Hebrew Codicology
Tentative Typology of Technical Practices
Employed in Hebrew Dated Medieval Manuscripts

by

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FOREWORD TO THE REPRINTED EDITION

The text of the first edition of this book is hereby reprinted unchanged, with addenda and corrigenda appended. In these, only errors concerning information such as dates or references have been corrected, and data regarding the employment of various techniques are replaced or added following further study of the dated manuscripts at the Hebrew Palaeography Project. Updated bibliographical references are also furnished.

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ABBREVIATIONS

Bernheimer — C. Bernheimer, Codices hebraici Bybliothecae Ambrosianae, Florentiae 1933.


HPP — Hebrew Palaeography Project (precedes the Project’s call-number of each dated manuscript).

JNUL — Jewish National and University Library.

JTS — Jewish Theological Seminary of America.


Steinschneider — M. Steinschneider, Catalog der hebräischen Handschriften in der Stadtbibliothek zu Hamburg, Hamburg 1878.

CHAPTER ONE
INTRODUCTION

Hebrew manuscripts were produced during the Middle Ages in many lands, due to the wide geographical distribution of the Jews in the East and in the West. Hebrew books were copied in Christian Europe, in Moslem Spain, North Africa, the Near and Middle East, and in Byzantine Asia Minor and Greece. While their script differs from Latin, Greek, Syrian, Arabic or Persian manuscripts, their techniques may have been similar. Medieval Hebrew handwritten books reflect both Oriental and Occidental, Christian and Islamic civilizations. In Hebrew manuscripts, Latin, Greek and Arabic palaeography and Handschriftenkunde might find a tool for comparative intercultural study.

Hebrew codicology is inevitably late Medieval, due to the scarcity of existing dated manuscripts from the early Middle Ages. In fact, there is an almost total gap of about eight centuries between the time of the most ancient handwritten books discovered — the Dead Sea Scrolls — and the earliest dated Hebrew codex, written in 894/5 C.E.1 Only few small literary leather or papyrus fragments, which were

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1 A manuscript of the Prophets, copied by Moshe ben Asher in Tiberias, kept in the Karaite Synagogue in Cairo. M.I. Leningrad, Institute of Oriental Studies D62 is alleged to be written before 847; see recently C.B. Starkova, "Les plus anciens manuscrits de la Bible dans la collection de l'Institut des Etudes Oriantales de l'Academie des Sciences de l'U.R.S.S.," La paléographie hébraïque médiévale (colloques internationaux du Centre National de la Recherche Scientifique, N° 547), Paris 1974, pp. 30-39 and Pl. VIII (the date should be read 847, not 747). The dating is based on a record of sale, dated 847. The owner who sold the manuscript is said in a legal statement of ownership to have inherited the manuscript from his ancestors, thus, one may conclude that it was written generations before.

In fact, this manuscript of the Latter Prophets was well known to scholars of the previous century as the Karashazar Codex, and its dating provoked long disputes among them. See D. Chwolson, Corpus inscriptionum hebraicarum, St. Petersburg 1882, coll. 184-187 and the lithographies of the record and of a sample of the manuscript. See also E. Delitzsch, Madâ ʿOfri, Warsaw 1878, pp. 24-27 (in Hebrew). On the calendar problems involved in the date of the record see Ch. I. Bornstein, Ha-Tiqqa, XIV-XV (1922), p. 354 (in Hebrew). Although this codex is obviously written in a very old script, the cursive script of
written during this long gap, have been discovered.² Part of them are obviously fragments of scrolls, and others are perhaps not derived from books at all. However, they provide some strictly limited codicological information.³ It is very likely that the Cairo Geniza, that huge deposit of some 200,000 fragments of Hebrew manuscripts (and documents), now scattered and kept in some dozen libraries, but mainly in the Cambridge University Library, includes also fragments of books copied before the end of the ninth century.⁴ However, the present stage of morphological research in Hebrew paleography is not yet sufficiently developed to date such fragments, and the technical information which may derived from them is small. Thus, Hebrew codicological research is bound to late Medieval dated manuscripts.

Furthermore, existing dated manuscripts up to the end of the twelfth century are quite rare. Of some 2700 extant dated Hebrew manuscripts until 1540, 6 dated codices from the tenth century, 8 from the eleventh century and 22 from the twelfth century are known to us, most of them Oriental. In addition, there are about 60 small fragments of Oriental codices dated before 1200 among the geniza fragments.⁵

Mostly, they are liturgical, although some of them are liturgical. See J. Schirrmann, JQR, XLIV (1953/4), pp.132-133:


c) Small literary fragments among the papyri found in Oxyrhynchos, which are kept in the Bodleian Library, Oxford. See A. Cowley, JQR, XVI (1904), pp. 1-8; idem, JEA, II (1915), pp. 209-213.


g) Sen Ciutat de Valèiss (Barcelona), Seminario de Paplogia PHPau I. Im 117:120: Four papyrus fragments discovered recently. See F. Díez, Esteban, Studia Papyrologica, VII (1968), pp.111-128.

h) Vienna, Nationalbibliothek, Erzherzog Rainer Papyri Collection: H37, H50 (these are the liturgical fragments described by D.H. Miller and D. Kaufman, Mittheilungen aus der Sammlung der Papyri Erzherzog Rainer, I, Wien 1887, pp.38-40); and H57 are definitely literary fragments of the Hebrew papyri in this collection.

4 Especially the palimpsests of Talmud Yeruzalmi, Mishna, Midrash Bereshit Rabba, Piyyuqey Yannay and Masora, written mostly on Christian Palestinian-Aramaic and Greek texts. See, for example, C. Taylor, Hebrew-Greek Cairo Genizah palimpsest, Cambridge 1900. See also Y. Sussmann, Tarbiz, XLIII (1974), pp. 155-166, note 497 (in Hebrew).

5 These figures do not include all the manuscripts kept in the U.S.S.R., due to lack of information.
common in the same cultural area, and sometimes it is possible even to trace their emergence and shifts, and to date changes of techniques.

