For the moment, the field seems to be broken down into 'regional' divisions. Yet a strict geographical division is impossible here, since the manuscripts in question were copied in places ranging from the Atlantic Ocean to the China Sea, from the Straits of Zanzibar to the shores of the Volga. Nor would using the term 'Islamic' be altogether satisfactory, for it would eliminate texts composed, and manuscripts copied, by members of other faiths even though those manuscripts are related, if only partially, to a larger group. Finally, readers will recognise that a definition limited by language would be, if not incorrect, at least premature. For although it is not unthinkable that some day a specialised codicology of (for example) Persian or Ottoman Turkish manuscripts may emerge, the bilingualism, indeed, trilingualism, of many copyists must be taken into account. How, then, can precise boundaries be established, when the same person may have written texts in Arabic, Persian, and Turkish? The least unsatisfactory solution, then, involves definition by reference to the Arabic script, which is the common denominator of this set of manuscripts written in a range of languages and originating from immensely diverse cultural and geographical regions.

This serves to highlight once again the still rudimentary state of our knowledge, in that the number of thoroughly studied manuscripts remains infinitesimal compared to the tens of thousands of volumes theoretically covered by this field of study. The contents of the following chapters cannot therefore claim to represent anything more than a starting point for what should become increasingly accurate and diversified research. Nonetheless, it is the authors' hope that our efforts to define and describe the most basic features of the codex will be useful to all those embarking on this fledgling but fascinating field of study.

The Writing Surface: Papyrus and Parchment

In the course of history mankind has used many materials—mineral, plant and animal—to write on. The following two chapters will be concerned only with those writing surfaces (papyrus, parchment and paper) employed in the Islamic world in manufacturing handwritten books in codex form. These materials were also utilised for other aspects of book production, such as binding; those other uses will be discussed at greater length in the relevant chapters.

Papyrus

In the Arab and Islamic field, papyrus more readily brings to mind types of documents that do not belong to the sphere of codicology proper: letters, contracts, administrative documents, etc. In fact, though, only scattered remnants of manuscripts written on papyrus in Arabic script have survived the intervening centuries, and our knowledge of the role played by this material in the history of books in Arabic script (illus. 5) remains scanty. Papyrus preserves traces of its vegetable origin since the fibres of the plant remain visible at the end of the manufacturing process, their two sides being distinguished respectively by whether the fibres run horizontally or vertically.

Origin

The word 'papyrus' denotes both a plant and the writing material made from it. Cyperus papyrus L. — to use its botanical name — grows wild in its original habitat, Egypt. During the first centuries of the Islamic period, it was also found in Palestine, Mesopotamia and Sicily. In Arabic, it is designated by terms such as:

1 Other materials have also been used to make manuscripts in codex form, if only sporadically. One case is represented by a Quran extract copied on wood, published by N. Abbot: 'An Arabic-Persian wooden Koranic manuscript from the royal library of Shah Husain Safavi I, 1005-35 H', Ars Islamica 5 [1938], pp. 89-94; 2 Groethmann, AP, 11, pp. 57-69. Finally, already noted (Natural History, XIII, 11, 73) that papyrus grew not only in Egypt, but also in Mesopotamia and in Syria. See also the references in note 4.
as gīrṣa, waqar al-qazab ('leaf of reed') and waqar al-baridis-ahard ('leaf made of papyrus'). The word 'papyrus', from which, paradoxically enough, the word 'paper' originates, is a loanword from the Latin papyrus or the Greek παπυρός, both derived from the Coptic pa-p-eru.

**Historical background**

Used as a writing medium from around 3000 BCE, papyrus was known and employed in Arabia well before Islam. With the meteoric rise of the Islamic empire in the first/seventh century the conquest of areas in which grows the plant whose stems can be fashioned into papyrus, offices and private individuals, civil servants and scholars alike used the material for various purposes such as letters, books, contracts, and tax registers. Papyrus continued in use until around the mid-fourth/tenth century, by which time competition from paper became overwhelming, papyrus manufacture practically dying out by the fifth/eleventh century. To judge by the repeated demands issued by the Caliph 'Umar II (reigned 99/717–1017/720) that sought to encourage economies in government offices, it must have been a relatively expensive material. The same conclusion emerges from the study of surviving papyrus prices, and is further corroborated by the manner in which every single part of a sheet of papyrus has sometimes been gradually encroached upon by writing until eventually it is completely covered with script in every direction.

