zu Berlin – Vorderasiatisches Museum, photo: Olaf M. Teßmer.

also seem to have typically used rush brushes.³⁰ Arguing to the contrary, Peter Daniels concluded that the Aramaic scribes of the period wrote using broad-nibbed reed pens, based on the concave edges at the top tips of many strokes

30 So also Turner 1952, 11; van der Kooij 1986, 59, 90; Byrne 2014. Bloch 2018, 12, agrees that normally-inked Aramaic documents on flat surfaces would have been 'painted' on with brushes, but also suggests that Aramaic texts incised on clay tablets were probably produced with styli, sometimes dipped in ink. Indeed, the thin rush could hardly be expected to withstand the pressure necessary to impress writing deeply into wet clay, so it is quite probable that writers used styli sliced from reeds like those of the cuneiform scribes (for which see Cammarosano 2014). Even if Bloch is correct that these styli were sometimes dipped in ink, they would still have differed from later split-nibbed reed pens both in shape and unsplit tip. Cf. van der Kooij 1986, 190–193, for further discussion.

that he observed in the handwriting of the scribe Haggai from Elephantine.³¹ This would mean, however, that the scribes held the reed pens with the tips concave-up, which would normally be considered upside-down.³² Furthermore, in experiments with imitation brushes and split-nibbed pens, I have found that it is in fact considerably easier to produce the effect observed by Daniels with both oval-shaped and chisel-shaped brush tips than with a broad-nibbed reed pen,³³ so I do not find this criterion at all convincing. It is especially noteworthy that this concavity is not normally evident in early Greek scripts or Hebrew/Aramaic scripts from the third century BCE and later, which were demonstrably written with a reed pen. Additionally, there are good indications that these official Aramaic scribes did indeed use rush brushes like their Egyptian contemporaries.

First, the fibers of the brush sometimes split, creating perceptible striations, gaps, and isolated strands (Figure 9).³⁴ *Second*, the extreme variation in

- 31 Daniels 1984, 60–61. Though Daniels does not explicitly distinguish reed from rush, his descriptions and illustrations of the pen and comparison with later reed pens make it clear he is thinking of a broad-edge split-nibbed reed pen.
- 32 Cf. Skoyles 1988, 376–377, who suggests that Daniels’ observations could imply an inverted hand position. But Skoyles admits that empirical observations based on modern pens and pencils are not necessarily valid for ancient brush (and I would add reed) writing, since the mechanics are very different. All of the pictorial and palaeographic evidence of which I am aware consistently points in the direction of ‘normal’ brush holds.
- 33 If cut to an oval-shaped tip, the relatively soft rush brush allows the writer easily to touch a significant proportion of the bottom edge of the brush to the writing surface, thus creating a concave stroke edge corresponding to the curvature of the cylinder. The chisel-shaped rush brush, despite its relatively flat edge, can also produce concave initial edges, since the inner fibers are less rigid than the outer cylinder and may not extend all the way to form a clean, flat edge. This observation about the chisel-shaped brush was suggested to me by Gerrit van der Kooij in personal communication and confirmed experimentally with botanically correct examples. On the other hand, the relatively hard cylinder of the reed would mean that only a small proportion of the outer edge of the cylinder would be in contact with the writing surface at any point in time, unless the pen was held nearly vertically or the writer applied a very large amount of pressure. The splitting of the nib under pressure could also create forking or splitting at the tips of strokes, but this would be very different from the smooth concave edges characteristic of the Aramaic documents.
- 34 Another clear example of an isolated strand is on the Bactria document Naveh-Shaked A4r line 3 first word, where a separated strand protrudes below the ends of the downstrokes. Turner 1952, 10–11, considers thick strokes, uneven ink application, and ragged or forked trails at stroke ends to be characteristic of brush writing. In contrast, reed pens produce finer, smoother lines, with little round blobs of ink accumulating when the hand stops.

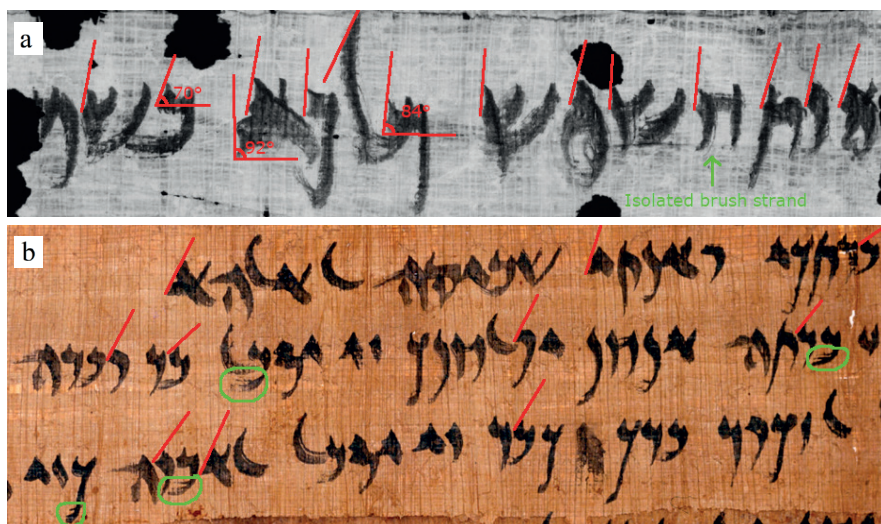


Figure 9. Evidence of brush strokes (green) and different writing angles (red). (a) Wadi Daliyeh Samaria Papyrus 2 (352/351 BCE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-513154>>; (b) Textbook of Aramaic Documents (TAD) B3.6, Brooklyn Museum, accession no. 47.218.90a-b, *Freedom for Tamut and Yehoishema*, by Haggai the scribe from Elephantine (427 BCE), <<https://www.brooklynmuseum.org/opencollection/objects/60790>>, photograph by Bruce and Kenneth Zuckerman, West Semitic Research, © Brooklyn Museum, bequest of Theodora Wilbour from the collection of her father, Charles Edwin Wilbour.

stroke thickness—especially the use of hairline thin tips at the ends of some strokes (e.g. the tips of many descenders in Naveh-Shaked A4r from Bactria)—is more easily explicable by the use of a brush.³⁵ In addition to the effects of writing angle, the brush may be very sensitive to differentiation of pressure. When the scribe presses the implement down more firmly, this can cause the brush to spread and create very broad strokes. When the scribe only lightly touches the brush to the writing surface (such as when lifting the brush), it is possible to create very thin traces. The relatively inflexible reed pen cannot easily produce this effect. *Third*, the writing angle varies considerably in the Aramaic documents, which has two manifestations.³⁶ The angles of the initial (often concave) edges of strokes differ considerably from stroke to stroke, which is characteristic of brush writing where scribes relatively freely move their hands, but atypical of writing with a reed pen (Figure 9).³⁷ Changes in writing angle also create inconsistencies in the relationship between

35 Quack 2015, 444–445, considers this the primary distinguishing factor.

36 Cf. the similar observations of Menci 2003 with regard to Egyptian scripts.

37 Contra Daniels 1984, 61, who attributes a constant 60° pen angle to the scribe Haggai.

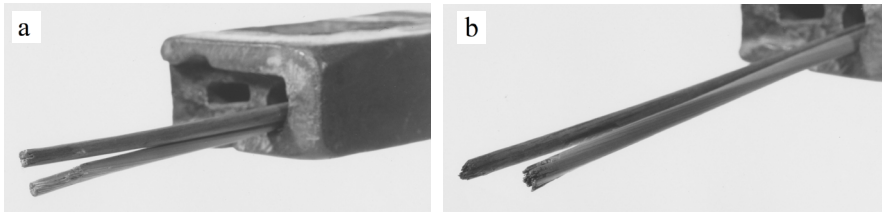


Figure 10. Details of an Aramaic writer's wooden palette-case (3.5 × 1.8 × 12.6 cm) and rush brushes (0.3 × 11.5 cm), Brooklyn Museum, accession no. 16.99a–d (525–343 BCE), <<https://www.brooklynmuseum.org/opencollection/objects/9356>> (with further images of the case and brushes), © Brooklyn Museum. Gift of Evangeline Wilbour Blashfield, Theodora Wilbour, and Victor Wilbour honoring the wishes of their mother, Charlotte Beebe Wilbour, as a memorial to their father, Charles Edwin Wilbour.

stroke direction and stroke thickness, whereas writers using reed pens normally maintained a relatively stable pen angle, such that variations in stroke thickness are consistently correlated with stroke direction.³⁸ In the Aramaic documents, the strokes of maximal thickness can occur in different directions (e.g. → and ↘), and strokes going in the same direction can vary considerably in width (e.g. ➡ vs →). These differences mean that the writers freely changed the writing angle in the process of writing. This freedom of motion was normal for brush writing, where the hand was elevated above the writing material, allowing the writer to flex at the wrist, elbow, and shoulder. It is unexpected, however, for reed pens, which usually imply a heavily restricted range of motion, since the hand (or at least one or more fingers) normally rests on the writing material.

A *fourth* line of evidence further supports my contention that the Aramaic scribes wrote with rush brushes. An Aramaic writer's palette-case was discovered in Egypt (possibly Elephantine), complete with two thin rush brushes (Figure 10).³⁹ The case clearly belonged to an Aramaic writer, since it has Aramaic writing inked on it. It is not entirely clear to me from the images if and how the rushes were prepared for writing. These artefacts strongly support the palaeographic evidence for the use of the rush brush by Aramaic scribes in the service of the Persian administration.

38 In some later formal scripts, writers did change their pen angles during writing; cf. Cavallo and Fioretti 2014. This may itself be an imitation of brush writing, however, and it is of little relevance for the early transition to the use of split-nibbed reed pens in Hebrew/Aramaic documents.

39 Aimé-Giron 1938, 47–57, plate IV; Porten 1979, 76, 79–80; van der Kooij 1986, 75, 90.

Under Greek and Roman rule, the rush brush was gradually abandoned in favor of the typically Greek reed pen for native Egyptian writing.⁴⁰ The same switch to the use of the Greek reed pen also appears to account for many of the most radical discontinuities between the Achaemenid Aramaic scripts of the fourth century BCE and the early Jewish Hebrew/Aramaic scripts of the third century and following, which I will explore below. This shift may perhaps be illustrated already by the numerous Idumean Aramaic ostraca from the fourth century.⁴¹ Both the Aramaic and Greek texts of the bilingual ostrakon from Khirbet el-Kôm (277 BCE?) may still have been written with a brush.⁴² From the mid-third century BCE onwards (at least until the adoption of the quill pen among European Jews), however, the reed pen was clearly the pen of choice for Jewish scribes writing Hebrew/Aramaic on soft materials.⁴³ The only plausible exception is 4Q52 from the early-mid third century BCE, which still exhibits widely inconsistent stroke thickness and occasional concave initial stroke edges like the earlier brush-written hands.⁴⁴ Nevertheless, a split-nibbed reed pen may be suggested by its small size (the thickest strokes are only about 1 mm wide), relatively consistent pen angle, and clean strokes

- 40 Möller 1965, 2; Tait 1988, 481; Clarysse 1993, 200–201; Depauw 1997, 83; Quack 2015, 444–445.
- 41 The Persian-period Aramaic ostraca from Beersheba and Arad (Naveh 1973, 1979, 1981) were evidently written with brushes. Similarly, of the Idumean ostraca collected in Porten and Yardeni 2014–2020, the vast majority of pre-Hellenistic examples are clearly brush-written (for particularly clear examples, see A2.4 [355 BCE] and A35.3 [341 BCE]). In contrast, a significant number of the ostraca from the late fourth century already exhibit thin, monotone strokes and so could perhaps have been written with reed pens (e.g. A15.18 [316 BCE], A2.46 [313 BCE], A111.1 [312 BCE], A300.1.47 [312 BCE], A3.39 [311 BCE]). Many others (e.g. A300.1.45 [322 BCE], A5.18–19 [320 BCE], A245.1 [319 BCE], A48.4 [317 BCE?], A229.1 [315 BCE]), however, were clearly brush-written, which might suggest a gradual transition in the late fourth and early third centuries BCE. For a complete list of 43 Idumean ostraca dated to the reigns of Hellenistic rulers, see Porten and Yardeni 2014, xxxviii–xxxix.
- 42 Angles 2019, 387–388, notes that brushes may have continued to be used for rough surfaces, even after the introduction of the reed pen.
- 43 Haran 1980, 83–84; Tov 2004, 55. In my opinion, this makes it highly unlikely that the reed-written Palaeo-Hebrew scrolls from Qumran pre-date the third century.
- 44 Yardeni 1990, 4, 35 and 2000, I, [160], described the writing implement as having a broad, flat tip held perpendicular to the direction of writing, similar to how she described the implement used for the earlier Aramaic scripts. In Yardeni 1997, 164, she calls the implement a ‘calamus’, but it is not entirely clear to me whether she is consciously distinguishing the split-nibbed reed pen from the rush brush, since she is emphasizing the continuity between 4Q52 and the early Aramaic scripts, in contrast to the obviously reed-written 4Q70.

lacking evidence of separated brush fibers. The earliest explicit reference to a reed pen in the context of Jewish Hebrew/Aramaic writing comes from around the early second century BCE, when the translator of the Greek Psalter rendered the Hebrew word for ‘pen’ טב as $\kappa\acute{\alpha}\lambda\alpha\mu\omicron\varsigma$ in Psalm 45(44):2.⁴⁵

4.2 Other material changes

The change in writing implement also entailed other material and physical changes. Scribes writing with an Egyptian rush brush traditionally used a palette to mix dry ink and water, and the Egyptian scribes’ palettes also had slots carved into them to store pens (Figures 4 and 11). In the Bar Rakib III inscription (Figure 8), the Aramaic scribe is depicted holding such a palette-case.⁴⁶ While the Hebrew נסק in Ezekiel 9:2–3, 11 has sometimes been interpreted as an inkwell, it is in fact probably a loanword from *gstj*, the Egyptian word for the scribal palette-case.⁴⁷ An example of an Aramaic scribe’s brush case from the fifth/fourth century BCE was also discovered in Egypt (Figure 10). In the Hellenistic period, this traditional palette-case was abandoned for Hebrew/Aramaic writing. Rather than a palette, the split-nibbed reed pen required liquid ink and an ink pot into which the pen could be dipped to draw the ink up into the split in the pen.⁴⁸ Numerous inkwells have been found in excavations from Hellenistic and Roman Egypt and Judea, including especially from Jerusalem and Qumran.⁴⁹

- 45 The use of $\kappa\acute{\alpha}\lambda\alpha\mu\omicron\varsigma$ for a writing implement was known already in the fourth century BCE at the latest (Plato, *Phaedrus* 276c). The suggestion of Turner 1952, 10–12, that the split-nibbed reed pen may have originated in Mesopotamia is unsubstantiated, but it is worth noting his observation that the usage of $\gamma\rho\acute{\alpha}\phi\epsilon\upsilon\upsilon$ for both writing and painting might indicate archaic brush writing. The Hebrew טב (cf. Egyptian ‘rush, brush’ [Germer 1985, 201]) is a general term, which can refer both to the pen of a scribe used for cursive writing (Jer 8:8; Ps 45:2) and metal styli/chisels for engraving on hard surfaces (Jer 17:1; Job 19:24); see Haran 1980, 81–84. There is no reason to think that the Greek translation of Ps 45:2 provides any reliable information about pre-Hellenistic writing implements, but in the context of the Greek translation there can be little doubt that $\kappa\acute{\alpha}\lambda\alpha\mu\omicron\varsigma$ refers to the split-nibbed Greek reed pen.
- 46 Reade 2012, 705, notes that, in some depictions of Sennacherib’s scribes, the scribes are holding long rectangular items tucked under the left arms, which could be interpreted either as additional scrolls or Egyptian-style writing cases.
- 47 Ashton 2008, 55.
- 48 According to Angles 2019, 385, brush-written ink is often a deeper, more concentrated black, since it is less diluted than liquid ink.
- 49 In a recent set of chemical analyses on samples from inkwells from Judea, Ilit Cohen-Ofri collected nearly 20 such inkwells. For a recent example, survey, and bibliography, see Streckert and Seevers 2019. For sample images, see <https://



Figure 11. Egyptian scribal palette and rush brushes (ca. 664–332 BCE), <<https://www.metmuseum.org/art/collection/search/544302>>, © Metropolitan Museum of Art.

It is also likely that the change in writing implement corresponded with changes in posture, though this cannot be definitively demonstrated.⁵⁰ Furthermore, the hard and sharp reed pen could easily have punctured the thin papyrus sheets traditionally preferred in Egypt, which may have required the use of a hard writing surface or supporting the writing material on the leg.⁵¹ This may in part explain the general Greco-Roman preference for relatively thick papyrus sheets.⁵²

5. Script Modifications

Even when writers did not completely switch scripts, there may still have been pressure from cultural contacts to make modifications to their scripts. Sometimes writers resisted changing deeply entrenched features, such as the retention of the right-to-left direction of writing in Northwest Semitic and native Egyptian writing systems against the left-to-right direction of Greek and Latin writing. The retention of the traditional word division in Hebrew/Aramaic scripts against the *scriptio continua* of contemporary Greek book scripts may have been further supported by pragmatic concerns for legibility,

www.imj.org.il/en/collections/379780>, <<https://www.loc.gov/exhibits/scrolls/art3.html>>, and <<http://www.israelnationalnews.com/News/News.aspx/287487>>.

50 See especially Parássoglou 1979.

51 Turner 1987, 6; Kidd 2013, 243.

52 Krutzsch 2012, 103 and 2017, 215–216, who notes that the reduced quality may also in part be due to increased demand.

especially given the greater potential ambiguity of its consonantal alphabet that did not generally mark vowels.⁵³

But frequently writers did adapt their scripts in noticeable ways. These transformations may sometimes have resulted indirectly from technological/material changes like those outlined above. At other times they may have been directly introduced in imitation of foreign scripts, whether for socio-political or aesthetic reasons. Such direct and indirect causes may also co-occur, making it difficult to disentangle them. In this section, I will discuss some of the most significant stylistic changes in the development of the early Jewish Hebrew/Aramaic scripts from the fourth century BCE through the fourth century CE, all of which to one degree or another have plausible causes in contacts with Greek and Roman writing cultures. I will concentrate here on developments in formal scripts, since these are often the most culturally significant and prone to conscious modification, though informal scripts are also worthy of further investigation.

5.1 Script size

One of the most visually striking differences between the Aramaic scripts of the fifth–fourth centuries BCE and the Hellenistic Jewish Hebrew/Aramaic scripts of the third is the script size (Figure 12).⁵⁴ In the earlier Aramaic documents on both papyrus and parchment, the average script height (excluding long ascenders and descenders) is almost invariably between about 5–10 mm.⁵⁵ In sharp contrast, in later Jewish documents by skilled writers, the average script height is almost invariably about 2–4 mm (cf. already the bilingual ostrakon from Khirbet el-Kôm [277 BCE?]).⁵⁶ Though, in principle, writers can freely vary the size of their writing, this dramatic and consistent difference implies divergent operational norms in the two corpora. The smaller size of

- 53 Of course, this concern is not absolutely determinative, as evidenced, e.g. by the common Phoenician use of *scriptio continua*. Compare the adoption of *scriptio continua* for Latin scripts under Greek influence.
- 54 Ironically, this glaring difference is often overlooked by palaeographers who legitimately stress the formal continuity in letter forms (including their relative sizes).
- 55 One exceptionally small example is P.Jericho 1 (late fourth century BCE), a brush-written papyrus document with an average height just under 5 mm. Some of the Bactria documents are smaller than 5 mm in height (e.g. Naveh-Shaked C1 [330 BCE] and C4 [324 BCE]), but the majority are larger. In the corpus of Idumean ostraca, even the smallest hands are rarely shorter than 5 mm. The average letter height in the reed-written Maresha ostrakon no. 66—an Edomite marriage contract dated to 176 BCE—is around 5 mm.
- 56 This is generally true for both Square and Cursive scripts, on parchment, papyrus, and usually even ostraca. With few exceptions, usually only non-professional hands are larger than 5 mm in height.



Figure 12. Differing script size and patterns of stroke contrast. (a) Wadi Daliyeh Samaria Papyrus 2 (352/351 BCE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-285087>>; (b) 4Q70 (third cent. BCE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-284875>>, both photographs by Najib Anton Albina.

the Hellenistic scripts is apparently in part a consequence of the adoption of the reed pen. The rush brush often produces broad strokes of up to about 2 mm in width, which would make it very difficult to produce the small writing of the Hellenistic scripts without rigorous brush control and severe and uncomfortable contortions of the hand. The reed pen, however, can easily be sharpened to a fine tip to produce clear, small writing, as was commonplace in Greek writing of the period.⁵⁷ Other outcomes would also have been possible. The Jewish Hebrew/Aramaic writers could have, for instance, used the sharp reed pen to write large letters, sacrificing the characteristic weight of the old Aramaic script in order to preserve its size. Or they could even have cut their nibs more broadly than their Greek counterparts in order to maintain graphic continuity in both size and weight with their Aramaic predecessors. Instead, the early Jewish scribes adopted the sharp Greek pen and reduced the size of their scripts accordingly, imitating the small size and balance of the contemporary Greek scripts with monotone strokes (e.g. the fourth cent. BCE Derveni papyrus [2 mm avg. letter height] and the Timotheos papyrus P.Berol. 9875 [4 mm avg. letter height], Figure 21 below).⁵⁸ A similar overall reduction in size

57 Clarysse 1993, 189.

58 For descriptions of these papyri, see Cavallo and Maehler 2008, 7–8, 26–27.

is also evident in native Egyptian writing from the Ptolemaic period, though the nature of the transition requires further study.⁵⁹

5.2 *Stroke contrast*

Another consequence of the adoption of the relatively fine-tipped reed pen is a difference with regard to shading (i.e. the regular contrast in stroke thickness depending on the direction of movement) (Figure 12). The Egyptian rush brush used by Aramaic scribes in the fifth–fourth centuries BCE characteristically produced sharply contrasting thick and thin strokes in these scripts, depending on the diameter of the stalk, the shape of the tip of the brush, the position of the brush in the hand, the direction of movement, and the pressure applied by the writer. The Egyptian Aramaic scripts of the late fourth and third centuries BCE (and the Nash Papyrus of the second), however, no longer produce this effect (Figure 13).⁶⁰ Rather, they exhibit relatively monotone strokes of roughly consistent width. Some Idumean Aramaic ostraca from the late fourth century show similarly monotone strokes (e.g. A15.18 [316 BCE], A2.46 [313 BCE], A111.1 [312 BCE], A300.1.47 [312 BCE], A3.39 [311 BCE]). It is sometimes difficult to tell whether these transitional documents were written with very fine brushes or reed pens.

The Judean Hebrew/Aramaic scripts from the mid-third century BCE through the first century CE are likewise generally monotone, and even the most formal generally no longer produce the marked contrasts characteristic of the earlier scripts.⁶¹ Only the early 4Q52 (third century BCE) still resembles

59 Möller 1965, 2; Depauw 1997, 24; Quack et al. 2020, 609–610. El-Aguizy 1998, 225, concludes that the most common style of Demotic writing in the late Ptolemaic period is characterized by ‘[v]ery compact, rounded, well formed characters’. Verhoeven 2001, 254, argues that the reduction in size and the lack of ligatures are characteristic developments of the Ptolemaic period.

60 Albright 1937, 153–154; Avigad 1958, 62; Cross 1955, 150, 152 and 2003a, 10. See e.g. two Aramaic papyri from Edfu in Sayce and Cowley 1907; Cowley 1915. Naveh 1970, 24–25, 45, argues that the development is not diachronic, but rather due to the use of shading only in formal scripts. Yet all of his examples of shading are pre-Hellenistic. Naveh hypothesizes the continuation of calligraphic shading on the basis of similar techniques in later Aramaic-derived scripts like square Hebrew and Arabic, but the almost complete lack of calligraphic shading even in the formal hands of the Dead Sea scrolls cautions against such proposed continuity.

61 One interesting reflex of earlier shading techniques, however, is that many formal hands—possibly as early as 4Q52 and 4Q28 (third/second cent. BCE), but certainly later—draw the roof of ן with two horizontal strokes, creating a heavily shaded roof. The need for two distinct strokes in order to create this effect follows from the adoption of the relatively finely cut reed pen.

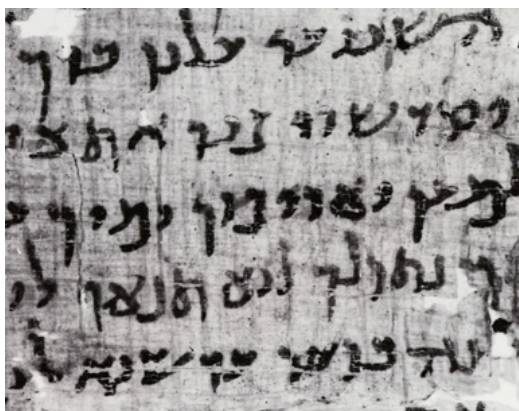


Figure 13. Nash Papyrus, Cambridge, Cambridge University Library, MS Or. 233, <<https://cudl.lib.cam.ac.uk/view/MS-OR-00233/2>>, © Cambridge University Library.

the characteristic shading of the earlier Aramaic scripts (Figure 20 below),⁶² though I suspect it too was already written with a broad-nibbed reed pen cut so as to imitate the earlier script style. Some later manuscripts evidence moderate differentiation in stroke thickness (e.g. 4Q28 and 4Q47), but by far the majority of hands (even formal ones) are relatively monotone.⁶³ Thus, shading is not a standard, stylized feature of formal Jewish Hebrew/Aramaic handwriting from the third or second centuries BCE.

This clear discontinuity apparently stems from the adoption of the tools of Greek writing culture and the imitation of its general appearance. The monotone strokes characteristic of Hellenistic- and early Roman-period Jewish Hebrew/Aramaic scripts are a direct consequence of the use of reed pens, which were normally sharpened to a fine point as done by most Greek writers. With a reed pen it is still possible to create contrasts in thickness if the nib is broad or cut obliquely or (to a minimal degree) by varying the amount of applied pressure, but the differences are generally far more subtle than those created by a brush. In such cases, the thickness of the lines for the most part correlates with stroke direction, since contemporary writers using reed pens tended to maintain a mostly invariant pen angle.⁶⁴ But intentional shading is not characteristic of Hellenistic Greek handwriting.⁶⁵

62 Cross 1955, 152–153; Yardeni 2000, II, [153] and 2014, 23.

63 Cross 2003a, 6, 33; Yardeni 2000, II, [153]; Longacre 2018, 65. According to Yardeni 2014, 23, shading ‘is not typical of the ‘Jewish’ script.’

64 Of course, this is not an absolute requirement. In later techniques of shading in Latin scripts from the first century BCE onwards, writers frequently did change pen angle in the process of writing to produce shaded strokes in different directions in imitation of brush writing; see Cavallo and Fioretti 2014, 35–38.

65 Cavallo and Fioretti 2014, 42–48, describe the development of shading in Greek formal scripts starting from the first century CE.

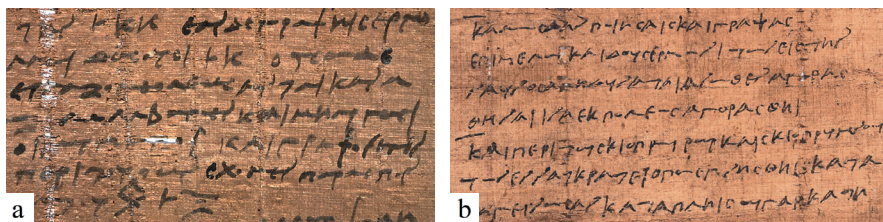


Figure 14. (a) Greek cursive writing with rush brush. Florence, Biblioteca Medicea Laurenziana, PSI IV 382 (248 BCE), <<http://www.psi-online.it/documents/psi;4;382>>; (b) Greek cursive writing with reed pen, Florence, Biblioteca Medicea Laurenziana, PSI V 533 (256 BCE?), <<http://www.psi-online.it/documents/psi;5;533>>; both images © MiBACT. Further reproduction by any means is prohibited.

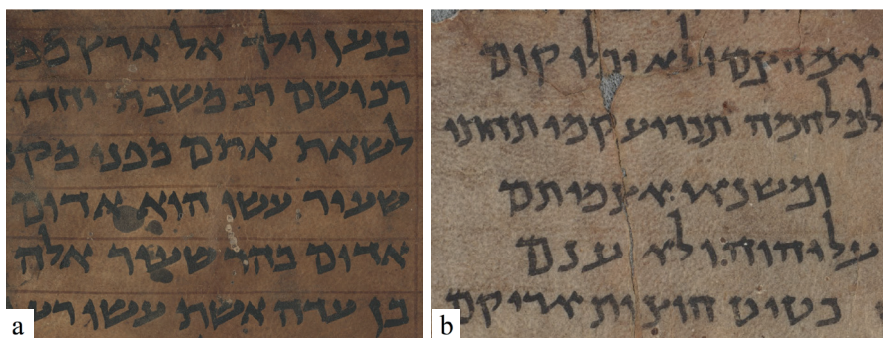


Figure 15. (a) Slightly shaded SdeirGen (first/second cent. CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-480570>>; (b) Unshaded 5/6HevPs (first/second cent. CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-366218>>.

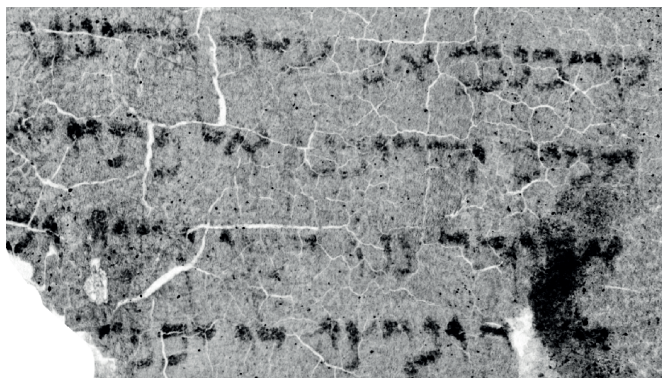


Figure 16. Heavy horizontal shading on EGLev (third/fourth cent. CE), see especially the first word at the top right (קרנבנכ) and the last line (הע[ל]ה ונרצה לו לכפר), © Brent Seales and Seth Parker.

Parallel interactions are evident in native Egyptian writing in the Ptolemaic and Roman periods. Sometimes Egyptian scribes wrote Greek texts with rush brushes, creating an unusually heavy appearance of the Greek script, with a higher proportion of ink in relation to the unscribed background (see Figure 14).⁶⁶ Alternatively, by the Roman period Egyptian scribes largely replaced their rush brushes with reed pens for Hieratic and Demotic scripts, monotonizing the traditional contrast in the scripts.⁶⁷

After a period of around 300 years where Jewish Hebrew/Aramaic calligraphic scripts typically lacked intentional and systematic contrasts in stroke thickness, some Jewish scribes began experimenting with new techniques of shading around the turn of the era.⁶⁸ In the formal hands of the late first and early second centuries CE these techniques had not yet become standard or even dominant (e.g. slightly shaded SdeirGen [first/second cent. CE] vs unshaded 5/6HevPs [first/second cent. CE], Figure 15). But the few surviving examples of the most formal, calligraphic Hebrew/Aramaic book scripts from the third century CE onwards are characterized by intentional contrast between thick horizontal and thin vertical strokes (e.g. EGLev [third/fourth cent. CE, Figure 16] and Oxford, Bodleian Library, Ms. Heb. d.89 [P] i [third/fourth cent. CE?]).⁶⁹

The best explanation for this change in graphic taste is undoubtedly to be found in what Cavallo and Fioretti have described as an ‘estetica del chiaro-scuro’, an aesthetic of shading.⁷⁰ In the first centuries BCE and CE, Latin writers developed a system of rustic capitals characterized by oblique shading, where strokes drawn diagonally down and to the right ↘ were of maximal thickness (e.g. P.Ryl. Gr. III 473 [Figure 17] or PSI XI 1183 [Figure 26 below]).⁷¹ The

66 Clarysse 1993; Sosin and Manning 2003; La’da 2013.

67 Tait 1988, 481; Clarysse 1993, 200–201; Depauw 1997, 26, 83; Menci 2003; Sosin and Manning 2003; Quack et al. 2020, 609–610.

68 According to Cross 2003a, 6, n. 28, shading is only ‘idiosyncratic’ in Hasmonean hands, while in elegant Herodian hands ‘new techniques of shading are used’. Naveh 1970, 24–25, 45, insists that there was continuity in practices of shading from the Persian-period Aramaic scripts through the Hellenistic and Roman periods into later calligraphic square Hebrew and Arabic scripts, especially with thick horizontal strokes and thin vertical strokes. Cross is almost certainly correct, however, because the shading occasionally seen from the Herodian period onwards (induced by the use of broad-nibbed reed pens at a constant pen angle) does not correspond closely to the variable patterns of contrast evident in the earlier brush-written Aramaic scripts.

69 Longacre 2018, 65–66.

70 Cavallo and Fioretti 2014, 64.

71 For the origins and dissemination of the rustic Roman capitals, see especially Cavallo and Fioretti 2014, 31–33; Fioretti 2014.



Figure 17. (a) Oblique shading on the Latin P. Ryl. Gr. III 473 (first/second cent. CE), <<https://luna.manchester.ac.uk/luna/servlet/detail/ManchesterDev~93~3~23980~100467>>, © University of Manchester; (b) Vertical shading on PSI Od. 5 (first cent. CE), <<http://www.psi-online.it/documents/psi-od-5>>, © Istituto Papirologico Vitelli.

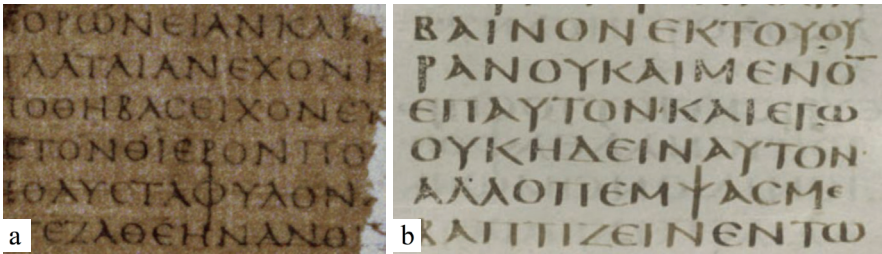


Figure 18. (a) Very minimal oblique shading on the formal round majuscule Hawara Homer, Bodleian Library ms. Gr. class. a. 1 (P) (second cent. CE), <<https://digital.bodleian.ox.ac.uk/inquire/p/ab7e8823-6160-4eaa-a103-a3f571ca1ca8>>, © Bodleian Libraries, University of Oxford; (b) Heavy vertical shading on biblical majuscule Codex Sinaiticus, British Library Add. ms. 43725, f. 247r, scribe A (fourth cent. CE), <<https://www.codexsinaiticus.org/en/manuscript.aspx?book=36&lid=en&side=r&zoomSlider=0>>, © British Library Board.

earliest rustic capitals were painted with flat-tipped brushes and used shading to imitate the depth of contemporary epigraphic scripts.⁷² Writers rotated the brushes in the process of writing (e.g. to produce thick horizontal serifs), and so there was no consistent one-to-one correlation between stroke direction and thickness.⁷³ This variegated writing angle with dominant oblique shading was picked up by Latin calligraphic writers using reed pens for writing on papyrus and parchment and continued in use for centuries.⁷⁴ The Roman calligraphic technique of shading was eventually transferred to the traditionally

72 Cavallo and Fioretti 2014, 33.

73 Cavallo and Fioretti 2014, 29, 31, 33, 35–38.

74 Cavallo and Fioretti 2014, 34–35, 37–38.

monotone Greek calligraphic tradition.⁷⁵ This influence is clear in some Greek hands from Herculaneum from the first century CE, which are characterized by oblique shading and Latin morphological intrusions.⁷⁶ PSI Od. 5 (first cent. CE, Figure 17) already exhibits the adaptation of this technique in the form of shading with vertical strokes of maximal thickness, which eventually became the standard shading technique for Greek scripts.⁷⁷ In the second century CE, shading is also used in some formal round majuscules (oblique) (e.g. the Hawara Homer, Figure 18) and in the early precursors of the biblical majuscule scripts (vertical).⁷⁸ In the third–sixth centuries CE—contemporary with the rise of shading in the Hebrew/Aramaic calligraphic tradition—Oriental Greek hands increasingly came to use shading intentionally as a calligraphic technique, especially in the biblical majuscule (e.g. Codex Sinaiticus, Figure 18) and sloping pointed majuscule scripts.⁷⁹ The vertical shading of these Greek scripts is the reverse of the situation with the contemporary Jewish Hebrew/Aramaic scripts with horizontal shading, which implies a different pen angle and/or opposite-direction oblique-cut nibs (right-oblique and left-oblique, respectively; see Figure 5 above) for the Greek and Hebrew/Aramaic writers. With the increasing prominence of Latin scripts in the late antique Eastern Mediterranean, it is possible that the Hebrew/Aramaic scripts were directly influenced by contemporary Latin exemplars without Greek intermediaries, which could help explain the horizontal shading of the Hebrew/Aramaic calligraphic scripts. The oblique shading and often thick horizontal serifs of the Latin scripts could easily have been interpreted in the relatively squat Hebrew/Aramaic tradition with a preference for horizontal shading, perhaps influenced by earlier Hebrew/Aramaic traditions. But it is also possible that the Hebrew/Aramaic writers directly imitated Greek exemplars. Despite their differences, the effect of the contrast in all three traditions creates a strikingly similar general appearance and seems to reflect a common aesthetic ideal, more so than the mere mechanical results of different pen holds.⁸⁰

75 Morison 1972, 21, 31–32, 37; Cavallo and Fioretti 2014, 42–48.

76 Cavallo and Fioretti 2014, 42–44, stress that this also implies a departure from the usual preparation of the pen for Greek writing with a fine tip.

77 Cavallo and Fioretti 2014, 48.

78 Cavallo and Fioretti 2014, 44, 48.

79 Cavallo 1967a, 2009, 132–133; Crisci 1985, 1996, 79–84. Parsons 1970, 377, remains cautious about Cavallo's claim for a general change in artistic taste in favor of heavier, contrasting scripts, given the admitted exceptions to this tendency.

80 Cf. Cavallo and Fioretti 2014, 63–64.

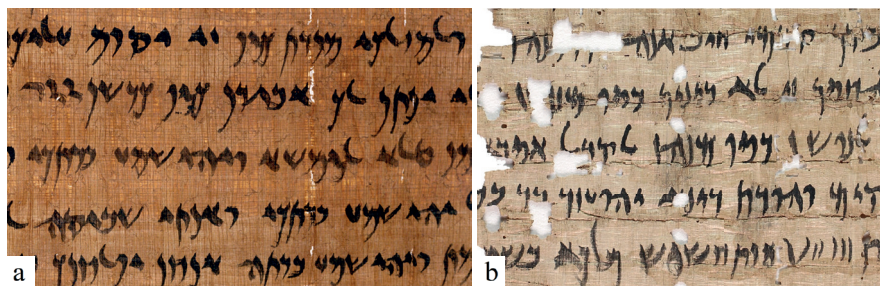


Figure 19. Curvilinear Aramaic scripts. (a) Textbook of Aramaic Documents (TAD) B3.6, Brooklyn Museum, accession no. 47.218.90a-b, *Freedom for Tamut and Yehoishema*, by Haggai the scribe from Elephantine (427 BCE), photograph by Bruce and Kenneth Zuckerman, West Semitic Research, © Brooklyn Museum, bequest of Theodora Wilbour from the collection of her father, Charles Edwin Wilbour; (b) Wadi Daliyeh Samaria Papyrus 2 (352/351 BCE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-497936>>.

5.3 Script ‘square-ness’

Another marked change in the Hebrew/Aramaic scripts is a move towards increasing ‘square-ness’ in the Hellenistic and especially Roman periods, characterized by rectilinearity, angularity, bilinearity, and a square module. In the Persian-period scripts, the brush strokes were typically very soft and curvilinear (Figure 19).⁸¹ The various letter forms also differed considerably in relative size, creating a very jagged appearance along the bottom edges of lines of writing (the letters hang relatively evenly from a notional top guideline).⁸²

The reed-written archaic Jewish Hebrew/Aramaic formal hands (e.g. 4Q52 and 4Q70 [both third cent. BCE]), in contrast, show a marked preference for rectilinear strokes and angular letter forms (Figure 20).⁸³ Yardeni suggests this increasing preference for rectilinear and angular formal scripts may be related to the change in writing implement to the reed pen, which facilitates

81 Yardeni 2014, 38, describes the script of Wadi Daliyeh Samaria Papyrus 1 (335 BCE) as already relatively angular, but the later scripts are clearly more so.

82 Cross 2003b, 44–45.

83 Yardeni 1990, 268; Ead. 1997, 164; Ead. 2000, II, [161], considers increasing rectilinearity and angularity to be the primary discontinuity with earlier Aramaic scripts. She also claims that the later scripts are more regular, because they hang from ruled guidelines. This latter suggestion is unfounded, however. The use of ruling (already found on some early West-Semitic inscriptions) may indeed help keep the lines straight, but regularity generally depends on the skill and care of the individual writer more than stylistic development; see Longacre 2019, 119–122. The overall impression of increased regularity may also in part reflect the change in writing implement and consequent modifications, since the reed pen is better suited for minute, controlled motions.

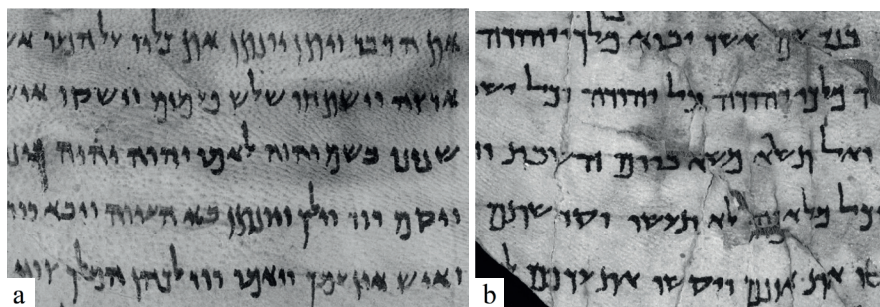


Figure 20. Relatively square Hebrew/Aramaic scripts. (a) 4Q52 (third cent. BCE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-284010>>, photo by Najib Anton Albina; (b) 4Q70 (third cent. BCE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-498974>>.

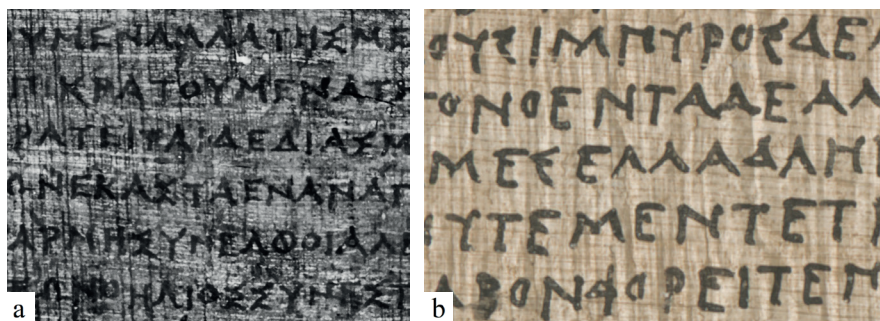


Figure 21. Square Greek scripts. (a) The Derveni Papyrus, Archaeological Museum of Thessaloniki, Organic Materials Collection, Inv. no. A 122 (fourth cent. BCE). The rights to the Derveni Papyrus belong to the Greek State and the Ministry of Culture and Sports (Law 3028/2002). © Archaeological Museum of Thessaloniki, Hellenic Ministry of Culture and Sports/Archaeological Resources Fund; (b) The Berlin Timotheos Papyrus, P.Berol. 9875 (fourth cent. BCE), <<https://berlpap.smb.museum/02776/?lang=en>>, © Staatliche Museen zu Berlin - Ägyptisches Museum und Papyrussammlung.

the writing of such strokes.⁸⁴ Yet many inscriptions on hard media from the third century BCE onwards also have a similar appearance (e.g. the Mt Gerizim inscriptions). Sometimes this general aspect of the script prompted specific changes in ductus. For example, in at least some formal hands, the horizontal base stroke of \beth was no longer drawn as a continuation of the downstroke

84 Yardeni 2000, II, [153], who further notes, ‘The square appearance is one of the prominent features of the Jewish book-hand from its beginnings.’ Yardeni sees antecedents of this trajectory in the fourth century Aramaic scripts from Wadi Daliyeh, but she does not state explicitly whether she thinks these were written with brushes or reed pens (in my opinion, the former).

(↵), but rather as a separate horizontal base stroke drawn left-to-right (→↓).⁸⁵ Though curvilinear informal and semiformal Hebrew/Aramaic scripts continued in parallel use throughout the period, the most formal scripts became evermore rigorously rectilinear and angular, culminating in the developed formal Square scripts of the first/second centuries CE and following.⁸⁶

Furthermore, by the third century BCE, the long, sweeping, vertical descenders in many letter forms—characteristic of most fourth century Aramaic scripts—had also started to bend in sharply to horizontal, sometimes being written with separate left-to-right horizontal base strokes.⁸⁷ Cross and others have plausibly explained this development of horizontal base strokes by processes of cursivization, whereby rapidity of ductus prompted scribes to bend their long downstrokes more sharply in anticipation of the following strokes.⁸⁸ This suggestion is indirectly supported by the fact that these letters in word-final position retained their older forms with long descenders, eventually leading to the standard distinction of non-final and final forms for the letters ,ך/כ ף/פ ,ן/נ ,ו/ב. An effect of this development was the general—though not yet complete—homogenization of letter height.⁸⁹

By the early second century BCE, letter height had been further equalized, yielding a strongly bilinear aspect, appearing as if the writing was bounded by both top and bottom (notional) guidelines (e.g. Maresha ostracon no. 66, an ostracon with an Edomite marriage contract dated to 176 BCE;⁹⁰ 4Q30 [third/

85 Cross 2003a, 14, 28, 33, 39–40, wrongly associated this change of ductus in formal scripts with the first centuries BCE and CE, supposedly derived from the ductus of earlier (semi-)cursive scripts of the second century BCE. In the Herodian period scribes began intentionally extending the base stroke of כ to the right of the downstroke as an essential part of the letter form. They did this in order to distinguish כ formally from כּ, with which it was easily confused, since כּ had shrunk to fit into the same square module as כ in the Square Hebrew/Aramaic scripts of the period. But the initial change in ductus occurred significantly earlier, as is evident already in 4Q52 (e.g. כ in the second word from the right הַכֵּר on line 1 in Figure 20a) and apparently also an Idumean ostracon (A97.2) dated to the reign of Ptolemy I (after 302 BCE).

86 Longacre 2019, 112–119.

87 For a particularly early example with fully horizontal base strokes, see P.Jericho 1 (late fourth cent. BCE). Wadi Daliyeh Samaria Papyrus 1 (335 BCE) already evinces some development in this direction.

88 Cross 1955, 150 and 2003a, 10.

89 Avigad 1958, 62–63, noted the movement towards the square script also in the third century Edfu papyri.

90 Eshel and Kloner 1996; Kloner et al. 2010, 72–76.

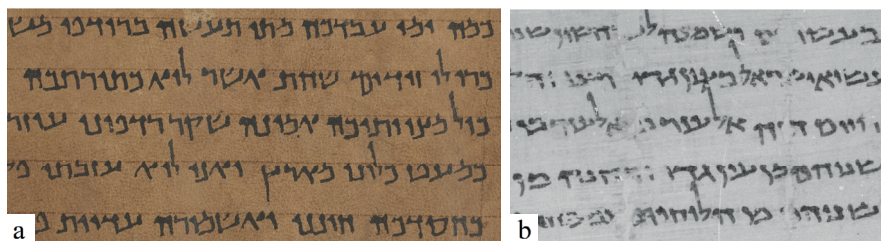


Figure 22. Square Hebrew/Aramaic scripts. (a) 11Q5 (first cent. CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-499040>>. (b) 5/6Hev44 (134 CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-300483>>.



Figure 23. Square module of SdeirGen (first/second cent. CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-480571>>.

second cent. BCE]⁹¹). This trajectory of increasingly rigid bilinearity continued to the realization of the fully square scripts of the late first cent. BCE and later, where most letters were formed within identical notional square bounding frames (i.e. a square module, Figures 22 and 23).

While some elements of this diachronic trajectory may have been produced by gradual, automatic development under cursive influence (e.g. the bending in of long descenders in non-final forms mentioned above), others cannot. For instance, even long after the tail of כ had turned into a horizontal base stroke, it continued to be generally differentiated from ב by being taller than ב. It only became necessary to formally distinguish ב and כ with a rightward protrusion of the base stroke in ב with the equalization of their respective letter sizes in accord with the developed square module. In addition to cursivization, therefore, the full realization of the bilinear Square scripts required another catalyst. I argue that the increasing preference for rectilinear, angular, bilinear, square scripts reflects a change in aesthetic taste for formal handwriting.

91 Cross dated 4Q30 to 125–100 BCE, but radiocarbon dating soon to be published by Mladen Popović, Hans van der Plicht, Kaare Rasmussen, and Perla Colombini suggests an earlier date.

The most probable explanation for this change is the influence of Hellenistic and Roman aesthetic preferences.⁹² Already by the fourth century BCE, Greek book scripts were defined by rectilinearity, angularity, bilinearity, and square module (e.g. the Derveni papyrus and P.Berol. 9875, Figure 21 above),⁹³ in stark contrast to the fourth century Aramaic scripts. In subsequent centuries, ink writing developed distinct rounded majuscule forms for some letters (especially Σ, Ε, and Ω), but formal book writing remained close to epigraphic ideals.⁹⁴ In the second century BCE, formal scripts were characterized by a move towards even greater regularity and consistently square module, which was completed in the rigidly bilinear and square scripts of the first centuries BCE and CE (e.g. P.Berol. 9941 [first cent. BCE]; PSI IX 1092 [first cent. BCE]).⁹⁵ These characteristics yield remarkable similarity in general aspect between contemporary Greek and Hebrew/Aramaic formal scripts, which is unlikely to be coincidence.⁹⁶ I suggest that the transfer of this aesthetic ideal into the Hebrew/Aramaic writing tradition was a (if not the primary) motivating factor for the noted trajectory towards square-ness in formal script traditions.⁹⁷

92 So also Tigchelaar 2018.

93 Turner 1987, 3, 92–93; Cavallo and Maehler 2008, 7–8, 26–27.

94 Cavallo and Maehler 2008, 17.

95 Cavallo and Maehler 2008, 15–16.

96 This was noted already by Sirat 1976, 6–7. Sirat 1976, 8–9, likewise notes the similar general appearance of contemporary Greek and Hebrew/Aramaic cursive scripts, to which we could also add examples of Latin cursives. Indeed, sometimes it is even difficult to tell at first glance which script a document is written in without close inspection. Compare, for example, Mur 20 (Hebrew cursive hand, 117 CE, <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-496370>>) with P.Oxy. XVIII 2192 (Greek cursive hand, c. 170 CE, <<http://163.1.169.40/cgi-bin/library?e=q-000-00---0POxy--00-0-0-0prompt-10---4----ded--0-11-1-en-50---20-about-2192--00031-001-1-0utfZz-8-00&a=d&c=POxy&cl=search&d=HASH01487f28c43ce8d6c4d921ec>>) and PSI VI 729 (Latin cursive hand, 77 CE, <<http://www.psi-online.it/documents/psi;6;729>>). The question of whether these similar cursives reflect parallel intramural cursivizing transformations and/or cross-cultural script interactions requires further study.

