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# The Anatomy of Non-biblical Scrolls from the Cairo Geniza

**Abstract:** The discovery in the Cairo Geniza of more than fifty fragments of horizontal scrolls containing texts that differ from liturgical biblical readings shows that a scroll format was used for non-biblical books long after the Jewish adoption of the codex format. This paper looks at the physical and palaeographical aspects of scrolls containing Talmud, Midrash, Targum and liturgical texts produced between the 9<sup>th</sup> and 11<sup>th</sup> century.

## 1 Introduction

The most remarkable feature of the Jewish bookmaking tradition is undoubtedly its unflinching attachment to an ancient book form for the biblical works used in public liturgical reading (the Tora and the Book of Esther): the horizontal scroll (*sefer* or *megilla*). It seems that the Jews of the Roman and then Byzantine Empire used the scroll format for all their books, both sacred and profane, and did this much longer than their neighbours. Christians produced their books in a new format – the codex – from the early centuries of the first millennium onwards. The Jews probably adopted the codex at the beginning of the mediaeval period, but they still kept on using scrolls for their liturgical books. This shift from the scroll to the codex for profane Jewish books and the conservative and anachronistic preservation of the scroll format for liturgy has attracted the attention of modern scholars, who have defined it as a turning point between ancient and mediaeval bookmaking practices.

However, this clear-cut functional and chronological distinction needs to be reconsidered, given the increasing number of discoveries in the Cairo Geniza of fragments of scrolls containing non-biblical texts such as prayer books, *midrashim*, the Mishna and the Babylonian Talmud. While none of the scrolls contain explicit mention of a date and place of production, palaeographical analysis suggests that they were produced between the 9<sup>th</sup> and 11<sup>th</sup> century. As we shall

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see, some of these scrolls contain Babylonian features, while others seem to have been written in the Land of Israel or in Egypt. This paper focuses on the material features of the non-biblical scrolls from the Cairo Geniza which have been identified so far. This is a preliminary study; I believe that more scroll fragments still await identification and that in-depth research is required to fully appreciate their contribution to the history of the Hebrew book in the Middle Ages.

## 2 From scroll to codex: Jewish tradition and scholarly interpretation

During Antiquity, the Hebrew book – *megillat ha-sefer* – was a horizontal scroll. Rashi of Troyes himself noted that in early times, ‘in the days of the Rishonim’, all books were written on scrolls, just like ‘our Sefer Tora’ (commentary on BT, ‘*Eruvin* 97b<sup>1</sup>). In Late Antiquity, when the reading cycle of the Tora with selected prophetic passages (*haftarot*) came to be the main focus of Jewish religious and communal life, the scroll became a liturgical object of veneration. Its production, reading, conservation and ultimately its disposal in a *geniza* when it was worn out were all codified. Obviously, not all scrolls were produced for sacred purposes: the late Talmudic tractate *Soferim* (‘scribes’) mentions the ‘Tora scrolls’ and ‘ordinary Pentateuchs’ (*Soferim* II, 4). However, after the spread of the codex form, the scroll gradually acquired a status that was exclusively liturgical, which accounts for its anachronistic survival through Jewish history, as it were, unaffected by changes in the technology involved in book production.<sup>2</sup>

The codex, a type of book formed by joining together quires of writing material composed of folded sheets, is a Roman invention. It derives from wax-covered wooden tablets joined together along a central axis. Wood could be replaced by a

1 כל ספרים העשויים בימי הראשונים עשוין בגליון.

2 In later periods, the liturgical use of scrolls became restricted to the Tora, *haftarot*, and the Book of Esther. Earlier on, it applied to other parts of the Bible: the Cairo Geniza contains scroll fragments of the *Five Scrolls* (e.g. Canticles and Ruth in fragment CUL TS AS 20.9). Some biblical scrolls in the Cairo Geniza contain vowels, which is contrary to the norm. This concerns the Pentateuch (e.g. CUL TS NS 3.25, TS NS 6.14) as well as *haftarot* scrolls (e.g. CUL TS B 17.25 and CUL TS Misc. 1.130 according to the Palestinian triennial reading cycle; see Joseph Ofer, <https://faculty.biu.ac.il/~ofer/>). An interesting case is a scroll of Psalms with occasional Palestinian vowels, several fragments of which have been preserved (CUL TS 20.52 + 20.53, 54, 58, 59 and probably CUL TS 12.764). The fact that the Psalms in each fragment follow in their usual order indicates that this early scroll contained the Books of Psalms rather than a prayer book with passages from Psalms.

less durable material such as papyrus or parchment. This new kind of book had many functional advantages; for one thing, a codex is easier to open and browse through than a scroll, which needs to be rolled up and unrolled, especially if one is looking for a particular reference. Moreover, the leaves of a codex are more easily written on both sides, thus saving space (although opistograph [double-sided] scrolls were also known in Roman Antiquity). Given this greater practicality, but possibly also as a mark of their distinctiveness, early Christians adopted the form of the codex as early as the 2<sup>nd</sup> century CE.<sup>3</sup> As for the Jews, there is no clear literary evidence that they wrote their books in the codex format in this early period. The few preserved fragments of Hebrew books dating from the late Byzantine and early Islamic period are all remnants of horizontal scrolls.<sup>4</sup>

It hardly seems possible that the Jews were unaware of the practical, new book form of the codex that was being used around them; it has even been claimed that the codex form itself was a Jewish invention. Saul Lieberman based this statement on rabbinic texts which mention *pinqasim* (from Greek πίναξ, ‘writing tablet’) composed of several tablets attached together (e.g. *Mishna Shabbat* XII: 5) and used for jottings and ephemera. Usually made of wood with a shallow wax-covered surface written on with a sharp stylus, *pinqasim* could also be created from papyrus and written on with ink (*Mishna Kelim* XXIV: 7). For Lieberman, such *pinqasim* composed of several tablets were akin to codices and influenced early Christians, who ‘accepted the Jewish practice and put down their ὑπομνήματα in codices’.<sup>5</sup> However, Menahem Haran argued on the basis of several Talmudic texts that, although *pinqasim* could be composed of several tablets, they were not attached to one central axis (which would enable the *pinqas* to be opened and browsed through like the pages of a book); rather, they were fixed on two sides, each tablet attached in a linear way to the one that preceded and the one that followed it, just like sheets of a horizontal scroll. Flexible attachments on both sides of each tablet would allow the *pinqas* to be folded not like a codex, but in a concertina-like way.<sup>6</sup> In support of the possibility that the Jews were acquainted

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3 See Roberts and Skeat 1983. See Resnick 1992 on the discussion concerning ideological reasons for the adoption of the codex by Christians and the Jews’ conservative attachment to scrolls.

4 They are all biblical texts: parchment fragments of the Book of Kings and Job from Antinoopolis; see McHardy 1950, 105–106; Sirat 1985, 118–119; two fragments of a Pentateuch scroll (Exodus) on leather, Jerusalem, Israel Museum, Ashkar-Gilson Collection, Hebrew 2 (carbon-dated to the 7<sup>th</sup>/8<sup>th</sup> century); see Olszowy-Schlanger 2012, 20; Sanders 2014; and a fragment from the same sheet, now in a private collection belonging to S. Loewentheil in New York (previously, Jews’ College, London); see Birnbaum 1959; and more recently Engel and Mishor 2015.

5 Lieberman 1962, 204–205.

6 Haran 1981–82.

with the codex, one may quote St Augustine of Hippo (354–430), who referred to a discrepancy between ‘the codices of the Hebrews’ (*discrepantiam hebraeorum codicum...*) and ‘our codices’ in his work *De civitate Dei* (*The City of God*).<sup>7</sup> This could indeed be the earliest reference to the Jewish Bible in a codex format. However, it is by no means certain that Augustine was referring to the Bible in Hebrew rather than to a translation used by the Jews, which was different from the Greek and Latin versions adopted by Christian communities.<sup>8</sup>

If the *pinqas* is indeed a concertina-like notebook and Augustine referred to Jewish books rather than codices in Hebrew, then the earliest evidence that the Jews used the codex format dates from after the Muslim conquest. It is generally believed that the Jews adopted the codex from the Muslims, who chose this format early on for the writing of the Quran.<sup>9</sup> The fact that the scroll format was particularly associated with Jewish bookmaking can be gathered from the epistle of ‘Abd al-Masīḥ ibn Iṣḥāq al Kindī (801–873, Iraq), who claimed that early Quran manuscripts had been written on leaves or on rolls ‘like the scrolls used by the Jews’ until Caliph ‘Uthmān (576–656) opted for the codex instead.<sup>10</sup> It is worth mentioning here that the term for ‘codex’ in mediaeval Hebrew, *miṣḥaf*, is an Arabic loanword.<sup>11</sup> The term *miṣḥaf* designates the codex in the earliest source confirming its existence among the Jews, the 8<sup>th</sup>-century *Halakhot Pesuqot* attributed to Yehudai ben Naḥman, Gaon of Sura c. 760–764, in a discussion concerning the exclusive suitability of scrolls and not *miṣḥaf* for the liturgical reading of the Book of Esther.<sup>12</sup> The term *miṣḥaf* for ‘codex’ was used among Oriental Jewish communities throughout the Middle Ages, notably in colophons of manuscripts.<sup>13</sup>

<sup>7</sup> Augustine, *The City of God*, XV. I. 11; see Nisard (ed.) 1845, 478.

<sup>8</sup> See de Lange 2012, 56–68, regarding the discussions of various early Jewish versions in Greek. On the arguments concerning the possible existence of a Jewish Old Latin translation, see Kedar 1988, 308–311.

<sup>9</sup> See Déroche 2000, 13.

<sup>10</sup> See Déroche 2013, 18 with n. 6, but no such Quran manuscripts are extant.