**The Manufacture of papyrus**

A description of papyrus production by Abū l-‘Abbās al-Nabātī (died 637/1239) survives in an Arab source of the seventh/thirteenth century, the

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3 Guess, *AMT*, pp. 11 and 116. 4 See W. Schubart, s.v. "Papyrus", *Pauly Realencyclopaedie der classischen Altertumswissenschaft*, XVIII, col. 1116–1118; also K. Muresch, s.v. "Papyrus", *Lexikon des Arabischen Mittelalters*, vol. VI, col. 1693–1695. For the Islamic domain, reference can be made to Grohmann, *APL*, pp. 66–93, and to G. Khan, *Hills, Lines and Deeds*, p. 11–22 and ‘Arabic papyrus’, in *Codology*, pp. 1–16. 5 A number of references to papyrus appear in pre-Islamic Arab poetry: see Grohmann, *APL*, pp. 68 and 70. The Qur'an also mentions papyrus (e.g. VI: 7 and 91). 6 Grohmann, *APL*, p. 73. This author maintains that the most recent dated papyrus is from 480/1087. Later documents appear in editions of Arab papyri, a situation that can be explained by the habit among specialists in Arab papyrology of grouping together documents copied on various supports (papyrus, parchment, etc.) into a single category as ‘papyrus’. 7 R. Sellheim, *EVP*, p. 173, s.v. ‘kaṣṣa‘. 8 Al-Qalqashandi, *Kūtub al-‘uṣūd fī nafs al-‘umūr*, vol. III (Cairo, n.d.), p. 49. 9 Grohmann, *APL*, pp. 92–93. 10 Grohmann, *APL*, p. 74. Letters survive in which the receiver has written a reply on the verso, and even in the spaces left empty on the recto. Y. Raghib (‘L'écriture des papyri arabs aux premiers siècles de l'Hebron’, *REMMAT* 59 [1995], p. 22) points out that government offices themselves had no qualms about employing used leaves that were surplus to requirements.

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11 *Jāmih al-masūridāt al-adasiyya wa-l-qahdiyya* by Ibn al-Baytār (died 646/1248). Al-Nabatī possessed no direct knowledge of the manufacturing process which had in fact died out by the time this passage was written: ‘The Egyptians used in former times to split the stalk of the papyrus into two parts, cut the pulp obtained thereby into strips, put them crosswise, in two layers, on an even pad made of wood; spread on them a size (kaṣṣa‘) made from the seeds of the blue lotus (*Nymphaea caerulea* Sav.) mixed with water; having left the strips to dry completely, they would then beat them thoroughly with a piece of wood resembling a small mallet until they got an even, solid sheet.’ Apart from the use of size, this text rather closely parallels the classic account given by Pliny the Elder. ‘The process of making paper [i.e. sheets] from papyrus is to split it with a needle into very thin strips made as broad as possible, the best quality being in the centre of the plant, and so on in the order of its splitting up. […] paper [sheets] of all kinds are woven on a board moistened with water from the Nile, muddy liquid supplying the effect of glue. First an upright layer is smeared onto the table, using the full length of papyrus available after the trimmings have been cut off at both ends, and afterwards cross-strips complete the latticework. The next step is to press it in presses, and the sheets are dried in the sun and then joined together.’ The foregoing description is relatively clear, except with regard to the initial stages of the operation when the leaves are cut up. Papyrologists understand the texts to mean that the stem, triangular in cross-section, is first divided into segments and then split into two halves that are sliced into strips from the centre of the stem outwards, parallel either to one of its sides or else to the incision.