97 It is worth pointing out that not all Aramaic-derived scripts followed this path towards square-ness, and some parallel traditions preferred more curvilinear scripts; see Klugkist 1982. In one important respect, it could be argued that the Hebrew/Aramaic writing tradition took this fashion further than did their Greco-Roman contemporaries, namely in the angularity of their scripts. First, the Greek alphabet had more structurally round letter forms than the Hebrew/Aramaic consonantal alphabet, whereas the basic forms of the Hebrew/Aramaic script allowed writers the possibility of producing more consistently angular scripts. Second, there was a parallel movement in some Greek writing styles in the first centuries BCE and CE towards soft, curvilinear strokes, culminating in the formal round majuscules; cf.

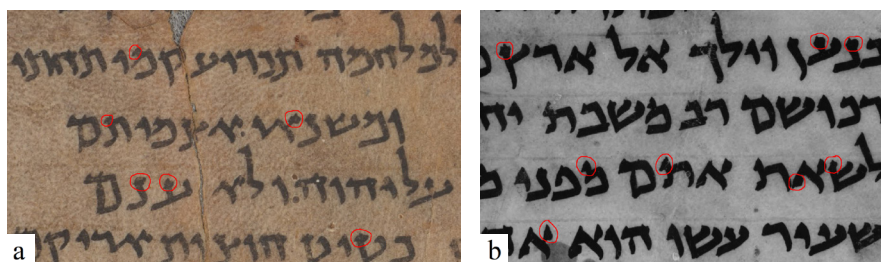


Figure 24. Examples of ornamentation circled in red. (a) 5/6HevPs (first/second cent. CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-366218>>; (b) SdeirGen (first/second cent. CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-480571>>.

5.4 Script ornamentation

In the Aramaic scripts of the fifth–fourth centuries BCE, the rightward strokes of some letters were often anticipated by serifs, which were inherited by the early Jewish Hebrew/Aramaic scripts of the third century and following. Other than these inherited serifs and newly developed hooks on the letters לוי, the early Jewish Hebrew/Aramaic scripts of all levels were simple and unadorned.⁹⁸ Starting around the middle of the first century BCE, Jewish scribes began to develop a system of ornamentation, which was fully developed in the first–second centuries CE and served as the foundation for later formal Jewish scripts until today.⁹⁹ This developed system was characterized by additional ornamental strokes at the tops of downstrokes on the letters שטטנוגך, flourishes on the right arm and sometimes left leg of א, and occasionally decorative elements on other letters like החמת (Figure 24).

Cavallo 1967b; Turner 1987, 21–22; Cavallo and Maehler 2008, 16. The Hebrew/Aramaic tradition does, however, exhibit a parallel trajectory of semiformal calligraphic curvilinear scripts (e.g. 4Q83 [second cent. BCE] and 4Q166 [first cent. BCE]), which closely resembles one particularly stylish variant of Greek curvilinear scripts (e.g. P.Oxy. XV 1790 [second/first cent. BCE]); cf. Longacre 2019, 116–118. Any possible interactions between these scripts and/or the ‘rustic’ Latin capitals would require further study.

- 98 Yardeni 2000, II, [154], plausibly sees antecedents of later separate ornamental strokes in the bent tips of some strokes in Hasmonean hands.
- 99 Yardeni 2000, II, [154–156] and 2014, 27, 30–31, 39; Longacre 2019, 115–116. The experimental nature of the early stages of this transition is evident in its rudimentary and unsystematic beginnings, where ornamentation appears only occasionally and in inconsistent patterns in different hands. A good example of idiosyncratic experimentation that was never adopted into standard script forms is the ה with ornamental foot in 11Q15 (first cent. CE), as pointed out by Tigchelaar 2018. On the difficulty of defining and ranking relative levels of ornamentation, see Best and Altmann 2008.

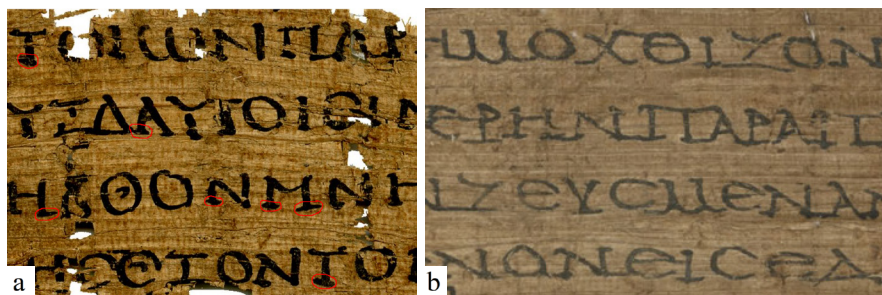


Figure 25. Ornate Greek scripts from Egypt. (a) ‘Epsilon-theta’ style. PSI Od. 2 (first cent. BCE), <<http://www.psi-online.it/documents/psi-od-2>>; (b) Early round majuscule. PSI XIV 1386 (first cent. CE), <<http://www.psi-online.it/documents/psi;14;1386>>, both images © Istituto Papirologico Vitelli.

Cross associated the elaboration of this system of ornamentation with the development of the formal Herodian book scripts,¹⁰⁰ but he could provide no specific explanation for its origin. It may well be, however, that the rise of the ornate Jewish Hebrew/Aramaic scripts was the direct result of contact with contemporary Greco-Roman writing culture.¹⁰¹ Contemporary Greek and Latin formal book scripts were generally characterized by decorative serifs at the tops and/or bottoms of vertical strokes.¹⁰² They gave the scripts an elevated calligraphic elegance and may have served to accentuate the notional headlines and baselines of the bilinear formal scripts.¹⁰³ The ultimate origin of these ornamental apical strokes remains contested, but they clearly reflect a widespread Mediterranean cultural aesthetic.¹⁰⁴ While examples of (rudimen-

100 Cross 2003a, 32.

101 So also Tigchelaar 2018. In most cases, this transfer is only indirectly evident in contemporary parallel developments. In some rare cases, however, we may see this process directly within a given manuscript with two different alphabets. For example, the lower tips of downstrokes on the letters of the Palaeo-Hebrew tetragrammata in 8HevXIIgr (first cent. BCE, <<https://www.deadseascrolls.org.il/explore-the-archive/manuscript/8Hev1-1>>—probably written by the same scribes who wrote the main Greek text—exhibit unusual ticks, which were probably introduced because of the scribes’ habitual pen movements when writing in Greek. While this technically relates to the Palaeo-Hebrew script, rather than the formal Hebrew/Aramaic Square scripts, it helpfully illustrates the kind of script interactions I envision here.

102 Menci 1979, 51–52, considers writing with apical ornamentation to be the *sine qua non* of calligraphic (Greek) writing in the first–second centuries CE, such that simple, unadorned scripts generally indicate informal productions.

103 Cf. Menci 1979, 48; Turner 1987, 3.

104 Morison 1972, 9–10, suggested imitation of Mesopotamian cuneiform for the origin of early wedge-shaped ornamentation. Menci 1979, 26–30, surveys more

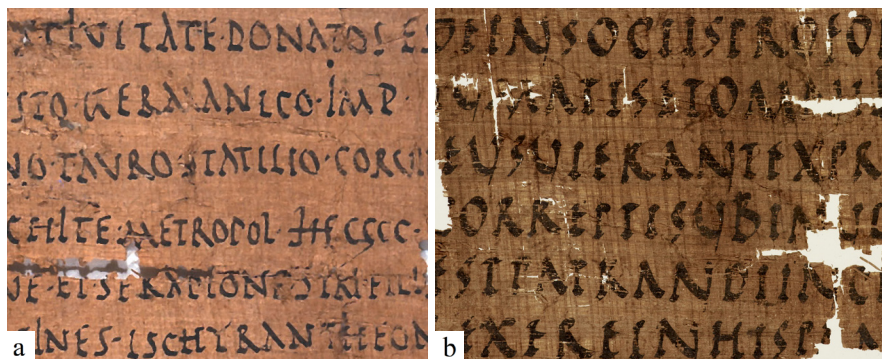


Figure 26. Ornate Latin scripts from Egypt. (a) Florence, Biblioteca Medicea Laurenziana, PSI XI 1183 (47/48 CE), <<http://www.psi-online.it/documents/psi;11;1183>>, © MiBACT. Further reproduction by any means is prohibited; (b) P.Ryl. Gr. III 473 (first/second cent. CE), © University of Manchester.

tary and occasional) serifs on handwritten Greek documents can be found as early as the third century BCE,¹⁰⁵ the heyday of these ornate scripts was from the first century BCE to the second century CE,¹⁰⁶ precisely when the phenomenon developed in the Hebrew/Aramaic scripts. The characteristic serifs—determinative for Schubart’s proposed *Zierstil* ‘decorated style’¹⁰⁷—were in fact applied independently to multiple different types of writing.¹⁰⁸ They also exhibit a remarkable geographic spread, ranging from Italy (e.g. P.Herc. 1044 [first cent. BCE];¹⁰⁹ P.Herc. 1471 [first cent. BCE]), to Egypt (e.g. PSI Od. 2 [first cent. BCE] and PSI XI 1215 [first/second cent. CE], Figure 25), Syria (P. Dura 34, in an informal hand dated to 116 BCE),¹¹⁰ and Judea (see below). Sim-

influential arguments that they could have come into Greek book scripts from 1) epigraphic scripts, 2) Latin scripts, or 3) the connecting strokes of joined cursive Greek scripts. Regardless, she contends—following Guarducci 1967, 372; Cavallo 1967b, 211—that a typical Hellenistic fashion for ornamentation may underlie their preferability and proliferation in this period.

105 Turner 1987, 21; Cavallo and Maehler 2008, 11.

106 Schubart 1925, 112–115; Menci 1979, 50, considers the first–second centuries CE ‘per eccellenza’ for apical ornamental writing.

107 Schubart 1925, 112–115.

108 Menci 1979, 26, 48, 51; Turner 1987, 21. In other words, they are calligraphic accessories that can be applied to different scripts, rather than determinative of a particular style of writing. This fact makes transfer into the Hebrew/Aramaic writing tradition even more plausible.

109 For P.Herc. 1044, see <<http://www.chartes.it/index.php?r=document/view&id=1070>>. For further examples from Herculaneum not noted by Menci 1979, see Cavallo 1983; Parsons 1990, 24.

110 <<https://findit.library.yale.edu/catalog/digcoll:2771673>>.

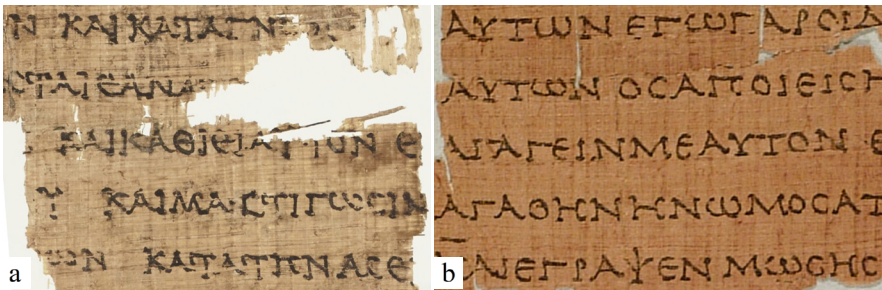


Figure 27. Jewish Greek ornate scripts from Egypt. (a) P.Ryl. Gr. III 458 (second cent. BCE), <<https://luna.manchester.ac.uk/luna/servlet/s/kg3w13>>, © University of Manchester; (b) Deuteronomy, P.Fouad Inv. 266 (first cent. BCE), © L'Institut français d'archéologie orientale du Caire.

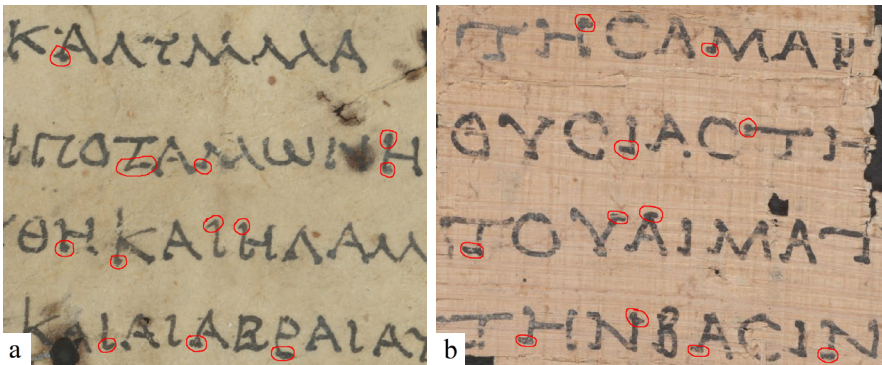


Figure 28. Jewish Greek ornate scripts from Judea. (a) 8HevXII gr (first cent. BCE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-370932>>; (b) 4QpapLXXLev^b (first cent. BCE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-503660>>.

ilarly ornate Latin scripts were likewise widely disseminated throughout the Mediterranean region, e.g. Italy (P.Herc. 1475 [first cent. BCE/CE]),¹¹¹ Egypt (PSI XI 1183 [first cent. CE] and P.Ryl. Gr. III 473 [first/second cent. CE], Figure 26), Syria (P.Dura 54 [225–235 CE]),¹¹² and Judea (Mas721 [papVirgil, first cent. CE],¹¹³ Mur158 [first/second cent. CE]).¹¹⁴ These observations imply that the preference for such ornate scripts was more than just a development within a single school of writing, but rather reflected broader cultural aesthetic preferences.

111 <<http://www.chartes.it/index.php?r=document/view&id=1500>>.

112 <<https://findit.library.yale.edu/catalog/digcoll:2771433>>.

113 <http://cojs.org/wp-content/uploads/2008/12/Virgils_Aeneid.jpg>.

114 <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-496360>>.

Ornate scripts were also frequently used for Jewish Greek literary rolls in Egypt (e.g. P.Ryl. Gr. III 458 [second cent. BCE] and P.Fouad Inv. 266 [first cent. BCE], Figure 27). And most of the formal Jewish hands in copies of the Greek scriptures from the Judean Desert also clearly evidence this ornamentation (e.g. 4QpapLXXLev^b, 4QLXXNum, 7QpapLXXExod, and 8HevXII gr, Figure 28),¹¹⁵ so there can be little doubt that this aesthetic preference for ornate scripts was well-known among educated biliterate Judean writers.

I suggest that these writers—impressed with the calligraphic appearance of the contemporary Greek (and perhaps Latin) scripts—began to imitate these serifs when writing formal Hebrew/Aramaic manuscripts. Of course, there were probably also socio-political factors influencing the adoption of this Greco-Roman fashion under the pro-Roman Herodian dynasty. The ornamentation on the Hebrew/Aramaic scripts was predominantly applied to the tops of downstrokes—in contrast to the Greek and Latin scripts where ornamentation is somewhat more prominent on the bottoms of downstrokes—probably because horizontal base strokes are more common in the Hebrew/Aramaic scripts than in the Greek and Latin scripts, so there was less need to accentuate the notional baseline. Nevertheless, the effect of the ornamentation on the general appearance of the various scripts is remarkably similar.

6. Numeral Systems

As in the non-Christian Greek literary tradition, Hebrew numbers in literary texts were typically written out in full words throughout this period. But in other contexts, numbers were frequently written symbolically. In the Persian Aramaic documents and Dead Sea Scrolls, writers used an old system of Hieratic-derived numerals (Figure 29).¹¹⁶ This system continued in practical use in Jewish circles well into the first century CE, as illustrated by an inscribed limestone ossuary lid from Bethphage listing payments to workers (first cent.

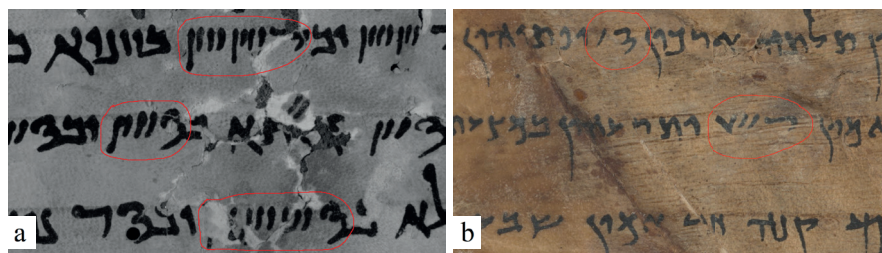


Figure 29. Hieratic-derived numerals. (a) 4Q318 (first cent. BCE/CE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-513184>>; (b) 4Q554a (second/first cent. BCE), <<https://www.deadseascrolls.org.il/explore-the-archive/image/B-513129>>.

115 Cf. Parsons 1990, 25; Id. 1992.

116 Tov 2004, 212–213.

CE),¹¹⁷ Mur29 (67 CE?), Mur30 (69 CE?), Mur22 (69/70 CE?), and P.Jericho 7 (84 CE).¹¹⁸ But, by the late Roman period, a new system of numerals had overtaken this traditional system, where each letter of the 22-letter Hebrew/Aramaic consonantal alphabet had a numerical value (א–ט = 1–9; י–צ = 10, 20, 30...; ק–ת = 100, 200, 300...).¹¹⁹ The earliest attestation of this new alphabetic numeral system in a Jewish Hebrew/Aramaic context is in a bilingual Greek-Aramaic coin series dated to the 25th year of the reign of Alexander Jannaeus (79/78 BCE).¹²⁰ On some variants of this series, the number 25 is written כה (כ = 20; ה = 5). The bilingual nature of this numismatic attestation is suggestive. Some of the Dead Sea scrolls—most significantly 1QapGen—use letters in alphabetic order to indicate sequences like the order in which separate parchment sheets should be stitched, but this is not the same alphabetic numeral system.¹²¹ It is possible that Hieratic (e.g. Masada 420) and alphabetic (e.g. Masada 421?) numerals were used contemporaneously in the Masada ostraca (before 73 CE), though the latter are not entirely clear.¹²² The use of Palaeo-Hebrew alphabetic numerals is common in the coins of the First and Second Jewish revolts against Rome. The rise of this new system in the Hebrew/Aramaic tradition seems to have been due to the influence of the contemporary Greek ‘Milesian’ alphabetic numeral system, which is evidenced as early as the sixth century BCE.¹²³

117 Cotton et al. 2010, 681–686.

118 In documents clearly dated to the second century CE, the numbers are written out in full as words.

119 For the complex development of this system, see Gandz 1932, whose history of the early stages of the transition must now be rewritten in light of new documented evidence. This numeral system famously generated a tradition of Jewish gematria parallel to Greek traditions of isopsephy, for which see Ast and Lougovaya 2015.

120 Meshorer 2001, 39–40, 210, type L. I am not aware of any pre-Hellenistic examples of alphabetic numerals in West-Semitic scripts.

121 Morgenstern 1996, notes a sequence of three successive sheets in 1QapGen (first cent. BCE) labelled respectively א, ב, and ג in alphabetic order. This indicates that these letters are not used in the same way as the alphabetic numerals common in later times, since these cannot correspond to 80, 90, and 100 respectively. This example does, however, correspond to an alternative Greek system of numeration (or at least sequencing) where each of the 24 letters of the Greek alphabet are assigned sequential numbers 1–24, as described in Ast and Lougovaya 2015, 95–96. However, the alphabet—with its established order—has inherent sequencing potential even without explicit numerical values, so it is not at all clear that 1QapGen evidences a full-fledged alternative system of Hebrew alphabetic numerals.

122 Cf. Yardeni 2000, I, 200, II, [75].

123 So also Gandz 1932, 108–109; Pettersson 1996, 803–804. Chrisomalis 2003, in turn, attributes the invention of the Milesian alphabetic numeral system to the influence of contemporary Demotic numerals.

7. Conclusion

The evidence cited above amply illustrates what Tigchelaar has conservatively described as ‘shared developments with the Hellenistic bookhand’¹²⁴ and provides considerable support for a theory of script interactions between the Greek (and possibly Latin) and Hebrew/Aramaic scripts of Egypt and Judea in the Hellenistic and Roman periods. Script encounters frequently led to cultural exchanges, where prominent aspects of Greek (and, later, possibly Roman) writing culture were apparently transferred to Hebrew/Aramaic writing culture, including both material and aesthetic changes. These processes significantly transformed the general appearance of conventional Jewish Hebrew/Aramaic scripts in assimilation to ever-changing stylistic preferences that were widespread throughout the Eastern Mediterranean and beyond. In fact, I argue that periodic intercultural transfer of material and stylistic features provides a more comprehensive explanation for the developments evident in the Hebrew/Aramaic writing tradition of the period than previous theories about the gradual evolution of its scripts. While there can be no doubt that the conventional letter forms indeed changed incrementally over time, most of these significant systemic changes took place within relatively short periods of time and had far more drastic effects on the overall appearance of the scripts.

Given the close contacts and biliteracy documented in section 2, I propose that these observed script interactions were mediated by biliterate Jewish writers, who were familiar with both Greek and Hebrew/Aramaic writing cultures. They must surely have belonged to influential classes, such as highly regarded scribes, scholars, priests, officials, and/or wealthy community members. These cultural intermediaries were positioned to alter fundamental aspects of conventional Hebrew/Aramaic practice to reflect the aesthetic preferences of the dominant Hellenistic and—later—Roman writing cultures. In the initial stages of many of these changes, there is evidence of non-standardized, even idiosyncratic experimentation (e.g. patterns of stroke contrast and ornamentation). But once a critical mass of change agents adopted the new features, they rapidly established new conventions and standards that were respected across the Jewish Hebrew/Aramaic writing tradition, especially for formal book scripts. Whether the systemic adoption of features of alien writing cultures was due to their associated aesthetics, prestige, or authority cannot be demonstrated definitively, but some of these changes are so drastic that it is difficult to imagine their success without some form of official sanction. Such acculturation can be both a reflection of aesthetic preference and a socio-political statement simultaneously.

124 Tigchelaar 2018.

My treatment here of these complex issues has necessarily been brief, and each aspect is worthy of further research and documentation. In addition to the above observations, other script-related phenomena warrant further investigation, such as possible correlations with respect to special sigla,¹²⁵ script inclination, round calligraphic styles, and distinct cursive registers. Furthermore, my preliminary investigations suggest that the study of manuscript formats have great promise for revealing similar technological and artistic intercultural exchanges in this period, including features of construction (e.g. size, proportions, direction of writing relative to papyrus fibers, and the use of wooden handles) and layout (e.g. large margins, changes in average column width, and stichometric vs prose layouts).

The amount of evidence yet to be integrated into the comparative study of the Greek and Hebrew/Aramaic traditions remains immense, but I have already pointed out numerous indications that demonstrate the value of this approach for a number of writing cultures in the ancient Mediterranean. Thus, this new intercultural research paradigm—Comparative Hellenistic and Roman Manuscript Studies (CHRoMS)—has great potential to bring together specialists in different culture-specific fields to trace more fully the material and cultural dynamics of the history of writing and bookmaking as both technology and art.

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125 Cf. Tov 2004, 273–274.

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The Arabic Manuscripts of the Riccardiana Library of Florence and the Retrieval of Alessandro Pini's Allegedly Lost Collection*

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A recent cataloguing project of the Arabic manuscripts preserved in the Biblioteca Riccardiana of Florence allowed to reconstruct the history of 20 codices which had arrived in the library before 1736. A close analysis of the material, and of the information contained in the letters exchanged between Alessandro Pini and Francesco Redi, two physicians at the Medici court in Florence, has shown that they were part of goods, shipped by Pini from Cairo in 1681, which were believed to have been lost in a shipwreck. In the paper I identify the manuscript according to a list of lading made by Pini and their actual content. I also outline the phases of their cataloguing and description and provide a tentative reconstruction of their history before their acquisition by Gabriello Riccardi.

In 2019, a project of the University of Florence gave me the opportunity to work on the collection of Arabic manuscripts preserved today in the Biblioteca Riccardiana of Florence. The aim of the project was to produce scientific descriptions of the material within the national on-line repository for manuscript material (*Manus OnLine*) and the publication of a catalogue in the *Series Catalogorum* of the Istituto per l'Oriente C. A. Nallino, Rome (forthcoming).¹ The oriental manuscript collection of the Riccardiana is not fully unknown: indeed, a few catalogues and inventories related to this specific corpus of manuscripts had been compiled since its first nucleus was gathered by the marquis and sub-dean Gabriello Riccardi (1705–1798).² Three

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1 The project, directed by Prof. Paolo La Spisa, was funded by the Ente Cassa di Risparmio di Firenze and the (then) Dipartimento LiLSI (Lingue Letterature e Studi Interculturali) of the University of Florence. The metadata of the Arabic manuscripts described in *Manus OnLine* (< <https://manus.iccu.sbn.it/>>) will be soon available as reference to the on-line images of the manuscripts (for the Riccardiana collection see <<http://teca.riccardiana.firenze.sbn.it/index.php/it/>>; for the Biblioteca Nazionale Centrale di Firenze (hereafter BNCf) see <<https://teca.bncf.firenze.sbn.it/manos/browseF.jsp>>).

2 On the library of Gabriello Riccardi see Bartoletti 2017. For a description of the catalogues see, Bartoletti 2011, 233–237 and 241–243 (NB: at p. 235 'Minorita' to be corrected in 'Maronita'); see also Minicucci 1983, 179.

of them are available among manuscripts preserved in the Riccardiana Library itself. The first (MS Florence, Biblioteca Riccardiana, Ricc. 3822, ff. 157r–159v) was compiled in 1736 by two Coptic priests during their stay in Florence, at the request of Giovanni Lami (1697–1770), the librarian of the Riccardi House’s collection.³ The second in chronological succession (MS Florence, Biblioteca Riccardiana, Ricc. 3580) was authored in 1741 by the Archbishop of Apamea Stefano Evodio Assemani, famous for being involved, together with his uncle, Giuseppe Simonio Assemani, in several cataloguing projects of oriental manuscripts in Italian libraries, among which the Biblioteca Vaticana and the Biblioteca Medicea Laurenziana of Florence.⁴ In 1867, Lupo Buonazia was entrusted by the Italian Ministry of Education to revise Assemani’s catalogue and produced his own accurate descriptions; they are available in the autograph manuscript preserved within the archive of the Riccardiana (MS Florence, Biblioteca Riccardiana, Archivio, no shelf-mark) and, despite the almost total absence of codicological descriptions, it remains an excellent reference for the descriptions of the manuscripts’ contents, especially considering the bibliographic tools available in his time. There are also two printed tools to access the collection of oriental manuscripts: one is the short list of Arabic manuscripts that Olga Pinto compiled in 1935, without knowing Buonazia’s work; the other one is the milestone catalogue of Persian manuscripts published by Angelo Piemontese, which includes also codicological and historical information related to the single codices, but not to the constitution of the collection itself, and only refers to Persian works, thus covering a very small section of the collection.⁵ The historical stratification and development of Gabriello Riccardis’s collection has been described in the major monograph by Guglielmo Bartoletti, who also devoted a specific study to the oriental manuscripts, identifying the main phases of their acquisition.⁶

3 Minicucci 1983, 180.

4 Hereafter BML. See Levi della Vida 1962; Farina 2021. Assemani’s project, never realized, to publish this catalogue together with those of the BML and Palatina libraries is recorded in the letters he exchanged with Anton Francesco Gori; cf. Minicucci 1983, 181–182. A short list of the oriental manuscripts, on the base of Assemani’s catalogue, was then included in the *Inventario* (1810), 8a–9a.

5 Pinto 1935, 238–242; Piemontese 1989, 131–137. Of the 58 oriental manuscripts in the collection, 35 are in Arabic, 9 in Ottoman-Turkish, 4 in Persian, 8 a mix of these mentioned languages, and 2 codices in one of the previous languages mixed with Latin or European vernacular. The historical core of the oriental collection runs roughly from shelf-mark Ricc. 167 to Ricc. 219bis, including also Ricc. 213, that is in Greek, and Ricc. 220, the only one in Hebrew within this group. Ricc. 4104, 4234, and 4240 are recent acquisitions.

6 Bartoletti 2017; 2011, 237–239, 241. The different phases of acquisition are also outlined in Bartoletti 2007 and 2009.

These tools are a precious key of access to the study of the Arabic manuscripts in the collection, but at the same time they show some inconsistencies in the reconstructed history of the fund, when compared to the information obtained from the manuscripts themselves.⁷

The corpus of manuscripts to which I refer in this contribution is part of the oldest set of oriental manuscripts acquired by Gabriello Riccardi. The first information about the presence of this material in the Riccardiana collection is in a travel report made by Giovanni Lami in 1740, in which he narrated his encounter with Stefano Evodio Assemani in 1737.⁸ In the account Lami made an explicit reference to the acquisition of 40 codices from the library that had belonged to the famous Giovanni Battista Doni (1594–1647) ('comprati da quello che fu già del celebre Giovambattista Doni').⁹ There is no specific documentary trace of this acquisition, but from the inventories of Gabriello Riccardi's collection it is clear that, for his library, this was the most relevant increase, counting more than 900 manuscripts.¹⁰

Giovanni Battista Doni was a renowned Florentine erudite whose interests spanned from geography, rhetoric, geometry, to music composition and musicology.¹¹ His innovative theories in this latter field—and his competence in humanistic studies—put him into contact with many contemporary scholars, personally, during his stay in Rome and France, and also via lively ex-

- 7 The work by Guglielmo Bartoletti, to whom I am largely indebted, is still essential, but the contribution from different disciplinary and linguistic fields to this kind of research, and a codicological and historical-archaeological analysis of the material objects can always add crucial information.
- 8 From the same report we discover that it was Riccardi himself to ask Assemani to correct the descriptions made by the Coptic priests, and to add those for the Turkish and Persian manuscripts (Florence, Biblioteca Riccardiana, Ricc. 3799, f. 123v; published in Bartoletti 2011, 235–236; Minicucci 1983, 179).
- 9 And not 'comprati da quello che fu già il celebre Giovan Battista Doni', as Bartoletti by mistake transcribes just two pages after (Bartoletti 2011, 237). A direct acquisition from Giovan Battista Doni was clearly impossible for chronological inconsistency (see n. 21 below). To be precise, of the 40 manuscripts, 37 were previously part of the Doni House's collection, and three were acquired in 1735 from Anton Maria Salvini (1653–1729), one of the major representative of the Florentine *Republic of letters*; see Bartoletti 2009. These three items have been identified by Bartoletti as mss Ricc. 167, 190, 192, but there is clear evidence of inconsistency in the identification of Ricc. 167 as it will be pointed out below (cf. n. 38).
- 10 The catalogue of the Doni House's Library is preserved in Florence, Biblioteca Riccardiana, Ricc. 3575 which lists, at f. 1v, the 37 Arabic manuscripts ('Auctores arabici codices XXXVII'). The descriptions in this list refer only to the format and size of the manuscripts ('in 4° e in 8°', 'piccoli' or 'grandi'), also hinting to their aesthetical and/or codicological quality ('libri' or 'libretti').
- 11 Formichetti 1992.

changes of letters dealing with literary, scientific and bibliographic subjects.¹² Famous orientalists, such as the Jesuit Athanasius Kircher (1602–1680) and Nicolas-Claude Fabri de Peiresc (1580–1637) were among his contacts.¹³ His works remained largely unpublished until his death, but, except for a general curiosity for oriental music, there is no evidence that could entail his proficiency in oriental languages. The first hint at this specific interest is found in his biography compiled by Angelo Maria Bandini (1726–1803), the famous learned bibliophile and director of the Biblioteca Laurenziana and of the Marucelliana, founded in 1752. According to him, Doni started to study oriental languages during his stay in Pisa, from 1620, acquiring at least a certain knowledge of Hebrew.¹⁴ Bandini also recalled the acquisition of Doni's oriental manuscripts by Gabriello Riccardi, possibly on the basis of the already mentioned report by Lami, asserting also that *he was not unacquainted* ('non ignarus') with oriental languages.¹⁵ But Doni's actual interest in oriental texts is better defined in his epistolary exchanges: more than a direct engagement testifying his skills in the oriental linguistic domains, he certainly played a crucial role as 'bibliographical broker' especially between the Florentine and Roman intellectual milieux, but also with other cultural centres. In fact, he had been appointed custodian of the Medicean collection by Grand Duke Ferdinando II de' Medici (1610–1670, r. 1621–1670) and facilitated the access of scholars to that extraordinary book heritage.¹⁶ This was the case for the study and translation of the Arabic version of the *Conics* by Apollonius of Perga, in which the Lebanese Maronite Abraham Ecchellensis (Ibrāhīm ibn Ibrāhīm ibn Dāwūd Ḥāqilānī, 1605–1665) was engaged, thanks to the mediation played by Lucas Holstenius (1596–1661).¹⁷ From these indications it is not clear if and how Doni had a proper knowledge of oriental languages, nor is there any mention of his personal oriental book collection and its origin, apart from the above mentioned inventory that does not identify the works. In any case his specific care for the oriental manuscripts and a certain awareness of their content is evident in the explicit mentions of the Medicean oriental

12 See Doni's epistolary published together with his biography in Bandini 1755 and his exchanges with Lucas Holstenius (1596–1661) in Mirto 1999.

13 Bandini 1755, cols 155–156, 169; Miller 2015, 90, 107.

14 Bandini 1755, x.

15 *Ibid.* LVI, n. 3.

16 Bandini 1878, 38–39.

17 Letters from Lucas Holstenius to Doni in Bandini 1755, cols 170–173, nos CVIII–CX, and also pp. CIII–CIV; letters from Doni to Holstenius in Mirto 1999, 134, 140–141, nos 63, 69. On the manuscripts and edition of the *Conics*' Arabic translation by Abū al-Faḥḥ b. Maḥmūd al-Faḍl al-Iṣfahānī see Fani and Farina 2012, 100–103. On Abraham Ecchellensis see Heyberger 2010.

collection—mainly gathered in Rome during the activities of the *Typographia Medicea Linguarum Externarum*—in his epistolary exchange with the Roman traveller and orientalist Pietro Della Valle (1586–1652).¹⁸ Doni shared with him the interest for music, the main subject of their correspondence, but he also asked Della Valle for his Turkish grammar, to which the Roman traveller replied in 1641, writing that the work was still unpublished, and that he intended to have it printed by the *Congregazione de Propaganda Fide*.¹⁹ Within this framework, Doni's Arabic manuscripts collection could represent a sort of showpiece, not necessarily something with which the owner could engage, but rather the materialization of a crucial part of human knowledge, which was rediscovered during the Renaissance and could not be excluded in any learned man's curriculum, or at least in his library.

In any case, a closer analysis of the oriental manuscripts allegedly ascribed to Doni's collection, supported by codicological and documentary evidence, has surprisingly shed light on the origin of twenty manuscripts included in this first nucleus of the Riccardiana collection, revealing a part of its still unknown history set in the orientalist milieu of seventeenth-century Florence. The oriental manuscripts considered to have been part of Doni's library by Bartoletti are MSS Florence, Biblioteca Riccardiana, Ricc. 168–189, 191, 193–201, 204–205, and 207–209.²⁰ Some of these, such as Ricc. 184 and Ricc. 194, show on their fly leaves notes in Arabic, which are later than Giovanni Battista Doni's death, thus excluding the possibility that the manuscripts—at least these two—ever were in his private possession.²¹ There should have been someone else who enriched the Doni Library with oriental manuscripts after the death of its founder (who, in any case, could have previously collected a part of them).²² Focussing on these two codices, it was possible to note that they share a common feature, namely a short note in Italian related to their contents on their first folios. The notes clearly show the same hand and, surprisingly, they are not unique to these two books. On MSS Ricc. 185 and 188, for example, similar notes are preceded by *ex libris* written by the

18 Solerti 1905, 286–288. On Pietro Della Valle see Micocci 1989. On the *Typographia Medicea* established in 1584 see Fani and Farina 2012, with bibliography.

19 Solerti 1905, 299, n. 9.

20 Bartoletti 2011, 245–246.

21 Cf. n. 9 above. MS Florence, Biblioteca Riccardiana, Ricc. 184, f. 2r, has a note of purchase in Cairo dated 12 Šawwāl 1091 (= AD 5 November 1680), MS Ricc. 194, f. 130r has an ownership note dated 1078 (= AD 1667/1668).

22 So far I have not been able to identify the collector (or collectors) of the Doni family who acted before 1736 (cf. Bartoletti 2017, 47–48); the *terminus post quem* of this activity is 1681, as I will explain in the following paragraphs.



Fig. 1. Florence, Biblioteca Riccardiana, Ricc. 185, f. 1r, © by permission of Ministero della Cultura.

same hand, ‘Di Alessandro Pini’, which represented the cornerstone for the reconstruction of their lost piece of history (see figs 1, 2).

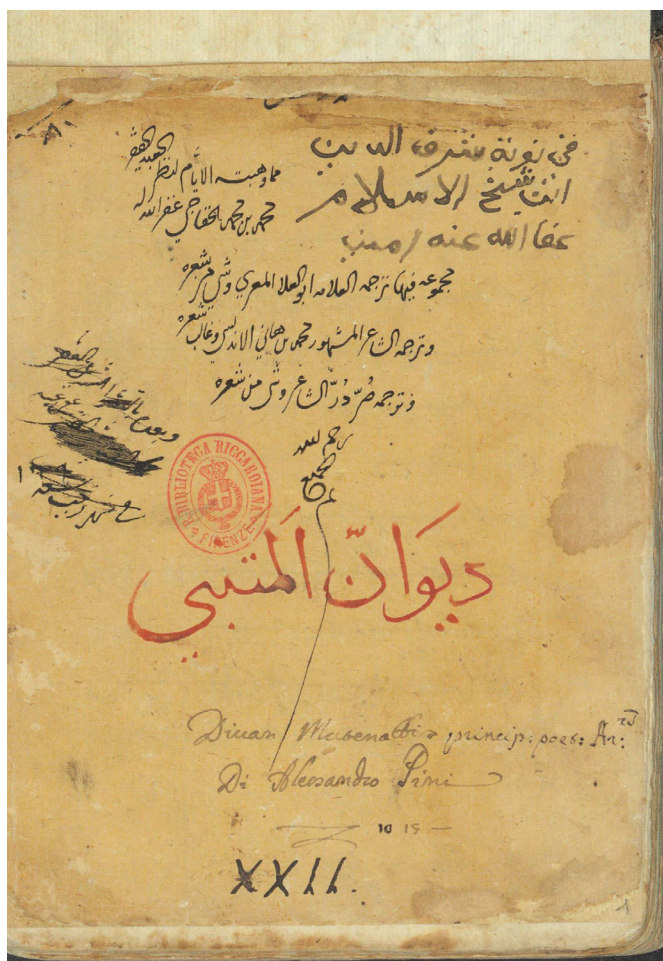
Alessandro Pini (1653–1717) was a Florentine physician whose competences spanned from medicine and philosophy to botany and classical erudition.²³ In Florence he studied and collaborated with Francesco Redi (1626–1697),²⁴ whose role and orientalist interests within the circle of the Tuscan erudite personalities and academics has been wisely outlined by Pier Mattia Tommasino.²⁵ Both of them worked for the Medicean court, under Ferdinando

23 Baldi 2015.

24 Bucchi and Mangani 2016.

25 Redi was better known for his contributions to the foundation of modern biology and parasitology, but he also engaged in literary compositions. After 1666 he

Fig. 2. Florence, Biblioteca Riccardiana, Ricc. 188, f. 1r, © by permission of Ministero della Cultura.



served at the Medici Court as head physician and superintendent of the grand ducal apothecary. Tommasino underlines how Redi's orientalism was not fostered by missionary intents, but was rather secular and without any confessional implication. These are the terms in which, for example, he asked one of his collaborators for a relation on the Qur'anic text (Florence, BNCf, Pal. 1907, ff. 107–110 'Notizie intorno all'Alcorano'), read in the translation made by Giovanni Battista Castrodardo (Venice, 1547), and according to a political and historical perspective (Tommasino 2015). Redi's cooperation and intellectual exchange with European orientalists and Muslim scholars living in Italy are illustrated in Tommasino 2018. See also MS Florence, BNCf, Pal. 1095, ff. 327–328 where Redi copied an excerpt of the catalogue of the Medicean oriental collection compiled by Barthélemy d'Herbelot in 1666 (MS Florence, BNCf, Naz. II.II.115; another copy in Paris, BnF, Ms. it. 480).

II and his successor Cosimo III (r. 1670–1723). The latter entrusted Alessandro Pini with a mission to Egypt, under Redi's scientific supervision: it was in fact to him that Pini addressed his reports during his fieldwork.²⁶ The official aim of the mission was experimenting the method for candying the cassia,²⁷ but behind this front activity Pini was also supposed to gather intelligence related to the Ottoman military activities. The challenging travel was also the occasion for other collateral activities appreciated by his sponsors, and in compliance with Pini's competences and interests.²⁸ Among them was the collection of seeds, coins, antiquities, reproductions of inscriptions, and, in general, detailed relations about the territory, and its people. His biographers—even those contemporary to him²⁹—attest that he was also entrusted with particular and secret assignments by the Grand Duke, also referring to the task to lead back to Italy a certain Domenico Cantieri, a Tuscan whom he met in Cairo.³⁰ Pini could not convince the latter to come back to Florence, and it seems that this was one of the reasons why, once he was back home, he lost the favours of the Grand Duke and decided to move to Venice. After a period of service as a physician in the Venetian galleys during the Morea War, and then in Constantinople following the Bailo Giulio Giustiniani, he

- 26 The letters are mainly preserved in ms Florence, BML, Redi 212 'Registro di lettere scritte a Francesco Redi dal dottor Giovanni Pagni pisano quando fu mandato in Tunisi, dal dottore Alessandro Pini fiorentino, quando fu mandato al Cairo, e in Gerusalemme e in Aleppo. Dal dottor Michelangelo Tilli da Castelfiorentino quando fu mandato in Costantinopoli, e quando si trovò a Belgrado nella corte del Granturco nel tempo dell'assedio di Vienna', published in Pintaudi 2004.
- 27 The *Cassia* L. is a genus of flowering plant of the legume family (Fabaceae), with large-scale pharmacological properties, for which it is largely employed in Asian and African traditional medicine until today (see Khurm et al. 2021). It is evident that the candying ('canditura') was a method of conservation of various parts of the plant and its properties; Pini's method of work is partly explained in his letters to Redi (cf. Pintaudi 2004, 138, 157–158).
- 28 Similar missions were entrusted by the Medici also to other physicians, such as Giovanni Pagni (1634–1674) in Tunisia, and Michelangelo Tilli (1655–1740) in Constantinople and elsewhere, before and after Pini's mission; see Pagni 1829; Bono 1964; Aglietti 2001, 43–55; Brevaglieri 2019.
- 29 See for example the article by Caterino Zeno published in the *Giornale dei Letterati d'Italia* in 1717 (Pintaudi 2004, 6–7).
- 30 When Pini met him, he was the chief of the pages of the Grand Pasha of Egypt, Osman Pasha the Bosnian (d.1683). He helped Pini in currying the favour of the governor, who, after having been healed by him, allowed him to carry on his scientific activities. The healings were clearly directed to the Grand Pasha and to the chief of the Janissaries in Cairo, and not to the Grand Vizier Merzifonlu Kara Mustafa (adoptive son of the Köprülü family), who resided in Constantinople (Pintaudi 2004, 6–7; cf. Baldi 2015).

established in Pera with his Genoese wife until 1715. Then they moved to Nafplio, in the Peloponnese, where he had acquired properties as a reward for his services to the Serenissima. Unfortunately, once there, the Ottoman army invaded the city and they were captured and transferred to the jails of Constantinople, where Pini perished of plague while his relatives in Florence were negotiating his ransom.

The information about his life is here reduced to the aspects that are relevant in this context; details are retrievable in his already mentioned biographies, and in his epistolary exchange with Francesco Redi.³¹ According to these sources he had more than one reason and certainly more than one occasion to engage with Arabic texts (but we could extend the statement also to Ottoman Turkish): he had to satisfy the curiosity and requests of his sponsor Cosimo III, those of his scientific supervisor Redi, his own interests related to the Arabic contributions in various scientific fields, and, last but not least, his need to learn the languages spoken in the lands where he resided to gather information. In fact, a list of Arabic manuscripts collected during his ten-months stay in Egypt appears in the penultimate letter he sent to Redi from Cairo (on 27 December 1681), before leaving for the Holy Land.³² There, Pini informed his supervisor about all the relics, naturalistic samples, and objects he was going to send in a forthcoming expedition. And there he listed also the Arabic books, as a sort of advanced bill of lading. In order to make every codex recognisable to the addressee, he listed their content in very short notes, often only the authors and title of the texts (at least the presumed ones), which correspond to what he had written on the first folia of the codices themselves. It is interesting to note that this method was not necessarily adopted assuming the addressee's scarce knowledge of the language, but rather depended on the scarce knowledge of Arabic of the sender himself, as some examples of inconsistency between the notes and the real content of the codices demonstrate.³³ Most likely Pini was guided by someone who could read Arabic, and knew about Arabic literary production, maybe by the very book sellers who provided him with these manuscripts in the market of Cairo. In some of the codices, in fact, there are notes referring explicitly to such an acquisition context, and in some cases the books show features which could comply with market

31 In addition to the already mentioned studies, I am pleased to announce the forthcoming monograph on Alessandro Pini, by Baldi Bellini.

32 Florence, BML, Redi 212, ff. 165v–166r (reproduced and transcribed in Pintaudi 2004, 163–165).

33 In a letter from Livorno dated 7 January 1683 (ms Florence, BML, Redi 212, ff. 221r–222v) Pini admits that he can understand just a bit of Classical Arabic, while he was quite proficient in the Egyptian dialect, even if elsewhere he had claimed that he was versed in both (Pintaudi 2004, 166, 193).

strategies, such as the sometimes arbitrary integrations in case of acephalous codices,³⁴ or the wrong (or deliberately false) identifications of the texts.³⁵

The list of books in MS Florence, BML, Redi 212, ff. 165v–166r is the following (the numbering is mine):

1. Abucrates * cioè Ippocrate
2. Ebn Calican de vitis Sapientum * questo è un libro raro delle vite di tutti li savii maomettani, o huomini insigni in lettere e in arme
3. Poesie intitolate Chetab el Sabe' * libro eccellente
4. Mulana Sceich el Sebchi * libro assai stimato fra i dotti maomettani
5. Mulana Sceich el Sebchi tomo II *
6. Chetab Diuan el Sababa * cioè libro di Poesie assai raro
7. libro di Chimica *
8. historia del mondo *
9. El Sciarhh el tani el baghie el uardie, parte seconda di uali alla ellarachi * libro rarissimo
10. Libro di Orazioni de i maomettani
11. Magemua el Baharin * libro buono
12. Poesie* cioè di diversi, et è libro buonissimo
13. Sciaar Mahammed ebn abd el manaem * poesie buonissime
14. Galeno medico * imperfetto assai non avendo altro li arabi che l'arte parva
15. Magemua Camel di abbu el abbas di Beccheri * libro rarissimo, essendo una raccolta di poesie di diversi autori buoni. Noti che magemua vuol dire raccolta in arabo e Camel, perfetta.
16. Chetab lumaa el Cauanin *
17. Diuan Mutenabbis principis poetarum arabum * il Virgilio delli Arabi
18. Poesie, di Alessandro Pini * non so ancora che libro sia questo per non lo aver letto che però li ho posto questo nome
19. Hada diuan Cafaz * buonissimo Poeta il pindaro o l'Orazio de i Persiani tradotto in Arabo forse meglio che non è in sua lingua
20. Magemua ibn Mahammed * libro rarissimo

Here below are the transcriptions of the notes found on the first folia of the Riccardiana's manuscripts, following the order of the list in Pini's letter to Redi, and the identification of the texts they contain.

1. Ricc. 175

Note f. 1r: 'Abucrates – no. 12', other marginal notes by Pini at ff. 2r–v. *Hikmat Ibuqrāt wa-mā šuriḥa fthā*, by uncertain author.³⁶

34 Florence, Biblioteca Riccardiana, Ricc. 175, 177, 178 (+206, ff. 3–25), 180.

35 Florence, Biblioteca Riccardiana, Ricc. 172, 176, 188. See also the indications of the price he paid, which is annotated next to the same notes on some of the codices ('medini ...'); cf. Scali 1759, 189–190.

36 It is a collection of medical texts ascribed to Hippocrates and here translated into Arabic by an uncertain author. For the Arabic versions of Hippocratic writings see GAS III, 23–47; Ullmann 1970, 25–35; *EP*, Suppl., 154–156.

2. Ricc. 178 + Ricc. 206, ff. 3–25³⁷
 Note Ricc. 206, f. 1: ‘Chetab tege el maaref ua taurihhe el Chalaif ebn chalican - 20’.
Tāğ al-ma‘ārif wa ta’rīh al-ḥalā’if, by Muḥammad b. Maḥmūd b. Abī al-Sa‘ādā b. Abī al-Ġūd al-Salmūnī (fl. 1494).
 GAL II, 54; GAL S II, 52.
 Ricc. 178, ff. 178v–180v: *Al-‘uqūd al-durriya fī al-umarā’ al-miṣriyya*, by Yaḥyā ibn ‘Abd al-‘Azīm Ğamāl al-Dīn al-Ġazzār (d. 1280).
 GAL I, 335; GAL S I, 574; Karabulut 2006, 3929, n. 10826/2.
3. Ricc. 167³⁸
 Note f. 2r ‘Chetab el - saba; poesie’.
Nasīm al-ṣabā, by Badr al-Dīn Abū Muḥammad al-Ḥasan ibn ‘Umar Ibn Ḥabīb al-Ḥalabī (131–1377).
 GAL II, 37; GAL S II, 35; al-Ziriklī 2002, II, 208; Karabulut 2006, 854, n. 2280/17.
4. Ricc. 173
 Note f. 1r ‘Mulana Sceich Sebchi – 19’, other notes by Pini at f. 1v.
Tarṣīḥ al-tawṣīḥ wa-tarğīḥ al-taṣḥīḥ, by Tāğ al-Dīn ‘Abd al-Waḥḥāb b. ‘Alī b. ‘Abd al-Kāfi Abū Naṣr al-Subkī (1327–1370).
 GAL II, p. 89; al-Ziriklī 2002, IV, p. 185.
5. Ricc. 172
 Note f. 1r ‘mulana Sceich el Sebchi tomo II’.
Kitāb al-umm, by Abū ‘Abd Allāh Muḥammad ibn Idrīs al-Šāfi‘ī (767–820).
 GAL I, 179–180; GAL S I, 304; Karabulut 2006, 2599, n. 7042/26.
6. Ricc. 184
 Note f. 1r ‘chetab diuan el sababa – 6’.
Dīwān al-ṣabāba li-ahl al-‘iṣq wa-l-ka’āba, by Ibn Abī Ḥağala Aḥmad b. Yaḥyā Šihāb al-Dīn Abū ‘Abbās al-Tilimsānī (1325–1375).
 GAL II, 13; Karabulut 2006, 557, n. 1382/4.
7. Ricc. 187
 Note f. 1r ‘libro di Chimica – 3’.
 ff. 1r–12r: *Risālat al-šams ilā al-hilāl*, by Muḥammad Ibn Umayl al-Tamīmī (c.900–c.960).
 ff. 14r–169r: *Al-mā’ al-warqī wa-l-arḍ al-nağmiyya*, by the same author.
 GAL I, 241–242; GAL S I, 429; Karabulut 2006, 2634, n. 7099/4, 6
8. Ricc. 177
- 37 The first quires of Ricc. 178 have been bound with the composite codex Ricc. 206.
 38 Note that Bartoletti considers this codex as one of the three coming from Salvini’s collection, but the note is evidently by Alessandro Pini, so it most probably arrived in the Riccardiana with the Doni collection, as the others here presented (cf. Bartoletti 2009, 143; 2011, 245).