Archeological approach and codicological typology are vital for Hebrew palaeography. The Hebrew palaeographer, in particular, cannot limit his scope to the study of scripts as his main role. One has to consider the exceptional historical conditions of the Jewish people. The wanderings of individuals and communities have hindered the natural process of stylization of local handwriting. The frequent migrations of entire populations by force, and of individuals by choice, have brought mutual influences and mixtures and obscured the identifiable marks of different types of handwritings. At the same time, and in the same locality, we find several types of script, where immigrant scribes continued to retain their native script. In Italy, for instance, Hebrew manuscripts were written in an Italian type of script, in a German type and in a Spanish type at the same time and place. Therefore, it is understandable that under such conditions, the role of script typology is weakened. One has to use every element revealed in the production of the handwritten book, not only because of theoretical reasons of examining the entire manuscript as a product of the culture of its locality and time, but also because of these practical reasons. These particular historical conditions offer an interesting opportunity to study the relationship between script and techniques, which is exemplified in the last chapter of this book, after the presentation of the codicological typology.

* * *

The following tentative typology of some technical elements of handwritten Hebrew books is based on the study of and classification of data drawn from about one thousand dated manuscripts studied by the Hebrew Palaeography Project, including most of the early manuscripts. Of the various physical, technical, graphical and scribal elements and practices accumulated by our project, few significant ones are presented here. The entire recorded information,

based to this day on the codicological study of about 2100 manuscripts, is being stored in computer tapes and will be classified mechanically in due time. The following tentative typology was made manually, but was also supported by partial lists sorted out by the computer. The results of this tentative classification are generally confirmed by the rest of the manuscripts. However, the computerizing of the data of all the dated manuscripts, and consequently the mechanical analysis of all the accumulated information, may modify this tentative typology, and will probably clarify some problems and supply us with a more sophisticated knowledge.

The vast areas in which Hebrew manuscripts were produced are divided in our typology into a few main groups, which are proved to have an independent codicological entity. This grouping does not necessarily coincide with the late Medieval political division, but correlates mainly to Jewish, and sometimes to non-Jewish, cultural entities, which are rooted in some cases in earlier political structures.

The codicological grouping emerging from our study is in full correlation with the grouping of the Medieval Hebrew book scripts, thus, forming a united palaeographical typology. Like Hebrew scripts, Hebrew book techniques once crystallized were not transformed by non-Jewish political and cultural shifts. Changes of techniques within an entity can not be related to political changes.

The branch of Islamic territories, sharing basically the same archetypes of Hebrew scripts, ductus and writing instrument (made of reed), influenced strongly by the Arabic script and calligraphy, is explicitly divided into two codicological entities, an Eastern one and a Western one, employing extremely different techniques.

The Eastern entity is well known to us thanks to the survival of dated manuscripts as early as the end of the ninth century and in the Cairo geniza. All Hebrew manuscripts written throughout the entire Middle East (Yemen, Egypt, Palestine, Syria, Iraq, eastern Turkey, Persia and its surrounding), which was enframed at the time of the earliest manuscripts in one political unit of the Abbasid Caliphate, share the same scribal practices until the end of the Middle Ages.

Within this group, two sub-entities are differentiated by some codicological elements (as well as by local scripts) – Yemen and Persia and its neighbourhood.
The Western Hebrew codicological entity within the Islamic civilization, which is known to us only from later manuscripts, includes not only the Maghreb and Modern Spain, but the entire Iberia, including Catalonia, and even regions beyond the Pyrenees. All late medieval Hebrew manuscripts written in the Iberian peninsula, Provence and Bas-Languedoc, and in North Africa, share the same technical, scribal and graphical features, which were retained despite political and cultural transformations.

Lack of dated manuscripts copied in Spain until the end of the twelfth century, and the scarcity of localized manuscripts written in North Africa prevent us from tracing how and when this divergence of the “Islamic” branch took place, and particularly, what was the role of the Maghreb in this process. However, Iberic manuscripts are distinctive in their techniques from the Oriental ones as early as the earliest Spanish dated manuscript (dated 1189), despite their common Islamic civilization and the strong affinity of their scripts.

Manuscripts written in Provence and Bas-Languedoc from the earliest localized manuscript dated 1282, share the same techniques and scripts with the Iberic manuscripts which correlates to the Jewish cultural affinity between Provence and Spain. How early this palaeographical association occurred is obscure. However, Hebrew or Latin-Hebrew documents from the second half of the eleventh century in Catalonia, was again under Christian rule as early as 801, are found to be written in a cursive script quite similar to the type of the Hebrew script used in Christian Europe, such as the Hebrew manuscripts written in Norman England9 and the cursive book hands of early French and German manuscripts. Paradoxically, the Christian reconquest of Spain was not followed by the introduction of the northern Christian type of Hebrew script, but, on the contrary, by Catalonia yielding to the Arabic type. Thus, Catalan documents dated from the early twelfth century are found to be written in the Arabic-Iberic type of Hebrew script, which persisted in the entire peninsula until the expulsion of the Jews from Spain and Portugal.

At what time North African Hebrew book-making became an integral part of the Iberic type is rather obscure too, due to the scarcity of dated and localized

North African manuscripts previous to the fourteenth century. Early cursive documents from Tunisia, found in the geniza, from the tenth century on show a distinctive script, considerably different from the Oriental cursive script, but similar to the cursive script of early Andalusian letters found in the geniza. Three early dated and localized North African codices can not naturally shed much light on this problem. However, they do reflect as early as 946, a mixture of both Oriental and (later) Iberic techniques.10 These findings may indicate that at the beginning North Africa had been the contact area of Oriental and Iberic scribal practices, due to its geo-political position. But such an interpretation is based on the assumption that a distinctive Iberic codicology had already been crystallized in the tenth century. One is entitled to assume that a different process took place, in which the differentiation of the Western Hebrew entity of the Islamic branch started in North Africa, from where it was introduced into Modern Spain, and interpret those findings as the manifestation of this process. However, it is obvious that, at least from the fourteenth century, Morocco, Algeria and Tunisia were completely part of the Iberic codicological entity.

The Western European Christian territories, sharing the same archetype of Hebrew script, ductus and writing instrument (quill), strongly influenced by the Latin script, are also divided into two codicological entities.