Adolf Grohmann has countered this view with the following observation: ‘It has long been believed that the pieces of pith could be separated merely by being slit longitudinally. Microscopic examination has demonstrated, however, that this was not the case. For if the strips separated by simple longitudinal cuts had been laid side by side, the packs of cells in the pith which to the naked eye look like fibres, should appear spread over two zones, tighter towards the back but looser in the central section. Consequently, where the strips of pith touch, tight packs of vessels should appear, whereas they should remain sparser towards the middle. But papyri themselves do not in fact demonstrate such a variation. The quantity of fibres is as homogeneous under the microscope as it is to the naked eye.’ Grohmann goes on to offer a different interpretation of the cutting process as consisting of two steps. ‘After removing the bark [of the papyrus], the lamellae comprising the stem would be separated with the aid of a sharp point. Another method consisted in […] attaching a thin blade to a horizontal support and rotating the pieces of pith around their axis, pushing them against this plane.'
like device. According to whether the strips of pith, whose breadth varies between 1.5 and 8 cm, were extracted from the bark area or from the centre, the variety extracted would be thin or thick, or even extremely thin.14

While the first step in manufacture has, as we have seen, given rise to divergent interpretations, the nature of the subsequent phases, on the other hand, is relatively unambiguous. The strips of papyrus were laid out side by side on a flat surface; next, perpendicular to the axis of this first layer was placed a second series of strips, also side by side. Then a preparation designed to bind the various ingredients together might be spread over the sheet15 and then pressed, before being smoothed out (an operation for which, according to Pliny, a tooth or a shell might be employed).16 The rectangular pieces thus obtained (Greek, hololemata, the plural of hollema - χολλημα) commonly measured between 20 and 30 cm wide and from 30 to 40 cm long, but the width tended to increase over time; the minimum and maximum dimensions given by Grohmann vary between 12.7 and 37 cm, for width and between 30 and 35 cm for length.17 The sheets were then sorted according to quality, and twenty of them were glued end to end with a slight overlap (approximately 2 cm), care being exercised to lay the fibres in one and the same direction; the joins were then smoothed down so that they would offer no resistance to the passage of the reed pen. The strip thus obtained was then rolled.18

By the end of the process, the papyrus appeared as a roll in which the horizontal fibres parallel to its length faced inwards. In accordance with the practice in antiquity of copying books as tabliftina, this was the first side to be written on, and thus constitutes what might be referred to as the 'recto'. On the outside of the roll, the fibres lay vertically; hence this side was in effect a 'verso', and was generally used second. The scribe would copy documents perpendicularly to the fibres of the recto.19

14 Op. cit., p. 30. More recently, Grohmann has expanded on the hypothesis of 'peeling' of the papyrus stalk. He bases his argument this time on the techniques employed in China for making rice paper, after making an incision in a piece of Arundo donax papyrata laid in front of him, the workman folds the knife firmly in his hand and slowly and steadily rolls the pulp against the blade of the knife, thereby extracting the long (2 to 3 foot) leaves in a spiralling movement (AP I, pp. 77-78). The results of microscopic examination of papyrus are equally important in this connection: see A. Wallert, B. M. Moineco and J. D. Kruiper, Μικροκυκλιστικές Ενδεχόμενοι της Παπυροι και Πνεύματος, Hist. Naturals XIII, 74-81; Zeitschrift für Papyrologie und Epigraphik 76 (1980), pp. 39-44. 15 The use and even the existence of a string in a matter of dispute: see Grohmann, AP I, pp. 78-79. It is questionable, however, whether that was really the desired effect. Pliny the Elder states that the leaves were indeed sized. "The common kind of paste for paper is made from fine flour of the best quality mixed with boiling water, with a very small sprinkle of vinegar [...] but a more careful process is to strain crumbs of leavened bread in boiling water; this method [...] produces a paper softer even than linen" (Pliny the Elder, Natural History, XIII, xxi, 2). This manner of proceeding is reminiscent of the kinds of preparations employed in papyrusmaking (see below). 16 Pliny, loc. cit. 17 Grohmann, AP I, p. 87. 18 This is due to the number of leaves used to compose a roll derived from Pliny the Elder. The process seems to have endured through the Islamic period (q.v. A. Grohmann, AP I, p. 89). 19 Khan, op. cit., in Codicology, p. 17 and 18 and fig. 3 b.

The protocol

A strip of poorer quality whose fibres lay perpendicular to those of the rest of the sheets would then be stuck to the head of the roll known as the protocol (from the Greek πρότειλημα - πρωτειλεμα), whose function was to protect the roll. As was the custom in Byzantine tradition, this initial sheet bore an inscription also known by the term 'protocol'. During the Arab period, this text was initially written in Greek, and then in Arabic and Greek from 74 or 75/593-664 or 694-695, and finally in Arabic alone.20 After the kaimala, the protocol would contain various religious formulae - such as the shahada, the tasliya (invocation of blessings on the Prophet) - or some verses from the Qurʾan, together with the name of the reigning caliph and, as the case might be, that of the governor of Egypt, the director of finance for the province or other senior officials. Authorities differ as to whether this inscription corresponded to a tax levied or to a maker's mark.21 The script employed for the protocol is of a particular type that might perhaps have been executed with a brush; in later times, combinations of inks of various colours (red and green, more rarely blue) were used to copy this text.