Note f. 1r: ‘historia del mondo – 5’.

Al-Ta’rīḥ al-mağmū’ ’alā al-taḥqīq wa-l-taṣdīq, by Sa’īd Ibn al-Baṭrīq (877–940).

GAL I, 148–149; GAL S I 1937, 228; GCAL II, 33–35.

9. Ricc. 170

Note f. 1r ‘el Sciarhh el bahgie el uardie, parte Seconda di uali alla ell’arachi – num. 1 – med. 25’.

Al-Nahḡa al-marḍiyya fī ṣarḥ al-Bahḡa al-warḍiyya, by Aḥmad ibn ‘Abd al-Raḥīm Abū Zur‘a Walī al-Dīn Ibn al-‘Irāqī (1361–1423).

GAL I, 394; GAL II, 66–67 (with the title *al-Bahḡa al-marḍiyya*); Karabulut 2006, 300, n. 813/21.

10. Ricc. 174

Note f. ivr ‘Libro di Orazioni de i Mahomettani’

Ḥādīm al-Rāfi’ī wa-al-rawḡa, by Abū ‘Abd Allāh Badr al-Dīn Muḥammad b. ‘Abd Allāh b. Bahādūr al-Zarkaṣī (1344–1392).

GAL II, 92; GAL S II, 108; Karabulut 2006, 2642 n. 7122/11.

11. Ricc. 195

Note f. 1r ‘Magmaa el baharin – 10’.

Mağma’ al-baḥrayn wa-multaqā al-nayyirayn, by Muḡaffar al-Dīn Aḥmad b. ‘Alī Ibn Sā’ātī al-Baḡdādī (d. 1295).

GAL I, 383; GAL S I, 658; Karabulut 2006, 346–347, n. 944/3.

12. Ricc. 191

Note f. 1r ‘Poesie – 7’.

ff. 1r–33v: *Muḡtaṣar Dīwān al-ṣabāba li-Ibn Abī Ḥaḡala al-Tilimsānī*, by Abū al-‘Abbās Aḥmad b. Muḡammad Ṣihāb al-Dīn al-Qaṣṭallānī (1448–1517).³⁹

GAL II, 87–88; GAL S II, 78–79; Karabulut 2006, 458–462, n. 1174.

ff. 34r–43v: *Ġilwat al-‘uṣṣāq wa-ḡalwat al-muṣṭāq* (also known as *Muḡaddimat Risālat al-tayf*), by ‘Alī b. ‘Īsā Bahā’ al-Dīn al-Irbilī (m. 1293).

ff. 44r–60v: *Risālat al-tayf*, by the same author.

GAL S I, 713; Karabulut 2006, 2109, n. 5655/3.

13. Ricc. 186

Note f. 1r ‘Sciaar Mohammed ebn abd el menaem num. [...] m[edini] 25’

Dīwān ṣi’r li-Ibn al-Ḥiyāmī, by Muḡammad b. ‘Abd al-Mun’im b. Muḡammad Ṣihāb al-Dīn Ibn al-Ḥiyāmī (d. 1286)

GAL I, 264; al-Ziriklī 2002, VI, 250.

14. Ricc. 180

39 The text is a compendium of the *Dīwān al-ṣabāba* by al-Tilimsānī (see *supra* n. 5, Ricc. 185) and it is explicitly attributed to the famous ṣāfi’ite faqīh al-Qaṣṭallānī in the text, even if it is not attested in the repertoires.

- Note f. 1r ‘Galeno Medico – 7’
Al-Talwīḥ ilā asrār al-tanqīḥ, by Muḥammad b. ‘Abd al-Laṭīf Faḥr al-Dīn al-Ḥuḡandī al-Isfahānī (m. 1157).
 al-Ziriklī 2002, VI, p. 217; Karabulut 2006, p. 2832, n. 7621/3
15. Ricc. 194
 Note f. 1r ‘Magmua Camel di Abu ell’abbas di Beccheri libro raro – num. 7 -- [?]’.
Maḡmū’ kāmīl, by Abī al-‘Abbās al-Bakrī.⁴⁰
16. Ricc. 183
 Note f. 1r ‘Chetab Lumaa el cauanin – 2 – med[ini] 25’
Luma’ al-qawānīn al-muḏḏīyah fī dawāwīn al-diyār al-Miṣrīyah, by ‘Uṭmān b. Ibrāhīm al-Nābulusī (d. 1261).
 al-Ziriklī 2002, IV, 202; Karabulut 2006, 1933, no. 5186/1
17. Ricc. 188
 Note f. 1r ‘Diuan Mutenabbi princip[is] poet[arum] Ar[abum] Di Alessandro Pini – 10 15 [?]’
[Biographies and selected poems of Abū al-‘Alā’ al-Ma’arrī, Ibn Hānī’ al-Andalusī, and ‘Alī b. al-Ḥasan Ṣarra Durr], by anonymous author.⁴¹
18. Ricc. 185
 Note f. 1r ‘Di Alessandro Pini – 1’ ‘Poesie’
Saḡ’ al-wurq al-muntaḥiba fī ḡam’ al-muwašṣaḥāt al-muntaḥaba, by Aḥmad b. Mūsā al-Saḡāwī (d. before 1480).
 ‘Atā 2001, 24–25, n. 11
19. Ricc. 176
 Note f. 1r ‘hada el Diuan hafadz – 13’
Rawḏat al-‘irfān wa-nuzhat al-insān, by Abū al-Mawāhib Muḥammad b. Muḥammad al-Bakrī al-Ṣiddīqī (1566-1628).
 al-Ziriklī 2002, VII, 62–63
20. Not identified⁴²

The events that brought these manuscripts into the Doni House library are not clear. What is clear from Pini’s penultimate letter to Redi from Cairo is that, before leaving for the Holy Land, he was managing to ship to Alexandria a

40 It is a collection of poems not identified in the repertoires.

41 The biographies are largely based on Ibn Ḥallikān’s biographical dictionary *Wafayāt al-a’yān wa-anbā’ abnā’ al-zamān* (GAL I, 326–328; GAL S I, 561; Karabulut 2006, 405–407, n. 1057/3) translated into English by William Mac Guckin de Slane in 1842–1871.

42 The manuscript could be identical with Ricc. 171, a didactic collection of Arabic dialogues and fables, which does not show the usual note by Pini, but it does contain his translation of part of the text at ff. 40r–45r. Cf. *supra*, n. 33.

trunk containing them to be sent to Livorno; on the same occasion he underlined that they were very expensive and that it was difficult to bring books outside Egypt. According to the same letter he would have kept the best books with him, planning to bring them to Florence in person. He made a list of what he had planned to send back together with the books: the equipment received from Florence for candying the cassia, a Turkish sword, 200 bronze medals, other goods of lower value, and various botanical samples.⁴³ When he started to write again, more than five months later, after a journey passing through Jerusalem, Damascus, Aleppo, Tripoli of Syria, Gaza, and other cities, he affirmed that he had been informed that one of the trunks he had sent, containing porcelains, got lost in a shipwreck, but he made no specific mention of the one containing the books.⁴⁴ In January 1683, he wrote to Redi from the lazaret of Livorno, where he had arrived from Alexandretta with a Flemish vessel. In his previous letter, now lost, Redi had evidently asked for information regarding the medals mentioned in Pini's shipment inventory, which he had never received. He was certainly referring to the cargo which included also the twenty manuscripts, and, in fact, Pini also specified that he had not brought other books (i.e. other than those twenty) with him, but just two or three booklets of no value.⁴⁵ These two details led Pini's biographers to think that also the books were in the lost trunk, or in another one lost during the same shipwreck, but this is not what emerges from the correspondence. In any case it is clear that Redi never received the twenty Arabic manuscripts bought by Pini with Cosimo III's money in Egypt. The passage to Doni's collection should have happened via a different channel: indeed, other oriental manuscripts collected by Redi are now preserved in the Biblioteca Medicea Laurenziana, and probably this would have been the fate of Pini's twenty manuscripts, had they passed through Redi's possession.⁴⁶ It cannot be ruled out that Pini himself used this misunderstanding to his own advantage, to avoid the delivery of that precious shipment to Redi and the Medici. An ownership note on the last fo-

43 Florence, BML, Redi 212, ff. 163r–166v (Pintaudi 2004, 159–166).

44 Florence, BML, Redi 212, ff. 143r–146v: letter from Tripoli of Syria, 19 May 1682 (Pintaudi 2004, 171).

45 Florence, BML, Redi 212, ff. 221r–22v: letter from Livorno, 7 January 1683 (Pintaudi 2004, 192, 193). This evidently contradicts what he had stated in his letter from Cairo of 27 December 1681. Other manuscripts pertaining to Pini are in the composite codex Ricc. 206, ff. 27–46, and ff. 47–58 containing Pini's own notes of Ottoman-Turkish vocabulary and phraseology with Italian translation. This material could be what he mentions in this letter, but, considering the language and the subjects, it could also be identified as material he produced during his later stay in Constantinople which somehow came back to Florence.

46 Florence, BML, Redi 4 and 39.

lium of MS Florence, Biblioteca Riccardiana, Ricc. 177 supports this hypothesis: the name of Agostino Pini, Alessandro's brother, could in fact hint to the appropriation of the manuscripts by Pini's family, maybe collecting the cargo in Livorno while Alessandro was still wondering in the Holy Land. According to his tense relationship with Redi and the Grand Duke after his return to Florence, for not having accomplished the intelligence tasks entrusted to him, it would not be surprising if Pini simply informed the brother to keep the books at their arrival in Livorno. Then the manuscripts could have been sold to some representative of the Doni family, to enrich an already gathered collection of manuscripts in oriental languages, that continued to expand until 1736.

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On Line Fillers in the Christian Medieval Central Asia Manuscript Tradition*

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The present study is part of the project ‘Scribal Habits. A case study from Christian Medieval Central Asia’, which aimed at providing a comprehensive understanding of scribal habits and approaches used in the c.1,000 fragments of Syriac and Sogdian manuscripts in Syriac script found in the oasis of Turfan (present-day Xinjiang, China), more precisely at the site of Bulayıq, at the beginning of the last century. This article focuses on the devices used to manage the writing space at the end of the line with a particular attention to a type of *diplé* used as line filler and found in a single hagiographic manuscript (E24) that resembles both the Greek and the Coptic manuscript traditions; as well as to a line filler that in this corpus is attested only in some Syriac fragments with liturgical content (Hudra D—Hudra DD—MIK III 45).¹

Structuring the page and structuring the text

Studies of the manuscript traditions of the Mediterranean basin and western Asia have already amply demonstrated how—in order to fill in the gaps—a series of strategies were devised from the earliest times to manage the writing space. As noted by Marilena Maniaci, ‘From the earliest stages of their development, all horizontally arranged alphabetical writing systems have consistently divided texts into lines of equal length (as far as possible) and set them down in a regular way from left to right or from right to left, with one

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1 The designations and signatures of the Sogdian and Syriac manuscript fragments are taken from their respective catalogues, namely, Sims-Williams 2012 and Hunter and Dickens 2014. The locations of the manuscripts are not specifically indicated, since they may be deduced from the shelf marks: SyrHT fragments are in Berlin, Staatsbibliothek Preußischer Kulturbesitz (SPK), fragments with n-, M-, So-, or U-numbers are in Berlin, Berlin-Brandenburgische Akademie der Wissenschaften (BBAW), and those with MIK numbers are in the Museum für Asiatische Kunst.

line placed on top of another until a pre-determined space has been partially or fully occupied'.²

In the Hebrew manuscript tradition, from the earliest texts 'rudimentary forms of several devices for achieving horizontal lines of as uniform length as possible can already be observed in the Dead Sea Scrolls, providing evidence that the roots of this unique phenomenon lie deep in the past'.³ While highlighting the arbitrariness with which each scribe chose the device to be used,⁴ Malachi Beit-Arié distinguished between solutions that preserve the integrity of the word, and solutions that truncate it.⁵ The former category, which is of interest for my study, includes:

- Dilating or constricting the last letters or reducing the size of letters liable to exceed the margin: dilation was only used for letters that could be extended without distorting their shape or causing them to resemble different letters, and therefore when such letters did not occur at the end of a line, the penultimate letters were sometimes dilated. Dilation was executed in two ways: the entire letter was written in dilated form (sometimes the scribe wrote a larger letter), or the scribe would write a standard size letter and only later extend it to the margin boundary line.⁶
- Inserting graphic fillers: the insertion of graphic fillers in the empty space remaining at the end of a line is a very ancient stratagem in both the Occident and Orient. The graphic fillers are variously designed. Sometimes, especially in early manuscripts from the Middle East and in Sefardic manuscripts, the filler is simply a complete letter, and especially stunted letters (mostly alef and shin).⁷
- Filling up the line by the first letter of the next line: the practice of filling up the end of the line with only a single letter—the first letter of the first fully written word in the next line.⁸
- Increasing spacing: achieving lines alignment by flexibly adjusting the space between words, the only means used in mechanical printing, was sometimes employed in manuscripts, but only by leaving extra space toward the end of the line.⁹
- Writing the words liable to exceed the margin slantwise.¹⁰

2 Maniaci 2021, 599 (cp. also 1997, 189).

3 Beit-Arié, 2019, 459.

4 *Ibid.* 460.

5 Beit-Arié 2003, 32–48 and 2019, 440–445, describes the methods used to fill the space at the end of a line so that all the lines (in Hebrew manuscripts) are of the same length.

6 *Ibid.* 440.

7 *Ibid.* 441–442.

8 *Ibid.* 443.

9 *Ibid.* 443–444.

10 *Ibid.* 444–445.

The management of space was obviously also important within the context of the Central Asian writing tradition(s). In this region, manuscripts written in different languages and alphabets have been found. Their contents range from religious texts to economic and administrative issues, and their usage was as varied as languages and contents. Yet, the layout and space management remains a young field of research. Some observations have been done for the Sogdian writing tradition¹¹ such as: ‘repetition of the last letter of the last word, insertion of a silent h, insertion of a meaningless logogram ZY (the only logogram used in Sogdian texts in Syriac script, where is assimilated in shape to the Syriac letters ‘y or yz)’.¹² A study of line fillers, their form and distribution, however, has remained a *desideratum*.

The focus of this study is the Christian (Syriac)¹³ tradition in the Syriac and Sogdian languages, to which some mentions of the Manichean¹⁴ manu-

- 11 The Sogdian culture (of Iranian origin) had its centre in present-day Uzbekistan and was important between the fourth and ninth centuries CE, with the latest manuscripts going back possibly to the eleventh century.
- 12 I want to thank the reviewers for reporting this passage to me.
- 13 The Christian Syriac manuscript tradition begins in the early centuries CE and is of particular importance for Christian oriental manuscript studies. According to Borbone and Briquel-Chatonnet (2015, 57–58), ‘the shape of the Syriac manuscript book was set early, and already the oldest manuscripts conform to some kind of formal perfection that later copyists sought to reproduce. Thus, there is from the beginning a Syriac kind of manuscript’. Whilst its home base was clearly in the Near East, the Syriac culture stretched to such peripheral areas as South India (Kerala), China, and Central Asia, with the latter preserving ‘some older manuscripts (ninth century)’ (ibid. 57–59).
- 14 The Manichaean tradition goes back to the third century CE. It originated in Mesopotamia, but soon spread to Central Asia and Egypt. Texts pertaining to the tradition were written in Syriac, Sogdian, and Middle Persian. A Manichaean psalter written in Coptic was discovered in Egypt. C.4,000 Manichaean fragments from the Berlin Turfan Collection ‘may be presumed to date from between the late eighth and the late tenth century’ (Durkin-Meisterernst 2008, 1). The origin of this scriptural tradition remains unclear, as we do not know whether these texts represent an Iranian or a Syriac tradition: ‘the problem is the lack of comparable material on the Iranian side. The only Iranian book that has survived from the Sasanian period is probably the Pahlavi Psalter fragment, 13 surviving leaves of a Middle Persian translation of the Christian Psalms’ (ibid. 13). This fragment was found in Turfan, but it was not made there because it is written in Pahlavi (Sasanian’s) script. This text can be expected to ‘reflect Christian and Syriac book-making in the Christian communities of the Sasanian empire but also indicate that there may have been a lot of common elements between Iranian and Syriac book-making’ (ibid. 13). Some of the Central Asian Manichaean manuscripts witness a specific Manichaean script, an abjad-based writing system, deriving, like Pahlavi (Sassanian script), from Syriac Aramaic, with influences from Sogdian. The script, regarded as a type of Palmy-



Fig. 1. ms SyrHT 95, Legend of St. George (side a).

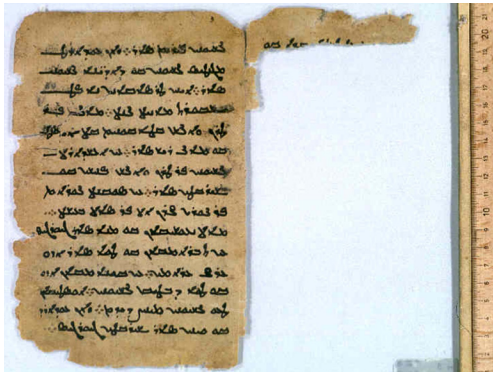


Fig. 2. ms n9, Martyrdom of St. George (side 2).

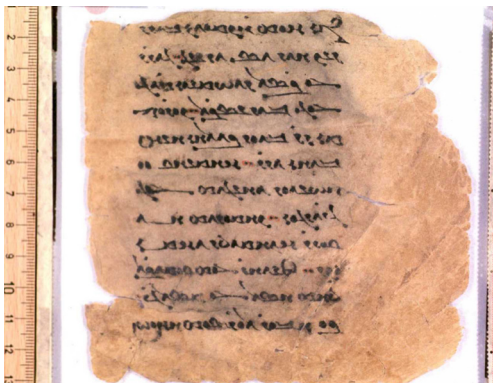


Fig. 3. ms M246, a hymn (verso).

scripts of Central Asian origin have been added. In these traditions, the management of writing space is not of secondary importance, since the script

rene cursive, has only few varieties, listed by Morano (2018, 30) as ‘normal script, elegant semi-cursive script, cursive bold, cursive script, ornamental script, used in headlines with a variety, with calligraphically elaborated ‘rope’ letters’.



Fig. 4. ms SyrHT 53–54, Hudra N: (probably) liturgy (side a).

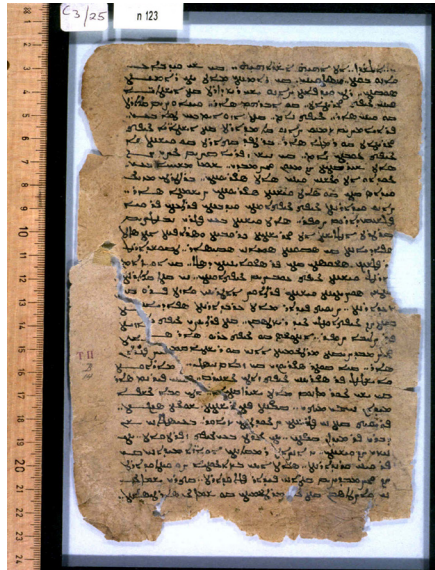


Fig. 5. MS n123, Life of Serapion (recto).

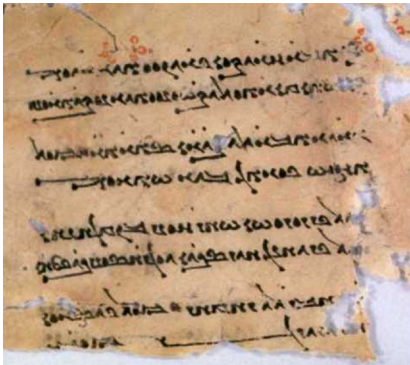


Fig. 6. M85, hymn written in couplets, probably from the *Gowišn īg grīw zīdag* (side 1).

is arranged within the page in an area specifically dedicated to it. The page is meticulously designed to ensure that each line is of uniform length, i.e. begins and ends in the same place (figs 1, 2, 3).

The traditions in question came into contact with and absorbed, to varying degrees, the writing practices of Aramaic and Syrian scribal circles. It is therefore not surprising that, in the management of space at the end of a line, the most common methods are the lengthening of horizontal sections of the letters (figs 4, 5, 6) and tracing horizontal lines to fill the otherwise empty space (figs 7, 8, 9). This latter device involved the insertion of a line at the end or between the last and penultimate letter, used as a ligature between the two letters. Sometimes the length of this ligature was more accentuated, in order

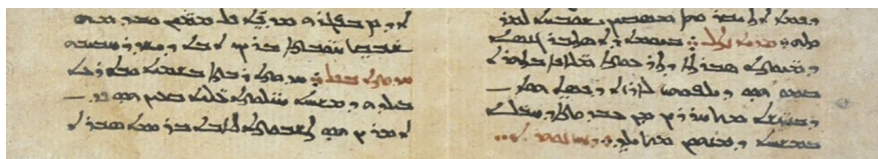


Fig. 7. MS SyrHT 41, Hudra E: liturgy for the season of Annunciation/Advent (side b; detail).

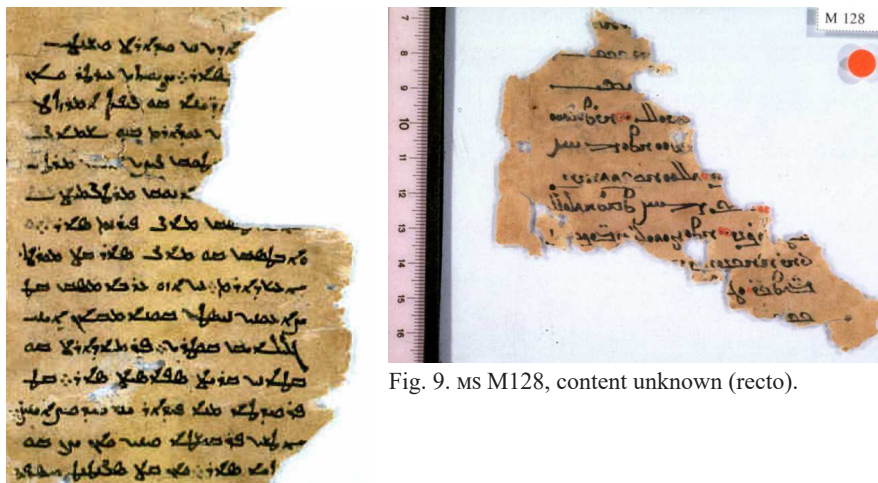


Fig. 9. MS M128, content unknown (recto).

Fig. 8. MS n6, Martyrdom of St. George, (side 1), folio II.

to fill the white space between the end of the word and the (left) margin (figs 10, 11, 12).

The development of the codex is accompanied by the evolution of a decorative *apparatus*, especially in the Occident. In her handbook, Maria Luisa Agati¹⁵ reports that the only decorative elements in a scroll would be punctuation marks (such as *coronis* and *paragraphos*), if they could be considered decoration. Originally, these paratextual elements, to which the *diplé* should also be added, were different and fulfilled different functions. The *paragraphos* normally indicated the end of a section or a period; the other marginal signs had functions that seem to interfere with the role of this diacritic: the *coronis* was placed on the left margin of a column and used to indicate the end of a section or the end of a book; the *diplé obelisméne* was used, especially in poetic texts, either at the beginning or at the end of a section, its further task being to indicate notable passages.¹⁶

15 See Agati 2017, 333–335.

16 See Albrecht and Matera, 2017, 8–9; Agati 2017.

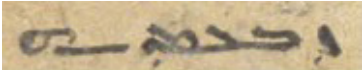


Fig. 10. MS SyrHT 85, Hudra F: liturgy for Epiphany (side a), /15/.



Fig. 11. MS n116, Life of Serapion (recto), /13/.

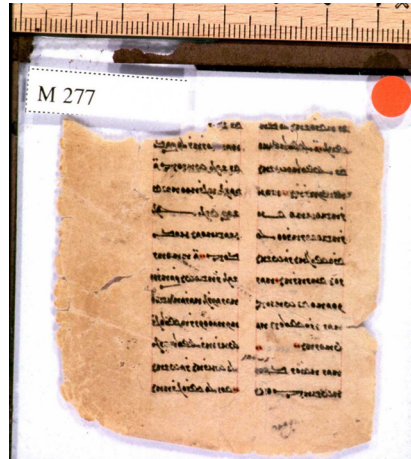


Fig. 12. MS M277, hymns in praise of a church leader (recto)

The first evidence of paratextual characters comes from the Hellenistic period,¹⁷ during which the *paragraphos* is attested in its simplest form, i.e. a short horizontal line that could be found in an interlinear position and exposed in the left margin. Yet, already in the earliest biblical codices, dating from the fourth and fifth centuries CE, such paratextual elements appear to be of uncertain use. The ambiguous evolution led, consequently, to terminological confusion. These signs share many functions, although they appear in different and distinct forms. The need to distinguish the shapes, functions, and names of these signs has only recently been underlined.¹⁸

In the current state of research, ‘it is not possible to determine how these diacritics evolved, or which factors caused the changes in their function’,¹⁹ but it is certain that they gradually started to be used as non-figurative ornamental signs with an exhortative and aesthetic function. They were thus used to embellish or enrich the text. Speaking of the decoration of texts, Agati²⁰ makes a distinction between figurative (or illustrative) and non-figurative ornamentation, specifying that possible influences of one on the other should not be precluded. For the second group, she lists such elements as ‘title pieces; deco-

17 Agati (2017, 324) speaks of ‘motifs which derive from Hellenistic art’ in the paratextual elements spread in the Mediterranean basin, distinguishing between Western ones (whose first attestations date back to the fourth and fifth century) and Byzantine ones (which would be slightly more recent).

18 See Albrecht and Matera 2017, 10.

19 *Ibid.* 9 (translation is mine).

20 See Agati 2017, 307–353.

rated initial letters; beginning or end of the text: lines, rectangular panels, portals, frames, cartouches. etc.; a particular arrangement of the writing, which might form a design; different types of signs (asterisks, small crosses, linear, geometric, circular motifs); coats of arms, or emblems, with pictorial representation'.²¹

The use of simple ornamentation, such as that described by Agati, is also found in the manuscript tradition attributable to Syriac Christianity, and has therefore also been found in fragments of Syriac and Sogdian manuscripts in Syriac script from Xinjiang (China). With regard to East Syriac tradition, it has been suggested to classify decorative elements into two groups: 'scribal decoration and painted (or drawn) decoration', with the first group including 'elaborate script, punctuation, attention marks, denotations, and text dividers'.²² The line fillers recognized within the Syriac tradition have been described as 'formed of red-black dots, strokes, small crosses, rosettes and tiny floral arabesques. Such adornments also flank the highlighted titles, elongating them from the inner to the outer margin and rounding out the final columns to the level of previous ones, thus retaining the visual balance of the page'.²³

In his study of scribal practices in the Turfan area, Mark Dickens²⁴ refers to a 'number of other marks [which] were employed by the Turfan scribes', among which:²⁵

- a black X at the end of lines (e.g. SyrHT 1, fig. 13a);
- a black St. Andrew's cross with four red dots (e.g. SyrHT 35, fig. 13b);
- line fillers (e.g. SyrHT 62, n122, figs 13c, 13d);
- floral designs or embellishments (e.g. SyrHT 80, SyrHT 223, SyrHT 259, figs 13e, 13f, 13g);
- a verso mark consisting of three dots (representing Trinity?) (SyrHT 202, fig. 13h).

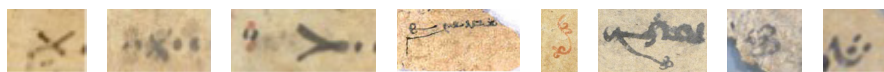


Fig. 13. Line fillers as described in Dickens 2013: (a) SyrHT 1; (b) SyrHT 35; (c) SyrHT 62; (d) n122; (e) SyrHT 80; (f) SyrHT 223; (g) SyrHT 259; (h) SyrHT 202.

21 *Ibid.* 323.

22 See Borbone et al. 2015, 259–260.

23 *Ibid.* 260.

24 See Dickens 2013. He discusses several 'marks' used in the Christian community of Turfan. In the paragraphs preceding 'Musical recitation accents & other distinguishing marks', in which line fillers are also discussed, Dickens gives an overview of all the marks that are used in the Central Asian Christian corpus. Punctuation and vocalization, other East Syriac pointing, quires and verso marks, scribal errors and corrections etc. are also mentioned.

25 See Dickens, 2013, 14.

Line fillers in Christian Sogdian and Syriac manuscript fragments from the Berlin Turfan Collection

An analysis of methods of line filling used in Christian texts in Syriac script, in both the Sogdian and Syriac languages, requires a reference to the fragments preserved in the Berlin Turfan Collection.²⁶ These fragments belong to eastern Christianity: ‘even though there is still a remarkable lack of knowledge in terms of manuscript production, dissemination and storage within the eastern Christian communities in Medieval Central Asia, the ongoing research suggests a monastic context linked to the missionary activities of Church of the East’.²⁷ This context explains the common features between the Central Asian scriptural tradition and that of the Church of the East.

A study of the approximately 1,000 fragments has shown that, while elongation and the use of a horizontal line to fill the space are the most common methods, they are not the only ones used. There are also special line fillers, that is diacritics written in the otherwise empty space between the last word and the margin of the page (more specifically, the left margin in the right-to-left writing traditions).

Concerning the use of diacritics and their writing in the Central Asian Christian context, it has been possible to establish some general rules (even if these principles are not always applicable, since there are many exceptions):

(a) The position of line fillers is obviously the end of the line. Such diacritics are usually written leaving a narrow blank space between the text and the line filler (fig. 14). Sometimes, although scarcely attested in the Central Asian Christian *corpus*, such a diacritic may be written either after a wider blank space²⁸ (MS SyrHT 26) (fig. 15), or over a line. Such a line usually consists of the final part of a letter that is elongated (fig. 16).

26 These manuscripts were found by the Second and Third German Turfan expeditions (1904–1905 and 1905–1907) in the Turfan oasis; most were recovered at Shui-pang near Bulayiq, and very few at the nearby sites of Qocho and Toyoq. All were written by Christians, as indicated by the Syriac script (though some use other alphabets) and by their contents. The corpus consists of *c.* 500 fragments in the Sogdian language in East Syriac script (Sims-Williams 2012), *c.* 50 fragments in the Sogdian language in Sogdian script (Reck 2018) and almost 500 fragments in the Syriac language in East Syriac script (Hunter and Dickens 2014). The fragments are preserved in the Turfan collection in Depositum der Berlin-Brandenburgischen Akademie der Wissenschaften in der SPK, Orientabteilung.

27 Barbati 2020, 12.

28 This solution is rarely practised in the Central Asian Christian writing tradition. In fact, when the scribe is in such a situation, he often prefers to elongate the horizontal sections of the letters in the preceding paragraph and then, if it is still necessary, to write a line filler.



Fig. 14. ms n209, unidentified text on worship or prayer (recto), /5/.



Fig. 15. ms SyrHT 26, Uighur Psalter (Peshitta Psalm 13:3-14:1) (side b), /10/.



Fig. 16. ms n122, Hudra H (unidentified; side b), /4/.

- (b) While the size of the line filler depends on the amount of space available, usually only one line filler is written to fill the space (figs 17, 18). An exception to this rule is MS MIK III 45, where even two or three line fillers are written together (see also below).
- (c) Line fillers are usually written in the same colour as the preceding text, probably in order to give a sense of continuity to the reading. Moreover, since they only had a filling function, there was no reason for the scribe to change colour, as he would have done if he had something to mark. Since black is the colour most often used in writing the Christian corpus, the majority of diacritics in the texts examined are black. Some exceptions are MS MIK III 45: 12, II, /25/ where the line filler is of a different colour than the preceding text (fig. 19). Although rare, some line fillers are written in red (MS SyrHT 248, side a, /7/; fig. 20). Exceptional cases are line fillers in two different colours (MS MIK III 45:22, II, /24/) (fig. 21).
- (d) The line filler may be preceded by dots used as punctuation marks,²⁹ when the space to be filled was between the end of a period, or a sentence, and the continuation of the text (figs 22, 23).

Considering the above, the scribe's individual discretion in choosing which diacritic to use to fill the space is obvious.

An interesting case study in this regard is the Uyghur Psalter (MS SyrHT 20–SyrHT 27 + MIK III 58³⁰), consisting of a Syriac text written in the Uyghur script. The main features attested in the manuscript are the pronounced cursive nature and management of the writing lines, which are mostly justified by the elongation of the letters. Yet, a particular type of diacritic with the function of line filler is also used. This diacritic, which is not found in the rest

29 'In the earliest manuscripts a single point is used to indicate a short pause; and a full stop is denoted by three or four small circles or by the sign ♠ [...]. In the sixth century two points were employed to indicate a short pause. [...]. The four-point sign is often placed at the end of the lection' (Hatch 1946, 42).

30 See Hunter and Dickens 2014, 32–41, 352–353.



Fig. 17. ms SyrHT 112, Hudra L (liturgy for the 'Friday of Gold' and perhaps also Pentecost Sunday (side a), /10/



Fig. 18. ms n148, Selected sayings of Šem'on d-Ṭaibuteh, here named as Rabban Šem'on (side 1), /15/.



Fig. 19. ms MIK III 45:12, service book, II, /25/.



Fig. 20. ms SyrHT 248, Hudra B (post-communion hymns (side a), /7/.

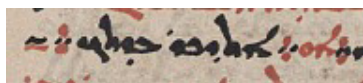


Fig. 21. ms MIK III 45:22, service book, II, /24/.

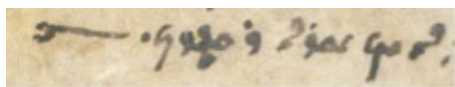


Fig. 22. ms SyrHT 64, Psalter D (Peshitta Psalm 89:46-47). (side b), /4/.



Fig. 23. ms n386, unidentified (On ascetic life?) (recto), /9/.

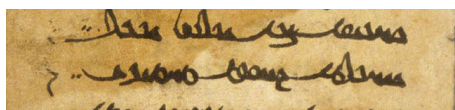


Fig. 24: SyrHT 21, Uighur Psalter (Peshitta Psalm 87:7-88:7 (side b), /12-/13/

of the Turfan Christian corpus, appears only three times (ms SyrHT 21(b), /12-/13/ and ms MIK III 58(a), /12/); two are clearly legible, while one is less clear than the others (ms SyrHT 21(b), /12/). Since the entire Psalter is well preserved, it is probable that this diacritic is less readable because it has been erased. Only diacritics present in SyrHT 21 are mentioned in the scholarly edition of the text,³¹ where the editors, Mark Dickens and Peter Zieme, write that the 'graffiti between ll. 6V12 e 6V13 is unintelligible and is perhaps only a scribble' (fig. 23).³² I rather think that this could be an attestation of the *paraglyphos* 'a coda ondulata', a diacritic already observed by Felix Albrecht and Margherita Matera³³ in the Greek Manichaean papyrus ms P. Colon. inv.

31 See Dickens and Zieme 2014, 291–328.

32 Ibid. 321.

33 See Albrecht and Matera 2017, 7.

nr. 4780 (*Codex Manichaicus Coloniensis*, fifth century CE) found in Egypt. The latter witness has ‘two *paragraphos* ‘*a coda ondulata*’ of extremely sober design and five enriched with decorative elements’,³⁴ which ‘are placed with-out regularity, at first glance they serve to indicate the beginning of a direct speech or parts of the text to which the reader’s attention is drawn’.³⁵ Dickens and Zieme also observed another type of line filler in MS SyrHT 26(b), /10/ (see fig. 15), which occurs at the end of the line after a considerable amount of space has been left blank: ‘This line is concluded by a decorative sign (not an Uyghur letter) which may be a space filler’.³⁶ There are two hypotheses for this space, either the text written there has been deleted, or it should have been filled with another portion of text, perhaps of a different colour.

In the following, I discuss some types of line fillers which seem to be unique to the Sogdian Christian and Syriac documentation from Turfan.

A distinctive type of diplé obelisméne in MS E24

MS E24 corresponds to twelve relatively well-preserved paper fragments³⁷ containing at least three hagiographic texts, the *Legend of the Invention of the Cross by St. Helena, the Mother of Costantine*;³⁸ the *Martyrdom of St. Sergius and St. Bacchus*;³⁹ and the *Legend of St. Barshabbā, bishop of Merv*,⁴⁰ as well as a prayer.⁴¹ The hagiographies are fragmentary, with gaps filled using versions written in Syriac and Arabic.⁴²

34 Ibid. 30

35 Ibid. 31.

36 See Dickens and Zieme 2014, 313.

37 Fragments n179 (E24/2a), n180 (E24/7), n181 (E24/1), n182 (E24/6), n183 (E24/5), n184 (E24/3), n185 (E24/4), n186 (E24/8), n187 (E24/12), n188 (E24/2b), n189 (E24/11), MIK III 44 (E24/9 and E24/10).

38 In n181 (r 11–v 12), n179, n188, n184, n185, and n183.

39 In n182 and n180.

40 In n186, MIK III 44 and n189..

41 In n181, r, 1–11.

42 The only translation is still the German one by Friedrich Wilhelm Karl Müller and Wolfgang Lentz (1934, 513–528), which is accompanied by the transcription of the texts and some notes. Some corrections have been proposed by Nicholas Sims-Williams in his catalogue (2012, 73–77). According to Müller and Lentz, the *Legend of the Invention of the Cross* is equivalent to the text recorded in the *Acta Martyrum and Sanctorum I* (Bedjan 1890, 326ff.) followed by the passage edited in *De Sancta Croce. Ein Beitrag zur christlichen Legendengeschichte* (Nestle 1889, 26, ll. 29 and 36). The *Martyrdom of St. Sergius and St. Bacchus* corresponds to the text contained in the *Acta Martyrum and Sanctorum III* (Bedjan 1892, 322). The *Legend of St. Barshabbā, bishop of Merv* has a partially parallel version in Arabic (Sachau 1918, 399–409).

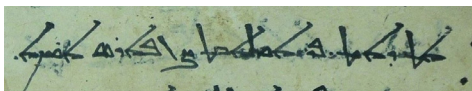


Fig. 25. MIK III 44. 2R, Legend of St. Barshabbā, /5/.



Fig. 26: n180, Legend of St. Barshabbā. (recto), /1/.

All texts were written on paper, folia measuring *c.*20.5–21 × 13.5–14 cm, with a written area of *c.*18.5–19 × 10–11 cm, with 11–12 lines per page.

The state of conservation is quite good: most folia are preserved in their entirety, with only some margins broken off and missing. Five of the fragments are too thin to be investigated;⁴³ it was still possible to identify the content of most of the texts (with the exception of n187). Although it was possible to establish the order within each text and, in some cases, to assume the length of the gaps, the original order of the texts within the manuscript could not be ascertained.

Ms E24 is interesting palaeographically, and it has already been noted for its particular handwriting. In this context, the study of the graphic signs it contains is important. Two hands can be distinguished within E24: the first and main hand, which most probably wrote the texts, and the second, which made some corrections and additions. The main hand used black ink; there is only one case of rubrication, in red ink, to indicate the title of the next section (the beginning of the *Legend of the Invention of the Cross* in E24/1 = n181r, /11/–/12/). It is likely that the paratextual elements, including the *diplé* (in both variants, see below) were written by the main hand.

The management of the writing space both within the line and—particularly—at the end of the line, differs in E24 from all other witnesses found at Turfan. The method of extending the horizontal elements in order to fill the space within and especially at the end of the line is hardly ever used, and in the few cases where it is employed, the lengthening is minimal (fig. 25). In addition, such lengthened horizontal elements are very often concluded with an upward stroke (especially characteristic of *yod* and *šin*). This peculiar use of elongation is not only characteristic of the elements at the end of the line of writing, but can also be found within the line. It seems that the scribe, aware of the writing space, did not want to occupy the space of the line by over-extending the letters (fig. 26).

It is remarkable that in ms E24 line fillers are the most common way of filling the space at the end of a line, whereas in the Christian corpus in Syriac and Sogdian, in Syriac script, the known space-filling devices alternate: this means that within a text one can find both ‘classical’ devices (the use of an

43 Fragments n179, n186, n187, n188, n189.

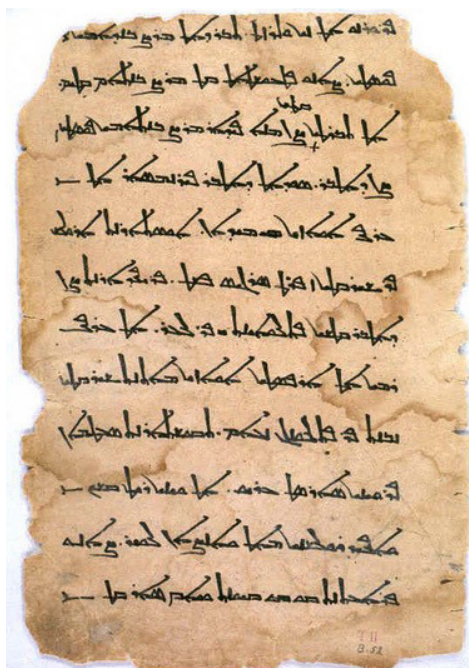


Fig. 27. n182, Martyrdom of St. Sergius and St. Bacchus (recto), in detail *diplé* at the end of the lines /4/-/10/-/12/.

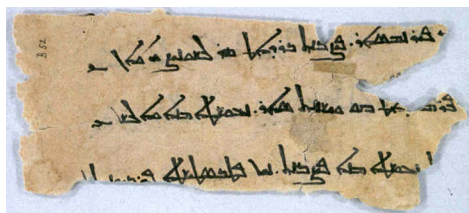


Fig. 28. n179, Legend of the Invention of the Cross (verso), /2/.

oblique horizontal line to fill the space or the elongation of a ligature) and line fillers. The arbitrary alternation of the two devices to fill the space supports the hypothesis that scribes no longer distinguished the use of such diacritics.

The most common line filler in E24 is a form of a *diplé obelisméne*, in two different variants:

- (1) the more 'classical' form, characterised by a '*diplé* (>)' which may be preceded by a horizontal extension'.⁴⁴ If the *diplé* is preceded by a prolongation, it is from the latter that the sides of the *diplé* are dashed; we can therefore assume that it was written with two strokes (fig. 27);

44 See Albrecht and Matera 2017, 9.



Fig. 29. M501p+/r/7/



Fig. 30. M229, Parthian Monday (*āfrīdagīg*) hymns (v), ii, /7/.

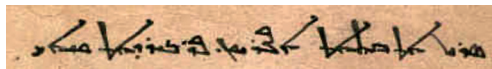


Fig. 31. n180, service book (verso), /11/.



Fig. 32. n182, service book (recto), /1/.

(2) in the second type, a more or less obvious curl is added to the lower part of the *diplé*; and it is written in a single stroke (fig. 28).

The two variants of *diplé* are found mainly in connection with dialogues and descriptions, but it is not possible to ascribe a precise use to either form.

The use of *diplé* as line fillers is also found in the Manichaean manuscript tradition⁴⁵ (figs 29, 30), although at present a complete study of the graphic signs and their respective functions in the Manichaean manuscript fragments of the Berlin Turfan Collection remains a *desideratum*. This is important for the purpose of the present discussion because it shows the common pool from which the Manichaean and Christian traditions of Central Asia drew.

Other line fillers are attested within MS E24 only one time each, being therefore *unicum*:

- (1) the line filler in n180v, /11/ is unique also because its shape does not resemble that of any other diacritic found in the manuscript (fig. 31).
- (2) the line filler in n182r, /1/ resembles the *diplé* described above, but the horizontal extension has been drawn upwards rather than on the reading line (fig. 32).

In MS E24, the mere use of line fillers can provide further data to frame the text chronologically. In fact, Müller and Lentz, in their translation, had already noted that the language used within the text was more archaic, using ‘to a great extent forms which certainly or probably point to an earlier phonetic state than what has become known from the other fragments’.⁴⁶ In addition to this philological fact, there is also the palaeographical data of the *diplé*: this diacritic is documented in the Mediterranean area since the Hellenistic period, during which it was used with ‘separative function, it may be at the beginning or at the end of a section, it seems that another task of the *diplé* was to signal

45 As kindly pointed out to me by Enrico Morano in a personal conversation on 10 January 2021.

46 See Müller and Lentz 1934, 512.

a noteworthy passage'.⁴⁷ The shape of the Hellenistic *diplé* is the same as that found in Turfan, both in the Manichaean and Christian contexts. It is evident that the two traditions draw from a common pool, as is also the case within the Uyghur Psalter and the Greek Cologne Mani-Codex found in Egypt.

Wavy line as line filler in Syriac manuscripts

A special type of line filler, which can be called a 'wavy line', has been employed in certain fragments of Christian manuscripts in Syriac script of liturgical content identified by Erica C.D. Hunter and Mark Dickens.⁴⁸ This is the case of manuscripts known as Hudra D⁴⁹, Hudra DD⁵⁰ and the 'Service-Book' MIK III 45.

With regard to the preservation of texts, with the exception of a couple of pages from Hudra D, Hudra D and Hudra DD are extremely fragmentary. The situation is different for the much better preserved MIK III 45.⁵¹ For this reason, mostly MIK III 45 will be examined in the following discussion.

The text is written on paper,⁵² the folia measuring *c.*22.5 × 14 cm, with a writing area of *c.*20.5 × 10.25 cm, in an East Syriac *'estrangēlā*; in which the two different types of inks, black and red, are alternated. The number of lines per page varies between 28 and 39 lines. There are two hands, 'the first (Scribe A) up to f. 33a, and the second (B) all thereafter'.⁵³

For filling the space at the end of the writing line, lengthening seems to be the most frequently used method, albeit in different ways:

47 See Albrecht and Matera 2017, 9.

48 See Hunter and Dickens 2014, 349–351, 449–452.

49 The following fragments belong to Hudra D: SyrHT 130, SyrHT 134, SyrHT 162–163, SyrHT 165, SyrHT. 178, SyrHT 214, SyrHT 288, SyrHT 394–395, MIK III 45 (fragment 2).

50 The following fragments belong to Hudra DD: SyrHT 89, SyrHT 133, SyrHT 147, SyrHT 306, SyrHT 376, SyrHT 384.

51 Of MIK III 45, 62 pages remain, which, with a few exceptions, consist of almost completely preserved bifolia. The pages contain a Syriac liturgical book called *penqita* ('proper texts for the daily officers and eucharistic for the whole year'; Hunter and Coakley 2017, 3). The designation *penqita* comes not only from its contents, but especially from its dating, eighth to ninth century; in fact, 'other manuscripts that answer to this description survive from the tenth century onwards, and are known from their contents as *Hudrā* 's' (*ibid.* 3–4). The most recent, as well as the only complete one, is the edition of Erica Hunter and James Coakley (2017). Some passages had been previously published by Sachau (1905, 907–973) and Engberding (1965, 121–148).

52 An analysis was conducted on the paper of the above text by the Klaus-Tschira Archäometrie-Zentrum at Heidelberg University, the results of which are published in Hunter and Coakley 2017, 273–280 as Appendix A.

53 Hunter and Coakley 2017. 4.

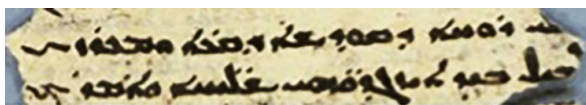


Fig. 33. SyrHT 130, service book (side a), /4/-/5/.

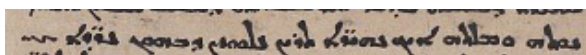


Fig. 34. MIK III 45.39, service book, II, /3/.



Fig. 35. MIK III 45.12, service book, II, /25/.

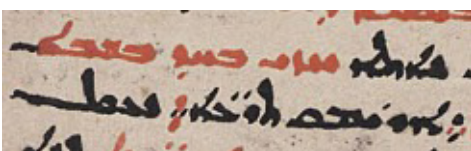


Fig. 36. MIK III 45.25, service book, II, /14/.

- (a) the letter is elongated: this occurs when the letter has a horizontal section characterized by a line, this portion is then elongated so as to fill the entire space;
- (b) a line (ligature) is placed between the last two letters: if it is not possible to lengthen the last letter, or the penultimate letter, a horizontal line of a length proportional to the space to be filled is often inserted to connect these letters;
- (c) a line is added after the last letter, which in the case of MIK III 45 often takes the form of a ‘wavy line’ rather than a straight one.

In the first two cases, the ink with which the elongation is written is always the same colour as the text preceding it. The third type is different, since it is a line filler. As mentioned above, while in the Turfan Syriac corpus diacritics are mostly in a single form and mostly in black ink just like the main text, in MIK III 45 the line fillers are in multiple forms and in black and red ink (figs. 33, 34; cp. also fig. 19). Moreover, they are not spread uniformly throughout the text: in the first part, particularly in ff. 2–31, line fillers are more present, which means that scribe A uses them more extensively than scribe B.

Two types of line fillers are used in order to justify the text: a straight line and the ‘wavy line’, with an obvious preference for the latter.

The straight line is found in a small number of cases⁵⁴ and in positions where a wavy line was not possible, as the space would have been too small.

54 There are fourteen such cases: MIK III 45.3, II, /2/; MIK III 45.11, I, /27/ and II, /24/; MIK III 45.12, II, /25/; MIK III 45.13, I, /15/; MIK III 45.18, I, /12/-/21/; MIK III 45.19, II, /16/-/17/; MIK III 45.21, I, /24/; MIK III 45.25, II, /14/; MIK III 45.43, I, /36/.

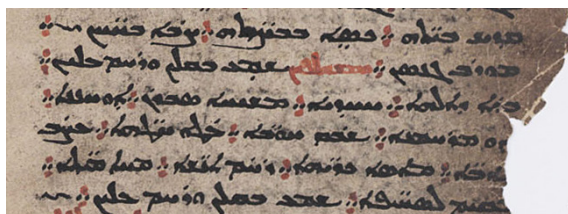


Fig. 37. MIK III 45.4, service book, II, /18/-/23/.