All manuscripts written in Medieval central and northern France and Medieval Germany share the same technical as well as graphical characteristics, and form an united entity. This entity should have included England, but no Hebrew manuscript with an indication of an English place of writing has been traced. But since English Hebrew documents share the same cursive script with

9 See the reproductions included in H. Loewe, Stars and Jewish charters, II, London 1932.

10 MS Leningrad, Public Library, II Firkovitch 124 (HPP Y375) was copied in Gabes (Tunisia) in 946. While its script is rather Oriental (see the facsimile included in Birnbaum's The Hebrew scripts, II, pl. 231), and so seems to be its ruling technique, the composition of its quirs corresponds to the Iberic practice. MS Oxford, Bodleian Library Heb. b. 1, fol. 10-20 (Neubauer-Cowley 2673/9) (HPP C238), which was copied by a scribe originating from Gebel Nefusa (Lybia) in 1123, shows Oriental script and composition of quirs, but also the exclusive Iberic-Provençal technique of ruling with a hand point each pair of successive leaves together on the hair side, and prickings in both outer and inner margins, a practice completely unknown in the Orient. On the other hand, MS Oxford Pac. 262 (Neubauer 896) [HPP C139], which was copied in Barca (Lybia) in 1202, displays entirely Oriental techniques, as well as script. It is very likely that the Lybian area belongs to the Oriental Hebrew codicological entity, as it was politically.
Franco-German cursive manuscripts, it is likely that some of the many unlocalized manuscripts of this entity were indeed copied in England.

The small number of localized manuscripts within this entity makes it difficult to differentiate between France and Germany, though it is already clear at this stage of our research, that in one technique, that of parchment manufacture, they differ, just as they slightly differ in their scripts.

The other Western codicological entity is Italy, where independent scribal practices (as well as scripts) have characterized Hebrew manuscripts from the earliest dated manuscripts on. However, some correlation can be noticed between early Franco-German and Italian techniques (as well as scripts), which can easily be explained by the historical affinities between Franco-German and Italian Jewries. Chronologically, this affinity should have been channeled from Italy to Germany, but lack of early dated manuscripts, particularly from Germany and France, prevents the exposing of the exact process. Nevertheless, the techniques of preparing parchment and of pricking and ruling are common to early Italian and Franco-German manuscripts up to the middle of the thirteenth century, when Franco-German scribes started to employ extremely different techniques. On the other hand, the composition of quires differs in these two entities from the early beginnings, but a few Italian manuscripts dated from the end of the thirteenth century share the Franco-German method.

Another independent late Medieval group consists of manuscripts written in Western Asia Minor, the Greek islands, the Balkans, Crete and Rhodes, which constituted the late Byzantine empire before its decline.

Although dated manuscripts from these areas are rather late, and most of them were copied after the destruction of the Byzantine empire, in the Ottoman period, their common independent techniques, as well as script, show that they are rooted in the former political and cultural structures, and that they were perhaps influenced by the Greek script and Byzantine book techniques.

This classification of codicological (and palaeographical) entities is designated in our typology by the following geo-cultural terms, fitted to convey their Jewish distinctiveness:

**ORIENT** — Yemen, Egypt, Palestine, Syria, Eastern Turkey, Iraq, Persia, Bukhara, Uzbekistan.

**SEFARAD** — Spain, Portugal, Provence and Bas-Languedoc, Morocco, Algeria, Tunisia.

**ASHKENAZ** — Central and Northern Medieval France, (England), Medieval Germany.

**ITALY** — Western Turkey, Greece, the Balkans, Crete.

**BYZANTIUM** — Western Turkey, Greece, the Balkans, Crete.

Following is a list of the earliest dated manuscripts studied by us in each palaeographical entity. Since only about one third of the dated Hebrew manuscripts have colophons in which the place of copying is specified, the earliest localized manuscript in each area is also added.

**Orient:**
- Tiberias (Palestine), 894/5 — MS Cairo, Karaite Synagogue (HP Y392).13
- Persia:
  - Da Gumbadan, 904 — MS Cambridge, University Library TS NS 246.26.2, 246.26.18, 283.10 (Geniza fragment) [HP C633].14
  - Egypt:
    - Cairo, 1009 — MS Leningrad, Public Library B19a [HP Y302].
  - Syria:

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13 This is one of the biggest obstacles of Hebrew palaeography. Naturally, codicological and graphical typology should be established on the study of dated and localized manuscripts alone, but the small quantity of surviving Hebrew manuscripts prevents this methodological confinement.

14 This earliest dated Hebrew manuscript was actually not examined by us. I have merely been able to consult reproductions of the manuscript and to draw more technical information from the dissertation of L. Avlin, The Illuminations of the Mohe ben-Asher Codex, Michigan, University Microfilms, 1975.

15 The second earliest Persian manuscript studied by us is dated as late as 1310. An earlier manuscript, known to us only from photographic reproductions, is MS Leningrad, Public Library, II Firkovich Hebrew 113 (Institute of Microfilmed Hebrew Manuscripts, Jerusalem, Ph. 2787), which was written in Khvoy in 1303 (HP Y373).
Yemen: Aden, 1222 — MS Berlin, Staatsbibliothek Or. Qu. 568 (Steinschneider 95) [HPP G94].

Iraq: Baghdad, 1263 — MS Oxford Poc. 256 (Neubauer 1533) [HPP C228].

Sefarad: 1094/57 — MS Vatican Ebr. 269 (HPP E92).15

Spain: Gerona, 1184 — MS Hamburg, Staats- und Universitätsbibliothek Cod. Hebr. 19 (Steinschneider 165) [HPP G150].

Portugal: Lisbon, 1278 — MS Oxford Can. Or. 67 (Neubauer 2391) [HPP C310].

Provence: Narbonne, 1282 — MS Amsterdam, Ets-Haim Library (Portuguese Synagogue) 47A (HPP F4).16

Tunisia: Gabes, 946 — MS Leningrad, Public Library, II Firkovitch 124 (HPP Y375).17

Morocco: Fez, 1332 — MS Oxford, Bodl. Or. 611 (Neubauer 1164) [HPP C162].

Algeria: Constantine, 1338/40 — MS Paris, Bibliothèque nationale heb. 321 (HPP 880).


France: La Rochelle, 1215 — MS Vatican Ebr. 468 (HPP E95).

Germany: Esslingen, 1290 — MS Amsterdam, Universiteitsbibliothek, Rosenthaliana Ros. 609 (HPP F22).

Italy: 1072/3 — MS Vatican Ebr. 31 (HPP E91).

Salerno, 1266 — MS Parma, Biblioteca Palatina 2750 (De-Rossi 422) [HPP E416].

15 That this manuscript should be regarded as the earliest Sefaradī manuscript is rather questionable. The manuscript is written on Oriental laid paper (with no chain lines), which could be of early Spanish or North African manufacture. The composition of its quires indicates indeed, that is was not copied in the Orient, but rather in Sefarad. However, the script seems to be of a later period. It is likely that the brief colophon, which includes merely the date, is just a copy of the author's colophon. The text copied in this manuscript, the anonymous Hebrew paraphrase of Saadīs Ga‘on's Kitāb al-Ammārāt wa-al-Ta‘āwūs, is indeed assumed to be written in the eleventh century by a Palestinian psephist; see H. Maier, Saadīs Ga‘on — his life and works, Philadelphia 1921, pp. 289, 361.