The use of papyrus in Arabic manuscripts

In the Islamic period, makers continued to prepare papyrus as they had done in ancient times, sticking the hollemata together to obtain a roll: this manner of proceeding explains why several ways of using papyrus are found in manuscripts. Too few manuscripts survive to allow any major trends to be extrapolated; only a few necessarily brief observations can be made. First of all, the whole roll can be used as it is, or else lengthened by sticking several rolls end to end, as required. The result could be a strip of some considerable length: indeed, two surviving letters exceed two meters in length,22 but, according to one source,23 the total length might reach nearly fifteen. Copyists could then lay out the lines of writing parallel to the length of the roll and set out their texts in columns side by side, a solution that corresponded to

20 Grohmann, AP I, p. 88. 21 Grohmann (AP I, p. 82) notes the use of Arabic alongside that of Greek in the reigns of the emperors (reigned 41-606/661-680), and hence at an earlier date than that generally accepted as marking the introduction of Arabic into the work of the administrative offices, i.e. in the reign of Abd al-Malik, in 74 or 75/693-694 or 694-695 (see for example G. Khan, op. cit., in Codicology, p. 16). 22 Grohmann, AP I, p. 80 sq. 23 Heidelberg Institut für Papyrologie MS Inv. FSR-3-7 measures 2.31 m. (C. H. Becker, N奸op Schetts-Reinkind, i, in Veröffentlichungen aus der Heidelberger Papyrologie, vol. III [Heidelberg, 1906], pp. 647-676, no. 83); a letter is also in the collection in the Museum of Islamic Art in Cairo in 2.4 m. in length (M. Hosni and H. Sakkara, A letter from the governor of Egypt to the king of Juba and Masqara concerning Egyptian-Nabataean relations in 147/578, in W. al-Qadi (ed.), Studia Arabiae et Islamicae; Festschrift für Basim 'Abd (Heidelberg, 1981), pp. 209-229). 24 Cited by Rāghib, op. cit., p. 20 and n. 25.
the shape of the book in antiquity (the *kolshem*), a form eventually supplanted by the codex in the first centuries of the common era (henceforth CE). In the Islamic world, however, the *kolshem* itself is not attested. If, on the other hand, the抄写者 wrote at right angles to the length of the roll, the term is *rotulus*. The *rotulus* — and more especially when made from papyrus — was employed during the first centuries of the *Hijri*, in particular for notes:25 one example is the compilation of Traditions made by ‘Abd Allāh b. Lahi‘a preserved at Heidelberg (P. Schott-Reinhart Inv. Ar. 50-53).26

Another way of handling papyrus consisted in progressively dividing it into pieces of variable size according to need. Sources indicate that the roll could be sold not only whole but also in smaller units, the most current — corresponding to one-sixth of a roll — being known as a *tāmar* (from the Greek *tōma* — *tōµapou*)27. As will be shown below,28 several pieces of the same size could be cut, superposed, and then folded in the middle so as to comprise a gathering (kurrāsā).29 Papyrus codices are in fact attested in the Islamic world from earliest times, which is hardly surprising since their use was already well established in areas taken over by Muslim conquerors. Some documentary codices in Egypt listed by Jean Gasco have been dated prior to the ‘Abbāsid period.30 Several of these, dating from between 690–705 and 716–721 CE, are made up from leaves (i.e. single bifolium) folded into two,31 another, from after 716–717, comprises a single gathering. It is thus advisable to treat with a degree of scepticism the theory voiced by several Arab authors of a shift from scroll to unbound quire (daftar) within the administration of the empire during the reign of the first ‘Abbāsid caliph, al-Saffah (reigned: 754–755).32 In this connection, it would undoubtedly be interesting to re-examine the history of the use of the *daftar* in the early *Umāyaḍ* and ‘Abbāsid administrations.