Fig. 38. MIK III 45.15, service book, I, /27/.



Fig. 39. MIK III 45.11, service book, II, /21/.

The straight line can be either attached to the text that precedes it or with a little space in-between; and in one case it is written inside a letter. The colour of the line is the same as that of the text preceding it, except for two occurrences: (1) in MIK III 45.12, II, /25/ the line filler is written in black while the preceding text (the title introducing ‘Evening office before the festival’⁵⁵) is in red, followed by the text in black (fig. 35); and (2) in MIK III 45.25, II, /14/ the line filler is in black, while the text that follows and precedes it (describing some prescriptions for ‘Consecration of a new Church’⁵⁶) is red (fig. 36). I believe that the lines, which are written in a different colour from the text preceding them, were added later, after the main text had been completed, since they served mainly to make each line of the page of equal length.

The ‘wavy line’, widely used within the text, also usually appears in the same colour as the preceding text and may be preceded by punctuation; but there are some special cases.

- (1) In MIK III 45. 4, II, /18/ the line filler (found within the ‘Forth Friday’ of the ‘Office for Rogation’⁵⁷) is followed, and not preceded, by dots with a punctuation function (fig. 37). Since it is unique, the scribe may have realized afterwards when reviewing the page that he had not written the punctuation. This is confirmed by the fact that there is a similar case within the page, where the line filler is written after the punctuation.
- (2) In MIK III 45.15, I, /27/ the line filler (inside the ‘Office for Saints’ in particular ‘Evening office before the fifth day’⁵⁸) is written in a different colour from the preceding text (fig. 38).

55 See Hunter and Coakley 2017, 196.

56 *Ibid.* 213.

57 *Ibid.* 183–185.

58 *Ibid.* 201.

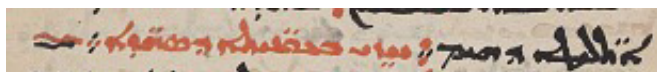


Fig. 40. MIK III 45.15, service book, I, /6/.



Fig. 41. MIK III 45.22, service book, II, /24/.

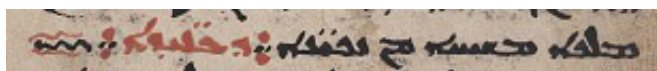


Fig. 42. MIK III 45.21, service book, II, /26/.

- (3) In MIK III 45.11, II, /21/ the line filler (within the ‘Office for Saints’, specifically ‘Evening office before the sixth day’) is written in two different colours: the final part of the diacritic is in black ink, while the remaining part is in red (fig. 39).⁵⁹ As this is the only case of a line filler written in two colours, it is possible that the black part was added later, to justify this line with the next one.

Among the line fillers found within the Christian corpus in Syriac, Sogdian and Syriac script, the wavy line is the only diacritic that may be written several times within the same space, arranged one on top of the other. In the three cases observed, none of these diacritics is linked to a specific function:

- (1) in MIK III 45.15, I, /6/ two line fillers of different colours, also preceded and followed by red text, appear in the ‘Evening office before the fourth day’ at some indications referring to the ‘Onyata’⁶⁰ (fig. 40);
- (2) in MIK III 45.22, II, /24/ two line fillers of different colours, preceded by black text, are found within ‘Next, orders of service and canons for the consecration of a new church’⁶¹ at the references to the Psalms (fig. 41);
- (3) in MIK III 45.21, II, /26/ three line fillers are located within the ‘Common vigil of all Saints together’⁶² within the Morning office, after the commemoration ‘of the departed’⁶³ (fig. 42).

In these cases the line filler is always written after the four dots used as punctuation.

59 The use of two colours is not restricted to line fillers. In fact, in MIK III 45, it could be seen in other contexts as well: (1) in two cases (MIK III 45.44, I, /8/, /26/) red is used to write only the vertical section of a letter; (2) red is also used as a ‘background’ to small portions of text (MIK III 45.35, I, /1–/5/; MIK III 45.35, II, /17–/32/; MIK III 45.42, I, /33–/37/; MIK III 45.43, II, /1–/8/).

60 See Hunter and Coakley 2017, 200.

61 *Ibid.* 210.

62 *Ibid.* 206.

63 *Ibid.* 209.

Conclusion

In the light of the evidence found in the manuscripts of the Christian community of Turfan, it is possible to identify two main methods used to manage the writing space in general and the space at the end of the line in particular: one is based on an ‘Aramaic tradition’, characterized by the use of elongations and lines to fill the space at the end of the line; the other is based on a ‘Hellenistic tradition’, using diacritics such as *diplé* and *paragraphos*.

Within the Central Asian Christian corpus, these traditions coexist and, in the light of the present study, it seems that the choice of the type of diacritic to be used depends neither on the literary genre nor on a possible function as a punctuation mark, since such diacritics had already lost their function in Late Antiquity and were used as embellishment.⁶⁴

Glossary

The paratextual elements presented in the previous pages were used as punctuation marks in Hellenistic texts, but by the fourth century CE they had already become decorative elements.⁶⁵

Coronis: could have different graphic types. Placed on the left-hand margin of the column, it is used to indicate the end of a section or the end of a book.

Diplé obelisméne: in Turner’s opinion it constitutes the evolution of the *paragraphos*,⁶⁶ it was used with a separative function, especially in poetic texts, it could be found either at the beginning or at the end of a section. Another task was to signal a noteworthy passage.

Paragraphos: consisting of a short horizontal line, has been documented since Hellenistic times. It is located in an interlinear position and exposed in the left margin of the column. It served several functions: ‘in literary papyri of prose heads it indicates the end of a section or period, in papyri of lyric texts it separates specific metrical groups, in papyri of dramatic texts it indicates the change of a line; it could be used to separate a lemma from a comment, or to mark the elements of a list’.⁶⁷

Paragraphos ‘a coda ondulata’: considered by Albrecht and Matera ‘the evolution of one of the oldest and best known marginal signs, the *paragraphos*’.⁶⁸ This diacritic was placed almost always in ‘front of a letter *en ek-*

64 See Albrecht and Matera 2017; Agati 2017, 301–344.

65 For a more detailed discussion of these elements, see Albrecht and Matera 2017 and the bibliography contained therein.

66 *Ibid.* 11.

67 *Ibid.* 7–8.

68 *Ibid.* 7.

thései, indicates in fact the beginning of a new section, like our paragraph sign (§).⁶⁹

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69 *Ibid.* 11.

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Writing and Correcting a Torah Scroll in Germany of the Thirteenth and Fourteenth Centuries*

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Ms Erfurt 7 (Berlin, Staatsbibliothek Preussischer Kulturbesitz, Ms. Or. fol. 1216) is a thirteenth-century Torah scroll from the famous Erfurt collection kept at the Berlin State Library. Multiple corrections, reinking, and three replacement sheets testify to intense ritual use of the scroll. A previous study has already investigated the different nature of the inks used for the original and replacement sheets and identified a two-stage process of writing, in which the names of God were sometimes added in the second stage. The present article broadens the previous study, investigating the relationship between the inks used for the different corrections, reinking, and names of God on both the original and replacement sheets, using a scanning micro-XRF spectrometer. Scientific material analysis confirms and supplements palaeographical observations, identifying the work of a scribe who filled God's name into blank spaces in replacement sheets and performed corrections on both the original sheets and the replacement sheets. It is suggested that this scribe was a master scribe working alongside an apprentice, a practice with parallels in the Dead Sea Scrolls and medieval Hebrew Bible codices.

Introduction

Scientific material analysis of the elemental composition of inks from different strata of a manuscript has the potential to complement scholarly observations using palaeography and philology in reconstructing the history of the manuscript's production, correction and repair.¹ There are three typologically different classes of black writing inks: soot inks consist of carbon particles

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1 See for example Hahn et al. 2008 on the reconstruction of the history of a manuscript from the same collection as the one studied in this article.

suspended in a water-soluble binder; plant inks made of tannin extracts with or without a binder; and iron-gall inks produced by chemical reaction between ferrous iron (Fe II) and gallic or tannic acid. In the Western world, iron-gall inks dominated writing materials in the Middle Ages. Historical records indicate that the most common source of iron for iron-gall inks was a water-soluble mineral, ferrous sulphate, commonly known as vitriol since late Middle Ages.² However, sometimes ink makers used other sources of iron for the production of iron gall inks.³ To distinguish between iron-gall inks based on vitriol and those based on metallic iron, we refer to them as vitriolic or non-vitriolic, respectively. The present study contributes to a study of the history of Erfurt 7 by combining material analysis of inks with scholarly investigation.

Background

Torah scrolls, containing the five Books of Moses (Genesis, Exodus, Leviticus, Numbers, Deuteronomy), have maintained a central place in Jewish liturgy down to modern times. As the book-form codex swept across the Roman world and was adopted by Christians, Jews continued to utilize the Torah scroll as an intentionally archaic, and to some extent archaizing, ritual artefact for use in public liturgy.⁴

The Torah was, and still is, read publicly three times a week in synagogues every Monday, Thursday, and Saturday.⁵ In order to be used in this public liturgy, a Torah scroll had to be written according to exacting standards. These standards required a precise reproduction of every letter of the biblical text.⁶ This also included certain paratextual details such as specific types of spacing between sections of text and the layout of poetic passages.⁷ Some requirements pertained to the thoughts active in the mind of the artisan or scribe during various stages of production of a Torah scroll. For example, there was a requirement that the skins needed to be prepared with the specific intent

2 Karpenko and Norris 2002.

3 Hahn et al. 2019 (publ. 2021).

4 Haran 1982, 347; according to Beit-Arié 2020a, 39, ‘The Jews ... adopted the codex ... not before the Muslim period and the beginning of the Geonic literary activity, and presumably no earlier than the eighth century.’

5 Jacobs 2007, 46, where the thrice weekly public Torah reading is attributed to the biblical Ezra.

6 To some extent this was an ideal, rather than a reality, in the Middle Ages, cf. Ofer 2019, 46–57. On the typologies of medieval Pentateuch texts in different geocultural regions, see Penkower 2002, 237–264. On the typology of Ashkenazic Pentateuch texts, see Peretz 2008, 92–175; Peretz 2019, 217–256.

7 On the layout of the songs, see Peretz 2019, 257–317; Penkower 2015, 131–137.

of being used for a Torah scroll.⁸ Failure to adhere to these specifications, whether textual, technical, or mental, could make a scroll unfit for use in the public reading.⁹

According to the Babylonian Talmud, a scribe needed to write each and every instance of God's name with the proper intent.¹⁰ This applied first and foremost to the personal name of God, 'Yehovah' (often rendered as Yahweh or Jehovah), consisting of the four Hebrew letters *yôḏ hē wāw hē* (יהוה). Writing the Tetragrammaton with 'proper intent' originally meant that as the scribe was writing, he had to form the thought in his mind that he was writing the name of the God of the Hebrew Bible. If the scribe intended to write a graphically similar word (e.g., 'Judah,' in Hebrew יהודה) but accidentally wrote the Tetragrammaton (יהוה), then that instance of God's name was invalid. This in turn invalidated the entire Torah scroll.¹¹ The requirement for a scribe to write with proper intent was extended to also include other 'names' (or titles) of God, such as *'ēlohîm* ('God').¹²

Dating Torah scrolls

Hebrew codicology and palaeography extrapolate the approximate date of undated manuscripts based on comparison with dated manuscripts. The manuscripts that provide the basis for such comparisons generally contain a date recorded in a colophon, dedication inscription, or ownership inscription. This poses immense methodological challenges for the study of Torah scrolls. Firstly, some aspects of codicology, such as dating Hebrew codices based on the characteristics and construction of quires, naturally have limited application when it comes to the study of scrolls.¹³ Secondly, Torah scrolls, as a rule, do not contain any writing other than the consonantal text of the Bible and precisely prescribed paratextual features. Hence, authentic colophons and dedication inscriptions are extremely rare in Torah scrolls.¹⁴ The result

8 Ganzfried 1871, 3b–4a (§2:2–6); for an English translation, see <https://www.sefaria.org/Keset_HaSofer.2.2?lang=bi&with=all&lang2=en>.

9 Some paratextual features, such as large and small letters, were deemed by Maimonides desirable (מצוה מן המבחר) but their absence did not invalidate a scroll's use in public liturgy, see *Mishneh Torah, Tefillin, Mezuzahs, and the Torah Scroll* 7:9–11 (for an English translation, see <https://www.sefaria.org/Mishneh_Torah%2C_Tefillin%2C_Mezuzah_and_the_Torah_Scroll.7.9?lang=bi&with=all&lang2=en>).

10 *Babylonian Talmud*, Gittin 54b.

11 *Babylonian Talmud*, Gittin 54b (cf. *Soferim* 5:4).

12 *Soferim* 4:1–2.

13 For an example, see Iakerson 2014, 69–70.

14 The First Firkovich collection at the Russian National Library in St. Petersburg contains several Torah scrolls with forged inscriptions (Harkavy and Strack 1875, 173–221; Beit-Arié 2020b, 195–205). Other examples of forged inscriptions in

is a lack of firmly dated scrolls from which to extrapolate to undated scrolls. Thirdly, Torah scrolls by their very nature are archaizing ritual artefacts. Even in the Middle Ages, there is a possibility that scribes intentionally used what they considered to be archaic-looking scripts when writing Torah scrolls, in order to imbue them with more of a perceived sanctity. This has the potential to skew dates extrapolated from palaeographical comparison with dated codices. Fourthly, the study of Hebrew codicology and palaeography carried out by *The Hebrew Palaeography Committee* only studied Hebrew manuscripts up until the year 1540.¹⁵ This was an arbitrary endpoint chosen because it was the end of a Hebrew century (5300 *anno mundi*) about one hundred years after the start of printing in Europe. However, the vast majority of surviving Torah scrolls (not even including those still in use in synagogues around the world) are later than 1540. Torah scrolls tend to become increasingly homogenous over time, especially following the printing revolution (lending special importance to the study of medieval scrolls). The above underscores the importance of employing radiometric dating, specifically, Carbon 14.

Other methodological challenges stem from the ritual performative function of Torah scrolls. The abrasive act of rolling a Torah scroll from one end and back again throughout a reading cycle (either, one year or three years) naturally damaged the writing.¹⁶ A scroll would be retired when enough of the ink was rubbed off, although reinking faded letters could delay this process. The browning of some types of skin over time, which reduced the contrast be-

Torah scrolls include MSS Jerusalem, National Library of Israel, Ms. Heb. 5935 (which attributes the scroll to Rabbi Nissim Gerondi; Zucker 2012, 623–633), Jerusalem, The National Library of Israel, Ms. Heb. 6100⁴ (which attributes the scroll to Anan ben David; Zucker 2012, 633–636), and Washington DC, Museum of the Bible, SCR.4676 (which attributes the scroll to Jewish survivors of the Spanish Inquisition). Examples of genuine inscriptions in Torah scrolls are MSS Cambridge, Trinity College, Wren Library, F.18.1 (Crimea, c.1320–1350; Chwolson 1882, 232–233), St. Petersburg, Russian National Library, Evr. IA 35 (Crimea, 1363; Harkavy and Strack 1875, 220–221; Beit-Arié 2020a, 105–106) and New York, Columbia University, Ms. General 61 (1690). These genuine examples were produced by Karaite Jews who did not consider themselves bound by rabbinic strictures that prohibited writing anything other than the consonantal text of the Bible (and specific paratextual elements) in Torah scrolls. Beit-Arié 2020a, 480, n. 31 cites an example of a (presumably) non-Karaite Torah scroll with a colophon from southern Italy dated 1091–1092 in a private collection.

15 See MMch I–III.

16 The triennial cycle was the custom of Eretz Israel (*Babylonian Talmud*, Megillah 29b) and was still being used in the synagogue of Jews following the traditions of Eretz Israel in Fustat as late as the beginning of the thirteenth century (Naeh 1998, 167).

tween the ink and the background, could also bring about the end of life for a scroll.¹⁷ When scrolls were retired, they were often placed in a grave or tomb, allowing them to decay naturally.¹⁸ The result is a paucity of surviving Torah scrolls from the fourteenth century and earlier.

Similarly, as objects with a performative function, Torah scrolls had to comply perfectly with the standards of halakhah (Jewish ritual law).¹⁹ Since no text on the scale of the Torah (approximately 80,000 words) could ever be reproduced perfectly by human hands, scrolls were corrected on an ongoing basis as errors were found. Medieval scrolls also needed to be corrected (or rather updated to new standards) as scribal praxis and halakhah evolved.²⁰ As a result, surviving examples of medieval Torah scrolls tend to contain successive corrections and modifications.

All of these factors make the study of the four Torah scrolls from the Erfurt collection an important contribution to Hebrew codicology and palaeography, to Jewish scribal culture, and to the transmission of the biblical text in the Middle Ages. It is generally assumed that these scrolls were seized from the Jewish community in a massacre that took place in March 1349.²¹ If this is correct, then the *terminus ad quem* for any Jewish scribal interventions in these scrolls would be March 1349.

Erfurt 7

Erfurt 7, one of fifteen Hebrew manuscripts purported to have been seized from the Jewish community of Erfurt in the 1349 massacre, is a thirteenth-century Torah scroll housed in Berlin, at the Staatsbibliothek Preussischer Kulturbesitz, Orientabteilung, where it is designated Ms. Or. fol. 1216. The scroll consists of fifty sheets containing three columns each, with sixty lines per column. The sheets measure in height between 64 and 68 cm (with an average of 66 cm) and in width between 51 and 62 cm (with an average of 58 cm) for an overall length of the scroll of 28.85 m. The scroll was copied from a codex now preserved at the Bayerische Staatsbibliothek in Munich (Cod. heb. 212 [IMHM F 25964]) or from a source in common with that codex.²² A date of

17 Rabin 2017, 309–322.

18 Stern 2017, 223, n. 170.

19 For examples of conflicts between scribal praxis and halakhah, see Ofer 2019, 271; Penkower 2019, 138–166; Penkower 2020, 33–49; Gordon 2021, 208–236.

20 Penkower 2015, 125–140.

21 Penkower 2015, 122–123; Caspi 2014, 240–241.

22 For further codicological and textual characteristics, see Jaraczewsky 1868, 116; Steinschneider 1897, 3; Thimme 2009, 64; Caspi 2014, 234–236; Penkower 2015, 118–119, 123–140; Gordon et al. 2020, 163–171.

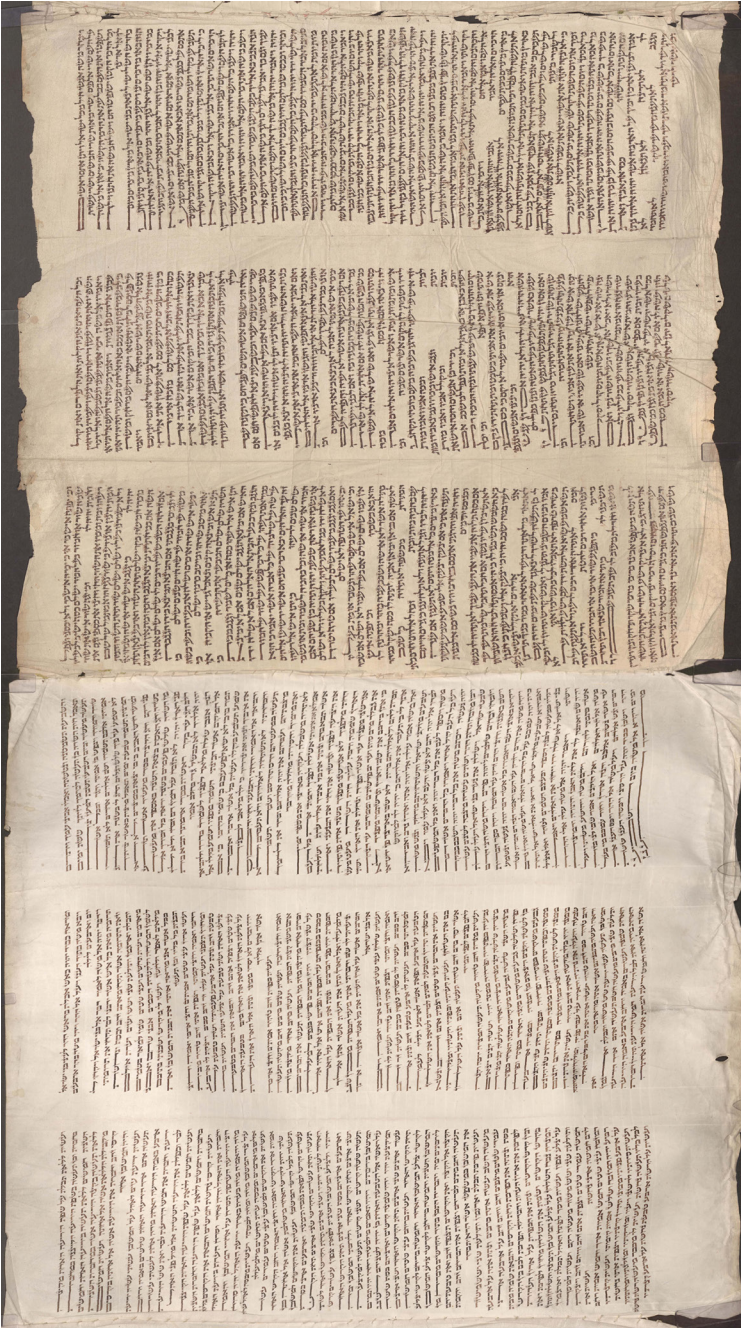


Fig. 1. The Torah scroll Erfurt 7 contains the Five Books of Moses (Genesis, Exodus, Leviticus, Numbers, and Deuteronomy) written on fifty 'sheets' (Hebrew: *yeri* אַף יָרֵי) sewn together end to end. Each sheet has 3 columns of text with sixty lines per column. In the photo, the sheet on the right (18) is one of forty-seven original sheets (1–18, 21–25, 27–50) presumably dating to the thirteenth century. The sheet on the left (19) is one of three replacement sheets (19–20, 26) presumably dating to the early fourteenth century. © Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, Orientabteilung, Ms. or. fol. 1216.

the thirteenth century has been suggested for the 47 original sheets of Erfurt 7, with three replacement sheets added in the fourteenth century.²³

Erfurt 7 contains successive corrections in the hands of multiple scribes. Corrections can usually be identified by the damage done to the parchment by an erasure through abrasion (scratching ink off the parchment with a sharp object). Another sign of correction can be a change in the appearance of the handwriting and ink. The hands of later scribes can often be identified based on palaeographical grounds such as the shapes of the letters and the density of the writing. When only a few letters were modified, it can be difficult to determine the relationship between various scribal interventions. Some corrections, especially the addition of missing words, can affect aspects of the script (e.g. size, density) making it difficult to determine the relationship of the corrector and the original scribe.

Our first study of Erfurt 7 explored the relationship between the names of God (יהוה 'YHWH' and יהוה אלהים 'YHWH God') in the first 1.5 columns of the first sheet and that of the surrounding text.²⁴ The names of God were in a distinctly darker shade of brown ink than that of the surrounding text. Despite the difference in colour, from a palaeographical perspective, these names of God appeared to have been written by the same scribe who wrote the surrounding text. However, prior research has shown there can be a lack of correlation between the appearance of inks and their elemental composition.²⁵ Nevertheless, in this specific case, through X-Ray Fluorescence (XRF) analysis, a small, although detectable difference in the signal of potassium relative to iron was observed between the lighter and darker shades of inks (respectively called OS.LT and OS.DK in the previous study). OS.LT and OS.DK were tentatively determined to be from two different batches of iron gall ink, suggesting that the divine appellations were not inscribed at the same time as the main text. This result fits well with a special procedure employed in liturgical scrolls, described in medieval Jewish sources and found in other scrolls.²⁶ The procedure involved initially leaving blank spaces for the names of God, which were filled in during a second stage of writing by the same scribe or a different scribe. The XRF results along with palaeographical observations suggested this two-stage procedure was performed by a single scribe. The same study also showed that the main ink used on the original sheets was non-vitriolic iron gall ink, which differed from the ink used on the replacement sheets,

23 Penkower 2015, 118–119; Caspi 2014, 234–236. On the characteristics of thirteenth and fourteenth century German Ashkenazic square script, see Engel 2017, xxii–xxxii.

24 Gordon et al. 2020.

25 See for example Rabin et al. 2012.

26 Gordon forthcoming.



Fig. 2. The Torah scroll Erfurt 7, mounted on a custom-built aluminium stage for non-destructive measurement with a high-resolution scanning micro-XRF M6Jetstream (Bruker Nano GmbH). The scroll is partially unrolled and opened to the first column of sheet 18 and the measurement is being conducted at approximately 10 mm distance. Some additional metallic weights (at the bottom of sheet 17, column 3 and sheet 18, column 2)—separated from the surface of the scroll by acid-free paper—are being used to keep (areas that are not being measured) flat. © Staatsbibliothek zu Berlin - Preussischer Kulturbesitz, Orientabteilung, Ms. or. fol. 1216.

which was vitriolic iron gall ink containing a large amount of zinc. Zinc-rich inks were also found in other manuscripts from Erfurt.²⁷

Material analysis has the ability to identify the elemental composition of inks and their possible relationships. The participation of a scholar who

27 Hahn et al. 2008.

specialized in the text being studied (Gordon) allowed the material scientists (Nehring, Bonnerot, and Rabin) to focus their investigations on specific regions of interest in order to answer questions of scholarly interest related to the production and development of the text. In the case of Erfurt 7, the questions pertained to scribal interventions that produced and modified the text. This involved the scholar identifying elements that may have been added to the text during its initial production such as crowns (paratextual decorations), God's name (potentially written in a second phase), and corrections seemingly executed by the original scribe. Further questions considered the relationship between the original text, the added elements, and what appeared to be later corrections in multiple scribal hands (identified based on the shapes of the letters and the visual appearance of the parchment and the inks). These questions also applied to three replacement sheets, which had their own corrections as well as God's name, which seemed to have been written in a second stage of writing by a second scribe. Another question was the relationship of some of the inks used for corrections on the original sheets and those on the replacement sheets. The questions were refined iteratively during the experiment.

Usually, the correlations between different stages of writing are determined based on palaeographical grounds, such as 'morpholog[y] ... singling out similar shapes of individual letters, by dismantling the components of the script' and comparing 'the texture of the writing, its styles and general impressions'.²⁸ The use of a micro-X-ray fluorescence imaging spectrometer added a layer of material science to visual palaeographical comparisons. This required an ongoing and continuous interaction between the material scientists (Nehring, Bonnerot, and Rabin) and the textual scholar (Gordon).²⁹

Preparation of the object for the experiment

To ensure the safety of the object during the measurements, we used a custom-built aluminium stage with a magnetic frame. The top part of the stage is made of plexiglass plates that can be slid open, leaving a space allowing measurements of an unrolled portion of the scroll without background interferences. Before each scan, the selected area was temporarily and non-invasively flattened using neodymium magnets wrapped in Tyvek³⁰ and placed on acid-free paper spacers and the magnetic frame on which the unrolled scroll

28 Beit-Arié 1987, iii.

29 On a practical level, this involved Nehring, Bonnerot, and Rabin operating the scientific equipment in Berlin, Germany, while Gordon was on-call over internet connection in Dallas, Texas. This allowed for real-time pragmatic adjustments of the experiment parameters based on philological and palaeographical considerations.

30 DuPont™ Tyvek® is a non-woven, conservation-grade material made of high-density polyethylene fibres.

was mounted. Due to the oversized nature of this precious object of cultural heritage, the scroll was handled by a group of three people and an art conservator coordinated the whole process.

Experiment

The scroll was analysed according to a protocol described in detail elsewhere.³¹ In short, the work protocol consisted in the initial reflectographic screening, followed by elemental analysis by X-ray fluorescence.

To verify that the inks belonged to the iron-gall type, we conducted the screening with a Dino-Lite USB microscope (model AD4113T-I2V). The device features magnification ranging from 20 to 200 and is equipped with built-in near-infrared (NIR) and ultraviolet (UV) lights at ~940 nm and ~395 nm, respectively, and an external LED white light source.

To obtain the elemental composition of inks, we used an M6 Jetstream (Bruker GmbH) imaging μ -XRF spectrometer with an adjustable measuring spot ranging from 50 to 650 μm , which is equipped with a low-power Rh X-ray tube, polycapillary X-ray focussing optics, a 50 mm^2 Xflash SDD detector, and two microscopes for positioning. Since scanning is conducted in air atmosphere, only elements heavier than magnesium (Mg, $Z=12$) can be securely identified. We conducted a semi-quantitative comparison of the abundance of elements starting with potassium (K, $Z=19$). All the measurements were performed at 50kV and 600 μA , with a spot size of 100 μm , an acquisition time of 10 ms/pixel, and a pixel (step) size of 200 μm . The areas for the scans were carefully chosen to contain the maximum number of the relevant features (corrections, re-inking, changes of hands, etc.), under the constraints dictated by space and time. We focused our study on large portions of the text from both original sheets (14 and 17) and a replacement sheet (19). In total, we conducted 8 scans ranging in area from 30.2 cm^2 to 298.4 cm^2 .

We used a simplified version of the ‘fingerprint model’ initially introduced to compare the elemental composition of vitriolic iron-gall inks on paper.³² For each given element, the intensity of the corresponding XRF signal is related to its quantity in the analysed material. However, the intensity also depends on the element itself, and on other factors (matrix effect, thickness etc.), making direct comparison of the measured intensities impossible. In the adaptation of the fingerprint model, we assumed:

- that the parchment composition in the inked and non-inked areas is the same;

31 See Nehring et al. 2021.

32 For the definition of the vitriolic and non-vitriolic inks see Hahn et al. 2021; for the fingerprint model see Hahn 2004.

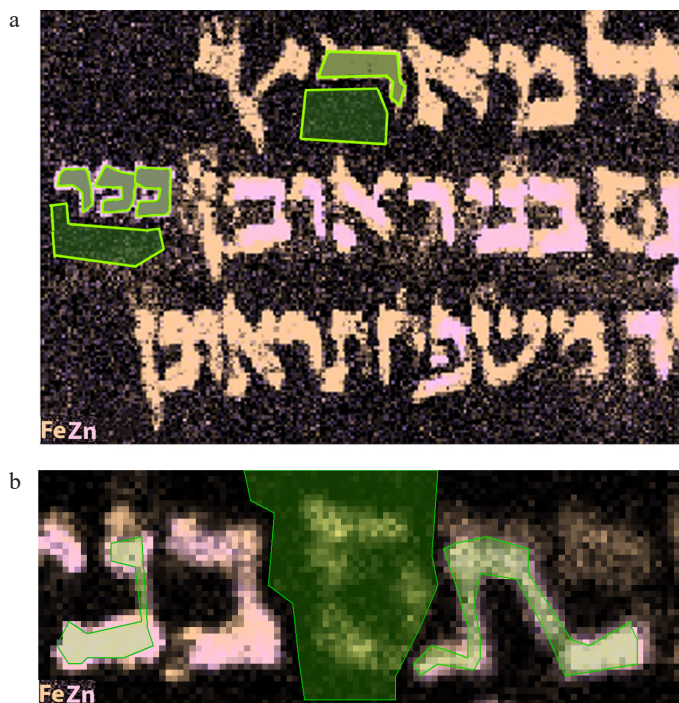


Fig. 3. Original and corrected text from sheet 14 col. 2 (Exodus 6:14). Superimposed maps of the elements iron (Fe, orange) and zinc (Zn, pink). The areas selected for semi-quantitative analysis are marked in green; (a) original text and correction in the margin; (b) reinked text.

- that the thickness of the inks is consistently smaller than that of the parchment;
- that if two areas were inked with the same batch of iron-gall ink, net peak intensities of a given element normalized to iron would be similar.

To estimate the contribution of the writing support to the element intensities measured in the inks, we selected regions of interest (ROIs) in the inked area and in the non-inscribed adjacent space as shown in fig. 3a. In one case, for which we investigated a reinked portion of the text, we had to choose a background area containing traces of the original ink in addition to virgin parchment (cf. fig. 3b). Since each pixel on the image of fig. 3 corresponds to a single XRF spectrum, each region of interest corresponds to a cumulative XRF spectrum, from which net peak intensities of the individual elements were calculated following an iterative fitting process using Gaussian deconvolution with the native software. To obtain net abundancies of the elements contained in the inks, the average net peak intensities from the background (non-inked) XRF spectrum are subtracted from those of the inked ones. Final-

ly, for each element, its net peak intensity (I_{Me} , where Me is the element) is divided by the net peak intensity of iron (I_{Fe}) resulting in a relative contribution of the element Me to the ink.

Results and discussion

We divided our work between the confirmation of the results of the previous survey for which we used the portable single spot measuring Elio XRF spectrometer,³³ and the investigation of questions which had remained unanswered. The primary survey indicated the presence of non-vitriolic inks in the main text of the original sheets (OS), while vitriolic zinc-rich iron-gall ink was used in the replacement sheets (RS). In addition, the results suggested that at least two batches of non-vitriolic ink were used on the original sheets. In the present survey, we were able to use a scanning micro-XRF spectrometer, which allowed us to delve further, investigating the relationship between the various corrections, reinking, and divine appellations present on the original sheets 14 and 17, and on the replacement sheet 19.

Fig. 4 summarizes the reflectographic survey of the different inks investigated in this work. All the inks reacted similarly to the tests: they appeared darker and more homogeneous under UV than under visible light testifying to the presence of tannins that quench the UV fluorescence of the parchment. By contrast, under NIR light, the letters become partly, but not totally transparent, indicating that they are penned with iron-gall ink.³⁴ No exact information on the ink composition can be extracted from the reflectographic analysis because the colour of the iron-gall ink and its transparency in the NIR light do not directly correlate with the presence or absence of impurities.³⁵

It is the elemental composition of the inks determined by scanning XRF analysis that allowed us to immediately spot several differences between the inks. Maps of elements from the scanned areas allowed us to identify or confirm the presence of features such as corrections and re-inking of letters and suggest the succession of events that took place when the Torah scroll was written, repaired, and corrected. Fig. 5a shows a photograph of the three bottom lines from column 2 of the original sheet 14 (Exodus 6:14). About half of the second line (left-hand side) and most of the third line were erased and initially corrected with smaller letters than that of the surrounding text. The small letters of this initial correction were then reinked in a later stage. The seemingly bad state of preservation of these inks contrasts strongly with that of the word *beḵōr* (בכר) added in small letters in the margin of the second line,

33 Gordon et al. 2020.

34 Mrusek et al. 1995.

35 Rabin et al. 2012.

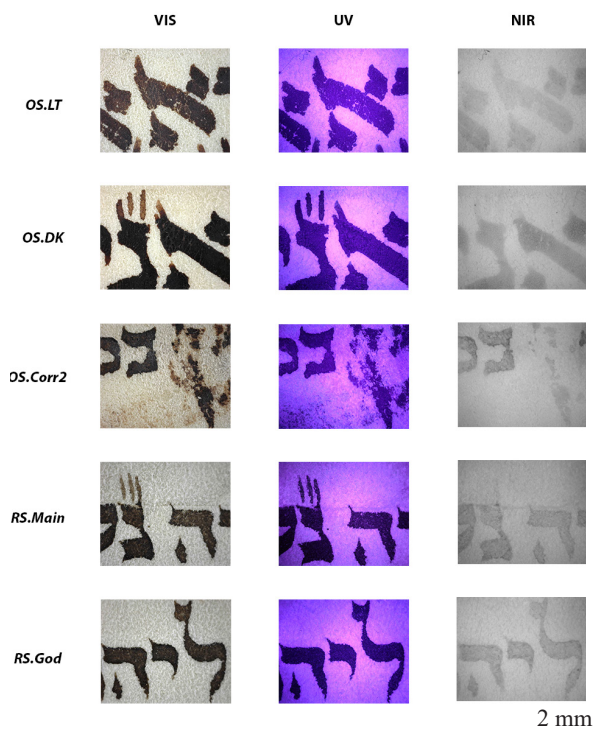


Fig. 4. Visible (left), UV (middle) and NIR (right) micrographs. *OS.LT* and *OS.DK* – inks of lighter or darker shades on original sheet 14 (column 2, line 40); *OS.Corr2* – addition of small letters on original sheet 14 (column 2, line 59), *RS.Main* – main ink of replacement sheet 19 (column 1, line 41); *RS.God* – God’s name on replacement sheet 19 (column 1, line 36).

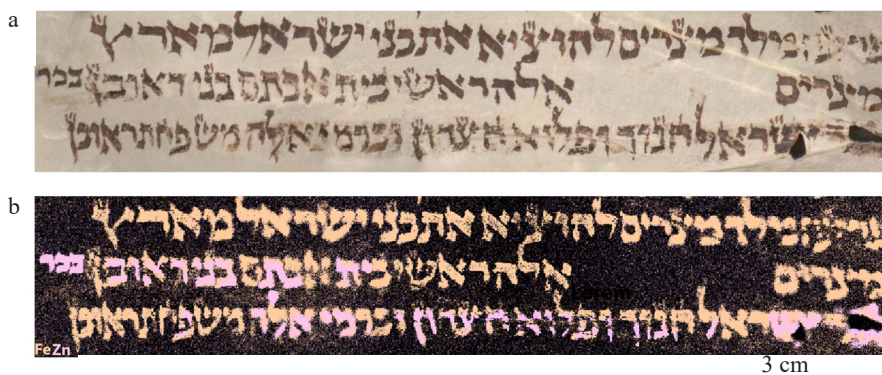


Fig. 5. Bottom lines of sheet 14 column 2 (Exodus 6.14); (a) image of the scanned area; (b) superimposed maps of iron (Fe, orange) and zinc (Zn, in pink colour).

visible on the left-hand side of the image. Note that the colour of this added word is not different from the original text of the top line. In fig. 5b one can see the superimposed maps of iron (Fe) and zinc (Zn) for the same area, which reflect the main difference in composition between the original ink and that of the initial correction, on the one hand, and the ink used by the reinker and the corrector who added the small letters in the left-hand margin, on the other hand. Since only the ink for some of the corrections contains zinc, the maps indicate the stratigraphy of the application of the ink, leading to the following tentative reconstruction of events: 1) The original scribe wrote Exodus 6:14 with some error. The error may have involved parablepsis, i.e. the scribe's eye jumping from one word to another after which he copied from the wrong place in his source text. The verse has the word *R^e 'ûbēn* (רֵאוּבֵן) twice, which makes it a good candidate for this type of error, although the cause for the specific error is speculation; 2) a corrector (based on palaeography, probably the original scribe) erased 1.5 lines of text and replaced it with a correction. In the process of erasing, he made holes at the beginning of the last line; 3) another corrector decided that the first word in the last line was unsatisfactory because of the holes, so he put ink over the word (probably *beḵōr*) and rewrote it at the end of the previous line, in the margin. The earlier abrasion caused the ink of the initial correction to deteriorate, leading this later corrector to reink parts of some of the deteriorating letters (pink in fig. 5b). This corrector used a zinc-rich ink.

Another example of scientific material analysis corresponding to, and supplementing, palaeographical observations, concerns the two-stage procedure of leaving blank spaces for the names of God which were filled in during a second stage of writing. Fig. 6a shows a portion of column 1 from replacement sheet 19. God's name (cf. fig. 6a, white arrow) is significantly smaller with finer horizontal lines than that of the main text, even when ample room was left for it during the first stage of writing. The tops of the horizontal lines of the main text are aligned with the horizontal ruling line, whereas those of God's name are below and parallel to the horizontal ruling line. The vertical lines of God's name also descend lower than those of the main text.

As was already brought up by the previous XRF study, the main ink of the replacement sheets, contrary to the original sheets, contains elevated amount of zinc and small amounts of copper. The script from sheet 19 column 1 in fig. 6a has a uniform hue. The script also appears homogeneous in the elemental maps of iron and zinc in fig. 6b and fig. 6d, respectively, in contrast to the heterogeneity of the copper map in fig. 6c. A visible change in the intensity of copper precisely in the position of God's name (marked with a white ellipse) suggests that this word was not written together with the rest of the



Fig. 6. Portion of sheet 19 column 1 Exodus 23,19-20; (a) image of the scanned area; (b) map of iron (Fe); (c) map of copper (Cu), with God's name marked with a white ellipse and with an arrow in the photograph; (d) map of zinc (Zn).

text. This unequivocally proves the validity of the scholarly hypothesis that God's name was filled into empty spaces left by the original scribe, apparently by a second scribe using different ink.

The two examples above show that distributions of specific elements such as iron, copper and zinc deliver important information regarding the succession of writing and correcting sessions of the scroll. Semi-quantitative

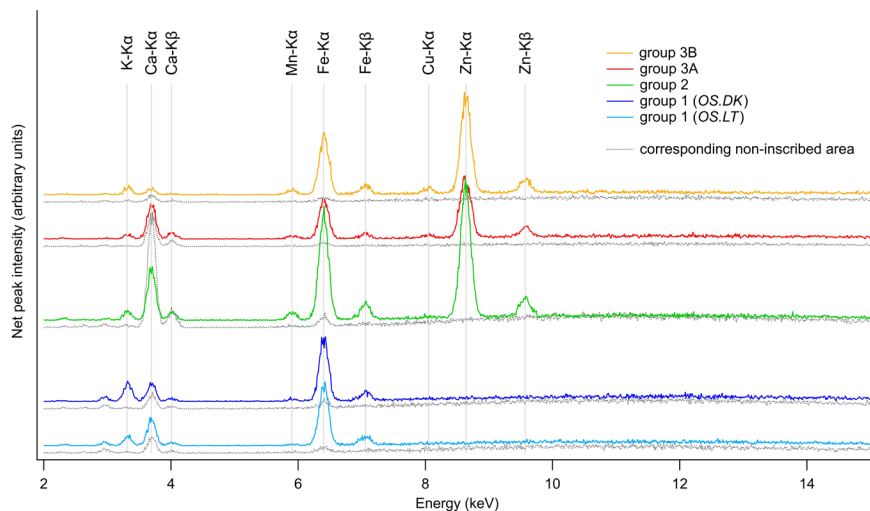


Fig. 7. XRF spectra of the different groups of inks. Group 1: OS.LT and OS.DK – dark and light inks from sheet 14 (column 2, line 40), respectively. Group 2: RS.Main – main ink of replacement sheets, sheet 19 (column 1 line 41). Group 3A: RS.God – God’s name, sample taken on sheet 19 (column 1 line 36). Groups 3B: OS.Corr2 – addition of small letters from sheet 14 (column 2 line 59).

evaluation of the data offers further insights into the history of writing and correcting Erfurt 7.

Based on their relative elemental composition, the inks studied in this work, i.e., main texts, corrections, re-inking, and additions of God’s names fall roughly into three groups, whose representative XRF spectra are shown in fig. 7. All the inks contained potassium (K), manganese (Mn), and iron (Fe) in varying amounts. In addition, several inks contained zinc (Zn) in high amount, accompanied in some cases by traces of copper (Cu). Calcium (Ca) was found to originate mostly from the support. In the previous work, zinc (Zn) was found to be a key element in discriminating different groups of ink, but this time, the better statistics due to higher spatial resolution and scanning utility allowed us to add copper as a second discriminating element despite its extremely low abundance.

Group 1 encompasses inks which do not contain detectable amount of copper or zinc. It corresponds to the main inks found on the original sheets (‘OS.DK’ and ‘OS.LT’ from the previous survey belong to this group: OS.Main as well as some early corrections: OS.Corr1). We suggested in the previous publication that ‘OS.DK’ and ‘OS.LT’ may be indicative of two different batches of the same ink, based on small, but statistically significant differenc-

es in potassium to iron net peak intensities. This result was confirmed by this survey, with OS.DK inks having an average I_K/I_{Fe} value almost twice that of OS.LT (around 0.22 and 0.12, respectively). Inks from group 2 contain a significant amount of zinc ($1.32 < I_{Zn}/I_{Fe} < 1.54$) but no detectable copper. They correspond to the main ink of the text in the replacement sheets (RS.Main). Inks from group 3 contain a higher amount of zinc than inks in group 2 ($1.72 < I_{Zn}/I_{Fe} < 2.09$), and detectable traces of copper (though less than 0.1 net peak intensity relative to iron). They correspond to God's name on the replacement sheets (RS.God), two corrections on the replacement sheets (RS.Corr), some corrections on the original sheets (OS.Corr2, OS.Corr2.God, OS.Corr2.Prepare) and reinking on the original sheets (OS.Reink). Table 1 and fig. 8 present the results of the quantitative treatment of all the data collected in this work.

Table 1. Relative content of zinc and copper. Min-max: minimal and maximum measured values, : average value, σ : standard deviation. Group 3 (A&B) presents the results of group 3 as a whole. L.O.D.: Limit of detection.

Group	I_{Cu}/I_{Fe}			I_{Zn}/I_{Fe}		
	min-max		σ	min-max		σ
1	< L.O.D.	-	-	< L.O.D.	-	-
2	< L.O.D.	-	-	1.32 - 1.54	1.44	0.076
3 (A & B)	0.02-0.09	0.06	0.021	1.72-2.09	1.91	0.115
3A	0.02-0.06	0.04	0.013	1.72-2.08	1.90	0.123
3B	0.07-0.09	0.08	0.009	1.89-2.09	1.95	0.088

The data evaluation clearly shows that the original script of the Torah did not contain such metallic impurities as zinc and copper tentatively leading to the suggestion that the original ink was not based on vitriol. Although we could confirm the differences in potassium concentration between 'OS.LT' and 'OS.DK' inks, we could not conclude whether corrections executed in this type of ink were conducted during the original production of the scroll. Indeed, such corrections were written over residues of the original ink which contains the same elements. Furthermore, they are characterized by a significantly worse preservation state than that of the remaining original script. By contrast, the Zn-rich ink of the replacement sheet is clearly of a vitriolic origin. Corrections conducted in vitriolic inks can be classified and compared in a more secure fashion. In this work, it was possible to tentatively divide group 3 into subcategories 3A and 3B. 3A consists of corrections and God's

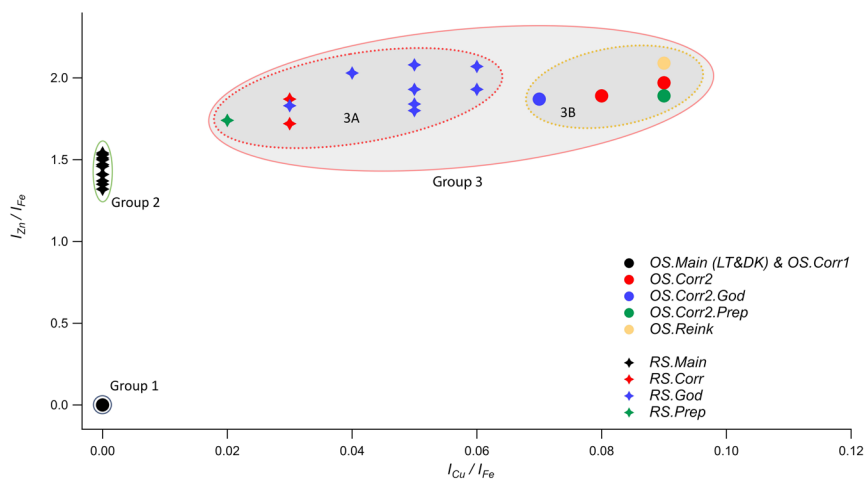


Fig. 8. I_{Zn}/I_{Fe} against I_{Cu}/I_{Fe} of the different inks sampled from the scans. Spots from the original sheets are represented as plain circles, while spots from the replacement sheets are plain diamonds. OS.main comprises both ‘OS.LT’ and ‘OS.DK’ from the previous study.

name on the replacement sheets. 3B consists of some corrections (including God’s name and an inseparable preposition) and re-inking on the original sheets. Zinc to iron ratios for both subgroups are indistinguishable, but there is a clear separation from the copper to iron net peak intensities (0.07-0.09 for 3B vs 0.02-0.06 for 3A). The difference in copper abundance, although small, clearly appears in fig. 8, which displays relative concentration of zinc (I_{Zn}/I_{Fe}) versus that of copper (I_{Cu}/I_{Fe}) for the different inked areas selected for semi-quantitative analysis.

We also tried to investigate the relationship between the inks used for the ‘crowns’ (*tagin*), the main text, and some other corrections. We observed no significant differences between the composition of the crowns and the corresponding letters in the examples we investigated. However, the crowns are extremely thin (~0.1 mm wide), and additional scans, centred around selected crowned letters, and with a much higher spatial resolution would be needed to unequivocally address this question. Because of time constraints, we could not perform these additional high-resolution scans this time.

Palaeographic and material ink analysis firmly suggest that God’s name was added by a second scribe. Two corrections on the replacement sheets share the same palaeographical characteristics as that of God’s name. Corrections on sheets 14 and 17 (original sheets) also share these characteristics and appear to have been written in the same handwriting as both God’s name and the corrections on the replacement sheets. The results of the experiment show

that God's name on the replacement sheets, corrections on the replacement sheets, corrections on sheets 14 and 17, and the re-inking that accompanies the correction on sheet 14 were all written with zinc-rich vitriolic ink containing copper. There is only a small difference in the copper amount between the ink used to write God's name and corrections in the replacement sheets (group 3A) and the ink used to write the corrections of sheets 14 and 17 and for the re-inking (group 3B). This difference, although minimal, tentatively suggests that the corrections and re-inking of sheets 14 and 17 were done during a separate writing session than the inscription of God's name and corrections on the replacement sheets. This difference might be due to contamination from a copper inkwell, in which the ink was laying during the correction session(s). These inks also have a similar visual appearance, and the handwriting appears to be the same (although one cannot determine the handwriting of the reinker). These material analysis results, combined with the palaeographical observations, suggest that a single scribe produced all these textual elements. Corrections performed in the same handwriting and bearing the same characteristics also appear on at least fifteen of the original sheets.³⁶ These corrections point to the work of a master scribe who filled God's name into blank spaces during a second stage of writing in the replacement sheets and made corrections throughout the scroll. It is possible that an apprentice was tasked with proofreading the forty-seven original sheets of the scroll and left the corrections to the master. Alternatively, the master may have proofread himself before making the corrections.

The Dead Sea Scrolls contain an early parallel to the practice of leaving blank spaces for God's name, which were filled in during a second stage of writing. In some instances, it has been determined on palaeographical grounds that God's name was filled in by a second scribe.³⁷ Hartmut Stegemann suggested that the community who produced the Dead Sea Scrolls employed a 'speziellen 'Gottesnamenschreiber'', who was perhaps qualified or authorized to write God's name in a way that the main scribe was not.³⁸ Stegemann suggested this based on palaeographical observations without the confirmation of material analysis. In the case of Erfurt 7, we can say based on material

36 The hand of the scribe who wrote God's name and the corrections on the replacement sheets, as well as corrections on sheets 14 and 17, is also evident on sheets 1 (col. 2, Gen 2:20), 2 (col. 2, Gen 7:11), 3 (col. 1, Gen 11:24), 7 (col. 1, Gen 27:44; col. 3, Gen 29:28), 8 (col. 1, Gen 30:38; col. 2, Gen 32:10), 10 (col. 3, Gen 41:21), 21 (col. 2, Exod 32:29–30), 28 (col. 2, Lev 17:13), 35 (col. 2, Num 14:8), 36 (col. 3, Num 19:6), 41 (col. 2, Num 36:3), 43 (col. 1, Deut 5:1), and 44 (col. 2, Deut 11:10). Our thanks to Nelson Calvillo for finding many of these examples.