16 A manuscript kept in the collection of the Jewish Community in Rome was copied in Arles in 1202, according to R. Gotthelf, ZfHB, IX (1905), p. 179, no. VI.

17 The second earliest localized manuscript was written as late as 1338 (MS Oxford Hunt. 518 [HPP C178]).

Byzantium: 1208 — MS Cambridge, University Library Add. 1733 (HPP G627).18

Seiron (Greece), 1307-8 — MS Oxford Hunt, 128 (Neubauer 1467) [HPP C215].

18 The authenticity of the date in the colophon is a little doubtful, since the day of the month does not correspond to the day of the week. The script too seems to be of a later time. MS Oxford, Bodleian Library Heb. C. 6, fol. 5 (Neubauer-Cowley 2616/41), a single leaf dated 1192 (HPP C303), is a last leaf, perhaps of a Byzantine manuscript; the entire codex was preserved by the Karaite community in Crimea (cf. E. Deinard, Mūša Ohrim, pp. 127-128).
CHAPTER TWO
WRITING MATERIALS

Hebrew Medieval manuscripts were written on two kinds of writing material – parchment and paper.19 Parchment was naturally earlier in use, but paper, once introduced into the Islamic civilization and later into Christian Europe, began to replace parchment, and eventually became the main material in most areas. However, there is a great difference between the Orient and the other entities regarding the rapidity with which paper replaced parchment after local paper production began.

The earliest surviving Hebrew manuscript on paper known to us so far is an Oriental fragment from the Cairo geniza, dated 1005.20 Apart from a few codices, mostly Biblical, all existing Oriental manuscripts copied thereafter, are written on paper. In Sefarad, the majority of the surviving manuscripts, dated from the middle of the fourteenth century on, are written on paper. In Ashkenaz and Italy, Hebrew paper manuscripts are rather rare until the beginning of the fifteenth century, though papermaking was introduced in these areas, notably in Italy, much earlier. In Italy, and apparently also in Ashkenaz, parchment was not superseded by paper even in the fifteenth century. In the middle of this century parchment was still the main writing material, and even in the second half of the century it was used exclusively in more than one third of the extant manuscripts, and as outer and inner sheets in a considerable number of paper

19 Cf. note 2 regarding the undated literary fragments written on papyrus. Some of the papyri listed are certainly pre-Medieval.

20 MS Cambridge, University Library TS B Ca. 1 (HPP Q691). The earliest Hebrew script found on paper is an undated Judeo-Persian document found in Khotan (Chinese Turkestan). Microscopic examination of the paper of this document, carried out by Prof. J. Wiss, proved that the paper had been manufactured between 751 to 796, while the text attests to an earlier date, around 718. See D.S. Margoliouth, JRAS, 1903, pp. 735-760. The earliest extant Arabic paper manuscript known so far is MS Leiden Cod. Or. 208, dated 865; see P. Sj. van Koningveld, The Latin-Arabic glossary of the Leiden University Library, Leiden 1976, chapter 2, note 89.
The Ashkenazic parchment

In general, the two sides — the hair-side and the flesh-side can be distinguished one from the other, but only in Ashkenaz were hides tanned in such a way that prevented completely distinction between the two sides.26

In the majority of the Ashkenazic manuscripts, mainly after 1300, the hair-side was shaved and rubbed thoroughly, resulting in the complete disappearance of the grains.27 Not only is the hair-side rubbed, but the flesh-side, which in all the other regions is smooth and glossy, is scratched and rubbed in these manuscripts as well. Both sides are very rough and seem completely alike.

This exclusive Ashkenazic technique was not the only way of parchment making in Ashkenaz. Indeed, Ashkenazic manuscripts from the earliest time on share the exclusive method of tanning the flesh-side, which makes it appear rough and rubbed,28 but some differ in the treatment and the appearance of the hair-side.

Their contemporary local techniques of parchment making for books, since they are confined to the leather on which the Scroll of the Law is written (G'dol), already prescribed in Talmudic sources. However, according to these sources, treatment of such leather by galls (after tanning), prescribed in the Talmud, was retained only in the Orient by Babylonian Jewry, while in Spain, Provence, France, Germany and Italy, tanning was done by liming and rubbing. For references see L. Ginzberg, Ginzel Schachar, II, New York 1929, pp. 527-535 (in Hebrew). For general information see R. Reed, Ancient skins, parchments and leathers, London-New York 1972. See also M. Thomas, Le manuscrit de parchemin (Faits de civilisation, II), Paris 1907.

26 In accordance with Latin Franco-German manuscripts, according to W. Wattenbach, Das Schriftwesen im Mittelalter, Leipzig 1896, pp. 116-117. But see below the differences which prevailed between German and French Hebrew manuscripts. The accordance between Hebrew and Latin manuscripts, as far as parchment is concerned, supports the Latin documentary sources quoted by Wattenbach (op. cit., p. 131) about production of parchment by Jews in Germany during the fourteenth and the fifteenth centuries and their supplying the Empire chanoftory with it. Wattenbach assumes that parchment manufacture had been in Jewish hands until the bourgeois industry began to produce it.

27 Such parchment is often called velum in Latin palaeography, etymologically a most proper term. The customary association of velum with calfskin (see, for example, E.A. Lowe, CLA, I, Oxford 1934, p. xii) is not well-founded. Jewish tanners in Jerusalem produce to this day calf parchment which retains completely the grains of the hair-side.

28 It seems that the common technique of producing a glossy and bleached flesh-side was known in old Ashkenaz, but had already been replaced at the end of the twelfth century. The earliest Ashkenazic dated manuscript, MS Florence, Biblioteca Nazionale Centrale III 11 (HPP E10), dated 1177, reflects this shift of techniques: While most of the flesh-sides of its sheets are bleached and rather glossy, some of them are rough and bear rubbing traces.

Only a few manuscripts, the earliest is dated 1189,29 and the rest in the thirteenth century, are found to use parchment in which the grains are entirely preserved in the hair-side. But in quite a considerable number of Ashkenazic manuscripts, as early as the earliest dated one,30 and up to the end of the fourteenth century, although both sides of the parchment are rubbed, one can distinguish easily between the hair-side and the flesh-side.