<sup>11</sup> Derived from the root *ṣahafa*, ‘to bind together’, this term designates the codex and notably the manuscripts of the Quran par excellence. See Blachère 1977, 54.

<sup>12</sup> Schlossberg 1886, 11: ומגילה כתובה במצחף אין אדם יוצא בה ידי חובתו שכתב ונכתב בספר ומצחף אינו ספר. See Sarna 1974, vol. 1, note 20; Glatzer 1989, 260–261.

<sup>13</sup> For example, in the colophon of the famous Babylonian codex of the Later Prophets, Ms. Firkovich EBP I B 3, copied in 916 CE. For details of this codex, discovered by Abraham Firkovich in a *geniza* in Crimea (cf. his *Avnei Zikkaron*, Vilna, 1872, 12), see esp. Strack 1876; Beit-Arié, Sirat and Glatzer 1997, no. 3. Another term for ‘codex’ used in Hebrew colophons is also an Arabic loanword (originally from Greek): *daftar*. In Arabic tradition, *daftar* refers to a quire rather than to a codex; see Déroche 2000, 34.

It seems that the use of codices among Jews probably only became widespread during the Gaonic period. It was then that the Jews adopted this more economic and ergonomic format for their books while reserving scrolls for liturgical Bible reading. Consequently, it has been often assumed that if non-biblical scrolls were discovered, they must be ancient and pre-date the adoption of the codex, *ergo* the Muslim conquest and the Middle Ages. Alternatively, if there are grounds to suspect post-conquest dating, such scrolls must be related to liturgy and partake in the holiness of the Tora scroll.

This pattern worked well when the first known non-biblical horizontal scroll fragments were discovered. The ‘Munich Palimpsest’, two Hebrew parchment fragments reused for Orosius’ *Adversus paganos libri I, 2* in Northern Italy (Bavarian State Library, clm 6315 and clm 29416 (1) (olim 29022), henceforth no. XXXI), is relatively old insofar as the upper Latin writing has been dated to the 8<sup>th</sup> century on palaeographical grounds, and it is liturgy-related because it contains poetic compositions for Yom Kippur.<sup>14</sup> Another scroll published by Michael Klein, no less than 12 fragments of which have been identified in the Cairo Geniza, contains the Palestinian Targum to the Book of Exodus (no. III) and includes references to the triennial Palestinian reading cycle of the Tora.<sup>15</sup> A ritual function could indeed be argued for liturgical and Targum scrolls.

Other fragments of horizontal scrolls discovered in the Cairo Geniza could not be attributed to a liturgical context quite as easily, however. This is the case for a fragment of *Avot de-Rabbi Natan* published by Marc Bregman in 1983 (no. VI)<sup>16</sup> and a fragment of Hekhalot literature published by Peter Schäfer (no. II).<sup>17</sup> Schäfer questioned the possible relationship of the fragment with liturgy. Although part of the text consists of *Qedushta* poems, the other part is non-liturgical. The identification of a fragment of the Babylonian Talmud, tractate *Hullin* 101–105, published by Shamma Friedman in 1995, shows even more clearly that there is not necessarily a relationship between the horizontal scroll format and liturgy.<sup>18</sup> The question of the dating of non-biblical scrolls therefore became a central one: were these scrolls written ‘in the period when rabbinic works were still written on scrolls’, to quote Marc Bregman, or could their use post-date the Islamic conquest

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14 Clm 6315 (29022); see Lowe, *CLA* 9, 1274; Halm 1873, 91; Hauke, 407–408, accessible online at *Manuscripta Mediaevalia*: [www.manuscripta-mediaevalia.de/hs/katalogseiten/HSK0546\\_b408\\_jpg.htm](http://www.manuscripta-mediaevalia.de/hs/katalogseiten/HSK0546_b408_jpg.htm). The Hebrew lower text was studied and edited by Beit-Arié 1968 (see esp. p. 417 on the relationship between the codex form and liturgy) and by Yahalom 1969.

15 Klein 1979.

16 Bregman 1983.

17 Schäfer 1984, 9–32.

18 Friedman 1995.

and the adoption of the codex? Bregman opted for an early dating for the scroll of *Avot de-Rabbi Natan*, suggesting a date close to the Hebrew papyri (4<sup>th</sup>–5<sup>th</sup> century) largely on the basis of its scroll format.<sup>19</sup> Peter Schäfer dated the Hekhalot manuscript to the 9<sup>th</sup> century or earlier. Scrolls of leather were indeed found in Egypt at the end of the 12<sup>th</sup> century, and were seen as archaic. In his *Mishne Tora* Maimonides mentioned such a Talmud on *gewil* which was ‘like the scrolls made five hundreded years earlier’ (*Hilkhot Malwe we-Lowe* 15,2).<sup>20</sup>

The discovery of further non-biblical (rabbinic and liturgical) horizontal scrolls from the Cairo Geniza and their preliminary palaeographical dating around the 9<sup>th</sup> century at the earliest show that clear-cut distinctions between sacred and profane, or pre- and post-adoption of the codex format, are less relevant than once thought. It seems more productive to postulate that a range of book formats were used by the Jews during the Middle Ages. It is becoming apparent that the ascendancy of the codex format was by no means instantaneous and that different book forms co-existed in the non-biblical sphere for much longer than previously believed. The scroll was still a common book form, in fact, and was not restricted to books kept in synagogues and used in public rituals. This is particularly true of vertical scrolls (*rotuli*), of which more than 400 fragments have been preserved among the Geniza fragments, some dated as late as the 13<sup>th</sup> century. Horizontal scrolls, too, are more frequent than previously thought. Research work that I have carried out over the past three years has revealed that, in addition to the previously known and published fragments, so far there are at least 54 fragments of horizontal non-biblical scrolls in the Cairo Geniza and elsewhere, which belong to 31 different original scrolls.

This relatively important number of extant scrolls makes it possible to shed new light on this little-known chapter of the history of the Hebrew book. A closer examination of their physical features helps us to reconstruct Jewish bookmaking techniques and contributes to the chronology of their production. Rather than claiming that the Geniza contains pre-Islamic strata, of which these scroll fragments would be the relics, it is important to try to examine them in the light of extant dated and datable Geniza manuscripts, which stem from the late 9<sup>th</sup> century at the earliest. Such a comparison shows that the pertinent palaeographical features of scrolls are also found in other groups of manuscripts. It is also important to realise that the corpus of scrolls from the Cairo Geniza is far from being palaeographically homogeneous, but rather presents a diversity that may indicate differences in

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<sup>19</sup> Bregman 1983, 212. A more cautious date – ‘9<sup>th</sup> century at the latest’ – was suggested by Malachi Beit-Arié, quoted by Bregman in a footnote, p. 204. See Reif 1993, 124 as well.

<sup>20</sup> Havlin 1989/1990, 151-152.

time, place or scribal tradition. I will begin by briefly discussing the extant corpus of non-biblical scrolls from the Cairo Geniza and the grounds on which previously unknown scrolls have been identified, and will then study their material features and propose a palaeographical definition of their writing.

### 3 The corpus of non-biblical horizontal scrolls

As indicated, 54 fragments of scrolls have been identified so far. They belong to 31 original books in this format. All but one of these fragments come from the Cairo Geniza and belong to the Oriental bookmaking traditions. The Munich Palimpsest probably originates from Italy and may be earlier than the remaining scrolls of the corpus, possibly as early as the 7<sup>th</sup> century. As for their text, the identified scrolls contain liturgy: Aramaic Targum (Palestinian Targum: no. III, Onkelos with Babylonian vowels: nos XIX and XX) and prayer books (nos V, XIII, XIV, XV, XVII, XXI, XXII, XXIII, XXV, XXVI, XXVII, XXVIII, XXIX, XXX and XXXI)<sup>21</sup>; scholars' books: Mishna (no. VIII), Babylonian Talmud (nos VII, IX, X, XI, XII), *midrashim* and rabbinic works (nos I, IV, VI, XVIII) and *Hekhalot Rabbati* (no. II). One scroll in our corpus contains a biblical text, but was included here because it is a pupil's exercise in reading and writing and constitutes a perfect example of the use of the scroll format for cheap private books and ephemera in the classical Geniza period.

**Table 1:** List of fragments grouped according to the original scrolls

Scroll	Fragments	Text	Verso	Comments	Date
I	TS K 21.84	<i>Pirqa de-Rabbenu ha-Qadosh</i>	Blank	3 notes of ownership by 3 different hands: 1: name not preserved, 2: written by the main scribe, Yona ben Ya'aqov; 3: Yishai ben Shemu'el	10 <sup>th</sup> c
II	TS K 21.95s	<i>Hekhalot Rabbati</i>	Blank		9 <sup>th</sup> c

<sup>21</sup> Several pre-mediaeval fragments on papyrus containing liturgical poems are extant; see Sirat 1985, e.g. 115, 120, etc. A fragment of a parchment scroll containing common prayers, University of Cologne, Papyrussammlung 5941, is palaeographically closer to the Geniza fragments and may date from the early Islamic period. See Klein-Franke 1983; Harding 1998.