37 Tov 2004, 218–221.

38 Stegemann 1969, 154; cf. Tov 2004, 240.

analysis that the God's-Name-Writer 1) filled in God's name in the replacement sheets, 2) made corrections on the replacement sheets, 3) made corrections on two (and based on palaeographical observations, possibly fifteen) of the original sheets, and 4) reinked part of sheet 14.

A medieval parallel of a master working with another scribe (although not an apprentice) can be found in some tenth-century Masoretic codices. An example of this is the Aleppo Codex, a copy of the Bible in Hebrew completed in Tiberias around the year 925 and prepared as a 'model codex' against which other scribes checked their copies.³⁹ According to the dedication inscription, the letters of the Aleppo Codex were written by Solomon Ben Buya'a, who is termed a *sofer mahir*, i.e., 'proficient scribe.' In a second stage, vowel points and accents were added by Aaron Ben Asher, who is referred to as *'adon ha-sofrim* 'Master of the Scribes.'⁴⁰ Maimonides later reported that, 'Ben Asher proofread it, precisely examining it for years, proofreading it many times, as has been related by tradition.'⁴¹ Israel Yeivin found that the Aleppo Codex indeed contained numerous corrections on every page, consistent with the report of Maimonides.⁴²

An Ashkenazic parallel, contemporary to the replacement sheets of Erfurt 7, is the Bible codex Hamburg, Staats- und Universitätsbibliothek, Levy 19 (Sfardata 0G132; IMHM F 1496), completed in Brussels in 1309. According to Judith Olszowy-Schlanger, one scribe wrote the main biblical text and the Rashi commentary, a second scribe wrote the Masorah parva, a third scribe wrote the Masorah magna, and a fourth scribe illuminated the manuscript and corrected the text throughout. The fourth scribe seems to have been the supervisor of the entire project; although he contributed quite little to the text, he states in the colophon (f. 625r): 'I completed the illumination and the writing together' (*š'yyūr wehakketibâ š'llamtî yaḥad*, ציור והכתיבה שילמתי יחד).

Conclusions

Our findings confirmed the results from the previous publication but with better statistics. Non-vitriolic ink was used for writing the text of the original sheets of Erfurt 7 (inks from Group 1), while vitriolic ink was used for the replacement sheets (inks from Group 2). Furthermore, the original text was written with (at least) two batches of inks. Thanks to the high-resolution

39 Penkower 1981, 41.

40 Ofer 1989, 287.

41 *Mishneh Torah*, Tefillin, Mezuzahs, and the Torah Scroll 8:4; cf. Penkower 1981, 40–42.

42 Yeivin, *Erasures Apparatus*; our thanks to Michael Segal and Rafael Zer of the Hebrew University Bible Project for giving Gordon access to the handwritten unpublished manuscript.

area scans, we could investigate the relationship between corrections from the original sheets and the various inks found in the replacement sheets. The composition of the ink used for the corrections and the divine names written on the replacement sheets was found to be very similar to that of some corrections and re-inking on the original sheets. We showed that God's name was written in the second stage of preparing the replacement sheets. We suggest that the master scribe, who filled in the empty spaces left by the main scribe of the replacement sheets, executed various corrections and reinking on both the original and the replacement sheets.

We could only achieve these results due to the interdisciplinary character of our team and a close collaboration between the fields of material science and humanities.

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The *Chronicle of 'Āmda Šəyon* and the *Gadla 'Azqir*: Some Linguistic and Philological Considerations*

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This paper presents some linguistical and philological features of Gə'əz (Old Ethiopic) which emerged while carrying out thorough morphological annotation of two texts of the Ethiopic literature, the *Chronicle of 'Āmda Šəyon* and the *Gadla 'Azqir*, during my work in the project TraCES, with the digital help of the GeTa tool. It also describes the workflow and some of the aspects which characterized the experience of annotation.

The project TraCES¹ had, among its aims, the linguistic analysis of texts of the Gə'əz written heritage, representative of different genres, periods, and types of transmission. For that, a digital tool, the GeTa, was designed and used.² In this paper I present some³ of the linguistical and philological features I could note in the two texts I analysed with the help of the tool, with a few consideration on some aspects of the annotation process.⁴

* This paper follows my presentation, 'The *Chronicle of 'Āmda Šəyon* and the *Gadla 'Azqir*: some linguistical and philological considerations from the annotation work', given during the workshop 'Tracing the TraCES' Footprints' (Universität Hamburg, 12–13 December 2019). I express my deepest thanks to Alessandro Bausi for his precious revision and attention in giving important advice and elements for this work, as for my past ones. My gratitude and my thanks also go the anonymous peer reviewers for valuable linguistic comments and to Eugenia Sokolinski for her usual patience, availability, and care during her editorial work.

1 The project <TraCES/>: *From Translation to Creation: Changes in Ethiopic Style and Lexicon from Late Antiquity to the Middle Ages*, which I was member of from 2014 to 2019, was funded by the European Research Council (ERC) under the European Union's Seventh Framework Program (grant agreement no. 338756, PI: Alessandro Bausi, Universität Hamburg; <<https://www.traces.uni-hamburg.de/>>). See also Bausi 2015, Sokolinski 2016, 2018, and Hummel, Pisani, and Vertan 2018.

2 The tool was developed by Cristina Vertan. On its functionalities and on the workflow of the digital annotation, see Vertan 2016, and Hummel, Pisani, and Vertan 2018, in particular pp. 98–102. On this and other tools used in TraCES see Sokolinski 2018. See also the *GeTa User Manual*, Sokolinski 2019.

3 This paper does not aspire to report all the linguistic aspects of the annotated texts. Many of other features undoubtedly deserve a further study and space.

4 These and other annotated texts produced by the project are available as a data set in the Research data repository of Universität Hamburg, <<http://doi.org/10.25592/uhhfdm.707>> in a variety of formats. Besides GeTa-specific data types, the texts have been exported as TEI XML. With the help of the 'Pepper' converter (implemented by Stefan Druskat) they can be also exported as ANNIS (ANNotation of Information Structure) files and visualized, searched, and analyzed online (<<https://>

On the Chronicle of ʿĀmda Šəyon

The first text which I morphologically annotated is the historiographical text known as the *Chronicle of ʿĀmda Šəyon* (hereafter *AS*)⁵ in the version critically edited, and translated from Gəʿəz into Italian, by Paolo Marrassini.⁶

The Gəʿəz text of the *AS* is transmitted in seven witnesses, always in combination with other historiographical works; all of them have been used in the edition to produce the critical text:

- Frankfurt, Universitätsbibliothek Johann Christian Senckenberg, MS. or. 38⁷ (= MS Ruppel⁸ Ia; Ḥäylu redaction⁹), dated to 1832; *AS* on pp. 13b–16, 65–86a;¹⁰

corpus-tools.org/annis/>). The TEI XML versions of the texts are additionally stored in the online research environment *Beta maṣāḥəft* (<<https://betamasaheft.eu/>>, hereafter BM), also developed at Universität Hamburg. Besides preserving texts, manuscript descriptions, and (when possible) manuscript images, the BM portal is also the main repository of data related to the Ethiopic written culture, including a repertory of texts, *Clavis Aethiopica* (hereafter *CAe*), and authority files for relevant personal, ethnic, and place names, each assigned a unique ID. BM also hosts the online dictionary of Ethiopic, created by the TraCES project team on the basis of Dillmann's *Lexicon Linguae Aethiopiae* (1865; see <<https://betamasaheft.eu/Dillmann/>>).

- 5 *CAe* no. 4275; data set DOI: 10.25592/uhhfdm.1489 (last accessed on 3 July 2021).
- 6 Marrassini 1993. The text used for the annotation was digitized (transcribed) by Alessandro Bausi. The annotation was completed and revised not for the entire text but almost for three quarters of it (corresponding to Marrassini 1993, 50–134). Another recent critical edition, with a German translation, was produced by Kropp (1994). Among the earlier editions and translations carried out with the editorial criterion of the base manuscript, I should mention the German translation by Dillmann 1884; the edition, with French translation, of Perruchon 1889; and the English translation of Huntingford 1965. The Portuguese translation by the Jesuit Páez (produced in 1622 and published in 1906) represents rather a compendium of existing traditions than a precise literal translation made on an unknown text or manuscript. In general, on the *Chronicle*, see, most recently, Hirsch 2020. See also Marrassini 1984 and 1985.
- 7 Images of the paper manuscript are available at <<https://sammlungen.ub.uni-frankfurt.de/urn:urn:nbn:de:hebis:30:2-48751>>.
- 8 Commissioned and copied for Eduard Ruppel in 1832 in Ethiopia.
- 9 Second redaction of the text promoted by *Dağğāzmāč* Ḥäylu ʿĪsate (on him see Chernetsov and Red. 2005, 1059b–1060a) in the eighteenth century (around the year 1785), after *Rās Mikāʿel* had set the historical archives of Gondar on fire (cf. Marrassini 1993, 10).
- 10 Goldschmidt 1897, 58–62, no. 16. For an online version of the manuscript description, see <<https://betamasaheft.eu/FSUor38>> (by D. Reule).

- London, British Library (BL), Oriental 821 (Ḥāyly redaction),¹¹ dated to 1851; *AS* on ff. 39r–64v;
- Oxford, Bodleian Library, Bruce 88 (= Codex Aethiopicus XXIX),¹² 2nd unit, sixteenth–seventeenth century;¹³ *AS* on ff. 5r–15v;
- Paris, Bibliothèque nationale de France (BnF), Éthiopien, d’Abbadie 52,¹⁴ nineteenth century; *AS* on ff. 1r–30r;
- Paris, BnF, Éthiopien, d’Abbadie 118 (Ḥāyly redaction),¹⁵ nineteenth century; *AS* on ff. 17v–29r;
- Paris, BnF, Éthiopien 143 (= Éth. 147; Ḥāyly redaction),¹⁶ nineteenth century; *AS* on ff. 32r–52r;
- Paris, BnF, Mondon-Vidailhet 27 (= 213),¹⁷ nineteenth century; *AS* (incomplete) on ff. 1r–12r.¹⁸

- 11 Images are available at <http://www.bl.uk/manuscripts/Viewer.aspx?ref=or_821_f001r>. Catalogued in Wright 1877, 315–318, no. CCCXCII. For an online version of the manuscript description, see <<https://betamasaheft.eu/BLorient821>> (by Solomon Gebreyes Beyene).
- 12 Cf. Dillmann 1848, 76–80, no. XXIX (and online description by D. Reule at <<https://betamasaheft.eu/BDLbruce88>>). On this manuscript cf. also Wion 2009, 135–138, and Kropp 2017, 345–348.
- 13 This composite manuscript is made up of three codicological units. The collection of chronicles, including the *AS*, belongs to the second unit, which, together with the third one, was copied between the end of the sixteenth and the beginning of the seventeenth century. The date is 1592 for Marrassini (cf. Marrassini 1993, 7), and most probably after the year 1610 for Kropp (cf. Kropp 1994, I, xviii). The first unit was copied for James Bruce, who was in Ethiopia between 1769 and 1771 and who brought the manuscript to Europe (cf. Marrassini 1993, 7).
- 14 Cf. Chaîne 1912, 37, and Conti Rossini 1914, 197–198, no. 194.
- 15 Cf. Chaîne 1912, 75–76, and Conti Rossini 1914, 199–200, no. 197.
- 16 Cf. Zotenberg 1877, 216–221; see also the online description by D. Reule at <<https://betamasaheft.eu/BNFet143>>.
- 17 Cf. Chaîne 1913, 15–16.
- 18 The critical editions of both Marrassini 1993 and Kropp 1994 were conducted on the basis of all seven manuscripts (each assigning different sigla). Both editors arrived at a *stemma codicum*, which shows two opposite branches with the same family groups of the text witnesses (for details and discussions, see Marrassini 1993, 6–17, and Kropp 1994, I, xi–xxxii). Marrassini also used the Portuguese translation Páez 1906, but he limited himself to recording only the most significant differences or analogies in the footnotes to the Italian translation, as well as the variants in the list of toponyms. He grouped the Páez version, according to some textual data, within the family of the manuscripts with the sigla A¹ M (= d’Abbadie 52 and Mondon-Vidailhet 27) in his proposed *stemma codicum* (on the Páez’s version and its use in Marrassini’s edition, see Marrassini 1993, 13–15).

The text narrates the military victorious campaigns of the Ethiopian king ‘Āmda¹⁹ Ṣəyon I (r. 1314–1344)²⁰ against the Muslim states of south-east Ethiopia. In particular, it describes the major campaign against the tributary Muslim king of ‘Ifāt, Sabraddin,²¹ who had revolted and tried to overthrow the successful Christian king.²² According to the text,²³ the war took place during the Year of Mercy 516, in the eighteenth year of ‘Āmda Ṣəyon’s reign, that is, in 1332 CE.²⁴

The author and time of composition of the *AS* are not known. Various hypotheses exist. Cerulli observed that the text could have been written when ‘Āmda Ṣəyon was still alive.²⁵ Several scholars maintain that the text was written soon after the king’s death.²⁶ Others suggest that the text should be dated to the sixteenth century.²⁷ According to Marrassini, the text, even with-

- 19 The dictionary attests the noun ሰምድ: ‘*amd* ‘column’ (see Dillmann 1865, <<https://betamasaheft.eu/Dillmann/lemma/La5968bbad7f14adfbe51ff7c10acbaff>>). I follow the spelling attested in the *AS*, ሰምድ, and transcribe ‘*Āmda* throughout. The name ‘Āmda Ṣəyon literally means ‘Column of Zion’ (on this term, cf. Marrassini 1993, 53, n. 2).
- 20 On ‘Āmda Ṣəyon I, cf. Mantel-Niecko and Nosnitsin 2003.
- 21 ሰብረዳጌ: *sabraddin* is the Gə‘əz name of the Muslim king صبر الدين Ṣabr al-Dīn. On him and his entire name cf. the text on the Muslim invasion of the Abyssinia, written by Maqrīzī in the years 1435–1436, ed. 1790, 16 (text) and 18 (translation); on him and a variant of his name, cf. also the so-called Harar chronicle (an Arabic text on the history of the Walasma’ dynasty) edited (on the basis of a manuscript he copied in Harar in 1926) in Cerulli 1971, 137 (text), 141 and 141 n. 14 (translation; cf. also Wagner 2010, 438b, and Huntingford 1965, 24). He is the eleventh sultan of the Walasma’ dynasty (cf. Marrassini 1993, 51 n. 10 (translation); on this dynasty cf. Cerulli 1971, 135–149, and also Van Donzel 2010, 1083a–1084b).
- 22 Cf. Huntingford 1965, 4.
- 23 See Marrassini 1993, 50 (text), 51 (translation).
- 24 According to Dillmann (1884, 2 (= 1008), 4 (= 1010), 6 (= 1019), and 6 n. 1) the Year of Mercy 516 corresponds to the year 1332/1333 CE. According to Tadesse Tamrat (1972, 138 n. 2), it is the year 1331/1332 CE. For Huntingford (1965, 4, 53 n. 2), the author of the text miscalculated the Year of Mercy, which should be 514, and therefore correspond to 1329 CE. Cf. also Marrassini 1993, 51 n. 4 (translation).
- 25 See Cerulli 1943, 238 n. 2, and *idem* 1968, 31–32. Cf. also Marrassini 1993, 40 (introduction).
- 26 Cf. Marrassini 1993, 39 and n. 12.
- 27 Kropp dates it to the time of Ləbna Dəngəl (r. 1508–1540); for him, the text has been written with the aim to console the king during the Muslim invasion of his time, with the memory of the past victory (cf. Kropp 1985, 58, and Marrassini 1993, 40). Dillmann considers the time of King Galāwdewos (r. 1540–1559) the *terminus post quem* of the text (cf. Dillmann 1884, 6 n. 3; cf. also Marrassini 1993, 40 and n. 6): he interprets the mention (*ibid.* 160, line 6 (text), 161 (translation)) of Tewodros and Galāwdewos as the reference to the two homonymous Ethiopi-

out 'objective data',²⁸ could be dated to the first half of the fifteenth century, approximately one century after the reign of 'Āmda Šəyon.²⁹

This text is commonly identified as a *chronicle*; however, except for few evident historical motifs,³⁰ it has little that could make it classify as a a historiographical work, comparable with the other Ethiopian chronicles.³¹ According to Marrassini, the text may have been originally a kind of a homily to be read to the gathered faithful with the possible aim to counterbalance the bad reputation of King 'Āmda Šəyon in ecclesiastic circles.³²

On the Gadla 'Azqir

The second text which I analysed for the TraCES project was the *Gadla 'Azqir* (hereafter *GA*),³³ in the version critically edited, with an Italian translation, by Alessandro Bausi.³⁴

an kings (r. 1412–1413 and 1540–1559, respectively). As showed later by several scholars (see e.g. Cerulli 1943, 238 n. 2), they are not the kings but the two famous saints, 'amici e cugini della tradizione agiografica' (for this and more details, cf. Marrassini 1993, 40–41).

28 Marrassini 1993, 39.

29 Cf. *ibid.* 42–43.

30 That is the fact of the war itself and the many personal and place names present.

31 On Ethiopic historiography cp. Chernetsov and Red. 2007.

32 We find in the narration frequent exhortations of the author to the 'people of Ethiopia', with the use of the sentence ስምዑ: እንግርክሙ: 'listen, so that I tell you', with an edifying and propagandistic purpose. Again, according to Marrassini, the non-historical character is demonstrated also by a certain confusion and repetition in the sequence of the events narrated (cf. Marrassini 1993, 43–45). On the conflict of the king with the clergy and monks see Marrassini 1993, 44 and n. 1.

33 *CAe* no. 1425; data set DOI: 10.25592/uhhfdm.1504 (last accessed on 3 July 2021).

34 Bausi 2017 (on the basis of twenty-five manuscripts, see below). Bausi also provided the digital transcription of the critical text. Among the previous editions of the *GA* we have the edition and the Italian translation by Conti Rossini 1910, on the basis of two manuscripts, MS Paris, BnF, Éthiopien d'Abbadie 110 (eighteenth century), and MS London, BL, Oriental 689 (fifteenth century). Earlier, Hugo Winckler had produced a German translation (Winckler 1896) on the basis of three manuscripts, MSS London, BL, Oriental 686 (1755/1769), Oriental 687–688 (eighteenth century), and Oriental 689 (fifteenth century). On the *GA*, see also the important contribution of Robin 2010, especially pp. 80–106, offering a detailed linguistic analysis of ethnonyms, personal, and place names of the text (he worked on the edition Conti Rossini 1910), which are compared with the South Arabic epigraphic and Arabic-Islamic sources, and with attestations from the pre-Islamic environment of the kingdom of Ḥimyar. See also Witakowski 2003, 421b–422a.

This is the Ethiopic version of the *Passio* of 'Azqir,³⁵ a Christian saint and martyr of Nağrān,³⁶ transmitted as part of the large canonical-liturgical collection of the *Gadla samā'īāt* ('Acts of the martyrs', lit. 'Combat of the Martyrs'), that is, together with the *Passiones* of other saints venerated in the Ethiopian Church.³⁷

According to the text,³⁸ 'Azqir was a priest who first³⁹ taught Christianity in the town of Nāgrān,⁴⁰ during the time of Sərabḥel Yənkəf,⁴¹ king of Ḥemer.⁴² He was put in jail and, after he performed some miracles, was first lapidated and finally beheaded on 24 Ḥədār⁴³ by the Jews of the place. The events of his martyrdom might have taken place between the years 470–475 CE.⁴⁴

The *GA* is a very short hagiographic text known only in the Ethiopic version.⁴⁵ The mention of numerous toponyms and personal names, whose reliability is supported by epigraphic evidence,⁴⁶ makes the text an unparalleled source of information on the political, economic and religious situation of the

35 **አባቲ**: 'azqir is the Gə'əz form of the saint's name as found in the text (Bausi 2017, 352 § 1 (text edited), 352 § 1,1 (critical apparatus)) and attested in the majority of the manuscripts which contain it. The etymology is uncertain; for a discussion see *ibid.*, 345 n. 27; see also *ibid.* 353 and 353 § 1 n. 2 (translation)). On this personal name, see also Robin 2010, 94.

36 Important town of the Kingdom of Ḥimyar, today in Saudi Arabia.

37 Research on the *Gadla samā'īāt* (*CAe* no. 1493) has been recently conducted by Antonella Brita, under the direction of Alessandro Bausi, in the DFG-funded project SFB 950, 'Manuscript Cultures in Asia, Africa and Europe' (2011–2015 and 2015–2019, now Center for the Study of Manuscript Cultures, CSMC, Universität Hamburg). Cf. Bausi 2019; see also Bausi 2002, 2–17, and Brita 2020, 265–268.

38 As reconstructed by Bausi 2017.

39 He is the first Christian Priest from Nağrān; cf. Robin 2010, 67.

40 **ናገራን**: nāgrān is the Gə'əz word for Nağrān found in the text (Bausi 2017, 352 § 1 (text); see also *ibid.* 353 and 353 § 1 n. 5 (translation)). On this toponym see also Robin 2010, 84–85.

41 **ሰራብሐል**: **ያንክፍ**: sərābḥel yənkəf is the Gə'əz variant of the Arabic Šuraḥbi'īl Yankuf (on that, cf. Bausi 2017, 353 § 1 n. 6 (translation)). For the Gə'əz form attested in the text, see *ibid.* 352, § 1 (text), 353 § 1 (translation). On variants of the second name of the king of Ḥimyar, reconstructed by Bausi as <Y>ənkəf, see *ibid.* 352 § 1.3 (critical apparatus); for an explanation, cf. *ibid.* 343.

42 **ሐሜር**: ḥemer is the Gə'əz form of Ḥimyar; cf. Bausi 2017, 352 § 1 (text), 353 § 1 and n. 7 (translation). On this toponym see also Robin 2010, 96.

43 This date is found in the *Gadla samā'īāt*. On the saint, we have also the short account given in the Ethiopian Synaxarium (*Sənkəssār*), where he is also celebrated on 24 Ḥədār (cf. Colin 1988, 354–357; see also Budge 1928, 275–276).

44 Robin 2010 explains this dating with the mention in the text of King Sərabḥel Yənkəf; for more details see Robin 2010, 67, 85–86. See also Bausi 2017, 341.

45 Cf. Bausi 2017, 341.

46 Robin 2010, 96.

oasis of Nağrān.⁴⁷ It offers direct and reliable references especially to the early Christian context of South Arabia in the second half of the fifth century.⁴⁸

As to the origin of this hagiography, Conti Rossini proposed the hypothesis of an Arabic *Vorlage* of the Ethiopic text, which in turn had derived from a Syriac text composed in Yemen between the sixth and seventh century CE.⁴⁹ The Ethiopic version would have been created only in the fourteenth or fifteenth century. Also Robin seems to tend towards an Arabic *Vorlage* of the Gəʿəz *Passio*,⁵⁰ this latter most probably circulating within the Ethiopian Church already before the fifteenth century. He assumes that the original text had been written in Arabic after the eighth century, and that the author was a native of Nağrān, who had at his disposal, for his narration, archival documents of the time.⁵¹ For Bausi nothing shows a clear and certain Arabic *Vorlage*. He cannot exclude a Gəʿəz redaction on the basis of an Arabic translation, but this would be not the Copto-Arabic of Egypt, but rather a non-Coptic-based Arabic, connected to the cultural environment of the opposite shore of the Red Sea, between the Sinai Peninsula and South Arabia.⁵²

The twenty-five manuscripts of the *Gadla samāʿtāt*, which Bausi used for the critical edition, come from different regions of Christian Ethiopia and Eritrea and were produced in different periods, between the fourteenth and twentieth century, even though the majority is dated to the fifteenth century. The manuscripts are:⁵³

– Berlin, Staatsbibliothek Preußischer Kulturbesitz (SPK), Orientabteilung, Tānāsee 121,⁵⁴ fourteenth century; *GA* on ff. 93ra–94vb;

47 *Ibid.* 80.

48 Bausi 2017, 341.

49 See Conti Rossini 1910, 725. On this point and for some details on Conti Rossini's hypothesis, see Bausi 2017, 343 and n. 11.

50 Hypothesis based on the transcription of some proper names found in the Ethiopic text (on this and more details, see Robin 2010, 80 and n. 133).

51 Cf. Robin 2010, 80–81, 97.

52 This is the case of a group of translations from Arabic concerning the military expedition of King Kāleb in South Arabia. Besides the *Gadla ʿAzqir*, this group of texts includes the *Martyrium of Arethas (Gadla Hirut)*, the *Martyrium of Kāleb (Gadla Kāleb)*, and the *Martyrium of Athanasius of Chysma* (cf. Bausi 2017, 346; Bausi 2016, 515; Bausi 2020, 229). For the *Gadla Hirut* see the critical edition Bausi and Gori 2006; for the *Gadla Kāleb*, see the important information given by Marrassini 2014, 112–113; and also Bausi 2010, appendix.

53 For the sigla used in the critical edition, see Bausi 2017, 347–348. For the tentative *stemma codicum* of the manuscript tradition of the text, cf. *ibid.* 348–349 and 351. For editorial information, cf. also *ibid.* 349–350.

54 The shelfmark refers to the microfilms preserved at Berlin, Six 1999, 86–96.

- CSMC,⁵⁵ AAE-001 (Ethiopia, Təgrāy), fifteenth century; *GA* on ff. 157va–159rb;
- CSMC, DaBan-001 (Ethiopia, Təgrāy), fifteenth century; *GA* on ff. 112rb–113vb;
- CSMC, DaQwe-001 (Ethiopia, 'Amharā), eighteenth century; *GA* on ff. 77ra–78r;
- CSMC, DAS-001 (Ethiopia, Təgrāy), fifteenth century; *GA* on ff. 153va–155vb;
- CSMC, MAA-001 (Ethiopia, Təgrāy), 1755–1769; *GA* on ff. 78rc–79va;
- CSMC, MayBe-001 (Ethiopia, Təgrāy), fifteenth century; *GA* on ff. 79ra–80vb;
- CSMC, MayBe-002 (Ethiopia, Təgrāy), fifteenth century; *GA* on ff. 156rb–158vb;
- CSMC, MaQa-001 (Ethiopia, Təgrāy), fourteenth–fifteenth century; *GA* on ff. 70ra–71rb;
- CSMC, YoKa-001 (Ethiopia, Təgrāy), fourteenth–fifteenth century; *GA* on ff. 61vc–63va;
- EAP704/2/28⁵⁶ (Ethiopia, Təgrāy), fifteenth century; *GA* on ff. 343va–346ra;
- EMLL⁵⁷ 1479 (Eritrea, Šā'dā 'Īmbā Šəllāse), dated to 1459/1460; *GA* on ff. 145va–147vb;
- EMLL 2514 (Ethiopia, Šawā), fourteenth century; *GA* on ff. 62vb–64rb;
- EMLL 2796 (Ethiopia, Wallo), fourteenth century; *GA* on ff. 94rb–97vb, 153ra–vb, 155ra–vb;
- EMLL 6903 (Ethiopia, Šawā), fifteenth century; *GA* on ff. 128ra–129r;
- EMLL 6951 (Ethiopia, Wallo), fifteenth century; *GA* on ff. 83rb–85rb;
- EMLL 6965 (Ethiopia, Wallo), fourteenth century; *GA* on ff. 89va–91rb;
- EMLL 7600 (Ethiopia, 'Amharā), fifteenth–sixteenth century; *GA* on ff. 125ra–126vc;
- EMLL 9185 (Ethiopia, 'Addis 'Ababā), twentieth century; *GA* on ff. 75va–76vb (incomplete: end missing);
- Ethio-SPaRe⁵⁸ KY-001 (Ethiopia, Təgrāy), sixteenth century; *GA* on ff. 79v–82r;
- Ethio-SPaRe UM-018⁵⁹ (Ethiopia, Təgrāy), fourteenth–fifteenth century; *GA* on ff. 204v, 207r–209r;

55 The CSMC shelfmarks refer to the digital copies produced for the SFB 950 'Manuscript Cultures in Asia, Africa and Europe' at Hamburg.

56 Manuscript digitized by M. Gervers in the framework of the project Endangered Archives Programme (EAP) 704, *The Melvin Seiden Award: Digitisation of the monastic archives of Marawe Krestos and Däbrä Abbay (Shire region, Tigray Province, Ethiopia)*, images available at <<https://eap.bl.uk/archive-file/EAP704-2-28>>. For more details Bausi 2017, 348 n. 38.

57 The EMLL shelfmarks refer to the microfilms of the Ethiopian Manuscript Microfilm Library preserved at the Hill Museum & Manuscript Library (HMML), Saint John's Abbey and University, Collegeville, Minnesota, and at the National Archives and Library of Ethiopia (NALA) at Addis Ababā, Ethiopia.

58 The Ethio-SPaRe shelfmarks refer to the digital copies produced for the ERC-funded project *Ethio-SPaRe: Cultural Heritage of Christian Ethiopia. Salvation, Preservation, Research* at Hamburg (of which I was also part from December 2009 to May 2015); the descriptions and some of the image sets are now also available on the BM portal; see <<https://betamasaheft.eu/manuscripts/ESky001>>.

59 Cp. <<https://betamasaheft.eu/manuscripts/ESum018>>.

- London, BL, Oriental 686,⁶⁰ 1755/1769; *GA* on ff. 71vb–72vc;
- London, BL, Oriental 687–688,⁶¹ eighteenth century; *GA* on ff. 107va–108vc;
- London, BL, Orient. 689,⁶² fifteenth century; *GA* on ff. 94va–96va;
- Paris, BnF, Éthiopien, d'Abbadie 110,⁶³ eighteenth century; *GA* on ff. 180va–182rc.

Some aspects of the annotation experience

I carried out linguistic annotation with the help of the GeTa annotator.⁶⁴ Due to peculiarities of the Gə'əz language, I frequently needed to implement disambiguation and manual corrections at the level of the 'transliteration adjustment',⁶⁵ 'tokenization'⁶⁶ and at the step of the 'linguistic annotation', by the assignment of the parts of speech.⁶⁷ The tool allows bulk changes to optimize the time of the linguistic annotation.⁶⁸ However, most features or corrections

- 60 Wright 1877, 166–169, no. CCLVII; images available at <http://www.bl.uk/manuscripts/Viewer.aspx?ref=or_686_fs001r>.
- 61 Wright 1877, 169–170, no. CCLVIII; images available at <http://www.bl.uk/manuscripts/Viewer.aspx?ref=or_687!688_f001r>.
- 62 Wright 1877, 159–161, no. CCLIII; images available at <http://www.bl.uk/manuscripts/Viewer.aspx?ref=or_689_fs001r>.
- 63 Cf. Chaîne 1912, 68–71, Conti Rossini 1914, 175–177 no. 164.
- 64 The GeTa tool allows a multi-level annotation of Ethiopic texts. The morphological annotation is the main level ('deep annotation' in the project's terminology), which allows to assign labels ('tags') to minimal morphological units ('tokens'). The labels include the part of speech alongside numerous further possible grammatical features. With the tool, it is also possible to provide lexical information by linking each word to the corresponding online dictionary entry (see n. 4 above), to mark up named entities (e.g. persons, places, dates, titles of work, offices, by linking to the BM authority files), to mark-up the text structure (chapters, verses, lines, sentences) and to introduce basic editorial remarks. For more details on the various annotation levels of the GeTa tool, see Sokolinski 2019, 4.
- 65 The tool carries out automatic transliteration of the *fidal* text; the *fidal* and the transliterated text are aligned in the GUI. The transcription must be then adjusted and corrected manually (see also Sokolinski 2019, 17–18); in particular, the corrections involve the gemination and the deletion (or insertion) of the sixth-order vowel (see Hummel, Pisani, and Vertan 2018, 100–102).
- 66 Each graphic unit is split (wherever necessary) into its smallest morphological units ('tokens'), to which one can assign a Part of Speech ('PoS'; see Sokolinski 2019, 15–17).
- 67 The tag set consists of 33 different PoS tags, each with a set of possible grammatical features (see Hummel 2017 and an updated version in Sokolinski 2019, 5–6). For an overview and development of the tag set, and for an introduction to some annotation principles, see Hummel and Dickhut 2016.
- 68 The annotator can choose between applying a change (whether a correction or an assignment of a feature) to a single occurrence (with the function 'local') or in bulk (with the function 'global'); see Sokolinski 2019, 32.

cannot be applied automatically. Only few PoS tags (such as ‘Punctuation’, the ‘Affirmative Particle’ ቶ -g^wā, the ‘Quotative Particle’ አ -’a, the ‘Conjunction’ ወ wa-, the ‘Independent Personal Pronoun’ አነ: ’ana, some verbs at perfect, third masculine singular, in the form ነገረ: *nagara*, the cardinal numerals with the logogram) do not require disambiguation. Wherever disambiguation is necessary, decisions have to be taken case by case, though at different levels of complexity.

As already mentioned, most frequently manual correction of transcription is needed for the gemination of a consonant and the disambiguation of the sixth-order vowel ə between consonants, features not evident in the Gə’əz script (*fidal*), but reflected phonetically.

Obviously, I needed to geminate a consonant in all the verbs in the imperfect indicative, a verbal mood which in Ethiopic is characterized by the reduplication of the second radical (except for verbs from middle-laryngeal consonant root). For example, the tool would transliterate ይነብሩ: as *yəṇabəru*, which has to be corrected as *yəṇabbəru*, to reflect the verb form imperfect, third person masculine plural (‘they stay/will stay, ‘they remain/will remain, ...’). The gemination of the second consonant in verbs was also implemented frequently in the perfect in the derived verb form (or stem) I.2, or intensive form, like the verbs (present in the *GA*) መጠዉ: *maṭṭawu*⁶⁹ (‘They granted, consigned, ...’), ጸለዮ: *ṣallaya*⁷⁰ (‘he prayed, supplicated, ...’). Of course, I had to manually implement the gemination of the second radical also in the other tenses and moods, as well as in nouns deriving from the perfect in this stem.

Sometimes I had to disambiguate between verbs which, judging by the mere spelling, could be annotated both as imperfect and as subjunctive. Such was the case of the several imperfects and subjunctives in the passive simple form III.1, which have the same Ethiopic characters, but which differ phonetically and thus in the transcription. Before correcting the transcription I had to carry out a proper morphological and syntactic analysis, and duplicate the second radical only in the imperfect forms. For example, the verb (in *AS*), ይጥአመን: ⁷¹ should be translated as ‘non era sicuro’,⁷² it has been therefore annotated, according to the textual context, as an imperfect, and transcribed with gemination, *yət’amman*, but its *fidal* form could also correspond to a subjunctive (which would then be transcribed *yət’aman*).

69 Bausi 2017, 378, § 37 (text), 379 (translation).

70 E.g. Bausi 2017, 354 § 5 (text), 355 (translation); 364 § 17 (text), 365 (translation).

71 ይጥይመን: from ተአምነ/ተአመነ, with the meaning of ‘be persuaded, believe, be faithful, be secure trust, ...’ (cf. Leslau 1989, 135).

72 Marrassini 1993, 70, line 14 (text), 71 (translation).

Concerning the seemingly epenthetic vowel ə,⁷³ many were the cases where I had to interfere. For example, in common nouns with a final consonant in the sixth order, as a general rule, the epenthetic vowel is present at the end if followed by pronominal suffixes in the first and second persons. Therefore I needed to correct (in *AS*) the automatic transliteration in words such as ንጉሥ: *nəguś* 'king', and the noun in the plural internal number ሰራዊት: *sarāwit* 'troops', inserting ə before the pronominal suffixes of first and second person, as in ንጉሥ: *nəguś* + የ *ya* = ንጉሥየ: *nəguśəya* ('my king'); ሰራዊት: *sarāwit* + የ *ya* = ሰራዊትየ: *sarāwitəya* ('my troops'). However, wherever these nouns did not have any token following them, I needed to delete the sixth-order vowel at the end.

As a last example, I bring here a case of disambiguation which requires in my opinion more attention at the syntactical level. In the part of the *AS* which I annotated, I encountered the Gə'əz word unit, ኢይትመየጥ: 'iyətməyyat,⁷⁴ which consists of two tokens, ኢ. 'i- (negative particle) and ይትመየጥ: *yətməyyat* (verb). When I first annotated the second token, I assumed that, since it has the prefix ይ *yə-* of the third person, it is an imperfect third person singular masculine. I was so sure that I applied this annotation to all the five occurrences. Only after a thorough analysis of the context, I realized that in these cases the *yə-* is not the prefix of the third person (*yə-*) but rather the first person prefix 'ə-, with a glide emerging as a result of the dissimilation with the negative particle 'i-. The form is therefore actually first person singular communis, and, in the context where this phrase occurs, it has the meaning of 'I will not come back', being this part of the direct speech of King 'Āmda Seyon.

Some linguistic elements from the Chronicle of 'Āmda Şəyon and the Gadla 'Azqir

While the assignment of PoS and their features was mostly carried out according to morphological criteria, in several cases a syntactic analysis is also involved and required. This is especially valid for the annotation of the 'Common noun', especially for its additional features of 'Gender' and 'Number'. As a matter of fact, the 'Gender' in our annotation system can be determined by the value 'Pattern', when there is a binary opposition between a feminine and a masculine based on the same root, by the value 'Nature' when the binary opposition exists on a lexical level, and/or also by the value 'Syntax', when

73 On the epenthetic ə in transcription see also Bulakh 2016, 116–128.

74 *Ibid.* 72, line 17 (text), 73 (translation); 80, line 10 (text), 81 (translation); 82, line 1 (text), 83 (translation); 90, line 4 (text), 91 (translation); 92, line 11 (text), 93 (translation).

the gender is deduced from the agreement with a verb, pronoun, or adjective within the same clause or sentence. As a rule, established during our work, the gender of a noun already marked by pattern cannot be marked at the same time by nature, while the value ‘Syntax’ can be applied in combination with each of them. It is also possible that the gender of a noun is marked only by a syntactic agreement. This happens when we have nouns that can be both in feminine and in masculine, according to the dictionaries, that is, nouns which have no specific gender based on formal or natural criteria. For these nouns, the value ‘Syntax’ remains the only available possibility to specify their gender during the annotation process. In the Gə’əz lexicon there are in fact many nouns that can be in both gender, such as for example **ሀገር**: *hagar* (‘city, town, province, country, ...’).⁷⁵ In the text of the *AS*, within the portion of the text which I fully annotated, for the majority of the occurrences⁷⁶ this noun has been annotated with the gender ‘Unmarked’, meaning that it does not have a syntactic agreement in the phrase or sentence where it occurs. Yet, in five cases, the noun *hagar* has been instead marked as feminine by agreement, as in:

ወአመዝበርከዋ፡ ለዐባይ፡ ሀገር፡ እንተ፡ ስማ፡ ኢፋት፡⁷⁷

*wa-’amazbarkəw-ā la-’abbāy hagar ’ənta səm-ā ’ifāt*⁷⁸

‘and I destroyed a big country of which its (her) name [is] ’Ifāt.’

The word *hagar*, annotated as PoS ‘Common Noun’, is here feminine due to the agreement with the adjective⁷⁹ **ዐባይ** ‘*abbāy*, which by ‘Pattern’ is the feminine form of **ዐቢይ**: ‘*abiy* (‘big’), but also by the PoS ‘Relative Pronoun’ ‘*ənta*, singular feminine, as well as by the ‘Pronominal Suffix’ **ሃ** -*hā*, in the third person singular feminine, which becomes -*ā* as it is attached to the noun **ስም**: *səm* (**ስማ**: *səm-ā*). A second example of the word *hagar* which by ‘Syntax’ has the feminine gender is the following:

ወተዐየነ፡ ጎበ፡ አሐቲ፡ ሀገር፡ እንተ፡ ስማ፡ ደስ፡⁸⁰

wa-ta ’ayana ḥaba ’ahatti hagar ’ənta səm-ā das

‘And he (the King) camped in one country, the name (her name) of which [is] Das’.

In this sentence, the word *hagar* is thus feminine due to the agreement with the ‘Cardinal numeral’ feminine, **አሐቲ** ‘*ahatti*, with the ‘Relative Pronoun’,

75 Cf. Dillmann 1865, 20 (and online at <<https://betamasaheft.eu/Dillmann/lemma/L46836496ad7b4239855ba274c5a77199>>).

76 Alone and in combination with other tokens or parts of speech.

77 Marrassini 1993, 56, line 4 (text). The translation by Marrassini is ‘ed ho devastato un grande paese che si chiama Ifāt’ (*ibid.* 57).

78 Here and in the following examples, I give the transcribed text (manually corrected), with the tokenization as it was in the linguistic annotation.

79 Annotated, according to the TraCES tag set, as ‘Common Noun’.

80 Marrassini 1993, 96, lines 16–17 (text); the translation by Marrassini is: ‘e si accampò in un paese di nome Das’ (*ibid.* 97).

singular feminine, **እንተ**: 'ənta, and with the 'Pronominal suffix' feminine **ሃ-hā**, attached to the noun **ስዎ**: səmə.⁸¹

Only in one occurrence within the *AS*,⁸² the noun *hagar* was marked with the gender 'Masculine' determined by the value 'Syntax', that is, by the agreement with the adjective before:

ወሐሩ፡ ውስተ፡ ካልእ፡ ሀገር፡⁸³

wa-ḥoru wəsta kālə 'hagar

'and [they] went to another country (region)'.

The adjective is **ካልእ**: *kālə* (feminine **ካልእት**: *kālə't*), annotated as PoS 'Common noun', with the additional grammatical features of 'Gender' masculine and 'Number' singular (both determined by the 'Pattern').

In the text of the *GA* the noun *hagar* occurs four times, always without a syntactic agreement, and consequently annotated with the gender 'Unmarked'.

In the *AS*, I observed the peculiar case in which a noun presents both genders, feminine and masculine, based on two different syntactic agreements. This happens in the following sentence:

በከመ፡ ዜነዉ፡ ቅዱሳት፡ መጻሕፍት፡⁸⁴

ba-kama zenawu qəddusāt mašāḥəft

'As the sacred books narrated'.

The 'Common noun' **መጻሕፍት**: *mašāḥəft* ('books'), with the number, by pattern, of an internal plural (singular **መጻሕፍ**: *mašəḥəf*), has here the gender marked by two opposite agreements: the feminine, given by the adjective **ቅዱሳት**: ('sacred'), external plural feminine of **ቅዱስ**: *qəddus*, and the masculine, given by the verb **ዜነዉ**: *zenawu* ('(they) narrated'), perfect, third person plural masculine.

Another peculiar case of double agreements, both for the gender and for the number, appears in the following sentence from the *AS*:

ውስተ፡ ክሉ፡ ምድረ፡ ተንባላት፡ እለ፡ ይሰመዖ፡ ክልኅረ፡⁸⁵

wəsta kʷəll-u mədra tanbālāt 'əlla yəssammayā kʷəlgora

'In all lands of the Muslims, which are called Kʷəlgora'.

- 81 Other occurrences where the word *hagar* occurs with the gender feminine by agreement are the following ones: *ibid.* 68, line 13 (text), 69 (translation); *ibid.* 68, line 14 (text), 69 (translation); *ibid.* 76, line 12 (text), 77 (translation).
- 82 Within the portion of the text completely (and manually) corrected.
- 83 Marrassini 1993, 66, line 2 (text); the translation by Marrassini is: 'se ne andarono in un'altra località' (*ibid.* 67).
- 84 *Ibid.* 62, lines 10–11 (text); the translation by Marrassini is: 'come narrano le Sacre Scritture' (*ibid.* 63).
- 85 Marrassini 56, lines 7–8 (text); the translation by Marrassini is: '... per tutte quelle terre dei musulmani che si chiamano Kʷəlgorā, ...' (*ibid.* 57).

Here, we see the word **ግድር**: *mādr* in construct state **ግድረ**: *mādra* ('land, territory, ...'), annotated as PoS 'Common Noun'. Concerning its number, *mādra* has been annotated as a singular, both by its 'Pattern' and also by its 'Syntax', this last due to the agreement with the adjective **ኩሉ**: *kʷəllu* ('all'); the word *kʷəll-u* has been annotated as two tokens, namely *kʷəll-*, as PoS 'Pronoun of Totality Base', and *-u* as PoS 'Pronominal Suffix' masculine singular. Yet, *mādra* is also plural by the agreement with the imperfect, third person feminine plural, **ይሰመዩ**: *yəssammayā* ('(which) are called'). This noun has thus, in this sentence, a double number agreement. Concerning the gender, the word *mādra*, which can be both feminine and masculine according to the dictionary,⁸⁶ has in this sentence two different syntactic agreements: masculine through the adjective *kʷəllu*, in particular through the pronominal suffix *-u* attached to *kʷəll* (*kʷəll-u*), and feminine through the verb *yəssammayā*.

The same phenomenon of the double gender agreements of a noun occurs also in the *GA*, in the sentence:

አንተ፡ አዝዝ፡ የግዲ፡ ይትረጎጥ፡ እሉ፡ ጥኃት፡⁸⁷

'*anta* 'azzəz yomə-ni yətraḥawā 'əllu hoḥāt.

'You, also today, order that these doors open'.

Here, we see that the word **ጥኃት**: *hoḥāt* ('doors'), 'Common noun' with the number (by pattern) of an internal plural (singular **ጥኅት**: *hoḥət*), has two gender agreements: the word is in fact feminine by the verb **ይትረጎጥ**: *yətraḥawā*, subjunctive, third person plural feminine, and masculine by the 'Demonstrative Pronoun' **እሉ**: 'əllu, masculine plural. Bausi already signals this 'problematic' phenomenon in his edition, explaining it as a possible clue of a calque on an Arabic text where the agreement between the internal plural and a verb in the singular creates this kind of disharmonies.⁸⁸

Concerning the syntactic group of a substantive and its adjective, the *AS* shows some cases where only one element of the group, although both are direct object of the verb in the sentence, presents the ending for the accusative *-a*, while the other, in particular the adjective, does not have it:

ወነጎእኩ፡ እምነገ፡ ወርቀ፡ ወብሩረ፡ ወአልባሰ፡ ቀጠንት፡ ወዕንቄ፡ ክቡረ፡⁸⁹

86 See Dillmann 1865, 217 (and online at <<https://betamasaheft.eu/Dillmann/lemma/L8b93b042451e4bbd8bb7de567f7a32da>>).

87 Bausi 2017, 354 § 5, 356 § 5 (text); the translation by Bausi is 'tu anche oggi da ordine che si aprano queste porte' (*ibid.* 355, § 5).

88 Cf. *ibid.* 355 n. 14 (translation).

89 Marrassini 1993, 56, lines 4–5 (text). He translates: 'e ho preso da esso oro e argento e vesti fine e gemme preziose' (*ibid.* 57). The critical apparatus from Marrassini's edition shows that only a manuscript, the manuscript with the siglum B (= Bodleian Bruce 88) has the adjective 'fine' with the accusative case, i.e. **ቀጠንተ**: *qaṭṭanta* (cf. *ibid.* 56, n. 14 (critical apparatus)). It should be noticed that in Kropp

wa-našā'ku 'əmnē-hā warqa wa-bərura wa-'albāsa qaṭṭant wa-'ənq'wa kəbura
 'and I took from it (the country of 'Ifat) gold and silver and fine clothes and pre-
 cious pearl'.

In this sentence, we have the substantive and his attribute (both annotated as PoS 'Common Noun') **አልባስ: ቀጠንት**: *'albāsa qaṭṭant* ('fine clothes'), where-
 in **አልባስ**: *'albāsa* ('clothes') is the substantive, internal plural of **ልብስ**: *ləbs*,
 and **ቀጠንት**: *qaṭṭant* ('fine') is the adjective, internal plural of **ቀጠን**: *qaṭṭin*.
 Although both are object of the verb **ነሳሕኩ**: *našā'ku* ('I took'), only the first
 element of the group, i.e. *'albāsa*, shows the ending of the accusative case;
 the adjective *qaṭṭant*, hence, has been annotated, according to our annotation
 system, within the grammatical category of 'Case', with the specific feature
 of 'Accusative zero' ('Accusative Ø').⁹⁰ In the same sentence the second group
 'substantive and adjective **ዕንቁ: ክቡረ**: *'ənq'wa kəbura* ('precious pearl') shows
 instead, as usually it occurs, both elements with the accusative case.

A second sentence with the same occurrence and same group of adjective
 and substantive, i.e. *'albāsa qaṭṭant*, is the following:

ወሰበ: ርእዩ: ውእተ: ወርቀ: ወብሩረ: ወአልባስ: ቀጠንት:⁹¹

wa-soba rə 'əyu wə 'əta warqa wa-bərura wa-'albāsa qaṭṭant

'And when (they) saw that gold and silver and fine cloths'.

Here we see again that within *'albāsa qaṭṭant*, although both elements are ob-
 ject of the verb **ርእዩ**: *rə 'əyu* ('they saw'), only the first word, the substantive
'albāsa, has the case accusative marked by the ending *-a*. Thus, I annotated
 the adjective *qaṭṭant* as a 'Common Noun' with the case 'Accusative zero',
 deciding to read it as an omission of the ending in the second element.⁹² Sev-

1994, I, 5 (text), the text presents **ወአልባስ: ቀጠንተ**: *wa 'albāsa qaṭṭanta*, wherein
 the adjective *qaṭṭanta* is also, as the substantive *albāsa*, at the accusative case. In
 the critical apparatus of Kropp, we see four manuscripts, with sigla A (= d'Abbadie
 118), D (= BnF d'Abbadie 52), L (= BL Oriental 821) and P (= Éthiopiens 143), con-
 taining the variant **ቀጠንት**: *qaṭṭant* (cf. Kropp 1994, I, 5 n. 25 (critical apparatus)).

90 The 'Accusative zero' case for a direct object with zero ending was only introduced
 in the GeTa tag set during the very last months of the project; so was the 'Construct
 zero' (or 'Construct Ø') feature for the category 'State', assigned when the first
 noun in a construct state, bound to the following one in a genitive relationship, has
 no grammatical marker *-a* (cf. Sokolinski 2019, 5, Table 1, and 45, 49 'Glossary of
 terms').

91 Marrassini 1993, 78, lines 13–14 (text). He translates: 'Quando videro quell'oro,
 quell'argento e quelli vesti fine...' (*ibid.* 79). In Kropp's edition, the text has in-
 stead both elements in accusative case: **ወአልባስ: ቀጠንተ**: (cf. Kropp 1994, I, 17,
 lines 7–8 (text), while the critical apparatus reports that the manuscripts with the
 sigla A L P (see above n. 89) omit the word **ቀጠንተ**: (cf. Kropp 1994, I, 17 n. 19).