The earliest dated Ashkenazic manuscript whose parchment was manufactured entirely by the equalizing technique is dated 1253.31 But, as early as 1193,32 until the end of the thirteenth century, the distinction between both sides in quite a lot of Ashkenazic manuscripts is, although possible, rather difficult. It seems that the parchment of these manuscripts was made with the intention of equalizing both sides, but this technique was not developed enough and this intention was not always achieved properly.

Furthermore, as early as the time of the earliest Ashkenazic dated manuscript33, up to the end of the thirteenth century, one finds manuscripts whose parchment was made by both techniques, that of clear distinction between hair-side and flesh-side, and that of making both sides seem alike.

Lack of dated Ashkenazic manuscripts before the end of the twelfth century hinders our understanding of these findings. However, it seems that in early time parchment was manufactured in Ashkenaz by the general technique of preserving the natural difference between hair-side and flesh-side. Gradually, from about the end of the eleventh century, a new technique of minimizing the differences between the two sides was introduced, resulting in the complete equalization of the two sides in the middle of the thirteenth century. In the transition period during the thirteenth century, both techniques, old and new, were used simultaneously, while from the beginning of the fourteenth century on, the new technique was generally adopted.

But if we try to draw conclusions from the limited number of Ashkenazic localized manuscripts alone, the data can be interpreted differently, and may

29 MS London, British Library Ar. Or. 51 (Margoliouth 861) [HPP C351].
30 See above, note 28.
31 MS Venice, Biblioteca Marciana Or. 211, 214 (HPP E241).
32 MS Bologna, Biblioteca Universitaria 2208/9 (HPP E526); occasionally traces of grains can be seen, but in general, the distinction between the two sides is almost impossible.
33 See above note 29.
provide us with an important palaeographical tool.

All the manuscripts localized in Central and Northern France, either explicitly by their colophons or on textual and other grounds, some 20 manuscripts dated from 1215 to 1406-7, are found to use parchment whose sides are completely or sometimes partly distinctive. On the other hand, all the manuscripts localized similarly in Germany, some 20 manuscripts dated from 1233 on, reflect the shift of techniques: the three earliest manuscripts written until 1258 have at least partly distinctive sides of parchment, while all the later ones have completely equalized sides.

Therefore, it seems that in old Ashkenaz, both in France and in Germany, parchment was made by a technique which preserved the grains of the hair-side. At the end of the twelfth century a new technique minimizing the difference between the two sides was introduced, both in France and in Germany. In Germany this new technique was adopted gradually and evolved finally into a complete equalization of both sides in the middle of the thirteenth century, while in France, although the minimizing technique was partly adopted, the old technique of distinctive sides persisted and was retained until the expulsion of the Jews. Naturally, after the expulsion of the Jews from Northern France in 1306, most of the Ashkenazic unlocalized manuscripts were written in Germany, therefore, one finds that most of these manuscripts are written on parchment whose both sides seem alike.

This shift of technique, or aesthetical taste in Ashkenaz, particularly in Germany, involved, as we shall demonstrate later in detail, a transition of pricking and ruling techniques both in Germany and France. While parchment sheets manufactured by the old technique were pricked along the outer margins and ruled with a hard point on the hair-side, the parchment leaves made by the new technique were pricked along the outer as well as the inner margins and ruled with a lead pencil on both sides. Indeed, during the transition period of the second half of the thirteenth century, manuscripts written on parchment made by the new technique might be ruled according to the old technique, and manuscripts written on parchment manufactured by the new technique might be ruled according to the new technique. But manuscripts copied up to around 1260 are pricked and ruled according to the old practice, and only occasionally is the new technique, in particular ruling with pencil, partly implemented. Therefore the adaptation of the new practice of ruling to the new kind of parchment seems more likely than a change in parchment making as consequence of the shift of ruling technique. On the other hand, the new ruling technique was also com-

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34 MS Vatican Ebr. 468 (HPP E993), written in La Rochelle.
35 MS Jerusalem, Schocken Institute 19922 (HPP A70), copied in Chambéry.
36 There is no dated German manuscript with a colophon specifying its place of writing until 1290 (see above, end of chapter one); even thereafter, colophons including indications of German localities are rare. However, the German locality of some Ashkenazic manuscripts can be assumed with certainty. Among them are at least six manuscripts dated before 1290: MS Munich, Bayerische Staatsbibliothek Cod. H. 5, dated 1233 (HPP G2), one of whose scribes originated from Würzburg; MS Milano, Biblioteca Ambrosiana B30 inf. (Bernheimer 2), dated 1236 (HPP E40), which was copied for a person originating from Ulm whose illuminations are indeed of a German style (see B. Narkis, Hebrew illuminated manuscripts, Jerusalem 1969, no. 25); MS Oxford, Bodleian Library Mich. 617, 627 (Neubauer 1033, 1035), a prayer book dated 1258 (HPP C147), is German according to its rite, and South German according to its illuminations; MS Jerusalem, JNUL Heb. 4781/1 (HPP A39), a prayer book dated 1272, which is German according to its rite and illumination; MS Rovero, Biblioteca dell’Accademia Concordi, Silvestriana 216 (HPP E86), a prayer book of German rite; MS New York, JTS Misc. 4843 (HPP D67), a prayer book of German rite copied by a scribe who was born in Bamberg.
37 The hair-sides in the three manuscripts, quoted in the previous note, are well rubbed and grains are completely invisible. The difference between the two sides in MS Munich (dated 1233) and Milano (dated 1236) can hardly be noticed, and in part of the sheet, the MS Milano there is no difference at all.
38 In MS Viona, Österreichische Nationalbibliothek Cod. Hebr. 16 (Schwarz 5) (HPP J2), copied in 1208-9 in Franconia (accordance to the chronicle referred to in the colophon of the vocalizer and masorete) one can hardly distinguish between the two sides. Since the sheets are not always arranged according to the so-called Gregory’s rule, it is clear that the parchment in this manuscript is merely a defective product of the new technique.
plete adopted by the French scribes, who continued to use parchment whose sides are distinctive.

Other Sorts of Parchment

In the entities other than Ashkenaz, the two sides of the parchment always retain their different appearances. However, different types of parchment, probably due to different method of manufacture, can be seen.

In Sepharad one may also distinguish easily the hair-side from the flesh-side. The rough hair-side, although often scratched, retains its grains, while the flesh-side is glossy and much brighter.