Scroll	Fragments	Text	Verso	Comments	Date
III	TS 20.155	Palestinian Targum Ex 20, 21/24 – Ex 23, 3	The scroll was reused for writing a liturgical text, probably during the 11 <sup>th</sup> century. The scroll was reused as a <i>rotulus</i> , and the text on the verso (hair side) is perpendicular to that on the recto. The same text appears on the verso of all the fragments.	Palestinian and Tiberian vowels; in some places the vocalisation is sporadic; marks of the <i>sidra</i> of the Palestinian triennial Tora reading cycle.	9 <sup>th</sup> c or earlier
	TS AS 63.24	Palestinian Targum, fragment (fr.) 1 col., Ex 22, 19–21			
	TS AS 63.51	Palestinian Targum, fr. 2 cols., Ex 21, 13–18; Ex 21, 34–35			
	TS AS 63.72	Palestinian Targum, fr. 1 col. Ex 4, 7–9			
	TS AS 63.85	Palestinian Targum, fr. 1 col., Ex 4, 9–10			
	TS AS 63.95	Palestinian Targum, fr. 1 col., Ex 4, 9–11			
	TS AS 63.96	Palestinian Targum, fr. 1 col., Ex 21, 26–33			
	TS AS 63.117	Palestinian Targum, 1 col., Ex 22, 17–19			
	TS AS 63.129	Palestinian Targum, 1 col., Ex 22, 19–20			
	TS AS 63.153	Palestinian Targum, 1 col., Ex 21, 30–36			

Scroll	Fragments	Text	Verso	Comments	Date
	TS AS 69.241	Palestinian Targum, fr. 1 col., Ex. 22, 26–28			
	TS NS 286.1	Palestinian Targum, fr. 1 col., Ex 23, 8–14			
IV	TS 16.282	Midrash: <i>The Pearl of R. Meir</i> (מרגניתא דבי רב)	Blank		10 <sup>th</sup> – 11 <sup>th</sup> c
V	TS H 8.84	Liturgy and blessings: <i>Musaf</i> for Rosh ha-Shana, <i>Amida</i>	Blank		10 <sup>th</sup> – 11 <sup>th</sup> c
VI	TS AS 74.324	<i>Avot de Rabbi Natan</i> , ch. 36–38	Reused for a <i>rotulus</i>		9 <sup>th</sup> – 10 <sup>th</sup> c
VII	TS AS 78.389 TS AS 4.162	TB BB 4a–5b 29a–b	Reused for a <i>rotulus</i>	Both fragments join directly	9 <sup>th</sup> – 10 <sup>th</sup> c
VIII	TS AS 78.390 TS AS 78.391 TS AS 95.291	<i>Mishna Bava Batra</i> 1: 1–6	Blank		9 <sup>th</sup> – 10 <sup>th</sup> c
IX	TS AS 78.392	TB <i>Hullin</i> 55b–56a	Blank		9 <sup>th</sup> – 10 <sup>th</sup> c

Scroll	Fragments	Text	Verso	Comments	Date
X	TS AS 78.393  TS AS 78.395	Midrash	Reused for a <i>rotulus</i> ; see no. XI (?)	These two fragments have been poorly preserved and their identification is difficult. It is possible that nos X and XI belonged together, especially since they were all reused for a <i>rotulus</i> . However, the handwriting of the scroll (hair side) seems different from that of no. XI.	9 <sup>th</sup> – 10 <sup>th</sup> c
XI	TS AS 78.394  TS AS 78.396	Midrash, fr. 3 cols., middle column of TS AS 78. 394: text similar to <i>Otiyot de-Rabbi Aqiva</i>	Reused for a <i>rotulus</i> ; see no. X (?)	Both scroll fragments were written by the same hand, and the proportions of the written space are similar. Their versos were reused for the same <i>rotulus</i> .	9 <sup>th</sup> – 10 <sup>th</sup> c
XII	TS AS 86. 263	Legal commentary?	Blank		9 <sup>th</sup> – 10 <sup>th</sup> c
XIII	TS AS 137.389  TS AS 137.447  TS AS 137.451	Liturgy: <i>seliḥot</i> for Yom Kippur   This fragment is poorly preserved. It is uncertain whether it is part of the same scroll as the two previous ones.	Blank	Two fragments belong to the same scroll. The third fragment is so dark that its identification is hypothetical at this stage.	9 <sup>th</sup> – 10 <sup>th</sup> c

Scroll	Fragments	Text	Verso	Comments	Date
XIV	TS NS 196.119	Liturgy and blessings: Passover and Shavuot, 'Amida, Palestinian rite	Reused for a <i>rotulus</i> with <i>piyyuṭim</i>		9 <sup>th</sup> – 10 <sup>th</sup> c
XV	TS NS 200.12	Liturgy: <i>piyyuṭ</i> , <i>yoṣer</i> for Passover and <i>Sukkot</i> , Palestinian rite	Blank but for the name of the owner	Notes of ownership	
XVI	TS Misc. 26.53. 17	BT <i>Hullin</i> 101a–105a	Reused for a <i>rotulus</i>		9 <sup>th</sup> – 10 <sup>th</sup> c
XVII	JTS ENA 4103  TS H 5.210	Liturgy: contains blessings for the morning prayer with Psalms 19, 20, 24, 25 and 103, Palestinian rite  <i>piyyuṭim</i> and blessings of the morning prayer	Blank		10 <sup>th</sup> c
XVIII	BL Or 5558A.6	<i>Avot de-Rabbi Natan</i> (I, 37; II, 40)	Reused for a <i>rotulus</i> of <i>seliḥot</i>		9 <sup>th</sup> – 10 <sup>th</sup> c
XIX	BL Or 4856.3  TS AS 62.511	Bible with Targum Onkelos, Num 31, 26–27  Bible with Targum Onkelos, Num 31, 5 – 32, 22	Blank	Babylonian vowels; verse-by-verse Aramaic translation of the Hebrew text; very similar to no. XX	9 <sup>th</sup> – 10 <sup>th</sup> c

Scroll	Fragments	Text	Verso	Comments	Date
XX	TS 62.512	Bible with Targum Onkelos, Gn 46, 12 – 31	Blank	Babylonian vowels; verse-by-verse Aramaic translation of the Hebrew text; very similar to no. XIX	9 <sup>th</sup> –10 <sup>th</sup> c
XXI	TS 28.12	Liturgy: <i>piyyuṭim</i>	Blank		
XXII	TS B 13.16	Liturgy: common prayer on scroll, <i>Shaḥarit Sukkot</i> , 'Amida, <i>Shemini 'aṣeret</i> , 'Amida, verses from Psalms, Palestinian rite	Blank	The name עמרם ברבי צדקה appears at the end of a paragraph in col. 2 (it also says עמרם and צדקה בירבי). These are written by the scribe and may be his own signature.	11 <sup>th</sup> c
XXIII	TS 18 H2	Liturgy: Psalms for holy days, Palestinian rite	Blank	Faded passages of the text were restored with darker ink	10 <sup>th</sup> –11 <sup>th</sup> c
XXIV	TS K 5.108 (P1 and P2)	Anthology of biblical passages (Gn 1, 1–5, 6, 9–12, 12, 1–7, 18, 1–4, 23, 1)	Blank except for a short scribble	Children's exercises on a scroll	12 <sup>th</sup> c
XXV	TS 20.153	Liturgy: <i>Musaf</i> Yom Kippur, liturgical poems, Psalms and 'Amida, Palestinian rite	Blank		10 <sup>th</sup> c

Scroll	Fragments	Text	Verso	Comments	Date
XXVI	TS AS 137.388 TS AS 137.392 TS AS 137.408	Liturgy: <i>piyyuṭ</i> of <i>Birkat ha-</i> <i>Mazon</i>	Blank	The writing is faded and blurred.	?
XXVII	TS Misc. 29.11	Liturgy: ' <i>Amida</i> for Shabbat, evening prayer	Reused for a <i>rotulus</i>		10 <sup>th</sup> – 11 <sup>th</sup> c
XXVIII	TS 28.13	Liturgy: Psalms 47, 4–10; 130, 1–8; 122, 1–9; 6, 6–11; 30, 1–13; 97, 12–99, 6, Palestinian rite	Blank		11 <sup>th</sup> c
XXIX	TS H7.47	Liturgy: <i>Musaf</i> and <i>Shemini</i> ' <i>ašeret</i> , Psalms, Pales- tinian rite			11 <sup>th</sup> c
XXX	TS NS 122.124 TS NS 122.132	Liturgy: Baby- lonian rite	Blank		11 <sup>th</sup> – 12 <sup>th</sup> c
XXXI	Munich Palimpsest	Liturgy: <i>piyyuṭ</i>	Blank	Western origin: probably Italy	7 <sup>th</sup> –8 <sup>th</sup> c

## 4 How to identify a fragment of a scroll

The first difficulty is the identification of the fragments as coming from a scroll. The distinction between a scroll and a codex is easy when the books are complete, but it may be harder when dealing with tiny fragments. It is likely that Cairo Geniza collections contain more scroll fragments whose present physical aspect does not allow immediate identification. Indeed, in order to identify Geniza fragments as remnants of scrolls, one has to consider various physical features together with their text. As will be detailed below, these include writing material, originally

blank versos, stitching on the edges of the sheets, the presence of several parallel columns of the text on one sheet, and vertical marks for folding.

- a) Writing material. The scrolls are written on parchment or leather (see below). While parchment was commonly used for writing codices as well, thick tanned leather was predominantly used for scrolls and *rotuli*. Probably corresponding to the Talmudic *gewil* (גויל), leather was effectively prescribed by normative texts as the only suitable material for liturgically viable scrolls.<sup>22</sup> As we shall see below, almost half of the scrolls in our corpus were indeed written on leather (Table 3). Even for small fragments, the use of leather normally constitutes good grounds for identifying them as parts of scrolls.
- b) Blank verso. Jewish scrolls are traditionally written on one side only. According to the normative texts, the written side of scrolls made of leather is the hair side of the hide (*Masekhet Sefer Tora* 1, 4; *Soferim* 1, 5). The recto of the parchment is the flesh side (*Soferim* 1, 5). A few opistograph scrolls have been identified among manuscripts from the Judean Desert,<sup>23</sup> and a scroll written פנים ואחור, ‘forth and back’, is mentioned in *Ez* 2, 10. But the corpus of the non-biblical scrolls from the Cairo Geniza does not contain opistographs; the text is written on one side and the verso has been left blank. In several cases (nos III, VI, VII, X, XI, XIV, XVI, XVIII) the blank verso was reused. These scrolls were all recycled as vertical *rotuli* to receive a different text, written by a different scribe in different ink. The texts of the secondary *rotuli* are written perpendicularly with regard to the text on the recto. Thus, fragments containing literary texts whose verso is blank or whose verso contains writings which result from a secondary reuse (especially in lines perpendicular to the recto) are often parts of scrolls. However, this criterion of the blank verso needs to be used with caution since there are some cases where folios in codices are only inscribed on one side. This concerns final folios of textual units and sometimes also the beginning of the texts: to protect the text, the scribes often began to copy the first quire of a codex from the verso of the first folio, leaving the outer recto free of text.<sup>24</sup> It is therefore important to identify the text with precision in order to situate it in the book.