Now, the existence of the documentary codices mentioned above makes it possible to assert that, for papyrus — contrary to what has sometimes been argued33 — the codex form was employed very early in the Islamic period. Admittedly, the majority of literary papyri subsist in a fragmentary state and provide only an incomplete picture of the use of the material. Nevertheless, these survivals, which include a certain number of bifolios in reasonably good condition, seem to confirm the conclusion that the codex was indeed the dominant form.34 Two of these papyrus manuscripts are better preserved and might perhaps provide more precise data: one is preserved in Heidelberg (P. Schott-Reinhart Arab. 23, dated to 229/843–844)35, the other in Cairo (Dār al-Kutub, Hadith 2123, before 276/889–890).36 According to Nabi‘a Abbott, there was a preference for square formats.37

Physical examination of papyrus

Physical examination should concern itself with the direction in which the fibres of the papyrus run (illus. 5). As has been noted, the interior face of the roll is conventionally called the recto, the outside being known as the verso. Papyrologists specialising in the Classical world extend this terminology to pieces cut from the whole, the recto bearing written lines parallel to fibres of the material. Ambiguities arise in the case of a codex, however, since the terms ‘recto’ and ‘verso’ can apply to the sheet itself, quite independently of the direction in which the script runs with respect to the fibres. A number of

25 N. Abbott, *Studies in Arabic literary papyri*, vol. II, *Quarian commentary and tradition* (Oriental Institute Publications, 70) (Chicago, 1967), pp. 57–59, contains a lengthy discussion of the sometimes long rolls in which traditional records were kept; reference may also be made to the chapter on The Quires of a codex. 26 R. G. Khoury, *‘Abbāsī dhār Lahi‘āī’s 971–1372* (Paris, 1985), p. 87. 27 See Gauze, *AMT*, p. 95. For the word can also designate ‘leaf’, ‘page’ and ‘leather’). The *tāmar* can also be divided into two sections: Grohmann mentions one-third part of a *tāmar*, i.e. 1/6 of a roll (AP1, p. 93). 28 See also the chapter on *The Quires of a codex*. 29 Grohmann (AP1, p. 75) raises this possibility, but is obviously thinking of administrative records rather than of classical. For kurrāsā, see Gauze, *AMT*, p. 124. 30 ‘Les codex documentaires égyptiens’, in A. Blanchard (ed.), *Les Dōwāb du codex*, (Bibliothèque, 9) (Turnhout, 1989), pp. 100–101. 31 Ibid. and p. 79; see also chapter 3, infra. 32 Sellheim, op. cit. 33 See for example Sellheim, loc. cit.; also Gauze, *AMT*, p. 47.

authors have therefore advocated indicating the horizontal fibres by the sign →, while for the other side the symbol ↑ shows that the fibres lie vertically. The occasional presence of joins in the middle of a sheet should also be noted.

Conservation and re-use

Although a substantial amount of papyrus has survived the passage of time, it is nonetheless a fragile and brittle material. Specific precautions were taken to improve conservation: for example, storing it in containers made out of terracotta or glass, or else in parchment envelopes. Arab sources indicate that the Caliph particularly appreciated papyrus on the grounds that it was impossible to abrade or modify the writing on it without damaging the surface. In reality, it was known for a sheet of papyrus to be washed and reused, and papyrus palimpsests do indeed survive. This was not however the only manner in which papyrus could be re-utilised. It was also possible to turn it into cartonnage (for boards), a material known to have been used for Coptic manuscript bindings as well as for a very ancient manuscript in Latin, and it is quite possible that the same operation was undertaken in the case of Arabic manuscripts.

Parchment

Unlike papyrus, the manufacture of which was confined to the few and circumscribed areas where Cyperus papyrus L. grows, parchment can in theory be produced anywhere, since its raw material, of animal origin, is available in practically every corner of the world and the manufacturing techniques involved are relatively elementary. This constituted a significant advantage, since users did not depend on supplies imported from far-flung regions along routes that political or economic circumstances might disrupt at any time. Until paper became the universal medium of choice, parchment (in Arabic رقاب, riqā` and also مكتبت) occupied – together with papyrus – a privileged position in manuscript production. It was certainly not restricted to this use, however, as is shown by the many documents on parchment that are traditionally discussed under the rubric of Arabic papyrology but will not be addressed in the context of the present study which is confined solely to the manuscript book. In spite of its time-honoured supremacy, collections of manuscripts today include very few specimens of the parchment codex. This scarcity, together with the still insufficient number of studies devoted to the use of parchment among Muslim copyists, explains why it is impossible as yet to present an overall picture of its use in the Islamic world.