In Sepharad one may also distinguish easily the hair-side from the flesh-side. The rough hair-side is generally not scratched, yet the grain patterns are hardly ever visible. The flesh-side is very bright and glossy.

The parchment used in the Orient in the earliest manuscripts and up to the end of the Middle Ages (in Yemen) is of a particular nature. Although one can always distinguish the hair-side from the flesh-side, the appearance of both sides is almost alike. The grains of the hair-side are removed, and only occasionally can traces of grains be seen, but this is not achieved by shaving and scratching. Not only is the flesh-side glossy, but the hair-side is too. Although there is a slight difference between the colours of the sides, it is sometimes not easy at all to distinguish one from the other, and only traces of grains assist in the differentiation.

It seems that like in Ashkenaz, in the Orient too, a technique of tanning hides was employed which was meant to produce parchment with sides resembling each other. While this effect was achieved in Ashkenaz by scratching both sides, it was accomplished in the Orient by smoothing and glossing.

2. PAPER

As in non-Hebrew manuscripts, two main types of paper are differentiated in Hebrew manuscripts — the Oriental Arabic paper and the Occidental European paper. Hebrew paper manuscripts do not provide additional information to our knowledge of the well-studied field of watermarked European paper, and their contribution to the less studied field of the pre-watermarked European paper is limited so far to only a few dated and undated manuscripts. But they can contribute much information to our knowledge of Oriental paper.

J. Irigoin, studying early Greek manuscripts written on paper, presented the differences between Oriental paper and pre-watermarked (and early watermarked) Occidental paper, especially by morphological characterizations, which are visible to the palaeographer without any laboratory tools. His differentiation is valid for Hebrew manuscripts too, and provides Hebrew palaeography with substantial technical means to distinguish Oriental paper manuscripts from European ones. However, a more detailed characterization of the morphology of the Oriental paper can be derived from dated Hebrew manuscripts.

The Occidental paper in the few Hebrew manuscripts written on pre-watermarked paper has rather straight laid lines and single chain lines spaced more or less regularly.


42 In the paper of the Sepharadic MS Vatican Ebr. 269, which has a questionable date of 1094/5 (cf. above, note 18), only laid lines are visible (cf. Irigoin, Scriptorium, IV, 1950, p. 200, about one of the oldest Spanish-Latin paper manuscripts, which also has no chain lines). MS Jerusalem, JNUL Yah. Ms. Heb. 1 (cf. note 21), written in Sepharad in 1226, has wide laid lines and chain lines spaced 40 mm one from the other (see Pl. 1). The distance between the chain lines in MS London, British Library Add. 27113 (Margoliouth 928), written in Sepharad (North Africa?) in 1292 (HPP C302), is 45 mm. In both manuscripts there are no zigzag signs, found by Valls i Subirà (Paper and watermarks in Catalonia, I, pp. 9-12, 34-36) to be characteristic of Spanish and North African early paper. However, in MS Jerusalem one notices along the middle of each sheet (on both parts of the folded sheet) wide horizontal signs, which look like a 'spinal column' (see Pl. 1). MS Jerusalem, JNUL Heb. 8* 3941 is an undated codex written in a Byzantine hand on pre-watermarked European (probably Italian) paper. The width of every 20 laid lines is 43.45 mm, and the space between the chain lines is 50-59 mm; see M. Beit-Arié in: J.O. Leibowitz and S. Marcus (editors), Moses Maimonides on the Causes of Symptoms, Berkeley-Los Angeles-London 1974, p. 36.

Of great interest are the three autographic volumes of Maimonides commentary to the Mishna, MSS Oxford, Bodleian Library Hunt, 117 (Neubauer 393), Poc. 295 (Neubauer 404) and Jerusalem 4* 5703/1 (formerly MS Sassoon 72). According to the author's colophon (at the end of Sefer Tharot, which has not survived in his handwriting), Maimonides worked on his commentary for seven years completing it in 1167/8 in Egypt, where he had settled some time after leaving Fez in about 1165. The paper of these volumes has single chain lines spaced 52.56 mm one from the other, representing a mould unknown in the
The morphology of Oriental paper revealed in dated Hebrew manuscripts or fragments can be classified into several types, representing different kinds of moulds and paper technologies.\(^{43}\)

A. Paper without visible wirelines at all (see Pl. 2).

This type is seen in a rather small number of manuscripts of different times, mainly in Iraqi and Persian localized manuscripts, and in all the manuscripts written in Yemen during the Middle Ages.\(^{44}\)

B. Paper with laid lines only (see Pl. 3)

This type is found in some early manuscripts of different localities until the middle of the thirteenth century, while later on it is found mainly in Persia, Bukhara and Samarkand, and only rarely in other regions.

All manuscripts written in Persia and her neighbourhood are found to use this type of paper, or, less frequently, the first type. Only in one or two manuscripts are some chain lines barely visible. The same applies to the five extant manuscripts localized in Iraq. Therefore, it seems that in the northeast of the Orient, paper moulds were perhaps constructed without chain lines.

C. Laid paper with grouped chain lines

It is obvious from our findings that irregular chain lines are marked in paper Orient, and thus, ought to be of early Occidental manufacture, presumably in Morocco. A fourth volume of Maimonides autographic commentary, Seder Na‘im (formerly MS Sassoon 73 and now MS Jerusalem Heb. 5703/2), is written on laid paper without chain lines, and thus ought to be Oriental paper.

\(^{43}\) In general, the main types seem to conform to the three kinds of moulds in the Arabian technology of papermaking as described briefly by J. Karabacek, Das arabische Papier, (= Mitteilungen aus der Sammlung der Papyrus Erzherzog Rainer, II-IIII), Wien 1887, p. 52. Karabacek noticed among the early papers all three different types specified by us, but did not characterize the types of chain lines at all. Cf. also Karabacek, "Neue Quellen zur Papiergeschichte, Mitteilungen aus der Sammlung etc., IV, Wien 1888, pp. 95-96; Ibn Sa‘id, the North African Arab author (1007-1061) of a treatise about bookmaking, describes only vaguely the nature of the moulds in the chapter on papermaking, edited by Karabacek.