<sup>22</sup> E.g. PT *Megilla* I, 71d: הלכה למשה מסיני שיהו כותבי בעורות (‘The law of Moses from Sinai that they should write on hides’).

<sup>23</sup> Tov 2004, 63–65.

<sup>24</sup> For example, two fragments which join together containing the text of Mishna *Shabbat* followed by the BT *Gemara*, TS E 2.24 + TS AS 78.249, are two parts of the same folio written on one side only. The page could easily be mistaken for a scroll fragment. However, the important width of the written text indicates a page from a codex written in long lines. The fragments contain the very beginning of the *Mishna Shabbat*. It is likely that the tractate was copied as a separate book. The extant leaf is therefore the first one in the book (and the first of the first quire of the codex).

- c) **Stitching.** Some fragments can be identified as parts of a scroll because they contain the outer edges of a sheet with marks of stitching to the side of another sheet. In nos II, XXIII and XXIV (P1), the sheets are still stitched together. No. IV contains a vertical row of holes in its well-preserved right-hand margin, with a piece of vegetal thread still attached to a part of the margin. Folding marks along the row of holes show that this sheet was stitched to another one through a fold towards the blank verso. Rows of holes are also visible on the edges of nos XI, XVI, XXII, XXV, XXVIII, XXIX, XXX and XXXI. Vegetal thread is preserved in no. VI and VIII.
- d) **Columns per sheet.** One sheet of the writing material may contain several parallel columns. For example, no. XXIV (P2) contains 7 narrow columns per sheet, no. III (fragment TS 20.155) and no. XXX contain 5 columns per sheet, no. I (sheet 1) and no. XV contain at least 4 columns per sheet, and nos XXII and XXVIII 4 columns per sheet. It should be pointed out that, as far as rabbinic texts are concerned, early Oriental manuscripts are usually written in a layout of one block of text per page, in long lines. The presence of several parallel and relatively narrow columns of text per page is usually an indication of the scroll format (see Figs 1 and 2).
- e) **Folding marks.** The vertical traces of folds are often easy to see (e.g. no. V, XXIII). They correspond to the folding of the scroll when it was read and preserved. Such traces provide an additional argument that the book was read while being progressively unrolled and folded horizontally. Moreover, these folds also provide an indication of the scroll's size – small scrolls were unrolled and folded during reading (see below).

All the fragments included in our corpus that were found to belong to a scroll met at least one of the above criteria. The corpus is a modest one compared to the thousands of Cairo Geniza fragments of codices that exist, but even so, it is still large enough for us to consider the horizontal scroll simply as one of the formats available for copying rabbinic and liturgical works in the mediaeval period, and to study their techniques and palaeographical features in their own right.

## 5 Writing material

As stated above, two types of writing materials were used to produce horizontal scrolls: parchment and leather. Parchment is the writing material employed in fragment nos I, II, III, IV, V, XIV, XV, XVIII, XXI, XXII, XXIII, XXIV, XXV, XXVII, XXVIII, XXIX, XXX and XXXI (which is probably of Western origin, possibly Italian). Leather was used for nos VI, VII, VIII, IX, X, XI, XII, XIII, XVI, XIX, XX and XXVI. Although both writing materials are of animal origin, the techniques used in their production differed and the final results are very different (see Figs 1 and 2 below).

As far as the Geniza fragments are concerned, leather was mainly used in the scrolls and *rotuli*. Leather is obtained from the dermis of an animal hide in its full thickness and is tanned and softened by beating. The well-attested method of transforming the animal skin into a usable product involves initially removing the fatty tissues of the hypodermis as well as the outer epidermis layer containing hair. Scientific analysis of leather Geniza scrolls has yet to be carried out to reconstruct the techniques that were employed in their production. Gaonic and mediaeval sources nonetheless give us some insights concerning the production of leather for writing. Maimonides differentiated four main stages in the preparation of the skin: hair removal, pickling in salt, drying with flour and tanning: 'A hide of domestic cattle or wild beast is taken. First, its hair is removed. It is then pickled in salt, afterwards prepared with flour and finally tanned with gall-nut or similar materials which contract the skin and make it durable' (*Hilkhot Tefillin* 1, 6). An earlier and more detailed account is a responsum attributed to either Sar Shalom, Gaon of Sura (mid-9<sup>th</sup> century) or to Sherira ben Ḥananya, Gaon of Pumbeditha (10<sup>th</sup> century):

The following is the manner in which *gewilim* are produced in our parts: dried hides are taken, their hair removed and they are soaked in water until soft [Maimonides' stage 1: hair removal], then cast into a specially designed pit into which water is poured along with a small amount of dog dung and a bit of salt. The pit is closed and the skins are left in it for one day in summer or three days in winter; no longer than that, lest the skins decay [Maimonides' stage 2: salting]. When the skins are taken out of the pit, they are inspected for tears, which are then sewn up. They are then laid out on a special wooden frame and rinsed thoroughly with fresh water. Then a large quantity of gall-nuts is brought, ground or crushed thoroughly, and each skin is treated with a third of a Baghdadi pound [of gall-nuts]. The skins are sprayed with these gall-nuts on both sides and sprinkled with some water. More of the gall-nuts are applied to the hair side than to the flesh side. This is done to each skin twice a day. On the third day, the rest of the gall-nuts are sprayed and the skins are placed in the sun to bleach and are left there to dry ([Maimonides' stage 4: tanning]. Subsequently, they are beaten (רצפנימי) and cut.<sup>25</sup>

<sup>25</sup> Lewin 1929, *Shabbat*, sect. 251; see Haran 1985, 54–55.

This procedure differs from Maimonides' description by omitting stage 3 (flouring) and placing the hides on wooden frames (which is done for parchment, but without any mention here of stretching; rather, the frame seems to be used to wash and tan the hides), and mentioning the final stage: beating the tanned and dried hides to soften them and make them fit for writing.

It appears from Gaonic and mediaeval sources that leather prepared in this way was identified with the Talmudic *gewil* (גויל) – the main writing material deemed suitable for copying liturgical scrolls.<sup>26</sup> The effect in actual Geniza manuscripts is unmistakable: the leather is thick, heavily tanned and darkened (almost black with age, in fact). There is a clear difference between the hair and flesh sides: the hair side is smooth and shiny, while the flesh side is suede-like and soft to touch. The text is written on the hair side. The flesh side has not been prepared for writing. In reused manuscripts, the flesh side is inscribed, but the surface absorbs the ink just like blotting paper and the outlines of the letters are blurred. On the glossy hair side, the ink adheres to the surface and reacts with it well. Some Geniza sources lead one to think that *gewil* was used exclusively by Jews. Indeed, in Judaeo-Arabic book lists, this term is not translated or given any Arabic equivalent, but used in its original Aramaic-Hebrew form.<sup>27</sup>

The second type of writing material used in non-biblical Geniza scrolls is parchment. Used for codices in Oriental communities (in addition to paper), this is also a frequent writing material for Tora scrolls found in the Cairo Geniza.<sup>28</sup> Here again, a scientific analysis of the elaborative techniques used would be very welcome.<sup>29</sup> A simple codicological observation alone is sufficient to distinguish parchment from leather, however. Even though the quality, colour and thickness of pieces of parchment found in the Geniza vary a great deal, some of the characteristics are shared: parchment is thinner than *gewil*, creamy-white to dark yellow in colour, and it is manufactured in such a way that both sides can easily be used for writing. Gaonic

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**26** On the different types of skins in Talmudic times and their identification in the Middle Ages, see Haran 1985.

**27** E.g. TS 20.44, a post-mortem inventory of books belonging to Avraham he-Ḥasid drawn up in Fustat in 1223; see Allony 2006, no. 67.

**28** TB *Menachot* 31b suggests that despite a preference for *gewil*, scrolls could also be made of parchment (כֶּלֶף). Maimonides explicitly permitted the use of *qelaf* to write Tora scrolls (*Hilkhot Tefillin* I, 8–9).

**29** The most frequently used hides were sheep and goat. Recent research on a sample of 32 Geniza parchment fragments DNA-tested by the Biology, Archaeology and Chemistry Department of the University of York using protein mass spectrometry to extract collagen has revealed that all but one of the fragments were written on sheep hides; see Nichols 2015, [http://www.lib.cam.ac.uk/Taylor-Schechter/GF/Genizah\\_Fragments\\_69.pdf](http://www.lib.cam.ac.uk/Taylor-Schechter/GF/Genizah_Fragments_69.pdf).

literature provides some information about the production of parchment, which is often referred to by the Arabic term *raqq* (or *riqq*) or Hebrew *qelaf*.<sup>30</sup> Indeed, the parchment used for Jewish manuscripts from the Cairo Geniza is not visibly different from what was used in Arabic documents, including those found in the Cairo Geniza. It is likely that Jewish parchment makers used the same techniques or even that Jewish scribes acquired parchment produced by Arab parchment makers.<sup>31</sup> It is relevant to note that Jewish craftsmen producing parchment were called *ruqūqī* or *raqqāq*, ‘the *raqq* maker’, in the Geniza texts.<sup>32</sup> In general, parchment can be defined as ‘a writing material of animal origin, untanned or very slightly tanned, dried under tension and apt to receive writing on its two sides’.<sup>33</sup> Scholars disagree on the role of tanning in the production of parchment. Some consider that parchment is not tanned, unlike leather,<sup>34</sup> while others observe that in Oriental communities parchment could be tanned very superficially without being turned into ‘leather’.<sup>35</sup> Indeed, it seems that the main difference in preparing leather and parchment is not so much the presence or absence of tanning agents as the process of thinning the parchment by scraping off the layers and especially stretching it and drying it under tension; in parchment, the structure of the skin tissue is profoundly altered by stretching. The production of mediaeval *raqq*, unlike *gewil*, also involved the use of lime at the initial stage of hair removal. Unlike leather, parchment was made for writing on both sides. The preparation of the flesh side made it lighter in colour than the hair side and progressively made the flesh side a favourite recto side.