Parchment is defined as skin of an animal ‘dressed and prepared for writing’; as Denis Mizziere has emphasised, ‘prepared’ means ‘unhaired and degraded’ and subjected to ‘a non-tanning (or very slightly tanning) process, and then dried under tension, rendering it suitable for writing on both sides’.

Chronological outline

In spite of the word by which it is known in several languages, parchment was not ‘invented’ at Pergamon in the second century B.C.E. It seems to have been known and used in the East from time immemorial, perhaps from as early as the beginning of the first millennium B.C.E. Although no dated Arabic manuscripts survive from before the third/fourth century, there can be no doubt that parchment was employed throughout the whole of the Muslim world from the onset of Islam. This is attested by Qur’ān fragments in the Hijāzī style

43 Grohmann’s remarks (AP, p. 108-111; also in EI 2 II, pp. 540-544, s.v. ‘qab‘) have more to do with ‘Arabic papyrology’, Pedersen, _The Arabic Book_, pp. 55-57, and G. Endress, ‘Pergament in der Codicologie des islamisch-arabischen Mittenalters’, in P. Rücker (ed.), _Pergament: Geschichte – Struktur – Rezeption – Herstellung_ (Stuttgart, 1991), pp. 45-46, should also be kept in mind. We return here to part of the data from our earlier presentation in ‘L’emploi du parchemin dans les manuscrits islamiques: quelques remarques initiales’, _Codicology_, pp. 17-27. 44 OED, _Als Maurizzare, Vulgatae_, p. 29. M. L. Ryder (‘The biology and history of parchment’, in P. Rücker (ed.), op. cit., p. 25) stresses that there was no tanning process, but Hesan, admittedly referring to ‘skin’, maintains that a lightly tanning treatment was commonly applied to hides in the Middle East (‘Technological heritage in the preparation of skins for biblical texts in Medieval Oriental libraries’, op. cit., pp. 35 and 37). Reed shares this view (Ancient skins, parchment and insular, pp. 122-123). M. Ben-Arie, who makes a distinction between East and West (the latter including Spain), refers in both cases to ‘parchment’ (Hellenistic codicology, p. 22, n. 25). 45 As in English ‘parchment’, German Pergament, French parchemin, Italian pergamo, etc. The Greek word meaning parchment, απόθεμα (apothēma), is the root of the Arabic دفتر (see B. Lewis, _III_ II, p. 78, s.v. ‘daffir‘). 46 See F. Blabot, in Paulin’s _Bibliographie des ostracodermatsen_ (vol. XVII), s.v. ‘Membranae’, vol. 596-601; P. Ladeau, in Lecoin’s _Ostracodermatsen_, 6, s.v. ‘Pergament’, vol. 1885. According to Ryder (op. cit., p. 25) Pinyi’s ‘illegible account is responsible for the ingenuity of this explanation. 47 Reed, op. cit., p. 277; Ryder, loc. cit. The term ‘parchment’, however, should be used with caution. In the first place, the presence of script on both sides of a skin is an insufficient criterion; secondly, superficially similar materials might well result from very different production processes. 48 On early dated manuscripts, see K. Awasz, ‘Abyaneh al-maghāzī’ al-`Arabiyah f. muḥātir al-`ilm (Baghavad, 1982); G. Emteros, ‘Handchriftenträger’, _GDP_, p. 281; and F. Dörner, _Les manuscrits arabes des dix III/VIIe siècles_, _HSS_ 55-57 (1987-1989), pp. 343-379.
were all used in the manufacture of parchment.53 The extant sources, as we shall see, appear to indicate that the most commonly employed material was sheepskin. For the fourthteenth century, however, an interesting remark appears in the Calendar of Cordoba for the month of May: ‘We make parchment from the skin of the fawn and gazelle skin until the end of July.’54 The skin of wild beasts was reputedly of superior quality to that of domestic livestock;55 this technical consideration may explain the choice of a material that was not without serious economic consequences, given the sheer number of skins required for a relatively thick manuscript. It is conceivable that the term ‘gazelle skin’ refers rather to a certain quality of parchment, as is the case with vellum. Indeed, a note in Dozy’s Supplément aux dictionnaires arabes which states that ragg idzil means ‘virgin parchment, the prepared skin of baby goats or stillborn lambs’56 implies as much. Among the ḥabba treatises that provide information (albeit somewhat sketchy) on the techniques employed, that of Ibn ‘Abdūn, written in Spain towards the end of the fifth/eleventh or at the beginning of the sixth/seventh century, recommends ‘not using skins from emaciated sheep in preparing [parchment].’57 This implies both that the sheep was the most frequently used animal and that parchment manufacturers were well aware that the health of the animal had serious repercussions on the quality of the parchment obtained: an underfed animal would yield a thin, flimsy hide with an uneven grain that would occasionally be marked with the imprint of the bones.58 Ibn ‘Abdūn’s reminder, however, surely stems from the fact that some makers were more lax than they should have been.