\(^{44}\) In the earliest dated Yemenite manuscript found so far, MS Berlin, Staatsbibliothek Or. Qu. 568 (Steinschneider 95), written in Aden in 1222 (HPP 994), traces of chain lines can be seen, but no laid lines are evident.
used in manuscripts written apparently in Egypt, Palestine and Syria, as early as the end of the eleventh century, but in quite a lot of them, especially up to early thirteenth century, the pattern and the distribution of the chain lines are not clear at all. However, when chain lines are distinctive and regular, at least partly, they are never single, but always grouped in three kinds of grouping:

1. Chain lines grouped in twos (see PL 4).
   This pattern is the oldest and the only kind of grouped chain lines found in manuscripts dated until the beginning of the thirteenth century. It seems that thereafter it was completely abandoned.

2. Chain lines grouped in threes (see PL 5).
   The earliest manuscript in which this pattern is seen clearly is dated 1277, (but such a pattern can sometimes be seen in an earlier manuscript, dated 1210, Ever since, this remains the dominant pattern of laid paper with grouped chain lines, replacing the two grouped chain lines pattern.

3. Chain lines grouped in twos and in threes alternatively (see PL 6).
   This pattern is the youngest one, introduced in the eighties of the fourteenth century. All the localized manuscripts which are written on this kind of paper were copied in Syria and Palestine.

Several late Oriental manuscripts were written on European watermarked paper. All the Byzantine manuscripts studied so far were found to be

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45 A reproduction of an Indian mould, in which the chain lines are grouped in threes (and on both edges also in twos) can be seen in D. Hunter, Papermaking, New York 1967, p. 68, Fig. 54.
46 MS Oxford, Bodleian Library Poc. 135 (Neubauer 1274), written in Baalbek (HPP C181).
47 MS Oxford Poc. 99 (Neubauer 1452) [HPP C211].
48 The earliest manuscript found so far to be copied on this kind of paper is MS Paris, Bibliotheque nationale hlb. 800, written in Jerusalem in 1386/7 (cf. Sirat–Beit-Arié, Manuscrits médiévaux, 1, 59).
49 For instance: Two manuscripts copied in Alexandria by the same scribe — MS Vatican Ebr. 103 (HPP E177), dated 1435/6, and MS Paris, Bibliotheque nationale hlb. 853 (HPP B180), dated 1437; MS Paris hlb. 735, copied in Jerusalem in 1459 (cf. Sirat–Beit-Arié, Manuscrits médiévaux, 1, 114); MS Paris hlb. 1074, copied in Damascus in 1482 (ibid., 1, 149); MS Paris hlb. 229, copied in Jerusalem in 1491 (ibid., 1, 162); MS Oxford Opp.
Pl. 5  Oriental laid paper with chain lines grouped in threes. 1420
MS Oxford, Bodleian Library Poc. 133, fol. 28

Pl. 6  Oriental laid paper with chain lines grouped in twos and threes alternatively. Syria? 1398/9
MS Jerusalem, JHU, Yah. Ms. Ar. 306, fols. 60/65
(60% reduction of the natural size)
written on Occidental paper.\textsuperscript{50}

Another visible difference revealed in Hebrew paper manuscripts concerns the outer appearance of the paper surface, which is connected to the final stage of papermaking, that of rendering the paper impervious to the corrosion of the ink. Regarding this, Hebrew manuscripts are divided into two main groups, the Oriental-Sefardic entities and the Ashkenazic-Italian entities. The first group includes both paper made by the Oriental mould technique and by the Occidental one; thus, these two groups correspond to the division between Islamic and Christian civilizations.

In the Orient, and quite often also in North Africa and Iberia, the surface of the paper used is very glossy, almost shiny, while in Ashkenaz and Italy it is not.\textsuperscript{51} This difference of appearance is probably due to different techniques not only of sizing paper,\textsuperscript{52} but also of burning it.\textsuperscript{53}

383 (Neubauer 411), written in a Sefardic hand in Safed (Palestine) in 1506 (HPP C76).

\textsuperscript{50} According to Trigo (cf. above, note 41), European (Italian) manufactured paper was introduced in Byzantium in the middle of the thirteenth century, and replaced completely the Oriental paper after 1380. Lack of early Byzantine Hebrew dated manuscripts prevents a comparison of his results with ours. However, the thirteenth century undated Byzantine Hebrew manuscript, MS Jerusalem mentioned above (cf. note 42), is written on early Occidental paper, and all the Byzantine Hebrew dated manuscripts from the time of the earliest paper manuscript (written in Saloniki) in 1329, cf. above, note 24) are written on watermarked European paper.

\textsuperscript{51} See M. Glazer, ‘D’après des manuscrits hébraux, le stade final de la fabrication du papier’, La paléographie hébraïque médiévale, pp. 51-53.

\textsuperscript{52} Starch in Arabic papermaking, gelatin in the European process of production; for references see Trigo, Scotiromum, IV (1990), p. 194. Ibn-Baddās mentions also the use of chalk in this process; one can consult also the English translation of his treatise by M. Lewy, Arabic bookmaking and its relation to early chemistry and pharmacology (Transactions of the American Philosophical Society, New Series, vol. 52, pt. 4), 1962, pp. 10, 39-40. Sizing with starch was used also in early Spanish papermaking, according to Valls i Subirà (cf. above, note 21), pp. 8-10. According to Hunter, op. cit., pp. 194ff, the sizing process in the Orient was one of coating, whereas in the Occident it was by absorption. Ibn-Baddās mentions both absorption and coating.

\textsuperscript{53} According to Ibn-Baddās, who might reflect the technique employed in early North African paper production, the last stage in papermaking was burning the sheets with hard glossy stones. Cf. Karabook, ‘Neue Quellen’ etc., pp. 101-102, according to the version of one of the manuscripts of Ibn-Baddās treatise. See also Valls i Subirà, loc. cit., regarding a similar technique in Spain.

The glossiness of the Oriental and Sefardic papers is very clear only in manuscripts dated from the fourteenth century on, but the absence of glossiness in earlier manuscripts might be due to the deterioration of the paper used.

A difference is found between the glossy Oriental papers and the glossy Sefardic ones. The glossiness of the paper used in the Islamic East is uniform and covers the entire sheet, while in the Islamic West it is not evenly distributed, but appears as strips in various directions (see Pt. 7). These strips are probably traces left by burnishing of the paper with smooth stones as practiced in Spain and North Africa,\textsuperscript{53} while in the Orient the glazing was perhaps already achieved by the sizing technique.\textsuperscript{54}

Sometimes only the written space of glossy Sefardic paper manuscripts is burnished, which indicates that this final polishing was made by the scribes themselves.