As for the techniques of production, they probably varied a great deal throughout the centuries and places – parchment was produced as early as the first millennium BCE in Egypt and is attested in European sources as early as the 8<sup>th</sup> century CE (Ms. Lucca, Biblioteca capitolare 490). As regards the parchments used in Geniza times, some information can be gathered from Muslim and Jewish sources. Unlike leather, parchment was produced using lime. The author of *Fihrist*

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**30** Although, as discussed by Haran 1985, 46, the technique used for making Talmudic *qelaf* differed slightly from that of the Arabic *raqq*; in the Geniza period, the term *qelaf* in Hebrew was a translation of *raqq*.

**31** According to Haran 1985, 47, the parchment found in mediaeval Oriental Jewish documents must have been produced by Jews because in his opinion the Arabs did not write on skins. However, while it is true that paper was the main writing material, Arabic books and manuscripts were also copied on parchment; see Déroche 2000, 36–38.

**32** See Goitein 1967, vol. II, 410, 422.

**33** See Muzerelle 1985, 39.

**34** See Ryder 1991, 25.

**35** See Beit-Arié 1981, 22, note 25.

(10<sup>th</sup> century) mentions a depilatory paste, *nūra*, which was composed of lime and arsenic and used to clean the hair side of hides,<sup>36</sup> and a responsum by Hai Gaon states that hides were soaked in a lime solution (במים ובסיד). This responsum is interesting because it describes the process in full and points out differences in relation to another technique, which is the one used to obtain leather (*gewil*):

This is the teaching of the halakhah of Moses from Sinai: *tefillin* are written on *qelaf*, *mezuza* on *dukhsustos*. *Qelaf* is in the place of the flesh, *dukhsustos* in the place of the hair (see BT, *Shabbat* 70b, *Menaḥot* 32a). May our lord explain to us whether *qelaf* and *dukhsustos* mentioned here concern the leather (גוילין) treated with oak water (מי מילין),<sup>37</sup> dog dung and salt, or, as it is done here, they bring skins, salt them, keep them in salt for two or three days, then they soak them in lime water, take them out of it and attach them to their frames (מלבוות), and then scrape from them their hair and their membrane layer, and they leave them on the frames in the sun. And also, if they are *gewilin*, do they need to be produced with a special intention or not? Is there a problem with using skins coming from the Gentiles' slaughtering or not?

The Gaon answers this query by making a clear distinction between the techniques:

We have seen that those who soak it (the skin) in lime and water do not peel off it the *qelaf* and *dukhsustos*. What is suitable is *qelaf* moistened with gall-nut (כלף דעפיץ), as you have written, with oak water, dog dung and salt. And after that, it is rubbed with dates and barley flour, then peeled and finished with gall-nut, with the intention of producing it. The sections of the *tefillin* are written on the place of the flesh, and they are bound with the same *dukhsustos* which was peeled off it.<sup>38</sup>

Thus, the Gaon considers that the liturgically suitable material mentioned in the Talmud is produced using salt, enzymes (dog dung) and tannins, then by rubbing with dates and flour, 'peeling', and finishing by tanning it in a gall-nut solution. This contrasts with the technique described by his correspondents, which involves lime solution, thorough scraping and drying stretched over wooden frames. This corresponds to Muslim sources, which insist that hides for *raqq* have to be scraped thoroughly, including the flesh side, and stretched over wooden frames so that they dry under tension.<sup>39</sup> Scraping and stretching consequently produce a much thinner writing surface than leather, ready for writing on on both sides. In the case of Geniza parchments, a small amount of tanning material is also used (most likely gall-nuts), probably at the latest stage

<sup>36</sup> Ibn al-Nadīm, *Fihrist*, ed. Flügel 1871, 21.

<sup>37</sup> מי מילין, from מילא, *quercus infectoria* or *quercus aegilops*, a species of oak from which one obtains gall-nuts and acorns, both used as tanning material; see Jastrow, 1926, s.v. מילא, 773.

<sup>38</sup> Harkavy 1885–1887, 28, paragraph 63.

<sup>39</sup> For Muslim sources, see Déroche 2000, 40–41.

of the parchment's treatment. This no doubt accounts for the yellowish to light brown hue of most Geniza parchments, which is stronger on the hair side, which also retains ink better.

The parchment used for the scrolls in our corpus has a cream to yellow colour. In some cases (no. I), the parchment is of poor quality and greasy. While the parchment can be written on both sides, parchment scrolls do not contain any text on their verso except for those cases where they were reused, as in no. XIV). The scrolls' text is generally written on the flesh side of the parchment, apart from no. IV.

## 5.1 Ink

Two basic types of ink were used to copy the scrolls in our corpus: carbon ink and iron-gall ink. The distinction between them has been made both by visual inspection and in some cases, notably nos VII, XVI and XX, by the use of multi-spectral imaging and the XRF technique (X-Ray Fluorescence).<sup>40</sup> All manuscripts on parchment were written in iron-gall ink, which has now turned brown. The manuscripts on leather are written in a carbon-based black ink. However, when scrolls on leather were reused, the ink on the flesh side was found to be of a different type: iron-gall, as in nos VII and XVI.

## 5.2 Sheets

In most cases, the fragments are so small that it is difficult to reconstruct the original size of the sheet, and even less of the entire scroll. Indeed, we have no indication of how much of a rabbinic or liturgical text was copied in a scroll or what version of the text was included. Any calculation of the original size would be futile. However, more than one sheet is preserved in nos II and III. The size of the sheets can be irregular: in no. II, for example, the right-hand sheet contains at least four columns of the text, while the left-hand sheet, whose lateral edges are fully preserved, contains only two columns per page. Sheet 1 measures

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<sup>40</sup> Ira Rabin and Oliver Hahn from the Centre for the Study of Manuscript Cultures (CSMC), Hamburg, and the Federal Institute for Materials Research and Testing (BAM), Berlin, examined no. XVI in September 2015 as part of their involvement in the *Cairo Genizah Palimpsests project* run by the EPHE-Labex Hastec, Paris, which was co-ordinated by Judith Olszowy-Schlanger (EPHE, Paris) and Ben Outhwaite (Cambridge).



**Fig 1:** Cambridge University Library, TS 18 H 2 (no. XXIII), liturgical scroll (detail). © Reproduced by kind permission of the Syndics of Cambridge University Library.

270 × 380 mm and is incomplete on its right-hand side, and sheet 2, which is complete, measures 270 × 220 mm.

The sheets are stitched together with white vegetal thread and in one case, no. XXIII (Fig. 1), with a narrow strip of parchment. Traces of stitching are preserved in nos IV, VI and VIII. In nos II, XVII, XXIII, XXIV (P1) and XXIX, the two sheets are still firmly attached. The edges of both sheets are folded and held together by circular stitching on the verso (no. XXIX: the recto presents a straight surface without an overlap) or on the recto (no. XVII).

### 5.3 Dimensions

Although the length and the thickness of the complete scrolls is difficult to reconstruct, their height can be determined in many cases.

**Table 2: Height of the scrolls**

No.	Fragment measured	Height in mm
I	TS K 21.84	230
II	TS K 21.95s	270
III	TS 20.155	290
IV	TS 16.282	295
V	TS H 8.84	215
VI	TS AS 74.324	310
VII	TS AS 78.389	180
VIII	TS AS 78.390	185 (incomplete)
IX	TS AS 78.392	100 (incomplete)
X	TS AS 78.393	
XI	TS AS 78.394	240
XII	TS AS 86.263	85 (incomplete)
XIV	TS NS 196.119	115
XV	TS NS 200.12	173 (incomplete)
XVI	TS Misc. 26.53. 17	340
XVII	JTS ENA 4103	155
XVIII	BL Or 5558A	97 (incomplete)
XIX	BL Or 4856.3	210 (incomplete)
XXI	TS 28.12	560 (incomplete)
XXII	TS B 13.16	185
XXIII	TS 18 H2	215
XXIV	TS K 5.108 (P1 and P2)	118
XXV	TS 20.153	175
XXVIII	TS 28.13	225
XXIX	TS H 7.47	210
XXX	TS NS 122.124	100

The height of the scrolls ranges from small to very large. The smallest are ‘pocket size’ liturgical scrolls, such as nos XIV and XXX, which are only 115 mm and 100 mm high respectively. Most scrolls whose height is complete (i.e. the fragment contains both the upper and lower margins) are between 200 and 300 mm in size, with two scrolls – both on leather – going beyond 300 mm: 340 mm for the *Hullin* scroll (no. XVI; see Figs 2 and 3) and 310 mm for *Avot de-Rabbi Natan* (no. VI). The

largest scroll is no. XXI, liturgy on parchment: its height is over 560 mm, yet it is still incomplete because the lower margin is missing.

As for the length of the scrolls, this is impossible to say; we do not know whether the scroll contained complete works, individual portions or tractates, or again a selection of texts. Likewise, it is unclear whether the text version corresponds to other known witnesses and versions of the text and would be of the same length. Some texts have not been identified yet. Consequently, any reconstruction of the length of the scrolls based on the hypothetical reconstruction of the text is fruitless and will not be pursued here. Nonetheless, some very approximate information can be gathered from the marks left by readers of the scrolls.