92 In the part of the introduction to his critical edition dedicated to the linguistical
 peculiarities found in the text (cf. Marrassini 1993, 17–21, in particular p. 20),

eral other examples with the same *fidal* words showing this phenomenon⁹³ are found elsewhere in the *AS*.⁹⁴

A peculiar grammatical phenomenon which occurs in the *GA* is illustrated by the sentence:

ወተከለ፡ ጎይመተ፡ ምጽላየ፡ ወግዕተበ።⁹⁵

wa-takala ḥaymata məṣlāya wa-mā 'taba

‘and (he) planted the tent of the oratory and the sign (of the cross).’

The two words ጎይመተ፡ ምጽላየ፡ *ḥaymata məṣlāya* (‘the tent of the oratory’) are in a genitive construction, where *ḥaymata* is the head noun and *məṣlāya* is a dependend noun. In this construction we note that also the word *məṣlāya* is in the accusative case, with the ending *-a* of the accusative, even though it is not the object of the verb, as the head noun *ḥaymata*. If we observe the variants reported in the critical apparatus in Bausi’s edition, we realize that this grammatical peculiarity is attested in most of the manuscripts.⁹⁶

Marrassini also signals, among other features, similar (but not identical) phenomena of some nouns. One is for instance the group ሐሳዌ፡ ነቢይ፡ *ḥassāwe nabiyy* (*ibid.* 60, lines 1–2 (text)), with translation (*ibid.* 61) ‘bugiardo di un profeta’; *ibid.* 90, line 13 (text), with translation (*ibid.* 91) ‘falso profeta’), in which the attribute ሐሳዌ፡ *ḥassāwe* ‘false’ is in construct state with the substantive ነቢይ፡ *nabiyy* (‘prophet’), as first element (head noun) of the genitive construction. Another peculiarity is in the group መንፈስ፡ ቅዱስ፡ *manfas qəddusa* (*ibid.* 50, line 6 (text), 51 (translation)), where only the attribute ቅዱስ፡ *qəddus* ‘saint’ shows the case accusative *-a*, i.e. ቅዱስ፡ *qəddusa*). This reading, despite occurring only in the manuscripts B and L (= Bodleian Bruce 88 and BL Oriental 821), has been accepted by Marrassini as *lectio difficilior* and thus as reading of the critical texts.

- 93 Kropp in the introduction to his critical edition, concerning the linguistical variants of the manuscript with his siglum O (= Bodleian Bruce 88), signals the ‘häufigen Wendung’ in this MS of አልባስ፡ ቀጠንት፡ ‘*albās qaṭṭant*, wherein none of two elements, noun and attribute, has the accusative ending; besides, he signals instead the presence, in other manuscripts, of the variant አልባስ፡ ቀጠንት፡ ‘*albāsa qaṭṭant*, behaving for him as a genitive construction, where the second element loses the accusative ending (cf. Kropp 1994, I, xx).
- 94 Cf. Marrassini 1993, 64, lines 18–19 (text), 65 (translation); 66, lines 7–8 (text), 67 (translation); 78, lines 12–13 (text), 79 (translation); 184, line 20 (text), 185 (translation). This exact expression is also found in other texts, suggesting that it may be possible to interpret it as a set phrase (see <<https://betamasaheft.eu/Dillmann/lemma/L8c2808dce21e475f8671a518de83e2a3>>).
- 95 Bausi 2017, 352 § 1 (text); the translation by Bausi is ‘e piantò la tenda dell’oratorio e il signacolo (della croce)’ (*ibid.* 353 § 1 (translation)).
- 96 Cf. *ibid.* 352 § 1.3 (critical apparatus). An exception is the manuscript with the siglum R (= MS EAP704/2/28), in which the noun is written as ምጽላይ፡ *məṣlāy*. It is also possible that we are dealing with two coordinate nouns: ‘he placed the tent, (that is), the oratory’. In this case, the accusative case is in accordance with the rules of the grammar.

Concerning the verbs, and in particular concerning the use of the subjunctive, especially in final clauses, in the *AS* the subjunctive is generally used with the conjunction **ከመ**: *kama* before it, or alone with an exhortative meaning. However, we find, at the very beginning of the text, the peculiar use of a phrase with an exhortative value, consisting of the conjunction *la-* followed by the verb in the subjunctive. It is the case of **ለይስአ**: *layəs ʿal* (tokenized *la-yəs ʿal*) ‘he should ask’,⁹⁷ where **ለ** *la-*, with the function of a conjunction,⁹⁸ is followed by **ይስአ**: *yəs ʿal*, subjunctive, third person masculine singular. This construction, i.e. *la-* plus a subjunctive (*la-yəqtəl*), used in the main clause with an exhortative meaning, is a phenomenon known already from the Aksumite period of Old Ethiopic.⁹⁹ We also see that in the part of the annotated text of the *AS*, this construction is found only in this specific case, that is, within and as part of a sentence taken from the biblical *Epistle of James*¹⁰⁰ (James 1:5), and this might maybe suggest only something about the *Vorlage* of the Biblical book used by the author of the *AS* for his specific quotation.¹⁰¹

Concerning the category of the particles, we see in the text of the *AS* the general use of the ‘Quotative Particle’ **አ** - *a* attached to a noun, a verb, but also to a preposition, within a sentence quoted and taken from other sources, typically biblical texts. We have also a large use of the PoS ‘Other particles’ **ሂ**

97 Marrassini 1993, 50, line 8 (text), 51 (translation). Marrassini’s translation is: ‘la domandi’. The entire proposition is: በከመ፡ ይቤ፡ ያዕቆብ፡ ሐዋርያ፡ እመቦ፡ ዘጎጥአ፡ ለጥበብ፡ ለይስአ፡ ጎበ፡ ወሃቤ፡ እግዚአብሔር፡ ዘይሁብ፡ ለኸሉ፡ በስፉሕ፡ ወኢይትዔየር፡ (*ibid.* 50, lines 7–9 (text)) ‘Come ha detto l’apostolo Giacomo: ‘Se c’è chi manca di Sapienza, la domandi al Signore generoso, che dona a tutti con sincerità e senza rinfacciare.’ (*ibid.* 51 (translation)).

98 The enclitic particle *la-* is one of the numerous cases in which the annotator needs to disambiguate by assigning the correct PoS, as it can be both the PoS ‘Preposition’, if followed by a noun (then with the further feature of ‘Nominal Case’) or a pronoun (with the further feature of ‘Pronominal Case’), and the PoS ‘Conjunction’ (without additional features), if followed by a verb. See the lemma **ለ** *la-* in the *Lexicon* by Dillmann 1865, 22–24 (see also the online version <<https://betamasaheft.eu/Dillmann/lemma/Le4d650c370464996939e7bfb43dd6444>>), where Dillmann also distinguishes the double use of *la-*, as ‘praepositio inseparabilis’ and as ‘conjunctio inseparabilis (sicut ∪ Arabum), c.c. subjunctivo verbi, nota jussivi vel cohortativi’.

99 See, for instance, Tropper 2002, 193. See also Weninger 2001, 176–180, 338 on the possible Arabic influence in the use, in final sentences, of *la-* plus subjunctive in post-Aksumite period.

100 On the *Epistle of James*, cf. the critical edition Hofmann and Uhlig 1993. On the specific quotation (James 1:5) in *AS*, cf. in particular p. 213. On various hypotheses on the *Vorlage* of this book, cp. in particular *ibid.* pp. 32–41.

101 For other morphological and syntactic peculiarities, concerning the verbs found in the *AS*, see Marrassini 1993, 20.

-hi, used as particle suffixed to the nouns, some personal, demonstrative and interrogative pronouns, ('and also, even, ...') and also of *z-ni* ('even, again, ...'), that occurs also attached to the nouns by also to personal independent pronouns.

Conclusions

In the present paper I tried to report on only very few of the linguistic aspects and elements emerged from the annotation of two texts during my work in the TraCES project. The texts, the *AS* and the *GA*, belong to two different categories of the Ethiopic Christian literature: the very long composition of the *AS*, revolving around the pious and valorous king 'Āmda Šəyon, 'hero' who for divine power defeats the rebel and infidel Muslims, and the *GA*, the very short hagiography around the 'hero' 'Azqir who fights and goes to his death for the Christian God against his Jewish persecutors. Authors and times of both compositions are also very divergent, with events of the first text taking place in Ethiopia during the fourteenth century, while the second ones happening in South Arabia during the fifth century. The *AS* is an original Gə'əz text, written during or soon after the 'Āmda Šəyon's ruling, and circulating in Ethiopia already before the sixteenth or seventeenth century, as the oldest manuscript copy of the text shows. The *Gadl* is an Ethiopic translation, made probably from an Arabic model, and transmitted through the Ethiopic manuscripts of the *Gadla samā'tāt* already during the fourteenth century.

The examples presented above are for the moment, single and isolated, and therefore cannot be used to advance conclusive consideration for the Ethiopic language as such. Proper linguistic analysis and annotation of other texts, of various types and periods, with the acquisition of new elements, are thus a fundamental tool—and a *desideratum*—in order to get new knowledge of the Gə'əz language.

Yet I believe that, even at this stage, meaningful observations can be made. The first applies to the process of annotation itself. My experience has shown that a fully automated process of transcribing Gə'əz texts with the help of a computer application is at this stage impossible: the peculiarities of the language and the script, especially the gemination of a consonant and the sixth-order vowel ə between consonants, make the manual disambiguation a necessary requirement.

Another observation refers to the distinction between the morphological and syntactic analysis. As it has been shown, in many cases features (especially gender and number of common nouns) may not be assigned on a pure morphological basis, requiring a thorough syntactic analysis and understanding of the agreement in the clause or sentence. In the example I provided, the noun

hagar, which is one of the words with both genders, according to the dictionary, was annotated as unmarked for gender in most occurrences in the *AS* (and everywhere in the *GA*), yet in five cases in the *AS* it has a feminine syntactic agreement. And this can suggest something about a certain preference of the use of this noun by the author of this text, or during the period when this text was created.

Interesting are also the cases of double gender and number agreements. Concerning the one case of double gender of a noun in the *GA*, Bausi speaks of a ‘very problematic’ phenomenon, probably a calque loaned during the translation from a supposed Arabic model. Yet, this phenomenon is even more peculiar and ‘problematic’ if we consider that it is found also in the text of the *AS*, which has an indigenous Ethiopian origin, albeit its composition most likely took place during or soon after the fourteenth century, the same period in which the translation from Arabic of the *GA* was perhaps realized, as it happened for many other texts of the Ethiopian Church.

Other interesting phenomena are related to some groups of substantive-adjective in the text of the *AS*, groups which are syntactically object of the verb, and where, in particular, we observe the absence of the accusative marker in the adjective. On the other hand, in the text of the *GA*, we observe the accusative ending attached not only to the head noun but also to the dependent noun within a group of nouns in genitive construction.

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Minbar, Shawl or Teeth? **Triangular Tables in Arabic Manuscripts**

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Tables (*ġadāwil*, sg *ġadwal*) are fairly common in Arabic technical and scientific manuscripts. Triangular tables are a particular case that results from the reduction of orthogonal arrays under particular circumstances. This contribution focuses on two case studies—a table of comparative chronology and one for the combination of logical propositions—and illustrates some peculiar features of triangular tables and their use, offering also their edition and translation.

The presence of tables (*ġadāwil*, sg *ġadwal*) in Arabic scientific and technical manuscripts is not exceptional.¹ Tables represent a formidable tool to arrange materials and contents in a synthetic graphical form, conveying complex relations at a first glance. A table is not just a geometrical layout to display information, but a way to organize it in a relational way.

Simple one-dimensional tables have a single set of elements in the header row that labels the contents of the columns underneath it. In such tables, the contents of the cells in a row are related to the same object (for instance, a table that lists name and age of a number of people). Two-dimensional tables express a more articulated level of relation. These arrays have two sets of elements, one in the header row and the other in the header column, and the resulting combined values are uniquely related to a single cell.

In Arabic manuscript tradition, two-dimensional (lookup) arrays usually take the form of an orthogonal table, with only the size of the page and the content of the cells to limit the number of rows and columns. In order to help the eye of the reader to follow a particular row or column, the text within the cells can be written along the diagonal, with the possibility to create zig-zag patterns. The same purpose is behind the use of different coloured inks. Chromatic variety and direction of the writing are often used in combination in order to create highly refined decorative effects on the page, in a magistral combination of aesthetic and functional aspects.

* هذا المقال هدية للصادق الكريم الدكتور يحيى بمناسبة عيد ولادته الخمس وسبعون
Restrictions and difficulties in accessing sources and materials have been even more bitterly felt during the pandemic. Writing this paper was possible thanks to the generosity of collectors and institutions that openly shared their materials; one can only hope that more and more will follow suit. Unless otherwise indicated, the translations are mine.

1 The entry 'Djadwal' in the second edition of the *Encyclopaedia of Islam* deals solely with magical squares, see Graefe et al. 1965.

All these features—the shape, the structure, the layout and even the decoration of a table—are meant to convey the relation between the two sets of elements in the headers,² and each particular kind of interaction between the sets of elements has its most suitable and ergonomic way to be displayed.

Triangular tables represent a peculiar way of expressing the interaction between form and content. These are a particular case of the two-dimensional table that takes the shape of a right-angled triangle, with the cells along the hypotenuse creating the characteristic zig-zag line. These tables can be oriented in different directions, and the position of the right angle—either in the upper or in the lower part—may convey different overall impressions and produce an association with different objects meant to recall this shape. The two case studies that follow illustrate the different possibilities to arrange contents provided by this particular kind of array. The triangular tables presented here have been collected in the course of research dedicated to other topics. The characteristic shape caught my attention and it is, in fact, the most striking feature that these different tables have really in common. Their content, logic arrangement, and design show considerable differences depending, on the one side, upon the information they convey and, on the other, upon the overall material dimension and quality of the manuscript.

1. Comparative chronology

The first example of such triangular table is a display of comparative chronology. It is included in MS Aix-en-Provence, Bibliothèque Méjanes, 1347 (1212) f. 7v (see fig. 1). The manuscript contains an incomplete copy of the *Ḥulāṣat al-siyar fī bayān ibtidā' al-'ālam wa-ba'd aḥwāl ḥayr al-baṣār* ('Epitome of the Lives of the Prophets: the Beginning of the World and Some Circumstances in the Life of the Best of Mankind'), a universal history and a biography of the Prophet Muḥammad, composed by Muḥammad Bīk al-Hindī later called al-Makkī for taking up residence in Mecca (tenth century AH/sixteenth century CE).³ An ownership note sets the *terminus ante quem* for the copy in the year AH 1109/1697–1698 CE.

In the course of a discussion of the different opinions about the years that elapsed between the lives of different prophets (Adam, Alexander, Noah) present in various sources and traditions (Christians, Muslims, a number of

2 On the use of tables and tree diagrams in Galenic summaries, with an analysis of the relation between form and content, see Raggetti 2020, 152–175.

3 See Ministère de la culture et de la communication 1902, 82 (short description by M. Gaudefroy-Demombynes; see also <<https://ccfr.bnf.fr/portailccfr/ark:/06871/004D40040431>>) and *Bibliothèque Méjanes*, no. 24. Another copy of the text is mentioned in Kafait Ullah Hamdani 2018, 27–29. This study suggests Muḥammad Bīk b. Yār Muḥammad al-Naqṣabandī as the name of the author.

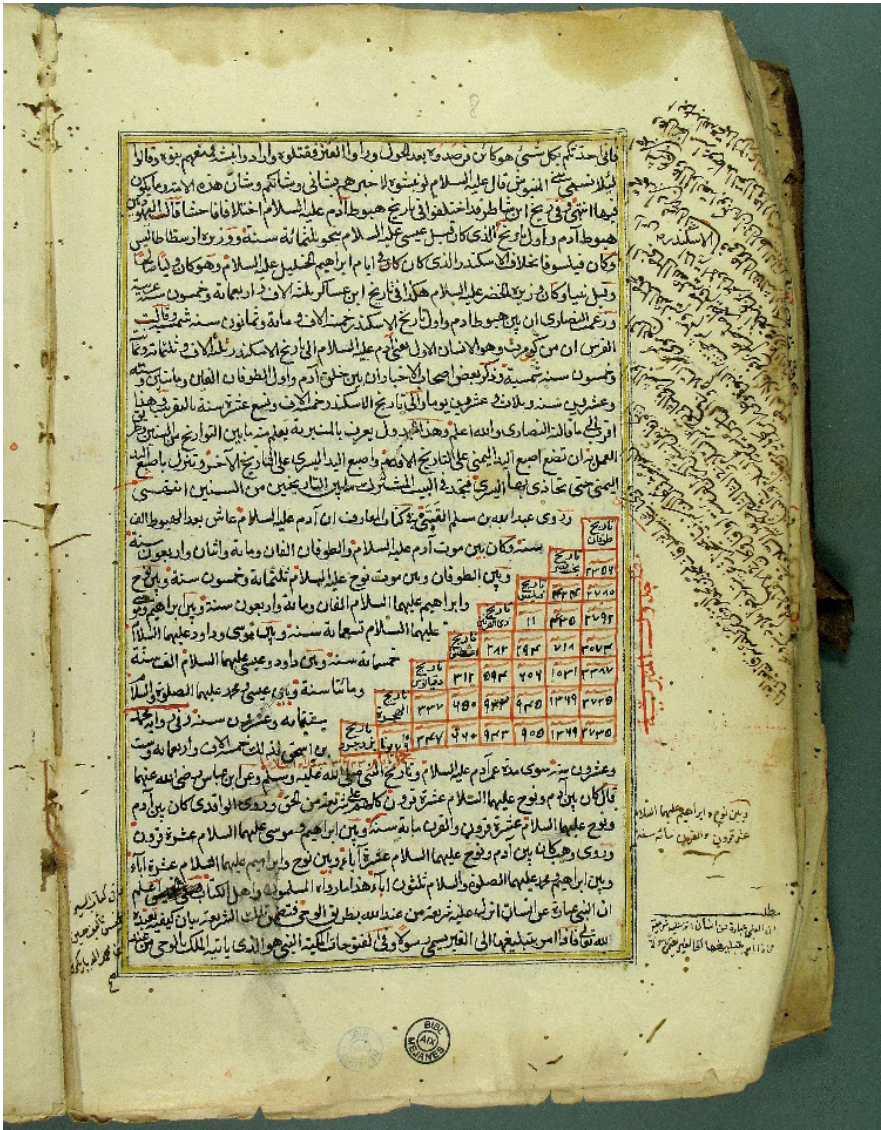


Fig. 1. Ms Aix-en-Provence, Bibliothèque Méjanès, 1347 (1212), f. 7v: page with the table for comparative chronologies, defined as *ḡadwal al-minbariyya*.

celebrated historians such as Ibn al-‘Asākir, the copyist includes a triangular table, labelled as *ḡadwal al-minbariyya* (‘minbar-shaped table’) by a rubricated caption in the margin that runs parallel to the rule-borders. Its shape is thus compared to that of the iconography of the pulpit in the mosque—a

closed staircase leading up to a seat or a kiosk-like structure, observed from its side—the origin of which goes back to the raised seat which the Prophet Muḥammad occupied in the assemblies of the first Muslim community. The table was probably drawn and filled by the same expert hand that copied the main text, and the inks seem to be consistent with the rest of the text around the table.

When a triangular table, as in this case, has its right angle in the lower part, the zig-zag of the diagonal may indeed remind of the stairs of a *minbar*. This resemblance might have very well been inspired by other representations of this architectural element in the Arabic manuscript tradition. Among the illustrations that accompany many of the manuscripts of the popular devotional text of the *Dalā'il al-ḥayrāt*, in fact, there is a double image that depicts the burial place of Muḥammad (*al-Rawḍa al-Mubāraka*, ‘the Blessed Garden’) including also the *minbar* of the Prophet in the Mosque of Medina (fig. 2).⁴

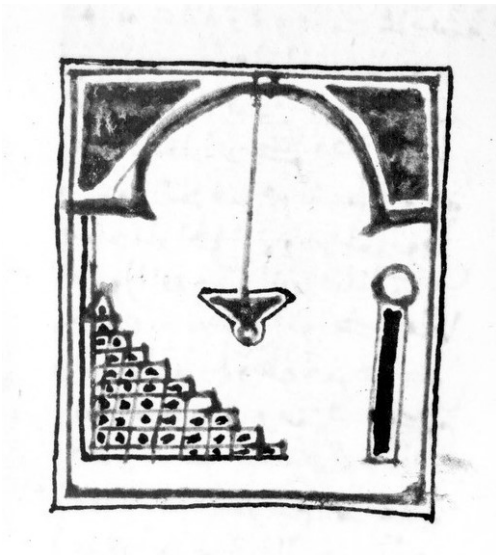


Fig. 2. Ms Paris, BnF, Arabe 6246, *Dalā'il al-ḥayrāt*, f. 14r, representation of the *minbar* of the Prophet in the Mosque of Medina, © <www.gallica.bnf.fr>.

The table of comparative chronologies has a single set of elements distributed in the cells along the zig-zag hypotenuse. These elements are represented by the event that marked the beginning of different eras and their respective chronologies. The table offers a comparative overview of the chronological gap between two chronologies, expressed as a number of years. The function of this table goes beyond the simple definition of the chronological divide between the ‘years zero’ in two different calendars. In fact, this number

4 See Witkam 2007b, 298–299.

of years is a constant value that, through simple additions and subtractions, helps to determine the equivalence of any year in the different calendars. In the context of a discussion on comparative chronologies, such table may indeed represent a practical tool to have at hand next to the text.

The elements in the ‘header diagonal’ are eight events that marked the beginning of different historical eras. These are arranged in chronological order in the cells along the hypotenuse, from the top to the bottom: the flood (*al-tūfān*), the reign of Nebuchadnezzar (*Buht naššar*, i.e. 605 BCE),⁵ Philip of Macedonia (*Filifus*, in the manuscript *Fīlis*, i.e. 359 BCE),⁶ Alexander the Great (*Dū-l-Qarnayn*, i.e. 336 BCE), Octavianus Augustus (*Ağustus*, in the manuscript *A štuš*, i.e. 27 BCE),⁷ Diocletian (*Duqlīṭiyānūs*, in the manuscript *Duqiyānūs*, i.e. 284 CE),⁸ the *Hiğra* of the Prophet Muḥammad (i.e. 622 CE), and the last Sasanid king Yazdağird (the third, i.e. 632 CE).⁹

Despite the apparently unique set of elements, this is a two-dimensional table. If one translates its values to a regular orthogonal array, the header row and the header column would both include the same set of eight elements—in this context, it is important to keep in mind that the eight elements in question are implicit numerical values expressed in words. The transposition of the value into an orthogonal array would produce a table in which the diagonal would see the matching of each era with itself, and would therefore contain only zeros; while the two halves of the table on either side of the diagonal would show the same set of values in mirror. The choice of a *minbar*-shaped table is, thus, an economical solution that avoids the duplication of values.

The numerical nature of the elements in the table allows to emend slips of the pen by conjecture (*ope ingenii*), mistakes that would probably remain undetected—especially in the case of a single witness—if not embedded in a context that makes transparent the logical relations between them. For instance, the table associates the same value (1369) to two different combinations of eras, Nebuchadnezzar-*Hiğra* and Nebuchadnezzar-Yazdağird. The *ğadwal* clearly states that there are ten years and a few months between the date of the *Hiğra* and the beginning of the reign of the last Sasanian king. Thus, relying on the internal coherence of the table, the number of years elapsed between Nebuchadnezzar and Yazdağird can be corrected in 1379 (see the edition below).

5 See Vajda 1960.

6 *Fīlis* in the manuscript.

7 *A štuš* in the manuscript.

8 *Duqiyānūs* in the manuscript.

9 In the edition of the Arabic table, I have opted to preserve the names as they are attested in the manuscript.

Just above the triangular table, there is a clearly defined block of text—not even three lines—with indications for its correct use. These instructions describe the concrete and physical act to follow any column and row with one finger from either hand (the right for the oldest date, the left for the more recent one), until the two fingers meet in the cell of intersection (*bayt al-muštarak*). This confirms that this table is not an addition but an integral part of the text, at least in this manuscript witness.

The author of the *Ḥulāṣat al-siyar* provides a genealogy of his sources, that is a number of historians of the fourteenth and fifteenth century. The information summarized in this table, however, seems to stem from al-Bīrūnī's *Chronology of Ancient Nations* (*Al-āṭār al-bāqiya 'an al-qurūn al-ḥāliya*), in particular from its third chapter ('On the Nature of the Eras and the Different Opinions of the Nations Regarding them').¹⁰ In other words, this table provides information external to the main text recalling one of the most complete and authoritative opinions on the subject in support to the main text.

Al-Bīrūnī (d. AH 440/1048 CE), in fact, reports the different opinions of Christian and Jews about the relative distances between eras, trying to correct the calculations he considered imprecise. His list of eras, however, includes three more items that are not considered for this table: the era of creation (*Awwal al-awā'il*), and the two reforms of the calendar operated by the Roman Emperor Antoninus Pius (r. 138–161) and by the Abbasid Caliph al-Mu'taḍid bi-llah (r. 892–902).¹¹

For each era, al-Bīrūnī stresses the peculiarity of the different systems for time calculations (lunar and solar calendars, presence of intercalary months, different dates for the beginning of the year, etc.). Although days and months are not included in the table, the approximation of +/-1 year in the calculations may mirror the necessary adjustments. In the case of the chronological interval between the last Sasanian emperor and the *Hiġra* of the Prophet, the specification of the number of days seems to confirm that the dates could in some cases be down to the day, especially when closer in time.

10 For the Arabic text see al-Bīrūnī 1878, 13–35, for the English translation see al-Bīrūnī 1879, 16–32. Other data for the calculations might also have been derived from the sixth chapter of the *Chronology* ('On the derivation of the eras from each other, and on the chronological dates, relating to the commencements of the reigns of the kings, according to the various tradition'), in which more tables provide lists of rules from the different eras and dynasties, together with the precise duration of their reigns. Al-Bīrūnī's spellings of the ruler's names has served as basis for the emendation suggested for the spellings as attested in the manuscript.

11 For the calendar systems encountered in Arabic manuscripts, see Gacek 2009, 60–61.

The manuscript tradition of al Bīrūnī's *Chronology* itself is incredibly rich in tables, and at least another of al-Bīrūnī's works, the *Kitāb al-tafhīm li-awā'il šinā'at al-tanğīm* ('The Book of Instruction in the elements of the art of astrology'), shares a similar propensity for the use of tables, especially in the second part devoted to astrology.¹² The tables in question may be simple or two-dimensional, and normally have a rectangular shape. From the numerous admonishments that al Bīrūnī disseminated in his text, it clearly emerges how he dreaded the damages that a distracted, inept, or ignorant copyist could inflict to the contents. Referring to the tables he found in one his sources, al-Bīrūnī writes:¹³

Now I have transferred those identical tables into this place of my book. Time has not enabled me to correct the names of the kings on the basis of their true pronunciation. I hope, therefore, that everyone will endeavour to correct and amend them, who like myself wishes to facilitate the subject for the student, and to free him from fatigue of research. And nobody ought to transcribe these tables and the other ones except him who is well acquainted with the *Ḥurūf-al-jummal* [arithmetical signs, numbers], and honestly endeavours to preserve them correct. For they are corrupted by the tradition of the copyist, when they pass from hand to hand among them. Their emendation is the work of many years.

Edward Sachau and other editors and translators of al-Bīrūnī have respectfully and scrupulously handled these tables, which are usually carefully reproduced not only in facsimile but also in printed editions. Perusing the seventh chapter of the *Chronology* in order to contextualize the Méjanes *minbar*, I saw that the *Chronology* manuscript tradition also includes a triangular table called here *ṭaylasān*, that is a head shawl that may be cut in a trapezoidal form.¹⁴ The association with another object might have been driven by the different orientation of the triangle on the page, this time with its right angle on top, or just by a different personal or local kind of association. After having explained in his text how to determine whether a year is leap or nor, al-Bīrūnī adds that years can be defined as 'imperfect', 'intermediate' or 'perfect' on the account of the day of the week with which they begin. The subject is rather intricate and the branch diagram (*'alā ṭarīq al-taqṣīm wa-l-tasğīr*) that resumes it in the previous page gives graphic form to the reasoning behind it by means of multiple divisions and crossed-ramifications (see fig. 3). The tree diagram reads as follows:¹⁵

12 See al-Bīrūnī 1934, 1934.

13 See al-Bīrūnī 1879, 98.

14 See al-Bīrūnī 1878, 159 = 1879, 152. The origins and lawfulness of this head shawls have been rather debated in Islamic jurisprudence, see Kindinger 2014, 64–80.

15 al-Bīrūnī 1879, 152.

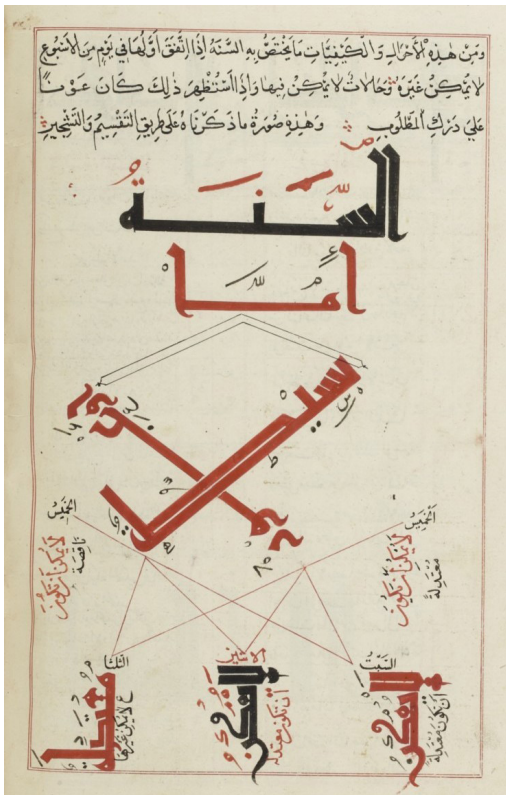


Fig. 3. Branch-diagram from al-Bīrūnī's *Chronology* illustrating the complex relations between imperfect, intermediate, and perfect years, MS Paris, BnF, Arabe 1489, f. 59v, © <www.gallica.bnf.fr>.

The year is either		
a common year	or	a leap year
Thursday (i.e. if New Year's day is a Thursday)		Thursday
The year cannot be Imperfect		It cannot be Intermediate
In both common and leap years		
Tuesday	Monday	Saturday
It is always Intermediate	It can never be Intermediate	It can never be Intermediate

The role of the *ṭaylasān* in what follows is to integrate the tree diagram and show in a synthetic way the results of further combinations of such conditions that allow or prevent years to follow each other, and is preceded by these indications:¹⁶

16 al-Bīrūnī 1879, 152–153.

Further, of these conditions there are certain ones which may happen in two consecutive years, whilst others cannot. If we comprise them in a *ṭaylasān*, it will afford a help towards utilizing the circumstance, and will facilitate the method. We must look into the square which belongs in common to the two qualities of the two years; in that square it is indicated whether the two years of two such qualities can follow each other or not.

Edward Sachau based his edition on three manuscripts available in European libraries: one at the British Library (MS Add. 7491), the second in the Bibliothèque Nationale in Paris (MS Arabe 1489), and the last in the private collection of Sir Henry Rawlinson (later acquired by the British Library with the class mark MS Or. 1495).¹⁷ On f. 60r, the Paris manuscript shows how the space of the page that remained blank due to the triangular form of the *ṭaylasān* is filled with a stylized vegetal decoration in blue, gold and white. The elements in the headers are written in a thicker display script of a decorative ‘neo-Kufic’ style that alternates black and red,¹⁸ while the cell at the intersection of the two headers defines the content of their cells: *al-kayfiyyāt* (‘qualities [of the years]’, see fig. 4). This accurate and lavish decoration is in line with the general style of this luxury manuscript, which extends to its technical diagrams as well.

In this case, the *ṭaylasān* has a header column and a ‘header diagonal’ with the same set of three elements (imperfect, intermediate, perfect). Differently from the table in MS Aix-en-Provence, Bibliothèque Méjanes, 1347, though the series of elements in the headers are identical, both need to be displayed, since also the combinations between two identical elements are relevant and productive. Moreover, here the relation between the different elements is not a simple arithmetical calculation, but a complex combination of many factors previously illustrated by al-Bīrūnī. The *ṭaylasān*, in fact, allows to reach the right conclusion about the kind of year in a mechanical way, without the need to understand the complex conditions expressed in the branch diagram.

17 An updated and definitely longer list of manuscript witnesses is given by J.P. Hogenlijk in the section of his website dedicated to al-Bīrūnī, <<http://www.jphogendijk.nl/biruni.html>> (last accessed, 25 April 2021). A digital reproduction of the Paris manuscript is available online <<https://gallica.bnf.fr/ark:/12148/btv1b8406161z.r=biruni%20athar?rk=21459;2>> (last accessed 25 April 2021). Unfortunately, it was impossible to see the other manuscript witnesses used by Sachau before the publication of the present article.

18 For the display script, see Gacek 2009, 95; for the term ‘neo-Kufic’, see Witkam 2007a, 249.

MS Aix-en-Provence, Bibliothèque Méjanes, 1347 (1212), f. 7v—Edition

مطلب جدول المنبرية

وهذا جدول يعرف المنبرية يعلم منه ما بين التواريخ من السنين وطريق العمل به ان تضع اصبع اليد اليمنى على تاريخ الاقدم واصبع اليد اليسرى على تاريخ الاخر وتنزل باصبع اليد اليمنى حتى تحاذى بها اليسرى فتجد في بيت المشترك ما بيت التاريخين من السنين انتهى

							تاريخ طوفان
						تاريخ بحت نصر	سنة ٢٣٥٦
					تاريخ فيلس	سنة ٤٢٤	سنة ٢٧٨٠
			تاريخ ذي القرنين	سنة ١١	سنة ٤٣٥	سنة ٤٣٥	سنة ٢٧٩٦
		تاريخ اعشطش	سنة ٢٨٢	سنة ٢٩٤	سنة ٧١٨	سنة ٧١٨	سنة ٣٠٧٤
		تاريخ دقيانوس	سنة ٣١٢	سنة ٥٩٤	سنة ٦٠٦	سنة ١٠٣١	سنة ٣٣٨٧
	تاريخ الهجرة	سنة ٣٣٧	سنة ٦٥٠	سنة ٩٢٣	سنة ٩٤٥	سنة ١٣٦٩	سنة ٣٧٢٥
تاريخ يزد جرد	سنة ١٠ و ٧٩ يوما	سنة ٣٤٧	سنة ٦٦٠	سنة ٩٣٣	سنة ٩٥٥	سنة *١٣٦٩	سنة ٣٧٣٥

جملة أيام ٣٦٢٣ مبتدأ الثلاثاء

* This value can be corrected in ١٣٧٩ considering the ten years between the two calendars.

*MS Aix-en-Provence, Bibliothèque Méjanes, 1347 (1212), f. 7v—Translation***Section: the minbar-shaped table (Maṭlab ḡadwal al-minbariyya)**

This is the table known as the *minbar*-shaped one, thanks to which one can know the years that separate the different eras. The way to use it is to place a finger from the right hand on the more ancient dating, while you place a finger of the left hand on the other dating, then you go down with the finger of the right hand until this is on the level with the left finger; then you will find the number of years between the two dating systems in the cell of intersection.

							<i>Era of the flood</i>
						<i>Era of Nebuchadnezzar</i>	2356 years
					<i>Era of Philip</i>	424 years	2780 years
				<i>Era of Alexander</i>	11 years	435 years	2796 years
			<i>Era of Augustus</i>	282 years	294 years	718 years	3074 years
		<i>Era of Diocletian</i>	312 years	594 years	606 years	1031 years	3387 years
	<i>Era of the Hiġra</i>	337 years	650 years	923 years	945 years	1369 years	3725 years
<i>Era of Yazdgerd [III]</i>	10 years and 79 days*	347 years	660 years	933 years	955 years	1369 ¹ years	3735 years

*For a total amount of 3624 days, with its beginning on a Tuesday

¹ This value can be corrected in 1379 considering the ten years between the two calendars.

المشترك لكيفيتي السنين فانه قد يوجد امكن توالي السنين المتليقتين بهما وابتدا

ا	ب	ج
د	هـ	و
ز	ح	ط

فاما امتناع توالي سنين معتد لشرين فهو لشارق واخرها واوائلها كما يلوجه جدول

Fig. 4. Shawl-shaped table (*taylasān*) from al-Bīrūnī's *Chronology* that shows in a simple and direct way whether imperfect, intermediate, and perfect years can follow each other. MS Paris, BnF, Arabe 1489, f. 60r (detail), © <www.gallica.bnf.fr>.

2. Combining logical propositions

The second case study belongs to the commentary tradition on the *Tahdīb al-mantiq wa-l-kalām* ('Refinement of Logic and Speech'), a popular work by Mas'ūd b. 'Umar al-Taftāzānī (d. AH 792/1390 CE). This author's fame rests on his many commentaries and compendia in various fields of learning, that were widely adopted for teaching in the *madrassa* context.¹⁹ I could collect two witnesses of this table. The first is an undated but relatively recent manuscript kept in the Bibliothèque Nationale in Paris (MS Paris, BnF, Arabe 5797, see fig. 5), which transmits the *Ġalāl 'alā tahdīb al-mantiq wa-l-kalām*, a commentary by Ġalāl al-Dīn Muḥammad b. As'ad al-Dawwānī's (d. AH 907/1501 CE).²⁰ The second is a multiple-text manuscript from a private collection (MS

19 See Brockelmann 1902, 215; Madelung 2000. See also Walbridge 2000, 61; and Brentjes 2018, 139, 165, 170, and 259. I would like to thank Sean Coughlin and Marco Bellini for discussing with me the contents of this table.

20 The reproduction the manuscript is available online, <<https://gallica.bnf.fr/ark:/12148/btv1b100320779.r=taftazani%20dawani?rk=21459;2>> (last accessed 25 April 2021).

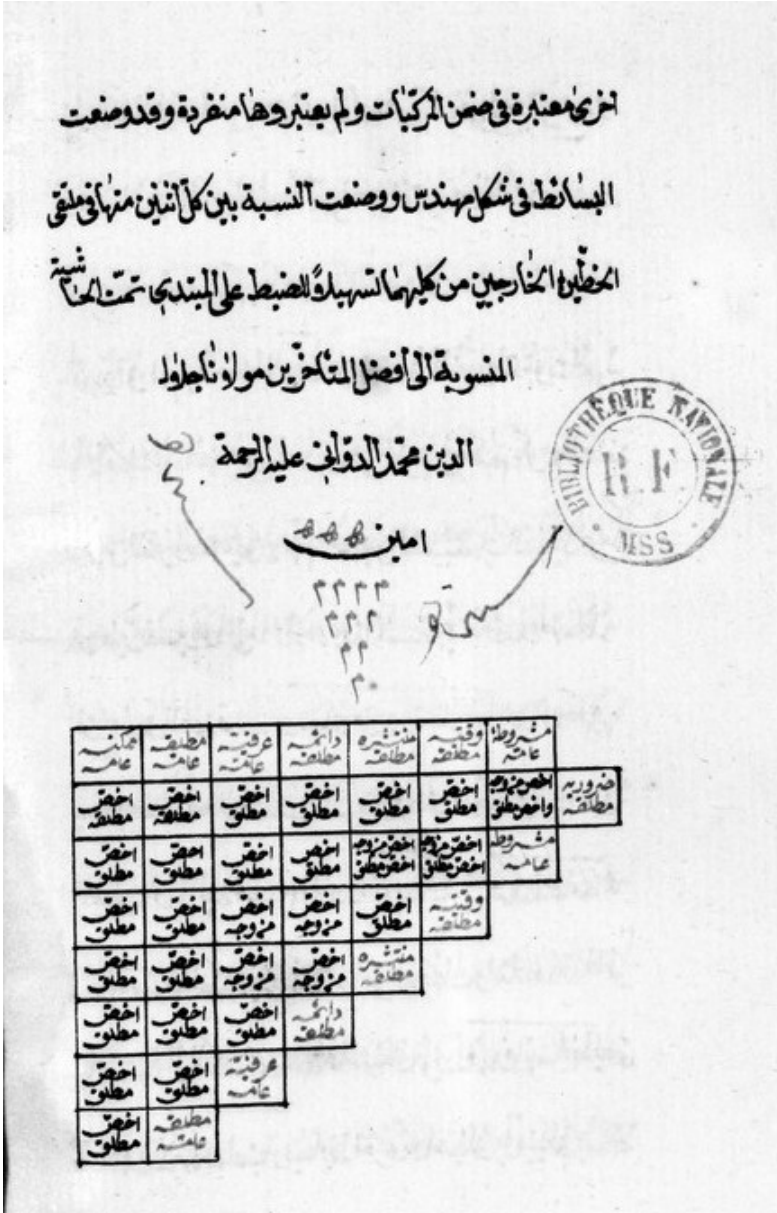


Fig. 5. Explicit and triangular table of al-Dawwānī’s commentary on al-Taftāzānī’s *Tahdīb*. Paris, BnF, Arabe 5797, f. 63v, © <www.gallica.bnf.fr>.

Leiden, Ter Lugt 11, see fig. 6), copied in AH 1185 /1771–1772 CE, by Ḥusayn b. Khalīl b. Ibrāhīm in the Ibn Malik Madrasa in Kūtahya (f. 38b) in Western Turkey. This manuscript contains two textual units: another copy of al-Dawwānī's commentary (ff. 1v–38v), along with another anonymous commentary of al-Taftāzānī's *Tahdīb* (ff. 42v–157v).

Al-Dawwānī's commentary discusses and elaborates on the combination of simple propositions (*basā'it*), assuming that his readership had no need for definitions. These can, however, be found in al-Taftāzānī's work that is object of the commentary. In the section devoted to 'asseverations, truthful statements' (*taṣdīqāt*), he writes:²¹

If the judgement in the proposition is assessed from the necessity of the relation as long as the essence of the subject lasts, then [the proposition] is 'necessary absolute' (*darūriyya muṭlaqa*); or, if it [the necessity of the relation] lasts as long as its property (*waṣf*), then it is called 'conditional absolute' (*mašrūṭa muṭlaqa*); or in a specific moment, then it is called 'temporal absolute' (*waqtiyya muṭlaqa*); if instead the moment is not specific, then it is called 'generic absolute' (*muntašira muṭlaqa*); or if it depends on its permanence as long as the essence lasts, then it is called 'perpetual absolute' (*dā'ima muṭlaqa*); or, instead, as long as the property lasts, then it is called 'customary absolute' (*urfiyya āmma*); or is from the its efficiency [?], then it is called 'absolute and general'; or from the privation of necessity of its contradiction, then it is called 'possible general' (*mumkina āmma*). These are the simple propositions (*basā'it*).

The same triangular table, with the purpose to summarize the ways in which simple propositions may be combined, appears to be associated with two different works on the same subject; in the Paris manuscript it is placed at the end of al-Dawwānī's commentary, whereas in MS Leiden, Ter Lugt 11 the table follows the anonymous commentary rather than al-Dawwānī's one.

In both manuscript witnesses, the last lines of each text undoubtedly refer to the table and give a very synthetic description of it. The focus of this short passage is on the two headers whose intersection defines the space and cells in which the relation between different couplets of simple propositions can be framed. The two versions of the text, however, show some interesting variants. One concerns the wording of the table's description, referred to as 'geometrical figure' (*ṣakl muhandas*) by one version, while the other depicts it as a geometrical figure having a toothed edge (*ṣakl muḍarras handasī*). The form *muhandas* in the Paris manuscript has a possible relation with *muḍarras handasī*—as it happens with *mubtadi*' and *mutabaddal*—of which could be a

21 See al-Taftāzānī 1330/1912, 8–9. For the translation of the technical terminology of logic, I have mostly relied on the *Online Dictionary of Arabic Philosophical Terms* by Andreas Lammer and Raphael Kretz, <<http://www.arabic-philosophy.com/dict/>> (last accessed 25 April 2021).

المطلقة العامة	المطلقة الخاصة	العقبة العامة	اللائمة المطلقة	المطلقة المنتهية	المطلقة الوثنية	المشروطة العامة
أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	مصلحة أخصى وأخصى زوج
أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	المشروطة العامة
أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	المشروطة العامة
أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	أخصى مطلق	المطلقة المنتهية
أخصى مطلق	أخصى مطلق	أخصى مطلق	المطلقة اللائمة	المطلقة اللائمة	المطلقة اللائمة	المطلقة اللائمة
أخصى مطلق	أخصى مطلق	العقبة العامة	المطلقة العامة	المطلقة العامة	المطلقة العامة	المطلقة العامة
أخصى مطلق	المطلقة العامة	المطلقة العامة	المطلقة العامة	المطلقة العامة	المطلقة العامة	المطلقة العامة

و توضيح هذه النسب هو ان يأخذ
 أو الظرفية المطلقة مع النسب
 مع النسب المطلقة وهذا بعد هذا
 على النسب المطلقة وما بعد هذا من النسب المطلقة وغيرها
 المتفاوتة في النسب المطلقة مع النسب المطلقة
 فانها كما يكون على المطلقة العامة
 مع النسب المطلقة العامة

Fig. 6. Triangular table and the indications about its use it associated to an anonymous commentary on al-Taftāzānī's *Tahqīb*. ms Leiden, University Library, Ter Lugt 11, f. 158r.

contraction and banalization, but without a complete recension of the manuscript tradition this remains an hypothesis. Both witnesses to the text agree to present this figure as intersection (*mutlaqan*) of rows and columns, and as a tool to facilitate the comprehension of such complex matter.

MS Paris BnF Arabe 5797, f. 63v

So I arranged the basic proposition in a ‘geometrical figure’ (*šakl muhandas*), and I place the relation between each couplet of them in the intersection of the two external rows [the headers], making it easier for the beginner (*mubtadi*) to grasp.

وقد وضعت البسائط في شكل مهندس ووضعت النسبة بين كل اثنين منها في ملتقى الخطين الخارجين من كليهما تسهيلا للضبط على المبتدى

MS Leiden Ter Lugt 11, f. 38v

So I arranged the basic proposition in an intersection [of rows and columns], a toothed geometrical figure (*šakl muḍarras handasī*); its peculiarity is in the two external rows, from each of them two derives a facilitation to understand by permutation (*mutabaddal*).

وقد وضعت البسائط في ملتقى شكل مضرس هندسي وصفة منها في خطين الخارجين من كليهما تسهيلا للضبط على المتبدل

As mentioned above, the table announced by al-Dawwānī does directly follow the commentary’s text in MS Ter Lugt 11, though a few blank pages after the colophon offered plenty of space for it. The very same table can be found, instead, after the second text of the Paris multiple-text manuscript, that is the anonymous commentary on al-Taftāzānī’s *Tahḍīb*. Also in this case, the conclusion of the text announces the presence of a table, which would exclude the occasional whim of a copyist to attached the table to a different work. The circumstances rather suggest that the unknown author attached the table to his own commentary—nuances and details can be discussed, but the combination of simple propositions remains the same—writing for it a much longer introduction in which he describes the sequence of passages to draw it. A clearly personal and moderately skeptical remark about the content of the commented text introduces the table and anchors it to the rest of the commentary.

MS Leiden Ter Lugt 11, f. 157v

As for the demonstration of contradictions the compound [propositions] (*naqā’id al-murakkabāt*) and others, than this his discourse [of the author, whose text is commented]; but something, in my mind wondered whether this was not as it should.

اما البيان نقائض المركبات وغيرها فقولها بل شيئاً في ظني اه ليس على ما ينبغي

So I arranged the simple propositions in this figure made of six columns (*ḥuṭūṭ mustaqīma*), complete in length (*mutafāwiyya al-ṭūl*), while the extreme point (*qaṣr*) is at the same level at one of the extremities but not at the other.

On top of the six columns, there is another [row], external to the ‘heads’ of this columns that intersect their counterparts in the shape of a right-angle[d triangle].

The figure should be according to the easiness of impression [*‘alā hīnat al-tab’*, easy to understand? easy to draw?]; on the side of the complete ‘heads’ [header row], make seven cells (*buyūt*) [along the diagonal]—each of them with an isolated corner, not joined with another corner, like isolated branches (*aḥrāṣ*).

In these cells [of the header row] there must be the names of the simple propositions in the order in which they were mentioned in the book, apart from the last of them, that is the ‘possible general’; on the other side there must be seven cells with the names, starting with first one of them, that is the ‘necessary absolute’

On the other side, there are eight cells; in one of them there is ‘possible general’, while in the other [‘absolute general’], while within the central cells there is the correct relation between each one of the last seven simple propositions.

وقد وضعت البسائط اه هذا الشكل يشتمل على ستة خطوط مستقيمة متفاوتة الطول والقصر متوازية في احد الطرفين دون الاخر

على ستة خطوط مستقيمة أخرى خارجة عن رؤوس تلك الخطوط المتقاطعة بما يوازي منها على زاويا قائمة

فيكون الشكل مثبتا على هيئة الطبع وتحدث في جانب الرؤوس المتناوية سبعة بيوت لكه منها زاوية منفردة غير مقارنة بزواية أخرى كاخراص منفردة

في تلك البيوت أسماء البسائط على ترتيب ذكرها في الكتاب غير الأخيرة منها وهي الممكنة العامة ومن جانب أخرى سبعة بيوت فيها أسماء ماعد الأولى منها وهي الضرورية المطلقة

وفي جانب أخرى ثمانية بيوت في واحد منها اسم الممكنة العامة وفي غيرها [المطلقة العامة] مع البيوت الوسطة النسبة الوافق بين كل واحدة من البسائط السبع الأخيرة

The explanation of the steps to draw the table is rather laborious. The first step is to draw the six columns that have the same elements in both their extremities (cols 2–7), listed in the order in which the propositions appear in the text.²² The expression *ḥuṭūṭ mustaqīma*, used to refer to the first six elements to draw, could generate some lexical ambiguity and be interpreted either as ‘standing rows’ (i.e. columns) or as ‘straight rows’. Though from other clues in the text, I interpret it as ‘columns’, it must be admitted that the opposite interpretation would not compromise the drawing of the table, thanks to the correspondence between the sets of rows and columns. The first column is the longest, while the others grow progressively shorter. Then, the header row must be added on top of the ‘heads’ of the columns, that is the first row, specifying that it should be divided in seven cells. The following step is to add the ‘header diagonal’.

22 In the edition of the table, the cells of the headers are respectively associated with numbers and letters in order to facilitate the reference to specific portions of the table itself, see below.

The last element of the header row (8a) and the first element of the ‘header diagonal’ (1b) are singled out as particular ones, somehow attached and external to the ‘core’ of the initial six columns. The final version of the table, that is drawn including the two exceptional elements in the headers, ends up to count eight cells in the longest and complete column (8a–h).

Comparing the two witnesses of the table, it is immediately visible how both of them make meaningful use of black and red ink to mark the difference between headers and cells, though with opposite graphic solutions. The table from the Paris manuscript is clearly drawn with the help of a ruler, and all cells are of the same dimension. Whereas the lines of the table in the other manuscript are clearly drawn with a free hand. It seems that the copyist might have started to draw the six central rows—perhaps interpreting *ḥuṭūṭ mustaqīma* as rows—but could not manage to keep the cells in line in the upper part of the table (rows a–c) because of more extended portion of text included in some of the cells.