The parchmenter began by unhauling the hide; mediaeval Western treatises indicate that the skin of the animal was first plunged into a lime bath to ensure the fleece peeled off more easily. This technique was known to the author of the Příručník in the fourth/fifth century; he mentions a depletion paste.

53 So far as the present writer knows, there has not yet been any systematic investigation of the animal species involved. There are no clues in ancient sources (Blübl, op. cit., col. 597). For the Islamic world, authors mentioning the use of parchment refer to sheep, goats and camels see Ghebrann, AP, p. 108; Endress, op. cit., p. 45; U. Dreibütz, ‘Das Pflanzenwissen von Sansau: frühchristliche Handschriften auf Pergament’, in M. R. ed., op. cit., p. 301. Sheepskin is often mentioned in catalogue and albums: see e.g. A. Mousa, Islamische Buchmalerei (Cairo, 1935), pp. 46 and pl. XVII [29]; M. Usher, Ruskin'un gönültesi Türk hat sanati, p. 110; etc.). Ghebrann devotes a few lines to the question (AP, p. 110). Armenian instructions, on the other hand, list the animals whose hides were used: goat, kid, sheep – domestic or wild – but also deer, hare, calf and donkey foal (P. Schwaller, ‘Zur Pergamentherstellung im byzantinischen Osten’, Codices manuscrits 9 (1983), p. 126).


The Writing Surface: Papyrus and Parchment

On the flesh side of the skin, scraping with a tool (a blade, for example) removed the residual flesh and fat. Ibn 'Abdun’s text seems to be stressing this very point when it states that ‘only scraped parchment should be prepared,’ unless the author is referring to a subsequent, finishing phase.57 After Ibn 'Abdun, 'Umar-al Jarshify (early seventh/thirteenth century?) likewise decreed: ‘The mubahith will supervise papermakers in particular; [...] similarly with the parchementers as to their choice of skins, which must be uniformly scraped and cleaned.’58 It is not clear, however, whether in the Islamic world the skin was then systematically smoothed with pumice so as to eliminate the difference between the flesh and hair sides.

A crucial phase of processing took place when the skin was dried over a wooden frame or stretcher. Since this required a significant amount of space, Andalusi parchmenters were in the habit of using the lanes in cemeteries, a practice of which Ibn 'Abdun took a dim view: ‘It must not be permitted to lay unclean things, such as tanners’ and parchmenters’ skins, on the ground along the paths [in the cemeteries].’59 Ronald Reed mentions that chalk or plaster was used to control the drying of the stretched skin,60 though chalk on parchment may in fact have been intended to render the appearance of the two sides more homogeneous. Although, as has been noted above, this type of writing material could be produced more or less anywhere, certain cities were famous for the quality of the parchment manufactured, and surely such products were in greater demand. Kufa and Edessa (al-Rabia) enjoyed a glowing reputation in this respect,61 but unfortunately the precise reasons for their pre-eminence—be they technical62 or climatic—are unknown. Before being used by the copist, parchment could be dyed, a practice well known in the Mediterranean region.63 Further comment on the most famous Islamic manuscript to be