As we have seen, in some cases it is possible to discern vertical folding marks (e.g. in no. V). These traces of use reflect the way the scroll was handled when it was read and rolled up again afterwards. Marks of this kind can be seen as an indication of the scroll's size. Indeed, while large, heavy and tightly rolled scrolls such as Tora scrolls were usually attached to two handles and unrolled while being held on a support, small scrolls such as *Megillat Ester* only had one handle, if any. While unrolling the scroll, the reader holds the handle-free end with his hand and folds it so it does not drop on the floor. Only small scrolls, loosely held and provided with one handle or no handle at all, would contain traces of such folding. The verso of no. XIX, which might have contained the Tora with the verse-by-verse Pentateuch, is smooth, without any traces of vertical folds.

## 5.4 Pricking and ruling

The fragments have not been preserved well enough for us to obtain a clear picture of the pricking and ruling techniques and patterns that were used in the past. Nonetheless, some general observations can be made. In nos I, V, X, XIII and XV, there are no traces of any pricking and ruling. In nos X, XIII and XV this absence may be due to the state of conservation, but nos I and V, both on parchment, were definitely not ruled at all. Several manuscripts were ruled and probably contained pricking as well, but the holes have not been preserved (nos IV, VI, VII, IX, XII, XIV, XVI, XVII, XVIII, XIX, XX, XXI and XXI). Pricking is preserved in no. II, where there are vertical rows of pricking holes in the side margins of the sheets, at a varying distance from the edge of the text. The pricking holes were made with a triangular awl. There are also single pricking holes in the top margin to guide the vertical border lines of each column. The pricking and ruling was done separately for each sheet. In no. III, there are only two holes in the preserved part of the upper margin to guide vertical lines between cols. 3 and 4 (from right to



**Fig 2:** Cambridge University Library, TS Misc. 26. 53. 17 (no. XVI), Babylonian Talmud, *Ḥullin*.  
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**Fig 3:** Cambridge University Library, TS Misc. 26. 53. 17 (no. XVI), multispectral image, infrared. © Reproduced by kind permission of the Syndics of Cambridge University Library.

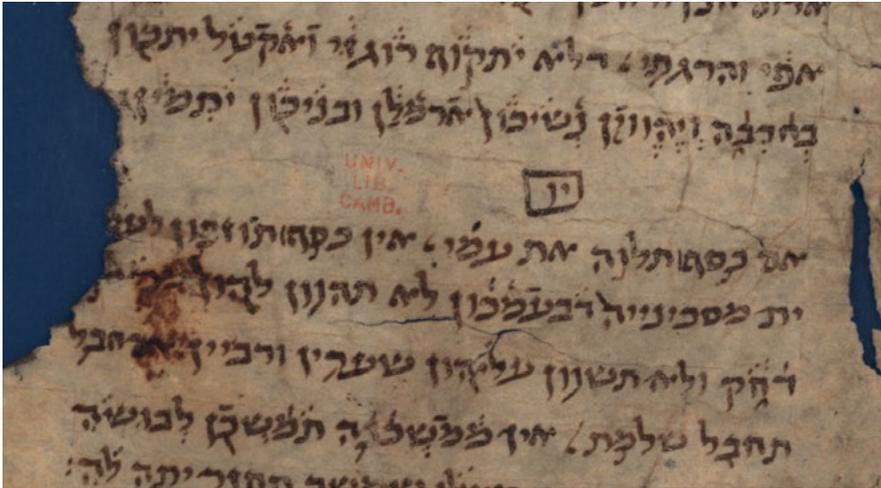


**Fig 4:** Cambridge University Library, TS Misc. 26. 53. 17 (no. XVI), detail; the last written line is under the last ruled line. © Reproduced by kind permission of the Syndics of Cambridge University Library.

left). These were made with a needle. In no. X, there is a row of vertical pricking, approx. 10 mm from the edge of the sheet on the left-hand side.

As for the ruling techniques, both leather and parchment fragments were ruled with a hard point. The scrolls on leather were ruled on the hair side, i.e. the side which received the text (nos VI, VII, VIII, IX, XII, XVI and XIX). As for the parchment, when the side of the ruling can be determined, the scrolls were either ruled on the flesh side, corresponding to the inscribed surface (nos III, XVII, XVIII and XXII) or on the hair side, which corresponds to the blank verso (no. XIV). In no. XI, it seems that ruling was done with a hard point, which left brown-coloured traces on the lines.

The ruling pattern is simple: there is a vertical line on each side of the columns (nos III, IV, XIV, XVI, XVII and XXI) and there are horizontal lines to guide the lines of the text (in no. XXII, only the vertical lines are visible). The horizontal lines were traced through the width of the sheet (no. XVI). The horizontal lines are spaced from approx. 5 mm apart in no. IX to approx. 7 mm in no. XII. In no. XVI, the space between the horizontal ruled lines varies between 7 and 9 mm (see Fig. 2). It seems that the distance was not measured with a ruler. In no. IV, the piece was ruled or marked with vertical lines as if the sheet was to be written in the opposite direction – maybe for recycling. As is the custom in Oriental manuscripts, in most scrolls whose preservation allows such observations, the first and last lines are written below the first and last line of ruling respectively. However, in no. XVII, there is a ruled line below the last written line (see Fig. 5). In no. XVI, there are two written lines under the last ruled line (see Fig. 4). There are 47 ruled and written lines in col. II, and 48 written and 47 ruled lines in col. III (see Figs 2 and Fig. 3).



**Fig 5:** Cambridge University Library, TS 20. 155 (no. III), graphically marked hierarchy of the text.  
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## 5.5 Layout of the sheets

The text is disposed on the sheets of leather or parchment in parallel columns. In most cases, it is impossible to ascertain how many columns there were per sheet. In nos III, XVI, XVII and XXIII, there were at least 5 columns per sheet. In nos V, XIV and XXII, 4 columns are preserved. The number of columns per sheet could vary, as in no. II, in which sheet 1 contained at least 4 columns, and sheet 2, which is complete, contains 2 columns. In no. XVII, sheet 1, which is also complete, contains 4 columns and sheet 2, which is incomplete, has 5 columns. In no. XXIII, sheet 1 contains 4 columns, while sheet 2 contains 5. The small liturgical scroll no. XIV contains one complete sheet, whose text is written in one column or one block of text.

## 5.6 Text layout

From the point of view of their text layout, the scrolls whose state of preservation allows conclusions to be made can be divided into two groups: manuscripts with a more developed system of text navigation and manuscripts with very basic text subdivision markers.

The first group especially includes nos II, V, XIV, XV, XXII and XXIII (*Hekhalot Rabbati*, Palestinian Targum and liturgical texts). All of these scrolls are written on parchment, and one can see a display of more than one text layout device. In no. II, new sections are introduced after a blank line and with an indent at

the beginning of the first line of a subsection. In cols. 3 and 4 of sheet 1, part of the text is written in the format of a tabular list. No. III contains a number of elements, some reminiscent of the text layout of the Hebrew Bibles. The text, which contains the beginnings of the Hebrew verses (*dibbur ha-mathil*) followed by a full translation of each verse in Aramaic, is subdivided according to the *sidrot* of the Palestinian triennial reading cycle and is also laid out in paragraphs and verses. The *sidra* is introduced by its number in Hebrew letters, written in the blank space of 2 lines between the sections and placed in a square frame. The paragraphs are arranged like open and closed sections (*parashiyot petuhot* and *setumot*). Each abbreviated Hebrew verse ends with a paragraph sign in the shape of a '6'. The Aramaic verses are ended by using a *sof-pasuq* sign. A further differentiation between Hebrew and Aramaic can be seen in the presence or absence of vowels: the Aramaic verses are systematically vocalised with Palestinian vowels, while Hebrew lemmata are often (though not always) devoid of vowels (they contain however, basic signs of cantillation). There is a clear and sophisticated hierarchy in the text to help the reader (Fig. 5).

Most liturgical scrolls, such as nos XIV and XV, also show that great care was taken in their presentation. The new subsections are introduced by titles in blank lines (the title הג שבויעות in no. XIV and the title of a *yošer* in no. XV). The paragraphs are marked by a relatively large space in the line. In no. XIV, the end of the paragraph is marked by a '6'-like sign. These hierarchically organised manuscripts use blank as opposed to written space as a major element in planning the page. Large white spaces in the lines marking the beginning of new paragraphs and the end of existing ones signalled by a circle are characteristics found in no. I as well.

The second group includes nos VI, VII, VIII, XI and XVI (*Avot de-Rabbi Natan*, TB *Bava Batra*, *Mishna Bava Batra*, TB *Hullin*). These are all manuscripts inscribed on leather. The most distinctive feature in this group is that smaller amounts of blank space are used to mark new subsections than in group 1. New subsections are never introduced by a blank line, and there are no indentations at the beginning of a new paragraph either. The system used to mark subdivisions is a rudimentary one. In no. VI (*Avot de-Rabbi Natan*), there are spaces of a width of three letters at the end of some paragraphs. In no. VII (TB), a new *mishna* is introduced by the abbreviation מתני placed in a space of approximately five characters left blank in the line, and the end of a paragraph is marked by a dot in the upper corner of the headline (Fig. 6).

In no. VIII, the *mishnayot* of the *Mishna Bava Batra* chapter 1 are introduced by consecutive letters of the Hebrew alphabet provided with a three-dot symbol on the top. The previous *mishna* is ended by a circle in the middle of the line (Fig. 7).