The description of the text states that the header row should have ‘possible general’ (*mumkina ‘amma*) as last element, whereas the ms Leiden, Ter Lugt 11 has ‘absolute general’ (*muṭlaqa ‘amma*, cell 8a), already present in the cell before the last. The comparison with the ms Paris, BnF, Arabe 5797 confirms the hypothesis of a mistake. Moreover, in the columns 2–3 and 5, the copyist inverts the order of the words in the ‘diagonal header’, perhaps to create a mirror effect between the header cells of the same column, but the effect is somewhat spoiled by the lack of a systematic application throughout the table.²³ This manuscript has an additional element, that is a spear-shaped paragraph on the side of the table meant to explain how to concretely use the array, that is from where to start and which elements should be combined one after the other. The content of this short paragraph furtherly confirms that the text in the cell 8a is not the correct one.

What strikes in this table is the rather repetitive contents of the cells, with numerous combinations leading to the same result. This does not have a straightforward correspondence in either text, but I leave this question open for experts in Arabo-Islamic logic.

23 In the edition, the order of the word follows the normal sequence of adjectives to characterize a simple proposition, as also attested in the Paris manuscript.

Table for the combination of simple proposition in the commentary tradition of al-Taftūzānī's Tahdīb — Edition

	8	7	6	5	4	3	2	1
a	الممكنة العامة	المطلقة العامة	العرفية العامة	الدائمة المطلقة	المطلقة المنتشر	المطلقة الوقتيّة	المشروطة العامة	
b	اخص مطلق	اخص مطلق	اخص مطلق	اخص مطلق	اخص مطلق	اخص مطلق	مطلق اخص واخص من وجه	الضرورة المطلقة
c	اخص مطلق	اخص مطلق	اخص مطلق	اخص من وجه	اخص مطلق واخص من وجه	اخص مطلق واخص من وجه	المشروطة العامة	
d	اخص مطلق	اخص مطلق	اخص من وجه	اخص من وجه	اخص مطلق	المطلق الوقتيّة		
e	اخص مطلق	اخص مطلق	اخص من وجه	اخص من وجه	المنتشر المطلقة			
f	اخص مطلق	اخص مطلق	اخص مطلق	الدائمة المطلقة				
g	اخص مطلق	اخص مطلق	العرفية العامة					
h	اخص مطلق	المطلقة العامة						

[MS Leiden Ter Lugt 11, f. 158r]

وتوضيح هذه النسبة هو ان يأخذ أولاً الضرورة المطلقة مع المشروطة العامة ثم مع الوقتيّة المطلق ثم مع المنتشرة وهكذا وبعد الاخذ تأخذ المشروطة العامة مع الوقتيّة المطلقة وما بعدها من المنتشرة المطلقة وغيرها على الكيفية التي ذكرناها أولاً وهكذا انجلوا ما في الجانب المتفاوت الخطوط فيه مع في الجانب التساوي فانتهاها يكون على المطلقة العامة مع الممكنة العامة

Table for the combination of simple proposition in the commentary tradition of al-Taftūzānī’s Tahdīb — Translation

	8	6	6	5	4	3	2	1
a	<i>Possible General</i>	<i>Absolute General</i>	<i>Customary General</i>	<i>Perpetual Absolute</i>	<i>Absolute Generic</i>	<i>Absolute Temporal</i>	<i>Conditional General</i>	
b	more particular absolute	more particular absolute	more particular absolute	more particular absolute	more particular absolute	more particular absolute	absolute more particular and more particular from the aspect	<i>Necessary Absolute</i>
c	more particular absolute	more particular absolute	more particular absolute	more particular from the aspect	absolute more particular and more particular from the aspect	absolute more particular and more particular from the aspect	<i>Conditional General</i>	
d	more particular absolute	more particular absolute	more particular from the aspect	more particular from the aspect	more particular absolute	<i>Temporal Absolute</i>		
e	more particular absolute	more particular absolute	more particular from the aspect	more particular from the aspect	<i>Absolute Generic</i>			
f	more particular absolute	more particular absolute	more particular absolute	<i>Absolute Perpetual</i>				
g	more particular absolute	more particular absolute	<i>Customary General</i>					
h	more particular absolute	<i>Absolute General</i>						

[MS Leiden Ter Lugt 11, f. 158r]

And the explanation of this relation is to take first the ‘necessary absolute’ together with the ‘conditional general’, then with the ‘temporal absolute’, then with the ‘generic absolute’ and so on; after this, take the ‘conditional general’ together with the ‘temporal absolute’ and what follows—that is the ‘generic absolute’ and the others—in the way we mentioned at the beginning. And in this way what is on the side of the complete row appears clearly in the rows in which it is, along with what is in the corresponding side, and their last combination is ‘absolute general’ with ‘possible general’.

Concluding notes

Whichever object their shape might recall—teeth, a shawl, or a *minbar*—, triangular tables are drawn only under certain conditions determined by the specific relation between the elements in the headers. Their shape may also be an economical solution to avoid redundances and the presence of non-significant values. The iconic association of this shape with a number of different material referents may point at local traditions or even personal definitions.

A table allows to perform operations and get answers or result without mastering the complex theory behind: being concretely able to use the table is the only requirements. Hence the rather practical and mechanical nature of the indications to use them, to the point of describing the movement of the fingers along rows and columns. This makes tables a particularly suitable tool for teaching and didactic practices, elements which are frequently hinted at in the various indications that accompany the tables.

The internal coherence of the table, defined by the relations between the elements in the headers, allows to emendate by rather safe conjecture some errors and slips of the pen that would be much more difficult to detect in a text in running prose.

The attestation of the table for the combination of simple propositions attached to two different commentaries on the same work shows how elements of fluid tradition can penetrate technical texts in subtle ways; the same table may be a didactic tool generally attached to a certain stream of tradition—in this case commentaries on the same basic text on logic—and may fit more than one composition on the same subject.

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Research projects

Bibliotheca Arabica—Towards a New History of Arabic Literature

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Since 2018, the Saxon Academy of Sciences and Humanities has been hosting the project *Bibliotheca Arabica*, which in the years to come aims to shed new light on the history of Arabic literatures focusing especially on the Mamluk and Ottoman periods from 1150 to 1850. In the following, we briefly outline the goals and the methodology of the project.

Bibliotheca Arabica aims to shed new light on the history of Arabic literatures focusing especially on the Mamluk and Ottoman periods from 1150 to 1850. Arabic literatures are defined in the broadest sense, to include belles-lettres, scientific works, religious texts, and other written materials. Manuscripts were the main medium for the production, transmission, and reception of literature during this period, and accordingly they represent our central source. The project (principle investigator: Prof. Dr. Verena Klemm, project term: 2018–2035) is hosted by the Saxon Academy of Sciences and Humanities in Leipzig, Germany,¹ and is carried out under the auspices of the Academies Programme of the Union of German Academies of Sciences and Humanities, dedicated to long-term projects for the study and preservation of cultural heritage.²

What are the project's main objectives and assets? The following example illustrates the interplay of literary text and manuscript.

Ṭawq al-ḥamāma ('The Neck-Ring of the Dove'), written in the eleventh century by the Andalusian theologian and jurist 'Alī b. Aḥmad b. Sa'īd Ibn Ḥazm (d.456 AH/1064 CE), is today one of the most popular works of Arabic belles-lettres. In this work, Ibn Ḥazm describes the many facets of love, weaving together prose and verse. Its popularity in modern times is reflected in the numerous editions, translations, and studies dedicated to this text. Yet, to the

1 <<https://www.saw-leipzig.de/bibliotheca-arabica>>. For a summary project presentation see also the project flyer available at <<https://www.saw-leipzig.de/de/projekte/bibliotheca-arabica/files/flyer.pdf>>.

2 <<https://www.akademienunion.de/en/research/the-academies-programme/>>. On specific projects see <<https://agate.academy/>>.

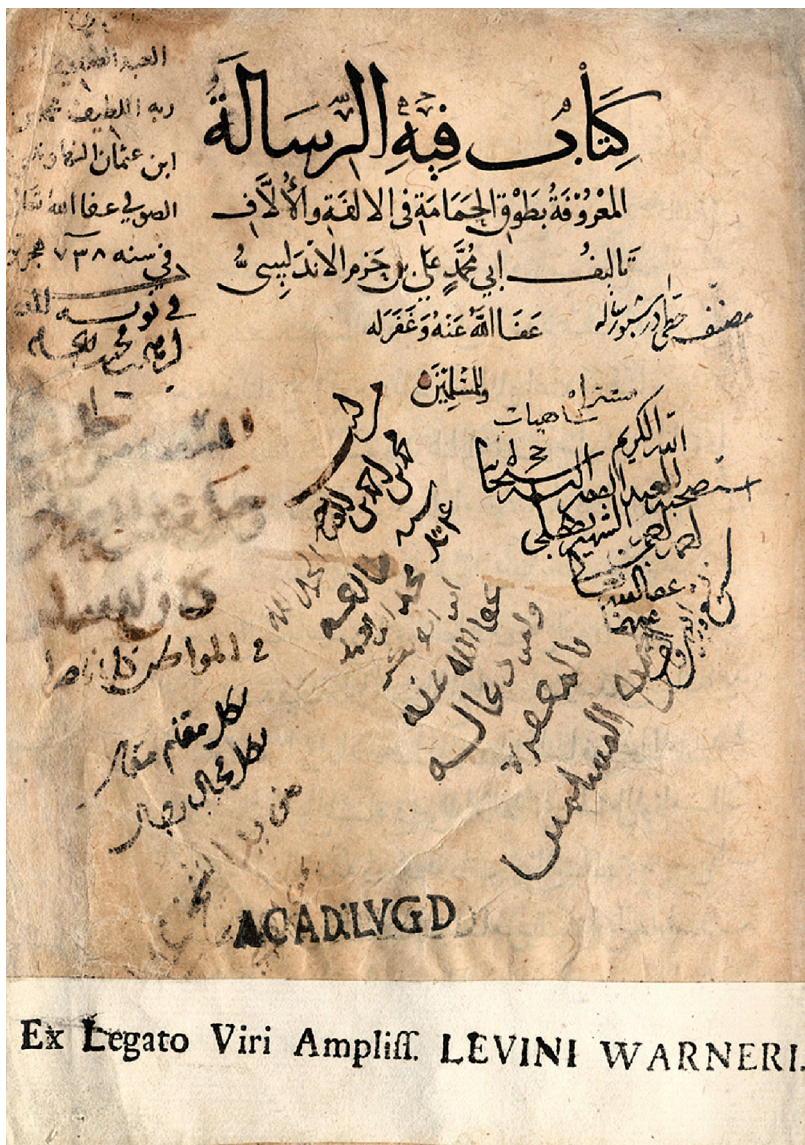


Figure 1. MS Leiden University Library, Ms. or. 927, c.1022 CE, *Ṭawq al-ḥamāma*, title page with manuscript notes, <<http://hdl.handle.net/1887.1/item:1567570>>, © Leiden University Library.

best of our knowledge, only one manuscript of the *Ṭawq* has survived.³ The discrepancy between the popularity of this text today, inspired by European orientalists, and the evidence of only one surviving manuscript copy raises a number of questions that challenge the notion of how the text was received in the eleventh century and beyond. Answering those basic questions requires investigating scenarios for the possible loss of manuscripts and reasons for the limited circulation of Ibn Ḥazm's texts—in short, issues relating to the broader context of *Überlieferungsgeschichte* and the relationship between the quantitative dissemination of a text and its significance. The possibility of oral transmission is yet another question to be explored.⁴ Major clues for deciphering the history of this presumably unique textual witness of the *Ṭawq al-ḥamāma* are the several readers' and owners' notes that provide traces of its transmission and the apparently continued interest in this text from the Mamluk to the Ottoman Empire.⁵ And finally, adding another twist in this history, the copyist informs us that he made changes to the text of his exemplar, abbreviating his source and thus making our edited text merely an adaptation of an otherwise lost version of the *Ṭawq al-ḥamāma*.

The example of studying a literary text such as *Ṭawq al-ḥamāma* and tracing its material transmission brings into sharp relief the complexity of the history of Arabic literature.

By combining literary and manuscript studies, the *Bibliotheca Arabica* project aims to gain new insights into this cultural heritage, and to critically revise the history of Arabic literature, which to a great extent relies on edited material. With its main sources being manuscript data from catalogues and the physical objects, as well as bio-bibliographical works, the project combines the macro-analysis of data with the close reading of primary texts and paratexts in manuscripts. Ways of production, transmission, and reception will be analysed within political and social contexts, and from a transregional perspective. Besides the literary works themselves, it is the agents who come into focus: authors writing about specific topics, readers leaving traces of their use of the texts, owners collecting manuscripts, and scholars commenting on various works and ensuring their transmission. Thus, the history of a literary text is studied within the wider context of book culture. In this sense, *Bibliotheca Arabica* has a strong grounding in Carl Brockelmann's *Geschichte der arabischen Litteratur*.⁶ Accordingly, the project is developing a comprehensive bio-bibliographical research platform, *Bibliotheca Arabica Digital*, as a

3 MS Leiden, University Library, or. 927. This unique manuscript was the basis for the edition published in 1914 by the Russian philologist D. K. Pétrouf.

4 See also Bourgain 2015.

5 Liebrez forthcoming.

6 Brockelmann 1898–1942.

central tool for all disciplines with an interest in the Arabic-language literature and manuscript heritage.

Why the period of 1150 to 1850?

Despite an enormously productive output, the period between 1150 and 1850 has been neglected in research, with interest growing only within the past twenty years.⁷ Thus far, most studies on the history of Arabic literature have presented the period from the pre-Islamic Arabic poetry of the sixth and seventh centuries to the end of the Abbasid era in the twelfth to thirteenth centuries as a period of cultural blossoming, bringing forth original and distinctive works of literature in prose, rhymed prose, and verse, or in a combination of genres and styles. After the Abbasid caliphate, which at least nominally united large parts of the Islamic world, this genuine strength and spirit is said to have come to a halt, with literature of the periods that followed being merely copies and adaptations of earlier works. This narrative of a cultural decline (*inhiṭāf*)—which was articulated already by some Muslim authors of the period in question but which became a mindset of European writing on Arabic literature—has ever since determined the lack of interest in studying the literary output of the post-twelfth and thirteenth centuries. Our study has set the middle of the nineteenth century as the end of the period under investigation, recognizing that in large parts of the Islamic world it marks the end of the manuscript age, due to the introduction and growing utilization of printing technology. The year 1850, though, should not be understood as an absolute *terminus*—the production, transmission and use of manuscripts has continued in some parts of the Islamic world until today.

Why manuscripts?

As noted, the writing of the history of literature—whether Arabic or beyond—is often based on edited texts. These texts, however, represent only the tip of the iceberg when it comes to the literary production in its entirety. By collecting metadata from manuscript catalogues, bio-bibliographic works, and manuscript notes taken directly from the physical objects, we open our study

7 This growing interest is reflected in a rising number of international publications and projects, among them the Leibniz-Preis Forschungsstelle *ALEA-Arabische Literatur und Rhetorik Elfhundert bis Achtzehnhundert* (Thomas Bauer) at the University of Münster; the DFG Research Centre *Annemarie Schimmel Kolleg — History and Society during the Mamluk Era (1250–1517)* at the University of Bonn, with the associated book series *Mamluk Studies* (eds Stephan Conermann and Bethany J. Walker), as well as the *Mamluk Studies Review* published by the Middle East Documentation Centre at the University of Chicago. For the later period see among others the DFG Priority Programme *Transottomanica*.

to a much larger pool of texts.⁸ With this data we can map out many new phenomena in the history of literature, four of which should be highlighted here:

First: While the histories of Arabic literatures have followed so far a more or less established ‘canon of known works’, the *Bibliotheca Arabica* seeks to stress the many neglected genres, texts, and authors—those that might have been rather popular at a given time, in a given region, but that fell out of favour or were forgotten entirely over the course of time. But the data might also work the other way round: a text that is popular today might not have circulated widely throughout the centuries—as the example of Ibn Ḥazm’s *Ṭawq al-ḥamāma* has shown.

Second: A thorough collection of data allows us to develop a much more differentiated mapping of Arabic literature. The production and transmission of texts in different fields of knowledge did not happen in a vacuum but was bound to regional (and transregional) networks, patronage, and social and political circumstances. Not all texts circulated equally from West Africa to India, and not all genres were produced in equal measure throughout the Islamicate world. Thus, the *Bibliotheca Arabica* project aims at a differentiation of temporal and regional developments, beyond known centres, such as Cairo and Damascus.

Third: By tracing the lines of production, transmission, and reception, *Bibliotheca Arabica* moves beyond a solely diachronic perspective on the development of Arabic literature—that is, authors producing texts arrayed along a chronological line—and adds to it the synchronic perspective, that is, texts circulating in particular temporal and spatial dimensions.

Fourth: Taking the manuscript as the starting point and investigating the distribution and circulation of texts throughout the centuries, *Bibliotheca Arabica* goes beyond writing a literary history that focuses on the text, its interpretation, and aesthetic evaluation, to bring in the many agents beyond the author connected to the production, transmission and use of literature, such as copyists, patrons, readers, scholars, and owners who left their annotations in a manuscript. Reconstructing the profiles of libraries and private collections, it investigates the circulation and reception of texts at given times and in given regions. With this, the social world of book culture unfolds.

8 Moretti 2005 has shown this for English literature; see also Jockers 2013. Research on the interconnectedness of Arabic literatures by text re-use in a digital corpus is carried out by the London-based project *Knowledge, Information Technology, and the Arabic Book* (KITAB).

Methodological approaches

As this outline of major objectives suggests, the *Bibliotheca Arabica* project incorporates a variety of methodological perspectives. The most formative ones focus on transmission history and lost source material (*Überlieferungsgeschichte* and *Überlieferungsverlust*), as well as on material philology. After the first conceptualisations in German medieval studies in the 1970s,⁹ material philology gained prevalence from the 1990s on, placing the physical object as the central source for the reconstruction of transmission processes.¹⁰ Literature was no longer seen as a chronology of works, but a phenomenon that emerges as a communication between authors, scribes, and the public. Hence a text should not be studied as an isolated object, but in connection to its physical medium, that is, the manuscript, and all its contexts of production, transmission, and use. Meanwhile a number of projects and research clusters have applied corresponding approaches.¹¹ Since *Bibliotheca Arabica* investigates literature and its physical medium, the manuscripts, in their political and social contexts, a variety of methodological approaches from the vast field of the sociology of literature can also be applied in individual studies.

How are these objectives of the Bibliotheca Arabica implemented?

Bibliotheca Arabica conducts research in three modules: The database *Bibliotheca Arabica Digital*, as the central research tool, and two modules for observing the production, transmission, and reception of works and genres through the lenses of macro and micro perspectives. Where the macro perspective focuses on long-term phenomena and developments of literature across regional boundaries, the micro perspective examines the reception and collection of literatures via histories of Arabic book and library culture.

Bibliotheca Arabica Digital is going to be the essential tool for the exploration and visualisation of social and historical contexts, based on graph database technologies, which enables researchers to trace the histories of single texts and literary genres, and to observe the impact of individual scribes and

9 Ruh 1985. A retrospective and extrapolation is: Brunner, Löser, and Klein 2016.

10 Nichols 1997.

11 See, for example, the two DFG-Sonderforschungsbereiche SFB 933 ‘Materiale Textkulturen. Materialität und Präsenz des Geschriebenen in non-typographischen Gesellschaften’ at the University of Heidelberg (2011–2023), and the SFB 950 ‘Manuskriptkulturen in Asien, Afrika und Europa’ (2011–2020) at Universität Hamburg. Comparative research on manuscript cultures has continued in Hamburg since 2019 at the Cluster of Excellence 2176 ‘Understanding Written Artefacts: Material, Interaction and Transmission in Manuscript Cultures’.

authors. Three main sources are being integrated into the database: (1) data from manuscript catalogues,¹² (2) bio-bibliographical sources such as Ḥayr ad-Dīn az-Ziriklī's *al-A 'lām*, and (3) manuscript notes taken directly from the manuscripts. Boris Liebreiz is continuously documenting manuscript notes in the collections within the project's scope, furthermore data that he had been collecting before the beginning of the project is incorporated.

The ingestion of catalogue data follows a multi-stage process in two main phases. (1) Relevant information on works and manuscripts is coded in a machine-readable format (YAML, JSON), accompanied by manual and automatic quality control. (2) The data will be processed by cross-linking different sources as well as authority control (Normierung). Additionally, preparations are currently underway to change the work process to OCR and full-text parsing.

Based on cutting-edge graph database technologies, the platform will enable researchers to follow the historical career of a work, a person, or, possibly, certain literary elements, such as genres or topics. It thus allows for combined as well as specific searches across all three units. By linking data on the production, reception, and circulation of manuscript textual witnesses, the research platform will not only provide insights into literary history, but this completely new and unique tool of presentation and exploration will result in enormous gains to manuscript research focused on social and cultural history, which is currently on the rise. The heterogeneous nature of the source material requires an increased need for a flexible and transparent handling of facts and their exact provenance, and this is reflected in the database design.

In a series of case studies, the macro perspective examines the production, transmission, and use of genres and works, taking a long-term and transregional perspective. Thereby it aims at a differentiated geo-temporal mapping of literatures and a highlighting of neglected genres and works. Questions of production and dissemination of literature are studied through manuscript metadata and biographical and historiographical sources on the one hand, and, on the other, through concrete textual practices observed in the

12 The catalogues were chosen with regard to content and for practical reasons. Representative catalogues of major collections of Arabic manuscripts in the world, for which a printed catalogue or database exists, were identified. These constitute the basis of the database. New cataloguing projects and the availability of updated information will add to the set of catalogues in the future. A central objective of the project is the linkage of catalogue data and data from manuscripts notes in order to reconstruct provenance history and the use of manuscripts. Hence, the accessibility to manuscripts has been of key importance for the choice of manuscript collections and their respective catalogues.

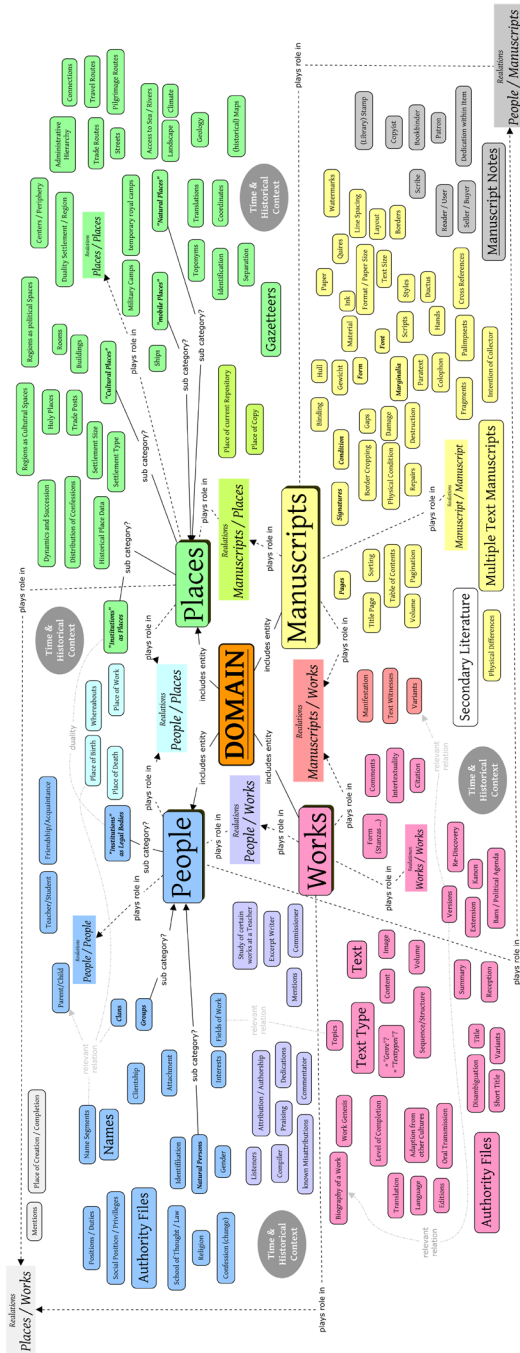


Fig. 2. Bibliotheca Arabica's domain model is being refined continuously.

physical manuscripts. In short: What was produced, transmitted, and read? How, when, and where? Why?

Arabic libraries at the time of the Mamluks and Ottomans are the central point of study for the micro perspective. The focus is always on the data collected from documentary manuscript notes in relation to biographical and historiographical sources. Basing our work on this data, which will be exemplified in case studies, we seek to understand the often centuries-long journeys of books via routes and stations, to recognize the genesis of a library, the profile of a collector, and the dissemination of literature. In short: Who read what, when, and where?

The project will produce a series of books, to be published by Brill in Leiden, featuring sixteen publications, including monographs, dissertations, and edited volumes. At the end of the project, the final publication, *A New History of Arabic Literature*, will integrate macro analyses for genres, works, authors, and manuscript users, the insights of exemplary case studies, and related methodological approaches.

Bibliotheca Arabica with its digital research platform and its publications is designed to serve as a reference for future studies in literature, culture, and social sciences. It will shine a light on a long neglected period of literary production and offer new approaches to the study of Arabic literatures, combining literary studies, manuscript studies, and digital humanities.

The current project team includes Prof. Dr. Verena Klemm (Principal Investigator), Dr. Daniel Kinitz (Managing Director, *Bibliotheca Arabica Digital*), Dr. Thomas Efer (Research Fellow, *Bibliotheca Arabica Digital*), Dr. Stefanie Brinkmann (Research Fellow, Macro Perspective), Dr. Boris Liebrecht (Research Fellow, Micro Perspective), Nadine Löhr, M.A. (Doctoral Researcher), and Edin Muftić, M.A. (Doctoral Researcher).

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An Infrastructure for Texts and Contexts: Qalamos—Connecting Manuscript Traditions

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This article presents the aims and scopes of the project ‘Orient-Digital’. We exemplify how the functionalities of the portal Qalamos can be used for future research. We show how it can be used to identify all manifestations of a work, on the example of the *Gulistān* by Sa‘dī Šīrāzī. On the example of Arabic grammar treatises we show how the portal also allows to examine diverse codicological contexts in which texts can be inserted. Finally, we show how our data can serve provenance studies by linking data for previous owners and readers to the respective manuscripts.

The project ‘Orient-Digital’ and the portal Qalamos

The project ‘Orient-Digital’ (OD), funded by the Deutsche Forschungsgemeinschaft, started in summer 2020. The applicants and main project partners are the Berlin State Library, Gotha Research Library of the University of Erfurt, the Bavarian State Library Munich and the Leipzig University Computation Centre. Whereas the earlier ‘Orient-Digital’ application was limited to the collections of the Berlin State Library,¹ the new project is creating a portal, now named ‘Qalamos: Connecting Manuscript Traditions’, which provides metadata for oriental manuscripts in more than 25 collections in Germany.²

The project cooperates with a growing number of associated libraries and research facilities, providing an infrastructure, which makes also smaller manuscript collections visible and accessible to researchers and other users. At the end of the initial funding phase in 2023, the portal will contain metadata for approximately 22,000 Arabic-script manuscripts (with texts in Arabic, Persian and Ottoman-Turkish). In order to achieve this aim, the project employs eight staff members in Berlin, Gotha, Leipzig and Munich.

The main objectives are (a) to provide metadata of the oriental manuscripts in Germany and (b) to establish and implement common standards for metadata of manuscripts as well as for the persons involved. The project coordinates its efforts closely with the *Handschriftenportal* (<[https://](https://www.handschriftenportal.de/)

1 Hanstein and Beez 2013.

2 See the project website at <<https://staatsbibliothek-berlin.de/die-staatsbibliothek/abteilungen/orient/projekte/dfg-projekt-orient-digital>>; the earlier portal at <<http://www.orient-digital.de/>>; the project blog at <<https://od-portal.hypotheses.org/>>, and the new portal at <<https://www.qalamos.net/>>.

handschriftenportal.de/), and the long-term projects *Katalogisierung der orientalischen Handschriften in Deutschland* of the Göttingen Academy of Sciences (<<https://orient-mss.kohd.adw-goe.de/>>), and *Bibliotheca Arabica* of the Saxon Academy of Sciences and Humanities (<<https://www.saw-leipzig.de/bibliotheca-arabica>>). Through the exchange with these projects, we are working to ensure the utmost uniformity of our data and conformity with technical and library standards. A central part of our work is extracting data from existing printed or handwritten catalogues. Additionally we provide online access to digitized manuscripts of various collections. When creating new database entries we refer as much as possible to existing authority files either from the Gemeinsame Normdatei (GND) or the Library of Congress (LoC). However, we also initiate new GND files when necessary.

The technical base is a MyCoRe database,³ which had been successfully used for smaller-scale projects in Berlin,⁴ Gotha,⁵ and Leipzig.⁶ The data from earlier databases as well as from collections of the Berlin-Brandenburg Academy of Sciences and the Austrian National Library have already been migrated into the new database. In addition, metadata for more than 10,000 manuscripts from seven collections have been entered manually.

The new database contains various data modules, among which the modules for manuscripts and persons are the most important. Moreover, it retains the modules for manuscript notes, bookbindings, and book art from the earlier applications.⁷ It greatly improves on the authority files for persons connected to a manuscript's history, supporting and easing research on different aspects of manuscript culture. In addition, a new module for works has been introduced, so that all manifestations (i.e. manuscripts) of one work may be linked to the work-specific data set. At this point, however, we only create data sets for the works whose title can be detected or which are known to circulate in several copies within the manuscript collections. This module will be developed further to make the relations between different works visible, for instance by ways of abridgement, commentary or translation.

Each data module is conceived according to the specific data that it contains; e.g. the manuscript module provides data concerning the material

3 MyCoRe (portmanteau of My Content Repository) is an open source repository software framework for building disciplinary or institutional repositories, digital archives, and scientific journals, see <<https://www.mycore.de/en/>>.

4 See <<http://orient-digital.staatsbibliothek-berlin.de/>>, cp. Hanstein and Beez 2013.

5 See <<https://gothams.dl.uni-leipzig.de/>>; cp. also Liebreiz 2014.

6 See e.g. <<https://www.refaiya.uni-leipzig.de/>>, <<https://www.islamic-manuscripts.net/>>, see also Klemm 2011.

7 See Beez 2015.

aspects of a manuscript, whereas the person module provides biographical information.

The data sets for manuscripts, work titles and persons can be searched in original script as well as DMG and LoC transliteration systems and are also accessible through indices. Upon launch, facet filters will further improve the usability of the database. These technical improvements will be complemented by a new design that takes into consideration the results of a usability study carried out in the first phase of the project.

In the following, we exemplify how the functionalities of the Qalamos portal can be used for future research.

Searching for Gulistān manuscripts

The *Gulistān* ('The Flower Garden') by the Persian author Sa' dī Šīrāzī (606 AH/1193 CE–690 AH/1292 CE) is a collection of moralizing anecdotes in prose and poetry arranged according to subject matter. It is considered, next to the *Būstān* ('The Orchard'), which contains only poetry, one of Sa' dī's two principal works, and it is probably the most influential work of prose in the Persian language. Due to their content, which deals with ethics, both the *Būstān* and the *Gulistān* were used as textbooks in curricula of madrasas for both the Persian language and Islamic ethics.⁸ The *Gulistān* has been transmitted in (as far as we know today) five ways: as a single text, together with the *Būstān*, embedded in the *Kulliyāt* (a collection that contains all of Sa' dī's prose and poetry), and in numerous commentaries or translations into other languages.

Research on the history of the *Gulistān*, its text, author or its various historical and literary contexts can be a challenge, precisely because the work has been so popular throughout its history, as reflected by the number of extant manuscripts. Copies of the *Gulistān* can be found in many manuscript collections; localizing these collections and the *Gulistān* manuscripts within them can thus be a time-consuming task.

The Qalamos portal will provide an infrastructure which allows uniform and quick access to all manifestations of the *Gulistān* in collections in Germany. Users can (first) rely on three ways of searching the collection for the *Gulistān*: through looking up the authority record for its author, searching for the title *Gulistān* in the title search field, or searching for the word in a full text search. Full text results are the most numerous as they include works that are related to the *Gulistān* and attest to its long-lasting impact on literary traditions. If your interest is in the original work's history itself, searching by title might be most prudent. Make sure, however, to do a search for *Kulliyāt* as well. Finally, going via Sa' dī's authority record will bring you to the

8 See Lewis 2001.

manuscripts of all of his works. To account for the complex historical literary connections, his authority record is also linked to works that are, strictly speaking, not his compositions but their adaptations, translations, or editions.


The literary interconnectedness is further accounted for by the new work-title module mentioned above, which links manuscripts to authority files for literary works. This module provides an additional search possibility. However, as we will not create a work record for each text, this is only possible with regard to a limited number of works.

We recommend employing all search options. At the moment, a search in the title field will yield 42 results: the *Gulistān* appears in 22 manuscripts at the Berlin State Library, five at Tübingen University Library, eleven at the State and University Library in Dresden, three at Heidelberg University Library, and one manuscript at the Herzog August Bibliothek Wolfenbüttel. A full-text search brings up 63 results (thirteen more in Berlin, five more in Dresden, three more in Heidelberg). In addition, via Sa‘dī’s person record you will find six manuscripts of the *Kulliyāt* (Berlin, Heidelberg), four translations (Berlin, Dresden) and six commentaries of the *Gulistān* (Berlin, Dresden, Heidelberg), a calligraphy of two verses from the work’s preface (*dībāčah*) and a dictionary specifically concerned with the work’s terms and phrases (both in Berlin).

When looking at the work record for the *Gulistān* we find that there are eighteen manuscripts linked to that as well as number of commentaries and glosses (see fig. 1).

Moreover, the metadata of those textual witnesses give contextual information for the history of the *Gulistān*. According to the search results, the oldest copy of the *Gulistān* within this corpus is MS Heidelberg, Universitätsbibliothek, Cod. Trübner 54 (see fig. 2). This *Kulliyāt* manuscript was copied in 825 AH/1422 CE. The latest copy, made in the nineteenth century, is MS Tübingen, Universitätsbibliothek, Ma III b 27. Half of the commentaries are in Arabic and half in Ottoman Turkish. Three were copied in the fifteenth and sixteenth centuries. At least one of the Ottoman Turkish translations was produced in the fifteenth century (Dresden). In addition to metadata, the OD-Portal facilitates access to digital copies. So far, five manuscripts in Berlin, four manuscripts in Heidelberg and one in Dresden are digitally available.

Finally, the Qalamos portal provides information on codicological contexts of the *Gulistān*. It features modules devoted to ‘Book binding’ and ‘Book art’ to search for these non-textual aspects of manuscripts. Both come together in MS Berlin, Staatsbibliothek, Or. oct. 3772, whose binding displays beautiful illustrations (see fig. 3a–b). The portal further provides information on paper quality and format, scripts, and ink colours.



Gulistān

Verfasser

↳ Name Sa'dī

↳ Lebensdaten * in Shiraz

↑ 1292 in Shiraz

Sprache Alle Gulistān

Qalamos
connecting manuscripts traditions

- ▶ Werk-Info
- ▶ Personendaten
- ▶ Allgemeine Info
- ▶ Use & Share

Erweiterte Suche Menu

Werk-Info

Werktitel

- Gulistān

weitere Titelform

- Der Rosengarten
- Persianischer Rosenthal
- Persisches Rosenthal
- Gulistān, das ist, Königlicher Rosengarten
- Golestān
- Le parterre de fleurs
- Rose-garden
- Hundertundeine Geschichte aus dem Rosengarten
- Gulistān
- گولستان

Alphabet

Sprache

Werkbeziehungen

- ist Auszug von Kulliyāt-i Sa'dī
- hat Kommentar *Hiyābān-i Gulistān*
- hat Kommentar *[Kommentar zu Gulistān]*
- hat Kommentar *[Kommentar zu Gulistān]*
- hat Glosse *Miftāh-i Gulistān*
- hat Glosse *Miftāh-i Gulistān*
- hat Kommentar *Šerh-i Gulistān*

Link zu Manuskripten

- [DE-SUBHam] Cod. Orient. 203 Gulistān
- [DE-SUBHam] Cod. Orient. 204 Gulistān
- [DE-SUBHam] Cod. Orient. 205 Gulistān
- [DE-SBB] Diez A quart. 54 Gulistān
- [DE-SBB] Landberg 667 - 1 Gulistān
- [DE-SBB] Ms. or. fol. 136 Gulistān
- [DE-SBB] Ms. or. fol. 137 Gulistān
- [DE-SBB] Ms. or. fol. 303 - 2 Gulistān
- [DE-SBB] Ms. or. oct. 63 Gulistān
- [DE-SBB] Ms. or. oct. 89 - 1 Gulistān
- [DE-SBB] Ms. or. oct. 102 - 9 Gulistān
- [DE-SBB] Ms. or. oct. 204 Gulistān
- [DE-SBB] Ms. or. quart. 145 - 23 Gulistān
- [DE-SBB] Ms. or. quart. 254 Gulistān
- [DE-SBB] Ms. or. quart. 340 Gulistān
- [DE-SLUB] Mscr.Dresd.Ea.8 - 2 Gulistān
- [DE-SLUB] Mscr.Dresd.Eb.409 Gulistān
- [DE-SBB] Wetzstein II 273 - 1 Gulistān

Personendaten

Verfasser

↳ Name Sa'dī

↳ Lebensdaten * in Shiraz

↑ 1292 in Shiraz

Allgemeine Info

Datenquelle lokaler Datensatz

Identnummer GND 4277954-6

Use & Share

Bearbeiter Import gnd/Dehghani

Bearbeitungsstatus fertig

Statische URL https://mymsportal.dl.uni-leipzig.de/receive/MyMssWork_work_00000085

MyCoRe ID MyMssWork_work_00000085 (XML-Ansicht)

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Fig. 1. Work record of Sa'dī's *Gulistān* work.



Fig. 2. ms Heidelberg, Universitätsbibliothek, Cod. Trübner 54, ff. 2v–3r.

The composition of multiple-text manuscripts is also visible. As mentioned, the *Gulistān* can appear as a part of the *Kulliyāt*. In three cases, a manuscript contains not the full collection but both the *Gulistān* and Sa‘dī’s *Būstān*. One particular case is the multiple-text manuscript MS Dresden, Sächsische Landesbibliothek–Staats- und Universitätsbibliothek, Mscr.Dresd.Ea.8. Its first part (ff. 1–136r) contains the *Būstān*. The *Gulistān* does not follow the *Būstān*, but was written in the margins of those folia, moving along in parallel with the author’s foremost poetic work. For us it looks as if one scribe or owner of the manuscript strove to put both texts in close conversation with each other.

Codicological contexts

The importance of codicological context comes to the fore as well for works on Arabic grammar. Ibn al-Ḥāḡib’s *al-Kāfiya* or al-Muṭarrizī’s *al-Miṣbāḥ* are not only ubiquitous within the manuscript corpus at large, their joint placement within the same collective manuscripts hints at their use as textbooks for grammar education (see fig. 4). Within these manuscripts, these four texts would usually be placed in the same order: (1) *al-Kāfiya*, (2) a commen-



Fig. 3. Sa‘dī, *Kullīyāt*, ms Berlin, Staatsbibliothek, Or. oct. 3772, (a) left: lacquer binding with a flower bouquet; (b) right: doublure with daffodils and other flowers.

tary on *al-Miṣbāḥ* (often the *Šarḥ dībāḡat al-Miṣbāḥ*), (3) *al-Miṣbāḥ* itself, and, finally, (4) al-Ġurġānī’s *al-‘Awāmil* (all of them are included in ms Dresden, Sächsische Landesbibliothek – Staats- und Universitätsbibliothek, Mscr. Dresd.Ea.89, 180, and 274).

The frequency with which those works appear together in one manuscript reflects curricula of Arabic grammar education. It is also noteworthy that we rarely find all four in the same manuscript. Thus, ms Wolfenbüttel, Herzog August Bibliothek, Cod. Guelf. 260.10 Extrav. contains texts (1), (2) and (3); ms Berlin, Staatsbibliothek, Diez A oct. 41 contains texts (2), (3), and (4) and ms Berlin, Staatsbibliothek, Diez A oct. 41 contains texts (1), (3), and (4). Such manuscripts frequently add other grammatical texts to this ‘canon’, expanding and updating it to specific historical circumstances. They might, for instance, be followed by a Turkish or Persian elaboration on Arabic syntax (ms Berlin, Staatsbibliothek, Petermann I 303, ms Berlin, Staatsbibliothek, Wetzstein II 104), supporting the canonical status of these works beyond the Arab lands.

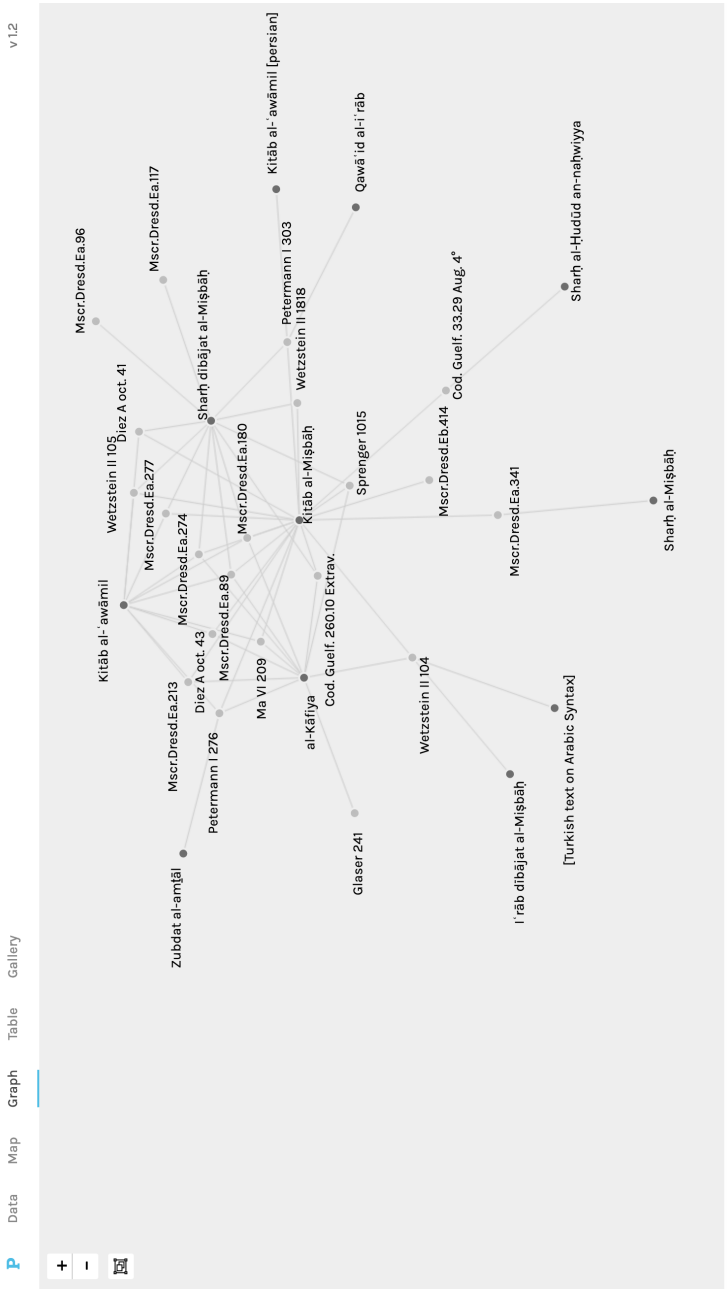


Fig. 4. Grammatical works in multiple-text manuscripts (created with *Palladio*).

Historical contexts

By examining the social history of writing and reading, recent scholarship has started to make the trajectories of translations and elaborations of works in other languages or their inclusion in multiple-text manuscripts more tangible. The portal supports such efforts by including information about the provenance of manuscripts in its associated collections. This is not limited to the people involved in the creation of a certain manuscript, e.g. scribes or calligraphers, but also includes those who were part of its subsequent history up to the acquisition for the collection to which it now belongs, such as former owners, endowers, donators and brokers of book sales.

Such information is provided partially through a separate module on ‘manuscript notes’, which not only tells us through whose hands a manuscript has gone, but also offers transcriptions of the notes these people left in the manuscripts. Those notes testify to their buying, reading, teaching, or studying a work. Most of the work on this module for the collections in Berlin, Gotha and Leipzig has been done by Boris Liebrecht, who has used such notes to, for instance, reconstruct the historical lending library of Aḥmad al-Rabbāṭ.⁹ His manuscripts can now be easily accessed through his authority file.

The significance of such notes in studying the history of a manuscript can be seen, for example, in the recent study of Konrad Hirschler and Torsten Wollina on MS Berlin, Staatsbibliothek, Sprenger 96b. They used these notes to trace its history from its creation in medieval Cairo through its being read in Damascus by the renowned bibliophile Yūsuf ibn ‘Abd al-Hādī (d. 1505) to the nineteenth-century manuscript collector Aloys Sprenger, who finally sold it to the Royal Library in Berlin (today Staatsbibliothek Preussischer Kulturbesitz).¹⁰

Casting light on European collectors, especially during the nineteenth and twentieth centuries, can also benefit our understanding of scholarly biographies, as collectors were often also academics in Oriental or Biblical studies or related subjects such as art history. Oskar Rescher’s (1883–1972) name, for instance, is associated with collections in Berlin, Heidelberg and Tübingen. These collections benefitted from his extensive collecting activities during his sojourn in Istanbul, either through purchase or bequest.¹¹

More information on the histories of the collections presented in the portal, the specificities of their printed catalogues, and on certain manuscript collectors or cataloguers can be found on our project blog <<https://od-portal.hypotheses.org/>>.

9 Liebrecht 2013.

10 Hirschler and Wollina 2021.

11 For further information on Oskar Rescher and his trade in oriental manuscripts, see Doğan Averbek and Hanstein 2021.

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Early Jewish and Christian Magical Traditions in Comparison and Contact*

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This article introduces the project *Early Jewish and Christian Magical Traditions in Comparison and Contact*, the first large-scale interdisciplinary comparative study of Jewish and Christian magical objects from Late Antiquity. It is expected to significantly improve knowledge of ancient magic and early Jewish–Christian relations in lived religion (i.e. religion as it was actually practiced in everyday life). The project examines the local and global features of these objects—and the social contexts behind them—through a synthetic and innovative interpretive framework, which draws upon various academic fields including religious studies, sociology, and art history. The project's illumination of the late antique lived contexts of early Jews and Christians will help rewrite the history of two of the world's most prolific religions.

Introduction

Like most individuals living in the late antique Mediterranean world (approximately third to seventh century CE), Jews and Christians believed that the world was populated with otherworldly beings (e.g. angels, demons, and ghosts) that could either provide assistance or cause spiritual and physical harm. In order to deal with this dire and complex situation, Jews and Christians sought the help of ritual experts (e.g., Christian priests, monks, Jewish rabbis, and neighborhood healers), who were entrusted to combat, appease, or invoke such beings. These so-called 'magicians' created various kinds of aids for the healing and protection of their clients, including amulets (often made from papyrus or parchment) to place around the neck and earthenware bowls to bury under the house. Fortunately, many of these artifacts have survived from antiquity and include texts written in diverse languages and scripts (e.g., Greek, Coptic, Jewish Babylonian Aramaic, and Syriac) that incorporate citations from sacred texts, drawings, divine names, and references to various ritual practices.¹

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1 The principal corpus of materials for this project is based primarily on published artifacts and consists of approximately 200 Greek objects (including gems); 275 Coptic objects; 500 Jewish Babylonian Aramaic magical bowls; and 50 Syriac objects. In addition to this principal corpus team members will make use of related

In many cases, however, these objects conflict with our inherited ideas about the boundaries between early Judaism and Christianity. Several amulets, for instance, include both traditional Christian language (e.g., the Trinity) and traditional Jewish language (e.g., *Iâo Sabaôth*). Unfortunately, such objects are often merely described or castigated as ‘syncretistic’ or as reflecting the polytheistic world of late antiquity. But such identifications—without further nuance and attention to the complex social dynamics of late antiquity—obscure at least two distinct phenomena: (1) the intentional usage of foreign or exotic names, practices, etc. for ritual efficacy and (2) the use of cultural elements that had already been absorbed into new cultural contexts and had, therefore, lost their original associations. Indeed, these objects raise various questions about their social contexts: do they reflect cooperation between Jewish and Christian ritual experts? Do they reflect the assimilation of originally Jewish terminology into the Christian tradition? How do these local ritual objects fit into the global world of late antiquity, in which Christians and Jews differentiated themselves from one another and even had violent exchanges? To state the problem in more technical terms: how did the dynamics of religious assimilation, cooperation, and differentiation play out in such magical contexts? This problem requires a study that traverses the academic fields of early Jewish magic, early Christian magic, and early Jewish–Christian relations. *Early Jewish and Christian Magical Traditions in Comparison and Contact (EJCM)* is the first focused and sustained project that brings together these fields of study.

Early Jewish and Christian magical traditions and disciplinary boundaries

The lack of a clear scholarly focus on the dynamics of religious assimilation, cooperation, and differentiation in the study of late antique Jewish and Christian magic is closely linked to disciplinary divisions and interests in the study of late antiquity. Although there has been substantial and important research over the past few decades devoted to magic in Jewish and Christian communities—including editions of Jewish and Christian textual amulets and incantation bowls² and studies examining particular practices of Jewish magic

magical objects, such as the approximately 100 Jewish Palestinian Aramaic amulets and 125 Mandaic incantation bowls.

- 2 E.g. Meyer and Smith 1999; Michel, Zazoff and Zazoff 2001; Moriggi 2014; Naveh and Shaked 1985; Naveh 1993; Shaked, Ford, and Bhayro 2013; Ford and Morgenstern 2019; Bonner 1950; Daniel and Maltomini 1990 and 1992; Choat and Gardner 2014; Kotansky 1994; Michel 2004; Preisendanz 1973; Sanzo 2012; Sanzo and Korsvoll 2017; Sanzo and Zelyck 2017; Segal 2000; Spier 2007; Stegemann 1934; Zwierlein-Diehl 2007.

or Christian magic³—the study of these magical traditions tends to be divided along disciplinary lines: historians of early Judaism study early Jewish magic; historians of early Christianity (or Classicists) study early Christian magic. To be sure, select studies have tried to approach the Jewish and Christian magical traditions with greater attention to local social dynamics, especially as it pertains to the Mesopotamian incantation bowls. For instance, scholars have stressed the broader Mesopotamian context within which both the Syriac incantation bowls and the Jewish-Aramaic incantation bowls were created and circulated. Most importantly, Nils H. Korsvoll's dissertation has usefully examined both sets of bowls (with the occasional reference to the Egyptian materials) in order to make a broader comment on the usefulness of the category 'Christian' for the Syriac incantation bowls.⁴ Despite the significant contribution his dissertation makes to the study of Mesopotamian incantation bowls, the analytical scope of the dissertation is primarily oriented around the Syriac materials; he did not, therefore, stress to a significant degree the respective dynamics of religious assimilation, cooperation, and differentiation within and across Jewish and Christian traditions (more globally understood) nor provide a broader theoretical analysis of these social dynamics in lived religion. In the end, disciplinary approaches toward the evidence have typically—and without scholarly justification—rendered instances of contact or sharing between Jewish and Christian magical traditions as syncretistic or as reflecting a cultural exoticism or a generic magical practice.