A few Byzantine manuscripts are found to be written on glossy paper. The glossiness applied to these manuscripts is of both Oriental and Sefardic kinds. Emigration of Spanish Jews to Southern Italy and Byzantium at the end of the fifteenth century was followed by the use of the Spanish technique in manuscripts written by Spanish immigrant scribes.\textsuperscript{55} This phenomenon is a striking proof that the scribes themselves used to burnish the paper sheets.

3. COMBINATION OF PARCHMENT AND PAPER

The shift in writing material from parchment to paper in the regions outside the Orient is best demonstrated by those manuscripts in which both materials are used together. Paper indeed replaced parchment as the main writing material, but parchment was still used for outer, or outer and inner, sheets of the quires.

This practice of composing quires was employed in Sefard, Italy and Byzantium, but never in Ashkenaz, nor in the Orient, despite the striking fact that the earliest Hebrew manuscript found, so far, in which such a technique was employed was written in 1212 in Alexandria, most likely by Byzantine scribes.\textsuperscript{56} Apart from this manuscript, all the earliest manuscripts constructed

\textsuperscript{54} See Lewy, op. cit., p. 10.

\textsuperscript{55} Cf. Glazer, loc. cit.

\textsuperscript{56} MS Frankfurt, Stadt- und Universitätsbibliothek hebr. 4° 2 (HPP G187). Its Byzantine nature can be proved by the text copied, its handwritings and codicological and scribal
of parchment-paper quires from Sefarad, Byzantium and Italy are also the earliest or some of the earliest manuscripts in which paper was used at all.

In Sefarad this practice is found as early as 1225,\(^6^5\) in Byzantium, in an undated early Occidental paper manuscript of the thirteenth century\(^6^6\) and in dated manuscripts as early as 1335/6,\(^6^7\) and in Italy as early as 1312.\(^6^8\) But only in Byzantium was this technique used widely, and in Sefarad less frequently than in Italy.

The use of this technique in Hebrew manuscripts correlates to the similar practice found in Arabic and Latin manuscripts written in Spain,\(^6^4\) and in Greek manuscripts in Byzantium.\(^6^2\) It seems that this practice was introduced in these areas after paper had turned out to be a cheaper material, as a compromise in the competition between the cheap, but less durable, paper and the much more expensive, but stronger and durable, parchment. The durable outer (and inner) sheets of parchment were used to protect the vulnerable internal sheets of paper.\(^6^3\)

practices, which are not familiar in the Orient. In most of its quires (fol. 1-168) both outer and inner sheets are made of parchment, but in part of them (fol. 167-210) only the outer sheets are.

\(^6^1\) MS Jerusalem, JNUL, Yah. Ms. Heb. 1 (cf. above, note 42), in which only the outer sheets of the quires are made of parchment.

\(^6^5\) MS Jerusalem, JNUL, Heb. 8° 3941 (cf. note 42). At any rate, MS Frankfurt (cf. above, note 56), which was probably copied by Byzantine scribes, suggests that this technique was practiced by Byzantine Hebrew scribes at least at the time of this manuscript (1212).

\(^6^6\) MS Leiden, Bibliotheek der Rijksuniversiteit Or. 4760 (War. 22), written in Adrianople in 1335-6 (HPP F8).

\(^6^7\) Cf. above, note 22.

\(^6^8\) Such a technique is found in dated Arabic manuscripts written in Spain apparently as early as 1143. See van Koningveld’s dissertation, chapter 2. It is also found in one of the earliest Latin manuscripts written on paper in Spain, the undated MS Paris, Bibliothèque nationale, Nouvelles acquisitions lat. 1296; see C.M. Briquet in: Briquet’s Opuscule (Memoranda chartae Papyraceae Historiam Illustratia, IV), Hilversum 1955, p. 48; Irigoin, Scriptorium, IV (1950), p. 200. Cf. van Koningveld, op. cit., note 9, on the dating of this manuscript.

\(^6^9\) See J. Irigoin, ‘Pour une étude des centres de copie byzantins’, Scriptorium, XII (1958), p. 221. His earliest example is dated 1276-1277 (outer sheets only).

\(^6^0\) P. Sj. van Koningveld (loc. cit.) provides interesting information, based on literary sources as well as actual manuscripts, about early Arabic manuscripts which were produced in a number of independent large gatherings (\(\text{\textmu}^{2}\)) kept separately. Each \(\text{\textmu}^{2}\) (containing some
Sometimes this practice was minimized in Sefaradic and Italian manuscripts. Instead of using entire sheets which serve as writing material as well, only narrow strips of parchment were glued along the folding line of the outer and the inner paper sheets of each quire in order to protect the vulnerable paper from the binder’s stitches and strengthen the binding.64

CHAPTER THREE
QUIRES

Examination of the composition of the quires of Hebrew manuscripts shows that each manuscript is constructed of quires which generally have the same number of sheets. Naturally, quires at the end of manuscripts, or at the end of parts of them, might be larger or smaller. The number of sheets which are folded (and later sewed together) to make a quire varies, but is usually uniform in the same codicological entity. In some entities there is a difference between the composition of parchment quires and paper quires, the latter ones show less regularity.

1. ORDER OF PARCHMENT QUIRES

The sheets of manuscripts written on parchment whose sides are distinguishable are arranged according to the so-called Gregory’s Rule:66 hair-side (H) facing hair-side and flesh-side (F) facing flesh-side. Consequently, each opening of a codex has a uniform appearance, hair-side or flesh-side alternatively. Only in a few old Oriental parchment manuscripts are quires not arranged in accordance with this method. The order of the sheets in these manuscripts is either regular, showing HHHHH,66 or completely irregular.67

Usually, each quire starts with the hair-side, but in Italy, and rarely also in Sefarad, starting with the flesh-side was also practiced.

66 Such is the arrangement of the parchment sides in the famous undated codex of the Sifra with Babylonian vocalization, MS Vatican Ebr. 66 (HPP ZE3) and in a few undated geniza fragments, such as MS Jerusalem, JNUL. Heb. 4° 577.4/8 and MS Cambridge, University Library Or. 1080. 15,33. An exceptional late Yemenite manuscript, dated 1484, shows the same arrangement in its unusual quires of 4 sheets (MS Cambridge Add. 1174 (HPP C002)).
67 In a fragment of a manuscript written in al-Rabba (now Meyadin, Syria) in 1029 — MS Oxford, Bodleian Library Heb. f. 30 (Neubauer-Cowley 2730) [HPP C317].