In no. XI, most probably copied by the same scribe as no. VI, there is no text subdivision or punctuation, but the end of the chapter, corresponding to the



**Fig 6:** Cambridge University Library, TS AS 78. 389 (no. VII). Beginning of a new *mishna*.  
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last line of the fragment and of the sheet, contains קילס followed by a *samekh*. In no. XVI, the subsections of the text are indicated by a white space of approx. 3 letters in the line (col. 3). There are no paragraph or punctuation signs.

Thus, we notice that in both groups there is a certain effort to mark subdivisions of the text, but to a different extent. In group 1, there is definitely more care about using blank spaces in order to indicate new sections. In group 2, such markings are reduced to a minimum. In group 1, there is constant use of end-of-paragraph signs, with more than one device sometimes being employed in the same scroll, and punctuation at the end of the verses, while in group 2 such graphic signs are minimal.

The state of preservation of the other fragments is such that it is impossible to ascertain whether their text was subdivided graphically. In the case of longer fragments (no. IX), the ends of the verses contain no punctuation signs.

## 5.7 Decoration

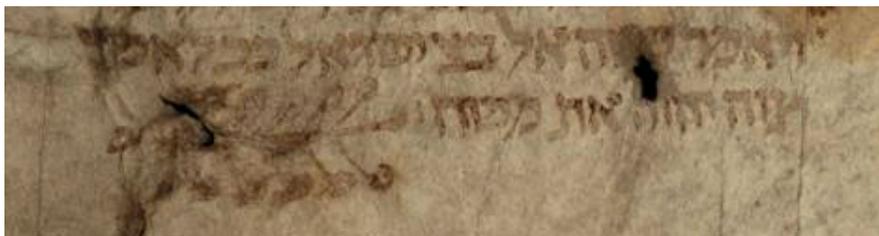
Although some of the scrolls display a high level of calligraphic skill, they do not contain any extra-textual decoration. In one case only, no. XXII (a common prayer book), there is a schematic drawing, which fills a short last line of a paragraph (see Fig. 8). The text includes prayers for *Sukkot* and *Shemini ašeret*, and the drawing may represent a *lulav* (bouquet of four botanical species for *Sukkot*).



**Fig 7:** Cambridge University Library, TS AS 78. 390 (no. VIII). End of a *mishna* and the number of the next *mishna*. © Reproduced by kind permission of the Syndics of Cambridge University Library.

## 5.8 Palaeography

All the scrolls in our corpus are written in square script,<sup>41</sup> often of calligraphic quality, and most of them show a high level of scribal proficiency. All of them are written in the Oriental type of Hebrew script, but belong to two distinct sub-groups within the large Oriental category: Oriental South-western (Palestine and Egypt) (see Fig. 1) and Oriental North-eastern (Iraq, Persia, diaspora communities under Babylonian influence) respectively (see Fig. 3 and Fig. 4).<sup>42</sup> This differentiation is well attested in the early strata of the Cairo Geniza (dated and datable documents: 9<sup>th</sup> to 11<sup>th</sup> century), when the two sub-types seem to have been used in parallel. Although most of the early fragments are undated and contain no mention of their locality, various features enable us to attribute them to ‘Palestinian’ and ‘Babylonian’ geo-cultural areas or zones of influence.



**Fig 8:** Cambridge University Library, TS B 13. 16 (no. XXII), decorative space-filler. © Reproduced by kind permission of the Syndics of Cambridge University Library.

<sup>41</sup> In no. V, one of the allographs of the letter *alef* however, has a more cursive ductus and shape.

<sup>42</sup> For a definition of these two sub-types of the Oriental Hebrew square script however, see Olszowy-Schlanger 2015; Tchernetska, Olszowy-Schlanger and de Lange 2007; Olszowy-Schlanger 2010; Olszowy-Schlanger and Shweka 2013; Olszowy-Schlanger 2014. Edna Engel also distinguishes two sub-groups of Oriental script, but places them in a chronological sequence; see Engel 1998/99, 369–371.

The South-western palaeographical sub-type is attested in manuscripts which can be attributed to Palestine or Egypt – a cultural continuum since the Byzantine period. Some of the manuscripts in this group contain Palestinian vowels, typically Palestinian texts such as the *Talmud Yerushalmi* or liturgical poetry, or are palimpsests written on reused books in Greek, Christian-Palestinian Aramaic or Georgian.<sup>43</sup> The script of this sub-group has affinities with the Hebrew script from Egypt from the Byzantine and early Islamic period, as attested in the Antinoopolis Papyri nos 47 and 48 from Oxford, Ashmolean Museum, Sackler Library (Book of Kings).<sup>44</sup> As for the dated or datable manuscripts which could be used for palaeographical comparison, this sub-type is attested in TS NS 308.25, a fragment of a liturgical book containing a standard model-formulary of a letter of divorce mentioning the date in 4633 AM (= 872/3) and Jerusalem as the place of writing.<sup>45</sup> This is a formulary and not an actual legal document, so the date of 872/3 is a *terminus post quem* for the copy of the book. The copy was probably not made much later than that. This sub-type is attested in the 10<sup>th</sup> century in various biblical fragments: TS A 39.11+Manchester, John Rylands Library Gaster Genizah 2 copied in 953/4 in Gaiffa in Egypt,<sup>46</sup> and in TS A 42.2+TS B 17. 38+TS NS 283.123+TS NS 80.14, copied in 924 in Egypt or Palestine since these *haftarot* fragments contain indications of the Palestinian reading cycle.<sup>47</sup>

The North-eastern sub-type probably originated in Babylonia, but spread westwards as early as the 10<sup>th</sup> century. The earliest dated and localised examples either come from Iran and contain Babylonian vowels<sup>48</sup> or come from Iraq.<sup>49</sup> From the 10<sup>th</sup> century onwards, this sub-type was also used in Egypt and Palestine. It is related to the calligraphic script of the famous masoretic codices with Tiberian vowels, such as the Aleppo Codex<sup>50</sup> or Leningrad Codex (Ms. Firkovich, EBP I B 19a, Cairo, 1008) and other books copied by its scribe, Shemu‘el ben Ya‘aqov.<sup>51</sup>

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43 For a list of the palimpsests from the Geniza, see Sokolov/Yahalom 1978; Olszowy-Schlanger 2014 and the bibliography there.

44 Sirat 1985, 35–37.

45 See Brody 1998, 197. Margalio 1973, 121.

46 Beit-Arié/Sirat/Glatzer, 1997 vol. I, no. 9.

47 Beit-Arié/Sirat/Glatzer 1997, vol. I, no. 4.

48 TS AS 62.402, 461, 492–493, 533, 644+TS NS 246.26.2 and 18(a)+TS NS 283.10, copied in 903/4 in Gunbad-i-Mallgān; see Beit-Arié/Sirat/Glatzer 1997, vol. I, no. 2; ‘Codex Babylonicus’ St Petersburg, Firkovich EBP I B 3, copied in 916, Beit-Arié/Sirat/Glatzer 1997, vol. I, no. 3.

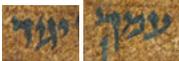
49 Ketubba TS Ar. 38.11, Hopkins 1981, proposed the year 870/1 as the *terminus ad quem*. For a different reading and a date a hundred years later, see Olszowy-Schlanger 2004–2005, 47–50.

50 Beit-Arié/Sirat/Glatzer 1997, vol. I, no. 6 and the bibliography mentioned there.

51 Beit-Arié/ Sirat/Glatzer 1997, vol. I, no. 17.

Described in more detail elsewhere,<sup>52</sup> some salient features of the two groups are summarised briefly here and illustrated by the scrolls (Table 3):

**Table 3:** Main salient features of the two sub-groups of the Oriental Hebrew script

South-western Hebrew square script	North-eastern Hebrew square script
<p>a) the letters <i>gimel</i>, <i>‘ayin</i> and <i>pe</i> are long and descend below the baseline (ex. no. XXIII)</p> 	<p>a) the letters <i>gimel</i>, <i>‘ayin</i> and <i>pe</i> are most often included between the headline and the baseline (ex. no. VII).</p> 
<p>b) the letters <i>lamed</i> and <i>resh</i> do not reach the baseline (no. IV)</p> 	<p>b) <i>lamed</i> often does not reach the baseline, but <i>resh</i> is the same height as the line of writing (no. XVI)</p> 
<p>c) example of distinctive letter shapes: <i>alef</i>, <i>he</i>, <i>het</i>, <i>pe</i> (no. XVII)</p> 	<p>c) examples of distinctive letter shapes: <i>alef</i>, <i>he</i>, <i>het</i>, <i>pe</i> (no. XVI)</p> 
<p><i>Alef</i>: the basic structure of the letter consists of three strokes: a slanted central stroke, left-hand vertical downstroke and right-hand vertical downstroke. The characteristic feature concerns the left-hand downstroke, which is almost perpendicular and links the headline with the baseline. It descends from the left extremity of the central mainstroke and sometimes even higher up above the headline. It is either straight or ended by a foot often turned right, towards the inside of the letter.</p>	<p><i>Alef</i>: the basic structure of the letter consists of three strokes: a slanted central stroke, left-hand vertical downstroke and right-hand vertical downstroke. The central mainstroke is often extended on the left by a serif pointing upwards. The left-hand downstroke is rounded or descends at an angle so that its lower end is further to the left than its top extremity. In many cases, the stroke is slightly rounded and ended by a foot turning either to the right or, more frequently, to the left. The meeting point between the left-hand downstroke and the mainstroke is at a distance from the headline and the top of the letter.</p>

52 See esp. Olszowy-Schlanger 2014, 295.



*He:* the right-hand downstroke descends from the upper horizontal bar without reaching the baseline. The upper horizontal bar may have a serif on its left-hand extremity. The left-hand down-stroke does not touch the upper horizontal bar.



*He:* the right-hand downstroke descends from the upper horizontal bar. Sometimes it stops slightly above the baseline. There is a serif on the left extremity of the horizontal bar. The left-hand downstroke is straight. It is attached to the upper horizontal bar. Its meeting point with the bar is removed from the left-hand extremity towards the middle of the letter.