Yet, recent studies on the early relationship between Judaism and Christianity more generally have shown that the boundaries between Judaism and Christianity were configured in diverse ways. For instance, scholars have deftly demonstrated that the arguments found in many early Christian writings (e.g., the Gospel of John, the Apologies of Justin Martyr, Melito of Sardis's *Peri Pascha*, and John Chrysostom's *Homilies against the Judaizing Christians*) and early Jewish writings (e.g., the Mishnah, the Palestinian Talmud, the Babylonian Talmud, and the Hekhalot literature) reflect the close social and spatial contexts at the local level in which ancient Jews and Christians negotiated their identities in relation to one another.⁵ Archaeological excavations from various regions of the ancient Mediterranean world have likewise demonstrated that local social, economic, and religious concerns often brought Jews and Christians into close contact.⁶ Not surprisingly, the ev-

3 E.g. Bohak 2008; Sanzo 2014a; Jones 2016; Harari 2017; de Bruyn 2017; Saar 2017; Bélanger-Sarrazin 2017; Bohak, Harari, and Shaked 2011; Boschung and Bremmer 2015.

4 Korsvoll 2017.

5 E.g. Becker and Reed 2007; Boyarin 2004; Schäfer 2012.

6 E.g. Rutgers 1992; Crawford 1999.

idence disclosed in these literary and archaeological sources reveals diverse kinds of social interactions and exchanges between Christians and Jews, from equal participation in local festivals,⁷ to sharing of poetic genres,⁸ to rhetorical and even physical violence.⁹ Such local dynamics were further augmented by global Christian, Jewish, and imperial factors.¹⁰ In fact, a powerful bishop, such as Ambrose of Milan, could even conflict with the Emperor (Theodosius) over issues surrounding Jewish–Christian tensions in another region (Callinicum). Unfortunately, scholarship on early Jewish–Christian relations has not taken into sufficient consideration how magical practices, texts, and artefacts might inform these local and global dynamics. This gap in the study of early Jewish-Christian relations is unfortunate because the magical objects give us insight into aspects of inter-religious interaction that are not readily apparent in the literary and archaeological sources. For instance, as I will describe in more detail below, the magical objects acutely demonstrate that religious assimilation and religious differentiation could be operative simultaneously.

In sum, despite the growing scholarly interests in Jewish and Christian magical traditions, on the one hand, and early Jewish–Christian relations, on the other hand, there has been no focused and sustained study of the social and religious dynamics that unfolded at the crossroads of late antique magic, early Judaism, and early Christianity. In order to offer an account of all of these dynamics, one must adopt a methodology, which takes into consideration all the features of the artifacts (e.g., texts, images, and materiality), the social complexities of (late antique) cultural interaction and exchange at the local and global levels, and the relationship between contemporary scholarly categories and ancient evidence.

Objectives

EJCM seeks to fill this important aspect of late antiquity by providing a detailed, comparative analysis of the similarities, differences, and contacts within and between early Jewish and Christian magical traditions on both the local and global levels. This project will contribute to the study of late antique magic by bridging materials and texts that are usually treated independent of one another and by adopting an interpretive framework for understanding the magical objects—and their operative social contexts—that is informed by recent scholarship on: (1) the intersection of text, image, and material of magical objects; (2) inter-religious contact and exchange (e.g., syncretism,

7 E.g. Sozomen, *Eccl. Hist.* 2.4; John Chrysostom, *Adv. Jud.* 8.5.4.

8 E.g. Münz-Manor 2010.

9 E.g. *Ep. Sev.* 13.3–14.1.

10 E.g. Sanzo and Boustan 2014.

foreignness/exoticism, boundaries, and identity); and (3) comparison and classification in the study of antiquity (e.g., how to approach terms, such as magic, Judaism, Christianity). This methodology will be outlined in more detail in the Interpretive and Methodological Framework (see below).

The project's four primary objectives are:

1. To synthesize insights from ancient magical studies, comparative history and religion, art history, and sociology in order to illuminate the local and global features of early Jewish and Christian magical objects and to assess their implications for the study of early Jewish–Christian relations.
2. To offer unique insight into the dynamics of religious assimilation, cooperation, and differentiation in late antique lived religion.
3. To reconfigure the ways historians of antiquity approach key terms in the field, especially Judaism, Christianity, magic, syncretism, and communal boundaries.

4. To provide new readings of patristic, rabbinic, and legal texts, which describe or complain about Christians and Jews participating in illicit rituals. In order to achieve these research objectives, this project will attend to the similarities, differences, and contacts between Jewish and Christian traditions in four shared and central magical practices: (1) the uses of biblical texts and traditions; (2) the uses of sacred names and titles; (3) the juxtapositions of words, images, and materials; and (4) references to illicit rituals. *EJCM* will also consider how rituals for healing and protection against demonic threat unfolded at the crossroads of the literary and material records of early Jews and Christians. Consequently, this project will not only include close readings of magical texts (written in the Greek, Coptic, Latin, Syriac, and Jewish Babylonian Aramaic languages/scripts), but it will also place such magical materials into dialogue with select literary and legal traditions (e.g., patristic writings; Talmudic literature; Roman imperial legislation), which describe, resemble, or criticize the Christian and Jewish uses of magic or early Jewish–Christian relations more generally.

Approaches and methods

Research orientation

In order to examine the dynamics of religious assimilation, cooperation, and differentiation in the Jewish and Christian magical objects, the team members must continually reflect on the following question: how did the local monks, Christian priests, rabbis, and other specialists who produced ostensibly magical objects synthesize the symbols and practices of their immediate, local environments with global religious motifs? This emphasis on both local and global dynamics dovetails with the Interpretive and Methodological Frame-

work (see below) in order to illuminate two partially overlapping domains of late antique religion.

(1) It will help us gain a better understanding of the ways magical objects facilitated or required close interaction between individuals from Jewish and Christian communities and the implications of those interactions for religious identity. For instance, a series of Christian Syriac incantation bowls cite the authority of a famous Jewish rabbi (Rab. Joshua bar Peraḥya), while several Jewish Babylonian Aramaic incantation bowls invoke Jesus, with at least one calling upon the power of the Christian Trinity. Such a network of local Mesopotamian practitioners is also reflected in the commonalities among the Syriac and Jewish Babylonian Aramaic bowls with respect to layout (e.g., the spiral writing, which typically progresses from the center to the rim of the bowl, and the usual placement of the image—when present—in the center of the bowl) and materiality (i.e., the use of domestic earthenware). Taken together, these objects demonstrate both that the alignment of region, medium, and language were often more important in determining the nature of ritual practice than religious affiliation and that in some cases practitioners may have actually embraced religious difference. To be sure, several other objects reflect a much more sectarian approach to religious identity: at times, Jewish practitioners would draw exclusively from global Jewish traditions, and Christian practitioners would draw exclusively from global Christian traditions. In short, communal identity and difference could take on diverse manifestations in lived religion. This project will work to taxonomize further these diverse configurations of difference and identity in lived religion.

(2) This approach will yield important insight into the relationship between religious symbols and religious identity in late antique lived religion, which will improve scholarly knowledge of early Jewish-Christian relations and the global Christianization process in the Mediterranean world. It will also raise new questions about the literary sources. For instance, a group of late antique Christian magical objects, written in Greek and Coptic, differentiate their clients from the ‘Jews’ using global vitriolic motifs.¹¹ These objects emphasize the evils of the Jews, especially in relation to the suffering and death of Jesus. In fact, one late antique Coptic spell book (MS Leiden, University Library, AMS 9) not only highlights the Jewish culpability for the death of Jesus, but also refers to the Jewish people as a ‘dead dog’, thus appropriating the anti-Jewish invective of ecclesiastical leaders, such as John Chrysostom. Nevertheless, the evidence suggests that these very same anti-Jewish objects ironically appropriate local Jewish ritual customs. This conjunction of assimilation and religious differentiation illuminates early Jewish-Christian rela-

11 See Sanzo 2014b; Boustan and Sanzo 2017.

tions and the early Christianization process more generally by demonstrating that local Jewish traditions could become so separated from their global—and original—contexts that they could figure into rigidly defined Christian discourses, which were directed against the Jews. These objects also require us to reassess the accuracy or the interpretation of the literary sources, which complain about believers crossing religious boundaries or mixing the symbols of different religious traditions when practicing magic; such objects reveal that, while participants in so-called magical rituals held to different versions of the boundaries between Judaism and Christianity than ecclesiastical leaders promoted, practitioners and their clients could in fact be very interested in religious differentiation. At a more general level, these objects challenge the widely held assumption in ancient history and archaeology that shared or common cultural traditions are necessarily indicative of friendly inter-cultural relations or the blurring of cultural/religious boundaries.

Interpretive and methodological framework

Given the interdisciplinary nature of the project, team members will not appropriate a single theory or method; rather, this project requires the linking of various approaches that are usually treated separately. This synthesis of approaches works in conjunction with the research orientation (see above). Each of the theories and methods falls into one of three categories:

(1) Text and artefact

At the most basic level, the project will draw on the methodological insights of recent scholarship on how to identify an amuletic or magical function of an object.¹² It is not always clear, for instance, if a small biblical artifact was intended to be used as an amulet or was used for another purpose (e.g., a memory aid). Team members will take into consideration the material and textual properties of the object in order to help identify its function. Are there holes on the object (which might suggest that it was worn as an amulet)? Does the shape and character of the object resemble other known magical objects? Are the texts, symbols, or images found on the artifact common to known magical objects? Members of the team will follow the now standard protocol of assessing the likelihood that an object was used for magical purposes based on the following rubrics: certain; probable; and possible.¹³ Of course, EJCM recognizes that objects could serve multiple functions for their users, even for a single user. Carrying a papyrus with a psalm inscribed on it to church, for instance, might have meant one thing; however, that same object proba-

12 Esp. de Bruyn and Dijkstra 2011; Wilburn 2013; Arzt-Grabner and de Troyer 2018.

13 See de Bruyn and Dijkstra 2011.

bly served a totally different function when the carrier was sick or afraid of demonic attack.

At a broader methodological level, the team members will also apply to the magical objects an integrative approach, in which the scholar examines the intersections of words, images, and material properties—with a particular emphasis on local parallels—in order to provide a more comprehensive interpretation of the artifacts.¹⁴ This approach synthesizes research from historians of the book¹⁵ and proponents of the ‘New Philology’¹⁶ on the relationship between materiality, reading habits, and conceptions of text, on the one hand, and on research from historians of ancient art on the complexities of ancient word–image relations,¹⁷ on the other hand.

(2) *Social dynamics*

The project will also draw from several academic disciplines, including art history, religious studies, and sociology, to address questions of religious identity and social interaction between early Jews and Christians on both local and global levels. The project’s synthetic focus on these issues will redraw the relationships between cultural symbols, communal boundaries, and religious identities in late antiquity and thus rewrite the early history of Judaism and Christianity in lived religion. For instance, the project will grapple with contemporary theory on the relationship between identity, the individual, and groups in order to answer the following question: to what extent was religious identity operative in the late antique magical objects? For this question, we will draw on the work of the sociologists Rogers Brubaker and Bernard Lahire, who have highlighted in separate studies the ways individuals can align themselves with different groups depending upon the situation and context.¹⁸ We are not the first historians of Late Antiquity to draw on the work of Brubaker and Lahire to discuss late antique magic; Éric Rebillard has used their work in order to claim that religious identity was not ‘activated’ in magical contexts.¹⁹ Rebillard’s analysis, however, was based exclusively on the literary evidence (e.g., the writings of St. Augustine). EJCM, which not only takes into consideration the literary sources, but, more importantly, the material evidence (e.g., amulets and incantation bowls), will show that in fact religious identity—conceived in both local and global ways—played an important role in such magical contexts.

14 Cf. Sanzo 2015; 2016.

15 E.g. Cavallo and Chartier 1999.

16 E.g. Driscoll 2010; Lied and Lundhaug 2017.

17 E.g. Newby 2007; Squire 2009.

18 E.g. Brubaker 2002; Lahire 2011.

19 Rebillard 2012, 73.

In addition, the examination of the dynamics of assimilation, cooperation, and differentiation requires that team members grapple with questions of cultural exoticism, syncretism, and synthesis. By attending to these features in conjunction with one another, the project addresses three central questions, which will reorient the study of early Jewish and Christian lived religion:

1. To what extent—if at all—did late antique Christian and, especially, Jewish practitioners appropriate cultural stereotypes about them when they composed their ritual texts?
2. To what extent did elements, which were originally Jewish (e.g., *Iaô Sabaoth* and Rabbi Joshua bar Peraḥya) or Christian (e.g., the name Jesus or a cross), continue to be understood as specifically Jewish or Christian by subsequent users?
- 3 What social factors contributed to the appropriation of foreign religious or cultural symbols, practices, and traditions?

The examination of exoticism, first, takes into consideration what historian of ancient religion David Frankfurter has called ‘stereotype appropriation,’ whereby an individual actively appropriates and displays the stereotypes thrust upon him or her by hegemonic power.²⁰ Frankfurter has demonstrated how Egyptian practitioners utilized Roman stereotypes of Egyptians as they produced their ritual objects. The examination of exoticism also takes into consideration the work of art historian Alicia Walker, whose study of the imperial court in the medieval Byzantine Empire has demonstrated how exotic cultural elements can function as ‘active agents of meaning,’ resolving the curiosities and fears that result from interactions with cultural and ethnic Others.²¹ Such scholarship works in dialogue with research on cultural syncretism and synthesis. In contrast to much scholarship in ancient magic, which has assumed that the inclusion of both Jewish and Christian elements on a single object inherently reflects a conscious and intentional mixture of religious traditions, Michael Pye has shown that cultural symbols commonly lose their original associations over time.²² This process, which he calls ‘resolution,’ can take a variety of forms, such as ‘assimilation’ (i.e., weaker elements are absorbed into the dominant tradition) and ‘synthesis’ (i.e., a new religious tradition is created). The project’s synthetic focus on identity, exoticism, syncretism, and synthesis will contribute to a new understanding of the ways late antique people understood Judaism and Christianity—as both local and global categories—as they went about their everyday lives.

20 E.g. Frankfurter 1998, 224–37. Cf. Dieleman 2005, 9–10, 287.

21 Walker 2012. Cf. Canepa 2010.

22 Pye 1994.

(3) *Comparison and Classification*

This project also grapples with the relationship between ancient artifacts and scholarly categories and approaches. The team's comparative study of Jewish and Christian magical traditions draws upon both the analytical use of comparison (i.e., oriented around similar kinds of individuals/groups at a particular period of time) and the illustrative use of comparison (i.e., oriented around a broader idea, concept, or model that transcends specific groups or a particular time period), as described by Victoria Bonnell and applied to the study of late antiquity by David Frankfurter²³ This two-fold comparative approach will help the team members to examine early Jewish and Christian magical practices as equivalent historical units (i.e., the analytical use of comparison) and to reflect on the relationship between this material evidence and broader scholarly categories, such as magic, religion, syncretism, and inter-cultural contact (i.e., the illustrative use of comparison). What is more, in light of this approach, the team members will not only rely heavily on scholarship devoted to early Jewish or Christian magical traditions and early Jewish-Christian relations, but they will also utilize broader sociological research on syncretism (see above) and on accusations of violence and boundary demarcation among closely related communities.²⁴

In addition, the project will also make use of scholarship on taxonomy and classification from various fields. For instance, analyses of the adjectives 'Christian' and 'Jewish' (as well as the controversial term 'magic') necessitates an evaluation of the use of these terms in ancient studies,²⁵ on the one hand, and a frontal engagement with research in the cognitive and social sciences on classification²⁶ and the emic/etic distinction,²⁷ on the other hand. This aspect of the project is largely oriented around the following question: to what extent should we allow ancient sources to frame our scholarly categories? In addition, the study of the practitioners' own understandings of their religious traditions, beliefs, and practices will make use of the work on lived religion among historians of modern religions, such as Robert Orsi,²⁸ and historians of ancient religions, such as Jörg Rüpke.²⁹

23 Bonnell 1980; Frankfurter 2012.

24 E.g. Simmel 1956; Coser 1956; Smith 1985, 44–48; Frankfurter 2001, 412–416.

25 E.g. Becker and Reed 2007; Boyarin 2004; Schäfer 2012; Jacobs 2012; Bremmer 1999; Aune 2007; Otto 2013; Styers 2004.

26 E.g. Smith 1980; Lakoff and Johnson 1980; Lakoff 1987.

27 E.g. Headland, Pike, and Harris 1990.

28 Esp. Orsi 1985. See also Hall 1997; Ammerman 2007; McGuire 2008; Knibbe and Kupari 2020.

29 E.g. Rüpke 2016; Raja and Rüpke 2015. See also Denzey Lewis 2021.

Conclusions

The *EJCM* project offers the first comparative and extended analysis of early Jewish and Christian magical traditions, with particular attention to their implications for the study of early Jewish–Christian relations and for the study of ancient magic more generally. In order to accomplish these research aims, the project applies a new analytical framework that allows for a reassessment of the local and global dynamics that stood behind early Jewish and Christian magical practices. This framework not only makes a unique and important contribution to the study of both ancient magic and early Jewish–Christian relations by bridging these sources (which are typically analyzed in isolation), but it also applies to them a robust, interdisciplinary methodology, which synthesizes insights from various academic fields, including history, religious studies, sociology, and art history. The joining of these fields and sources will produce significant information about the past by revealing how religious assimilation, cooperation, and differentiation worked in ancient rituals, on the one hand, and by illuminating the ways Jews and Christians configured the symbolic, social, and material boundaries between their respective communities in lived contexts, on the other hand. Beyond supplementing the literary evidence, the Jewish and Christian material objects challenge scholars to redraw many of the constructs they currently use to describe and think about ancient magic and early Jewish–Christian relations (e.g., syncretism and communal boundaries). These artifacts also recontextualize patristic, rabbinic, and legal texts that describe or complain about believers participating in illicit rituals or interacting with religious and ethnic Others. This synthetic project will also better equip scholars to evaluate the extent to which we can usefully distinguish between Jewish and Christian magical traditions and Judaism and Christianity more generally in late antiquity. In the end, this interdisciplinary project will offer a unique portrait of the intersecting histories of early Judaism and early Christianity.

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**Letters to the Sheikh:
Political and Economic Transformations in the Indian
Ocean World as Reflected in the Letters to the ‘Abriyin
of al-Hamra’ (Oman) during the Long 19th Century***

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This is a short introduction into the DFG-funded project *Letters to the Sheikh*, dedicated to the history of Central Oman viewed through the letters in the archive of a local elite family, the ‘Abrīyīn from the oasis of al-Ḥamrā’.

Within the framework of the project ‘Transformation Processes in Oasis Settlements of Oman’ (DFG, 1999–2007), documents were discovered in a house in al-Ḥamrā’, inhabited since the seventeenth century by the leaders of the ‘Abrīyīn, an important family lineage of Oman (fig. 1). The archive is mostly



Fig. 1. The house Bayt aṣ-Ṣafā.

* This is an expanded version of the poster presentation for the Digital Humanities Day # 3 at Ruhr-Universität Bochum, 14 and 15 January 2021 (<<https://dhday3.ub.rub.de/>>), convened by the newly inaugurated Digital Humanities Center at the Central University Library (<<https://dh.ub.rub.de/en/center/>>). For the project poster visit <<https://doi.org/10.13154/294-7835>>.

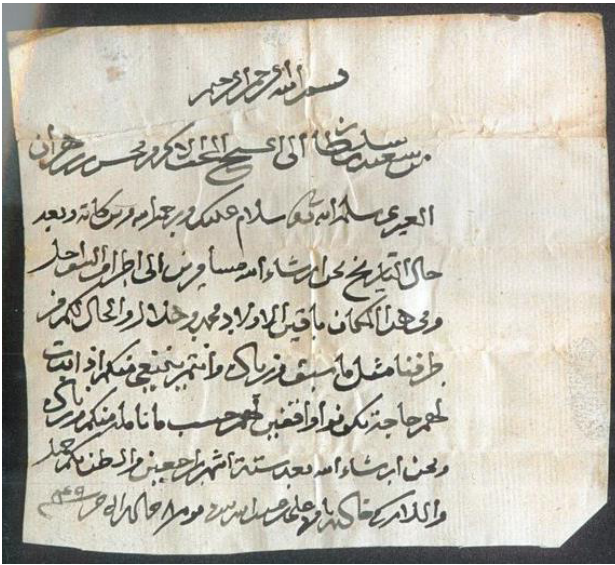


Fig. 2. Letter of Sayyid Sa'īd b. Sultān al-Būsa'īdī to the 'Abrīyīn family, 8 Ġumādā II 1249 AH / 23 October 1833 CE.

made up of handwritten letters, addressed to the current family head, the *šayḥ* (fig. 2). Several thousand documents spanning a period between the second half of the eighteenth century until the mid-twentieth century were recovered.

The importance of an in-depth study of these historical documents was quickly recognized. A pilot project was launched in 2016, setting up (with the help of the eScience Center, University of Tübingen) a custom-made relational database for a detailed description of the manuscripts (fig. 3).

Against this background, a new project was called into life at Ruhr-Universität Bochum, also funded by the DFG, for the years 2021–2024, *Letters to the Sheikh: Political and economic transformations in the Indian Ocean World as reflected in the letters to the 'Abrīyīn of al-Hamra' (Oman) during the long 19th century.*¹

The project is devoted to the social, political and economic history of Central Oman during the long nineteenth century (here defined as the time span 1792–1920) using the aforementioned archive as its main source. The letters will be examined with a combination of serial and qualitative analysis. Based on this, individual studies will focus on social and political networks, economic relations and historical semantics. The general aim of the project is to build a bridge between two strands of research that have been largely pursued in isolation from each other: the macro-level history of Oman and the Indian Ocean and the microlevel history of the 'Abrīyīn as an important tribal

1 <<https://gepris.dfg.de/gepris/projekt/446674248?language=en>>.

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- **Date: Day**
- Other Places**
 - sawāhīl (Sawahil coast) (ID = 615)
- **Related Persons**
 - Būsa ṭḍī, al-, Hāilī b. Sa ṭīd (ID = 177)
 - Būsa ṭḍī, al-, Muḥammad b. Sālim (ID = 176)
 - Unknown, 'Afī b. 'Abdālāh (ID = 614)
- **Referenced Documents**
- Keywords**
 - authorisation of deputies (ID = 616)
- **Bibliographic References**
- Summary**

Sa ṭīd b. Sultān announces he will leave the country to Zanzibar with the intent to return after six months. He has authorised his oldest son Hāilī b. Sa ṭīd al-Būsa ṭḍī and his nephew Muḥammad b. Sālim al-Būsa ṭḍī to act as his deputies. He asks Muḥsin b. Zahrān al-'Abīf to give his two deputies full support whenever need arises.
- English Translation**

From Sa ṭīd b. Sultān to the dear šayḥ Muḥsin b. Zahrān al-'Abīf. Greetings and God's blessings [. . .]
 Now to the point (wa-ba ḍ):
 The time has come [and] we will, God willing, travel to the Sawāhīl [i.e. Zanzibar].
 The sons Muḥammad and Hāilī will remain in these lands [i.e. as deputies in Oman].
- **Editing Note**

See Handout 8, "Absences of Sa ṭīd b. Sultān".
- **Editing Status ★**

Fig. 3. Pilot database entry form to describe the letter in fig. 2.

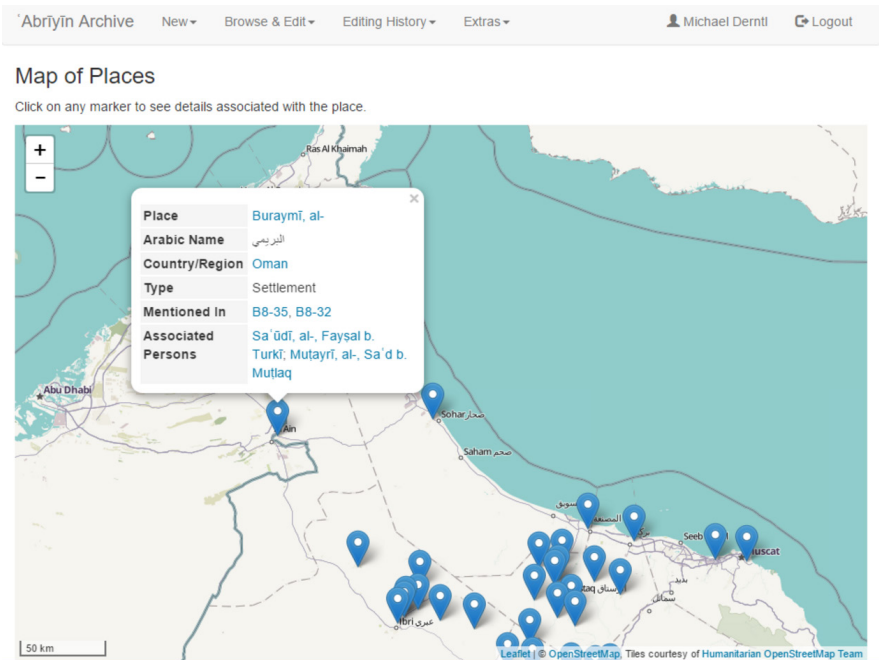


Fig. 4. Map of places mentioned in the letters.

group. The project can build on extensive preliminary work, including a study on *ṣayḥ* Muḥsin b. Zahrān al-ʿAbrī (d. 1873)² as a political actor as well as the custom-made relational database created during the pilot project phase.³

By focusing on the concerns and strategies of local actors, the project will complement the existing research on the history of Oman by a microhistorical perspective. Another focus of research is the language of letter communication, which will be examined with regard to questions of conceptual history and historical semantics.

The project intends to contribute to a new understanding of Oman as a historical region in its trans-regional framework. In this regard, we will explore the reaction of the letters' authors to political and economic developments in the Indian Ocean. We shall further challenge basic assumptions in the research literature, such as the isolation and stagnation of central Oman during the period (in contrast to the Omani territories in East Africa).

2 Hoffmann-Ruf 2008.

3 Visit also <<https://uni-tuebingen.de/forschung/forschungsinfrastruktur/escience-center/projekte/abriyin-archiv-von-al-hamra/>> (last access 25 November 2021) for more background information on the pilot project.

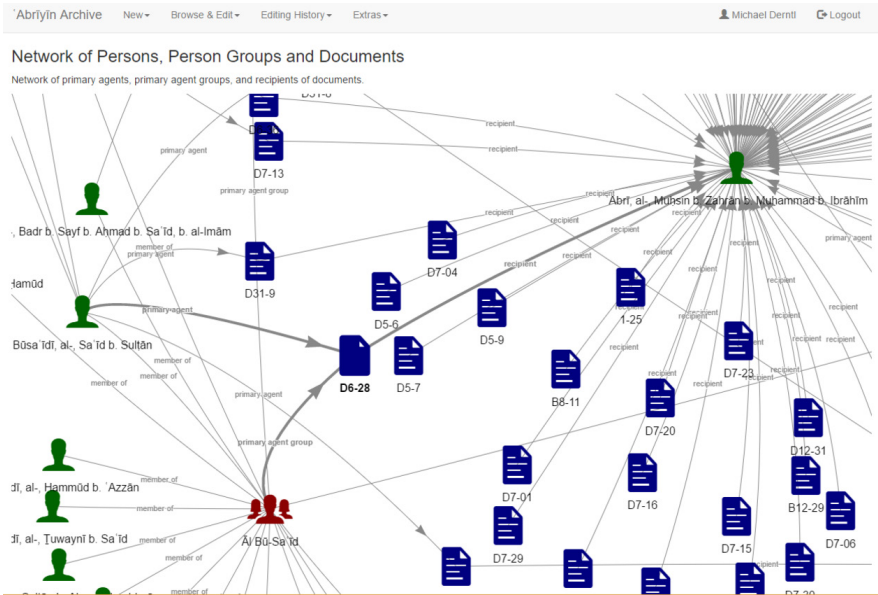


Fig. 5. Visualisation of the network of persons (green), groups (red), and letters (blue). Clicking on an element opens the corresponding database record.

The analysis of the archival material focuses on five select correspondences between the ‘Abrīyīn and other local actors. It will proceed in three steps: We shall begin with a serial analysis, which generates information on the correspondences’ intensity and duration and allows for a further selection of letters with special significance for our concerns. In the following, these select texts will be subjected to in-depth analysis. Finally, the results will be discussed in the wider context of the history of Oman and the Indian Ocean.

In order to guarantee sustainable hosting of the data, the pilot database shall be migrated to *Qalamos*, the new portal for Asian and African manuscripts.⁴

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4 See <<https://www.qalamos.net>> and the presentation in this issue.

The *Chronicle* of John of Nikiu: Text-Critical Edition and Digital Research Platform

Daria Elagina, Universität Hamburg

A new project is dedicated to the critical edition of the *Chronicle* of John of Nikiu, a unique source for the history of Late Antiquity surviving exclusively in Ethiopic.

In 2022–2024 Universität Hamburg will be hosting the project *The Chronicle of John of Nikiu: Text-Critical Edition and Digital Research Platform*,¹ dedicated to a unique historiographical work, which is an essential source for historians dealing with Late Antiquity² and a promising source for future studies.³ The project aims to produce a new text-critical edition of the *Chronicle of John of Nikiu*,⁴ which has been considered a scholarly *desideratum* for years.⁵ The edition of the Ethiopic text of the *Chronicle* will be based on at least five direct witnesses⁶ (Paris, Bibliothèque nationale de France, Éthiopien 146;⁷ London, British Library, Oriental 818;⁸ Paris, Bibliothèque nationale de France, Éthiopien d'Abbadie 31;⁹ Rome, Biblioteca dell'Accademia nazionale dei Lincei e Corsiniana, Conti Rossini 27;¹⁰ Collegeville, MN, Hill Museum & Manuscript Library, Ethiopic Manuscript Microfilm Library 7919¹¹).

The project foresees a printed edition, and a digital edition, in addition to a new English translation. Both editions (printed and digital) will be based on the same critical text established under the application of the genealogical-reconstructive method but will differ in their functionality and possibilities for further reuse. The printed edition will include several apparatuses and a system of references. The English translation will include a standardized translit-

- 1 The project is funded by the German Research Foundation (DFG project no. 470097824, Principle investigator: Daria Elagina).
- 2 For an overview see Weninger 2007; Fraser 1999.
- 3 For example, Booth 2016, 551; Felege-Selam Solomon Yirga 2020.
- 4 The only complete edition of the *Chronicle* of John of Nikiu so far is Zotenberg 1883.
- 5 Fiaccadori 2009, 213; Booth 2011, 557.
- 6 The overall dossier of the *Chronicle* comprises at least 30 manuscripts including the indirect transmission of the text in Ethiopic, represented, for example, by the *Vita of Cyril of Alexandria* and the *Vita of John Chrysostom* (Witakowski 2008).
- 7 Zotenberg 1877, 222–249, no. 146.
- 8 Wright 1877, 297–314, no. 391.
- 9 d'Abbadie 1859, 37–40; Chaîne 1912, 19–20; Conti Rossini 1914, 207–208, no. 209.
- 10 Strelcyn 1976, 100–102.
- 11 Brown and Elagina 2018.

the old numbers of BnF are no longer used; the official shelfmark is the number of the Zotenberg catalogue; 123 changed to 146

eration of all proper names, including doubtful or conjectural readings, titles, corrupted portions of text and ambiguous Ethiopic terms. The translation will be accompanied by an apparatus for parallel traditions, extensive philological commentary, a system of indexes, as well as by a historical commentary by Phil Booth (University of Oxford), who has been extensively working on the *Chronicle of John of Nikiu* in the past years¹² and has kindly agreed to cooperate in the project. The printed edition and translation should thus become a standard work of reference for future research on the *Chronicle of John of Nikiu*.

A digital edition in TEI XML will be published on the platform of the long-term project *Beta maṣāḥaft: Manuscripts of Ethiopia and Eritrea*¹³ and be freely available. The launching of the edition on this platform allows for placing the *Chronicle* into the context of the manuscript tradition of Ethiopia and Eritrea, which might also be crucial for the study of the influence of this text on the manuscript production of the region. The integrated on-line lexicon of Ethiopic¹⁴ and the morphological parser¹⁵ will allow for a better analysis of the text in Ethiopic.

Additionally, the digital edition will offer several added values, which would promote possibilities for the further analysis of the *Chronicle*'s text, such as the annotation of persons, place names, and dates. In cases of vague identification, the encoding of the grade of certainty is possible, which would allow for filtering doubtful identifications of persons, places, or dates to spot the problematic passages in the text.¹⁶ As the *Chronicle*'s text narrates realities out of the scope of Ethiopian domain, the annotation of persons and places will also include a mapping and linking of annotated entities to external databases, such as Wikidata, but also to databases which are specifically focused, in terms of geography and time, on the realities of the *Chronicle*, such as

12 For example, Booth 2011, Booth 2013, Booth 2016.

13 *Beta maṣāḥaft: Manuscripts of Ethiopia and Eritrea* (Schriftkultur des christlichen Äthiopiens und Eritreas: eine multimediale Forschungsumgebung) is a long-term project funded within the framework of the Academies' Programme (coordinated by the Union of the German Academies of Sciences and Humanities) under survey of the Akademie der Wissenschaften in Hamburg. I want to express my deepest gratitude to the project team for establishing and maintaining the project infrastructure, which serves not only as an outstanding and innovative research tool, but also as a reliable partner for smaller projects such as the one described in this note. I extend my special thanks to Pietro Liuzzo, the technical lead of the project, for his indispensable assistance and excellent expertise.

14 <<https://betamasaheft.eu/Dillmann/>>.

15 <<https://betamasaheft.eu/morpho/>>.

16 Liuzzo et al. 2018.

PATHs,¹⁷ including a repository of Egyptian place names; *Trismegistos*, an interdisciplinary portal of the ancient world;¹⁸ *Pleiades*,¹⁹ a gazetteer of ancient places; the *Prosopography of the Byzantine World*;²⁰ and the *Prosopographie der mittelbyzantinischen Zeit Online*.²¹ The digital edition will remain editable and annotatable and is intended to become a platform for scholarly exchange after the end of the project.

The digital edition will also allow for linking the text to the available digital editions of texts attesting parallel transmissions. Among such texts the *Chronicle of John Malalas*, the earliest extant example of a Byzantine world chronicle,²² occupies one of the most prominent places. The *Chronicle of John of Nikiu* has a specific value since it documents readings which are attested only in some branches of Malalas' extant tradition,²³ thus the analysis of the *Chronicle of John of Nikiu* is included into the commentary on the digital edition of the *Chronicle of John Malalas* by the project *Historisch-philologischer Kommentar zur Chronik des Johannes Malalas* at the Universität Tübingen.²⁴ It has been agreed to cooperate with the project for documenting parallel textual transmissions with the *Chronicle of John of Nikiu* and commenting on the *Chronicle of John Malalas*.

The project will also pay attention to further aspects of the textual history of the *Chronicle*, for example, the influence of the *Chronicle* on the Ethiopic literary production and its indirect transmission, the historical circumstances of the textual transmission, especially its translation into Ethiopic, as well as the advantages and restrictions of the application of digital research and documentation methods in the preparation of digital editions, and the exploration of the possible synergies with other projects.

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17 <<http://paths.uniroma1.it/>>.

18 <<https://www.trismegistos.org/index.php>>.

19 <<https://pleiades.stoa.org>>.

20 Jeffreys et al. 2017 available at <<http://pbw2016.kdl.kcl.ac.uk>>.

21 <<https://www.degruyter.com/document/doi/10.1515/pmbz/html>>.

22 Jeffreys et al. 1986, xxi–xxiii.

23 Elagina 2018, xxxi–xxxii.

24 The project is funded within the framework of the Academies' Programme, coordinated by the Union of the German Academies of Sciences and Humanities under survey of the Heidelberger Akademie der Wissenschaften (<<https://www.hadw-bw.de/forschung/forschungsstelle/malalas-kommentar>>).

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Conference reports

Networks of Manuscripts, Networks of Texts

Amsterdam (online), 21–23 October 2020

In the last decades, methods of network analysis have been increasingly applied to historical disciplines. Both as a way of visualising connections or as a mathematical model to represent and study relationships, network analysis offers a valuable tool for historical disciplines, including researchers working on pre-modern manuscript cultures. However, as any young methodological subfield, the study of manuscripts using network analysis is still in an exploratory stage, with theoretical frameworks being forged and methods tested. The conference *Networks of Manuscripts, Networks of Texts* brought together scholars applying networks analysis to pre-modern or early modern texts, whether transmitted in manuscripts or printed books, and inscribed artefacts in general and has shown that there is a significant community of scholars working within this framework achieving interesting results.

The conference was conceived and organized by Evina Steinova, post-doctoral researcher at the Huygens ING at the Dutch Academy of Arts and Sciences in Amsterdam, and co-organized by Gustavo Fernández Riva, post-doctoral scholar at the Collaborative Research Cluster 933 ‘Material Text Cultures’ at the University of Heidelberg. The idea for the conference arose in the context of Evina Steinova’s research project ‘Innovating Knowledge’.¹ Originally planned as an in-presence event to take place in Amsterdam, it was moved online due to the SARS-CoV-2 pandemic. Although this created a challenge for the organisers, it also allowed for a wider participation. Zoom and Network Tables were used as video conference and event management software, respectively.²

While most presentations dealt with medieval Europe, the theoretical reflections and the methods employed are relevant for other contexts as well.

The first talk, by Gustavo Fernández Riva, analysed the shared manuscript transmission of medieval texts using three online databases, *Handschriftencensus*, *Jonas*, and *Philobiblon*. This presentation did not focus on any particular research question, but introduced many different ways in which scholars can use network analysis to better understand how and why different texts were compiled in the same textual carrying artefact.

1 <<https://www.huygens.knaw.nl/projecten/innovating-knowledge/>>.

2 <<https://networks-manuscripts-networks-texts.iseated.com/>>.

Andreas Kuczera and Martin Fechner presented their ongoing project *Commentaria in Aristotelem Graeca et Byzantina* (CAGB), where a graph database (Neo4J) is used for the analysis of research data. In their project, data about manuscripts containing Greek commentaries of Aristoteles is encoded in TEI format and exported into a graph database that enables complex queries. After explaining how graph databases work, some examples from the project showed how graphs can help to explore this data and connect it to other resources.

Evina Steinova's presentation focused on how tools of network analysis can improve traditional stemmatics when dealing with some special types of textuality, in this case, annotations. While annotations can behave text-like, it is more often the case that each individual gloss must be treated as an autonomous entity. The approach is exemplified on the corpus of medieval annotations to the *Etymologia* of Isidore of Seville, the most important medieval Latin encyclopaedia. With this perspective it is possible to classify and identify different kinds of annotations that are hard to see with other methods.

Catherine Emerson also works with the surviving manuscripts of a particular text, in her case the *Chronique Abrégée* by Nicole Gilles. In this presentation, she compared two kinds of networks. In one of them, the manuscripts were related based on material similarities (physical support, size, page layout). The other plotted the personal connections between the individuals associated with these documents as authors, scribes, and owners. Both networks were compared in order to test whether personal networks correlate with physical features.

Katharina Kaska explored the connections between three interrelated monasteries in twelfth-century Austria (Heiligenkreuz, Zwettl and Baumgartenberg). These monasteries were connected through manuscripts and scribes moving from one to another, as well as by the texts copied in each of them. This analysis offered an overview of the relationships and similarities between the monasteries, as well as the specificities of each one.

Katarzyna Anna Kapitan focused on the transmission history of an Old Norse saga, *Hrómundar saga Greipssonar*. Using an existing network of shared manuscript transmission for Old Norse literature, she studied the position of this individual saga within that general context.³ This research resulted in the discovery of a new saga of Hrómundur, which appears in a quite different manuscript context than the older saga.

3 Cp. K. A. Kapitan, T. Rowbotham, and T. Wills, 'Visualising Genre Relationships in Icelandic Manuscripts', in D. Brodén, ed., *Digital Humaniora i Norden. Digital Humanities in the Nordic Countries, 2nd Conference, Göteborg, March 14-16, 2017: Conference Abstracts* (Gothenburg: The University of Gothenburg, 2017), 59–62.

Dominique Stutzmann and Louis Chevalier analysed the networks of manuscripts and texts in the books of hours produced in the Low Countries during the Late Middle Ages using a corpus of 442 manuscripts. Books of hours are complex compilations of textual units and constitute precious sources on medieval devotion. In this presentation, the authors proposed the existence of ‘hybrid hours’ and explored different textual networks that help to understand the connections among and evolutions of these sources.

Shari Boodts and Iris Denis study Latin sermons by the Fathers of the Early Church, for which they and other colleagues have created a database, PASSIM.⁴ In their presentation, they focused on network visualisation of overlap between sermons. They exemplified the utility of these visualisations with the pseudo-Augustinian sermon *S.App. 121*.

Richard Matthew Pollard repurposed network analysis methods common in studies on the history of science and applied them to investigate the influence of the Church Fathers. The main question was a very fundamental one: who were the Church Fathers for those living in the early Middle Ages? Using networks of shared manuscript transmission and co-citation, this presentation offered useful insights towards answering that question.

Ina Serif also used networks of shared manuscript transmission for her research, focusing on Jakob Twinger von Königshofen’s *Chronicle* attested in nearly 130 manuscripts. Her presentation demonstrated that genre categories are fluid and flexible in the transmission of medieval texts and considered questions related to criteria and levels of classification for manuscripts and texts. These reflections are relevant for any research on how genre and manuscript transmission interact.

Sara Steffen analysed political ballads of the sixteenth-century Swiss Confederation. Based on a corpus of around 150 printed ballads (both original compositions and reprints or adaptations of earlier songs), she provided a visual representation of the connection between the different songs as a network in which individual printed songs function as nodes and melodies as edges. This enabled the identification of particularly influential melodies, chains of ‘musical references’ and clusters of songs which share the same melodies.

Jialong Liu offered the only presentation that did not deal with European sources. He analysed text reuse, especially quotations of authoritative texts, in Chinese public inscriptions between 618 and 907 CE. He used a database containing images, transcriptions, and descriptive metadata of over 1,000 inscriptions. This work gave geographical information a very relevant role, as

4 <<https://applejack.science.ru.nl/passimproject/>>.

the networks were combined with maps in order to understand the interrelated textual and spatial connections.

Immo Warntjes presented his research on computus objects in early medieval manuscripts (tables and diagrams related to computation of dates). The database used includes over 400 manuscripts. The talk dealt with specific problems raised by these textual objects, particularly the way to identify each of them. The goal of the ongoing research is to create networks of manuscript-producing centres and identify channels of transmission of these objects.

Agata Paluch analysed networks of production and circulation of Jewish esoteric texts in early modern East-Central Europe. As many other talks in the conference, she focused on shared manuscript transmission as a way of finding patterns in the reception of texts. To evaluate and interpret the results, she incorporated abundant data about the materiality of the manuscripts.

Elisabeth Archibald worked on data from early medieval library catalogues in order to explore intellectual networks. She studied the affinities between intellectual materials held in specific collections and the relationships between the institutions, including borrowing, copying, and other forms of obtaining books. Two kinds of networks were created and interpreted: books connected when they were present in the same institution and institutions connected by the holdings they shared.

The final keynote lecture was given by Matteo Valleriani. He explained some results from the project *The Sphere. Knowledge System Evolution and the Shared Scientific Identity of Europe*.⁵ The project gathers information about the early modern printed editions and commentaries of *Tractatus de sphaera* of Johannes de Sacrobosco, a very important and widespread treatise on geocentric cosmology. Probably the most sophisticated methods of network and statistical analysis of the conference were displayed in this presentation. The main research goal was finding out the strategies by which some commentaries turned out to be more successful and hegemonic than others. The analysis also shed new light into the role of different printing centres, like Wittenberg. Additionally, the presentation also showed some ongoing work that incorporates machine learning in order to analyse the images that appear in books.

Informal talks and ‘breakout rooms’ were implemented in the last day of the conference in an attempt to emulate the social and networking opportunities of in-presence events. Many of the presentations were pre-recorded and shared with the participants in advance, so that they could listen to them and prepare questions with more time, which was extremely successful.

5 <<https://sphaera.mpiwg-berlin.mpg.de/>>.

The full program of the conference with links to each abstract is online.⁶ Some of the recorded presentations can be accessed at the *Digital Medieval Webinar Repository* (DMWR)⁷ and on YouTube.⁸ A publication of the conference proceedings is expected.

Gustavo Fernández Riva, Collaborative Research Centre 933 'Material Text Cultures: Materiality and Presence of the Scriptural in Non-Typographic Societies', University of Heidelberg

6 <<https://homomodernus.net/2020/08/26/conference-programme-networks-of-manuscripts-networks-of-texts/>>.

7 <<https://zenodo.org/communities/dmwr>>.

8 <<https://youtube.com/playlist?list=PLK3oMFX57ubw-e1ToV8O5S3vZWTPDjnHy>>.

Bridging the Gap with Linked Open Data.

Linked Open Data for Written Artefacts

Hamburg (online), 25–28 May 2021

In the days 25 to 28 May 2021, two events took place at Universität Hamburg (both using the Zoom videoconferencing tools), the conference *Bridging the Gap with Linked Open Data* and the Advanced Training *Linked Open Data for Written Artefacts*. Both were ‘multiplier events’ funded by the project ‘Bridging the Gap in Ancient Writing Cultures: ENhance COmpetences in the Digital Era’ (ENCODE).¹

The conference, organized by Daria Elagina, saw the participation of more than one hundred researchers; fourteen participants were selected among the many applications for the practical training.

In the first presentation of the conference, *ENCODE and the Modelling of Vocabulary of Digital Competences*, Daria Elagina (Universität Hamburg), highlighted the activities carried out by the Hamburg project team. The paper also served as an opener for a series of thought-provoking talks by cooperating scholars. Matteo Romanello (Université de Lausanne) spoke of *Building a LOD Knowledge Base of Classical Authors and Works*, Jonathan Prag (University of Oxford) presented on *LOD and Digital Epigraphy*, David Allen Michelson (Vanderbilt University) and James Walters (Hill Museum and Manuscript Library) explored the topic of *Linked Open Text Encoding: Serializing LOD from Syriac Datasets in TEI XML*.

Tom Gheldof (Katholieke Universiteit Leuven) chaired the Round Table *Using LOD for Cultural Heritage within and out of the Academic World* with the participation of Federico Aurora (Universitetsbiblioteket i Oslo), Alessandro Mosca (Libera Università di Bolzano), Elton Barker (The Open University), and Nathan Gibson (Ludwig-Maximilians-Universität München).

An animated discussion took place around potentials and risks of Linked Open Data (LOD), showing the need to discuss and build further venues of permanent exchange about this topic. The question raised by the ENCODE project was if and how skills and knowledge of LOD may have to fit into the training of students and researchers dealing with ancient documents. The proposed approach of classification was challenged by the observation that such competences are acquired independently, often occasionally and informally. On the one side, a wish—and a promise of the technology proposed—would

1 ENCODE is an Erasmus+ Strategic Partnership for higher education funded via the Istituto Nazionale Documentazione Innovazione Ricerca Educativa (INDIRE) and coordinated by Alma Mater Studiorum Università di Bologna (2020–2023), see <<https://site.unibo.it/encode/en>>.

be that it may seamlessly unlock a network which would become more accessible to all. On the other side, practitioners know how this works only if there is a shared awareness and community commitment not only to support projects but also to be able to evaluate and use critically what exists, either collaborating with existing efforts or building upon them. If a researcher dealing with ancient documents does not need to know how to implement content negotiation on a web server, it is indeed necessary to be able to make full use of the existing resources, so that the presence of available LOD is recognized and the ways to reuse that information are immediately available to the scholar, not as ready-made tools but as skills in their own skill set.

Can these, which are often informal self-thought skills, be matched with the skills required to study ancient documents and become formalizable part of the learning outcomes of a formal training course? How can occasions for informal learning of techniques and technologies related to LOD may be created and provided to students for self progress in the context of training on the study of ancient documents?

The ENCODE project, while creating occasions to discuss these issues, also takes concrete opportunities to explore new practices in this area. Making researchers into critical and practical users, producers and advocates of LOD resources was also the aim of the training which experimented with innovative ways of forming the training group as well as new modules. Candidates provided a self assessment of their digital competences based on the DigComp2.1² framework and information about their skills in the study of ancient documents. These were not classified on an individual basis but in view of the possible formation of learning groups which would include shared interests but diverse competence levels and span diverse areas of research. For example a group with interests in letters included an experienced digital humanist, a papyrologist, and a scholar of manuscripts including letters, as well as graduate students interested in the topic with no previous exposure to digital humanities. The modules and their organization, the exercises in each new module, and the examples were tailored to the interests of the participants. The presentations benefited from the existing examples of Ethiopic manuscripts encoded by the project *Beta maṣāḥaft: Manuscripts of Ethiopia and Eritrea (Schriftkultur des christlichen Äthiopiens und Eritreas: eine multimediale Forschungsumgebung)*.³

Participants of the conference and the training provided very positive feedback. Some of them agreed to remain in dialogue and become involved

2 DOI 10.2760/38842.

3 < <https://www.betamasaheft.uni-hamburg.de/>>.

in a long-term process of the evaluation of the progress, which fed into the research materials for the ENCODE project.

The entire programme and training materials are available online at <<https://pietroliuzzo.github.io/LOWA/>>. Further events will be organised by the ENCODE project until 2023 to further explore the strongly felt need for a deeper understanding of the gaps between the study of ancient cultures and the use of digital technologies.

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Errata corrigé

Elisabetta Boaretto, Hillel I. Newman, Sophie Breternitz, Ivan Shevchuk, and Ira Rabin, 'Date, Materiality and Historical Significance of P.Köln Inv. 5941', *COMSt Bulletin* 6/2 (2020), 173–186.

On p. 182 legend to Figure 7 has been printed as:

Fig. 7. Illustration of the effect of radiocarbon calibration on the distribution of uncertainty in the calibrated ages of P. Köln inv. 5941. The uncalibrated radiocarbon age and uncertainty are shown as the red distribution, and the marine09 calibration curve representing the apparent radiocarbon age variability caused by changes in the marine $\Delta^{14}\text{C}$ through time is shown in blue. The resultant calibrated age distribution is shown in gray, with the 95.4% and 68.2% probability bounds shown as bars below.

Please read:

Fig. 7. Probability distribution of the radiocarbon calibrated range of P. Köln inv. 5941. The uncalibrated radiocarbon age and uncertainty are shown as the red distribution, and the atmospheric 2013 calibration curve representing the atmospheric ^{14}C concentration through time is shown in blue. The resultant calibrated age distribution is shown in gray, with the 95.4% and 68.2% probability ranges shown as bars below.