*Het:* differs from *he*, notably in the space between the left-hand downstroke and the upper horizontal bar.



*Het:* can easily be confused with *he* because the left-hand downstroke touches the upper horizontal bar. However, in *het*, this downstroke is attached to the horizontal bar at its very extremity.



*Pe:* the letter is larger and broader than average letters, descending slightly below the baseline. The upper horizontal line is as long as the base. The left-hand stroke crosses the upper bar and ends in a hook turned inwards to the right.



*Pe:* the upper horizontal part is shorter than the base of the letter. It is created by a meeting point of the slightly slanted right-hand downstroke and the left-hand stroke. The left-hand stroke ends in a decorative foot which often turns outwards to the left.

## 6 Conclusions

This preliminary study of the corpus of the non-biblical horizontal scrolls identified in the Cairo Geniza reveals two distinct bookmaking traditions. The differences between the groups of manuscripts include writing materials, page and text layouts, and two different sub-groups of the Oriental square script. The distribution of these physical features follows a pattern, which seems to include the nature of the text as well. Table 4 below displays this consistent pattern of physical features of the manuscripts and the nature of their texts. Moreover, as far as it could be ascertained, most of the scrolls made of parchment are written in iron-gall ink, while the main texts of the rabbinic scrolls made of leather are written in carbon-based ink.

Table 4 shows us that there is a relationship between the type of text and the main physical features of the scrolls in the majority of cases. Except for no. XIII,

the scrolls containing prayers, i.e. nos IV, V, XIV, XV, XXI, XXII, XXIII, XXV, XXVII, XXVIII, XXIX, XXX and XXXI, are written on parchment, usually contain a more sophisticated and hierarchical text layout and are written in a South-western sub-type of the Oriental script. Similar physical features are found in no. III, a scroll containing the Palestinian Targum with Palestinian vowels, as well as in two other scrolls, nos I and II, containing a late *midrash* (*Pirqa de-Rabbenu ha-Qadosh*) and *Hekhalot Rabbati* respectively, and in no. XVIII containing *Avot de-Rabbi Natan*. The textual aspects of these texts require a dedicated specialist analysis. However, according to the preliminary analysis by Dr Vered Raziel-Kretzmer, the liturgical compositions of nos III, V, XIV, XV, XVII, XXII, XXIII, XXV, XXVIII and XXIX belong to the Palestinian ritual. Of all the liturgical scrolls, only no. XIII (on leather) may be Babylonian, and no. XXVII contains some Babylonian features. The only non-Geniza scroll, the 'Munich Palimpsest' (no. XXXI), also contains early *piyyuṭim* probably belonging to the Palestinian ritual tradition.

The *Mishna* and Babylonian Talmud scrolls, nos VII, VIII, IX and XVI, are written on dark and thick leather, have a very rudimentary array of devices to facilitate navigation in the text and are written in the North-west sub-type of Oriental script. The same physical features are found in no. XIX, a fragment of Targum with Babylonian supralinear vowels, and in three midrashic scrolls, no. VI containing another copy of *Avot de-Rabbi Natan*, nos X and XI. No. XXIV is not included in any of these groups; it was produced much later than the other manuscripts and contains children's exercises, which makes it difficult to attribute it to a particular scribal tradition.

**Table 4:** Comparison of contents and main physical features of the scrolls

Scroll	Text		Material		Text layout		Script	
	Liturgical-related	Rabbinic	Parch-ment	Leather	Hierar-chical	Rudi-mentary	South-west	North-east
I		+	○		○		○	
II		+	○		○		○	
III	○		○		○		○	
IV		+	○		?		○	
V	○		○		○		○	
VI		+		+		+		+
VII		+		+		+		+
VIII		+		+		+		+
IX		+		+		+		+
X		+		+		+		+
XI		+		+		+		+
XII		+		+		+		+
XIII	○			+		+		+
XIV	○		○		○		○	
XV	○		○		○		○	
XVI		+		+		+		+
XVII	○							
XVIII		+	○		○		○	
XIX	○			+		+		+
XX	○			+		+		+
XXI	○		○		○		○	
XXII	○		○		○		○	
XXIII	○		○		○		○	
XXIV	n/a	n/a	○		n/a	n/a		+
XXV	○		○		○		○	
XXVI	n/a	n/a		+	n/a	n/a	n/a	n/a
XXVII	○		○				○	
XXVIII	○		○		○		○	
XXIX	○		○		○		○	
XXX	○		○			+	later	later
XXXI	○		○		○		○	

One is immediately struck by the affinity of the first group of manuscripts, i.e. those written on parchment, with the Palestinian-Egyptian cultural zone. The texts, especially the Palestinian Targum with Palestinian vowels based on the Palestinian reading cycle, point to Palestine or Egypt. On the other hand, the ‘Talmudic’ group, the manuscripts written on *gewil* with little attention to graphic devices to guide the reader, and written in the North-eastern sub-type of Oriental script, show a Babylonian connection. While it is not possible at this stage to ascertain that these manuscripts were written in Iraq, they certainly emanate from a centre or workshop that followed Babylonian models and practices. Nos XIX and XX, Targum scrolls with Babylonian vowels, and the Babylonian vowels in eight words in no. XVI<sup>53</sup> all point in that direction, as does the analysis of the textual features of the scrolls. A detailed textual study of the scrolls is beyond the scope of this paper, but two of the scrolls in the second group, ‘on leather’, nos VI and XVI, have already attracted scholars’ attention. Following a detailed philological analysis of the spelling and language of our no. XVI, Shamma Friedman concluded that it contains an early Babylonian variety of Tannaitic Hebrew.<sup>54</sup> A Babylonian connection has also been claimed by Marc Bregman in his study of the language of the scroll of *Avot de-Rabbi Natan* in our no. VI. Leather or parchment for scrolls was also used in a Gaonic source as a marker of the difference between Babylonian and Palestinian customs. The Babylonian scholar Pirqoi ben Baboi, who, in a letter to a North African community written at the beginning of the 9<sup>th</sup> century defending Babylonian customs as opposed to Palestinian ones, pointed out that the *raqq* type of parchment was in common use in Palestine, contrary to the custom of the ‘two Babylonian *yeshivot*’ who continued applying ancient bookmaking techniques and notably used *gewil*. The prescribed techniques are valid even for the writing of the scroll of the adulteress (Num 5, 19–23), as explained in *Mishna Soṭa* 2, 2 and *TB Soṭa* 17b. Pirkoi ben Baboi added that because of the persecution by the Byzantines (the ‘wicked Edom’), the Tora scrolls in Palestine were hidden to protect them from being burnt. As a consequence, there were no model scrolls left by the time the Muslim conquest took place in Palestine, and scribes were no longer trained according to ancient tradition; instead, they used parchment produced by non-Jews to write their Tora scrolls. As Pirqoi pointed out, this recourse to non-Jewish book materials and practices had continued in Palestine up to his time and it began to gain influence in other communities.<sup>55</sup>

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53 One word in this scroll contains Tiberian vowels; see Friedman 1995, 22.

54 Friedman 1995.

55 Ed. L. Ginzburg, *Ginzei Schechter*, II, 1929, pp. 561–562: וכך הלי' בשתי ישיבות ובכל ספרים ראשונים: הישינים שמימות משה ועד עכשיו לא נהגו לכתוב בריק זה אלא משנים מועטים מפני שמנהג שמד הוא שגור אדום הרשעה

Of course, one should not generalise and claim that the use of leather is related exclusively to Babylonia or to places under its influence.<sup>56</sup> Nonetheless, for Pirqoi ben Baboi, bookmaking techniques were used as an argument for claiming Babylonian superiority. This shows that two different technological book traditions were clearly perceived as the products of two respective cultural centres in the Gaonic period. It is also the case that Babylonian Talmud scrolls and other scrolls in the North-eastern type of script in our corpus, some of which are not much more recent than Pirqoi ben Baboi's letter, are the ones written on *gewil*, while the scrolls written in the South-western type are on parchment. This relationship between the writing material and text and script is striking. Without claiming categorically that the scrolls made of leather were necessarily written in Iraq, while those on parchment came from Palestine or Egypt, it does seem appropriate to study the respective bookmaking techniques as one example of the numerous cultural differences between the two Jewish centres and the communities that followed their respective teachings.

## Abbreviations

AS	Additional Series, Taylor-Schechter Genizah Research Unit, Cambridge University Library
BL	British Library
BT	Babylonian Talmud
CUL	Cambridge University Library
ENA	Elkan Nathan Adler Collection, Jewish Theological Seminary New York
Misc.	Miscellaneous, Taylor-Schechter Genizah Research Unit, Cambridge University Library
NS	New Series, Taylor-Schechter Genizah Research Unit, Cambridge University Library
PT	Palestinian Talmud
TS	Taylor-Schechter Genizah Research Unit, Cambridge University Library

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שמד על ארץ ישר' שלא יקראו בתורה וגנוזו כל ספרי תורה מפני שהיו שורפין אותן וכשבאו ישמעלים לא היו להם ספרי תורה ולא היו להם סופרים שיש בידם הלכה למעשה כיצד מעבדין את העורות ובאיוזה צד כותבין ספרי תורה והיו לוקחין ריק מן הגוים שעשו לכתוב בהן ספרי עבודה זרה והיו כותבין בהם ספרי תורה מפני שלא בידם הלכה למעשה ועד עכשיו הם נוהגין כך ולא עוד אילא שלמדו אחרים שבכל מקומות מהם והם כותבין ספרי תורה ומחזרין מפני שהוקל וחומר עליהם בדמו ובכתבו. **56** For example, an early magical *rotulus*, Ms. Oxford, Bodl.Heb.a.3.31, is composed of sheets of parchment and leather, and its script is of the South-western type.

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