59 The exact ingredients are not given in the text of the Fihrist (Ibn al-Nadim, Fihrist, ed. G. Fliegel [Leipzig, 1871], p. 21; ed. R. Tafazzali [Thehran, 1356/1977], p. 23); its composition is, on the other hand, indicated in various dictionaries—in Arabic as well as Persian—and in B. Dodge (ed.), The Fihrist of al-Nadim, I (New York and London, 1980), p. 40, n. 92. 60 Ibn al-Nadim, ed. Bodel (Dodge, op. cit., p. 40. 61 It is mentioned by Hay Gaon (Iraq, late ninth century c.e.) see, A. Harkavy, Studien und Mitteilungen aus der kaiserlichem öffentlichen Bibliothek zu St. Petersburg, 4, Teil, Repertorium der Gemüt (transcribed from dem X.-XI. Jahrhundert) (Berlin, 1885-1887), p. 28. 42 Reed, op. cit., pp. 155-156, Ryder, op. cit., p. 27. 62 According to Schroer (op. cit., p. 125), this method was known in ancient times; Harun (op. cit., p. 42) shares this opinion. These divergences, due in part to differing authors in interpreting the textual sources, should not detract from the potential of a comparative approach in codicology. Comparing various manuscript traditions from regions such as the Middle East or Spain can help to complement some information from elsewhere. A case in point is the curious question of whether petals might have been saved along their thickness—basically so as to make two sheets from a single skin. Harun believes that two traditions existed: one in the West producing what might properly be called parchment, and the other in the Orient which manufactured an analogous but not identical product. He maintains that Muslim parchmenters had mastered the above-mentioned technique of “sawing” and could extract from a single pet (the naq (Hebrew naq corresponding to the thick layer near the flesh) and the qaliq, the thinnest layer on the hair side. See Harun, “Little scripts in Eastern and Western Jewish communities from Qumran to the High Middle Ages,” Hebrew Union College Annual 56 (1985), pp. 47-50. As well as the oft-cited text by Maimonides (Mishneh Torah, II, Hilahot qalathin, 6-7), Harun cites a responsa, also by Maimonides, in which the various names of these two types are used in accordance with the reads qaliq, whereas the text cited by J. B. Blau & M. Reuchmann, ed. J. Blau, vol. I (Jerusalem, 1957), p. 284, 1.7 (for the Arabic and Hebrew texts) has also. There seem to be no traces of this technique in the Arabic sources on parchment, and, while the root qaliq is reasonably meaningful, a word qaliq designating a variety of parchment is not attested in the dictionaries consulted. The same root, however, appears again in connection with palmatops (see note 86 below). The technique may well have been an ancient one, nonetheless. Before Maimonides, who lived in Egypt in the twelfth century, it is the object of an earlier responsa, dated to the ninth century: that is, at a time when parchment was still produced in quantities. Harun (op. cit., pp. 48-49) goes on to reconstruct the Arabic method of making both naq and qaliq at the end of his study. First, the skin was tacked for two or three days; it was plucked into a water and lime bath, then dried while being stretched over a timber frame; finally, the remaining hairs were removed, and it was also at this stage that the naq and qaliq were separated. Apart from the last phase, it is clear that the process was in fact relatively close to that undertaken in Europe. It should be added that in our study of manuscripts we have not been able to identify any parchment as having been produced by splitting the hide into layers. 64 Harun, ibid., p. 36; op. cit. (1983), pp. 36-37.
Dimensions of parchment

It should be noted first of all that the size of a manuscript is partly determined by the animal species whose pelts are used in preparing the parchment. In a study of the dimensions of French manuscripts, Carla Bozolo and Etsu Onno have estimated the average ‘usable’ surface area of a mediæval sheepskin at 48 × 60 cm. It should be borne in mind that the animals concerned were at that time smaller in size than those of the present day. For modern parchments manufactured from lamb- and sheepskin, the same authors calculate that the average surface area amounts to 45 × 55 and 59 × 76 cm, respectively. Thus in order to make larger books it was necessary to select materials produced from the skins of bigger species, whereas those of smaller animals, such as gazelles, could only be turned into volumes of modest dimensions. Of greater interest than these lower limits are the following two examples, one a manuscript, the other a document, that seem to represent the upper limits in size for parchment.

The fragments of a Qur’an (Paris BNF arabe 324) includes leaves that, though heavily cropped, measure 53.7 × 62 cm, while a document preserved in London (BL Or, 468aIII) attains 85 × 82 cm. Once the manufacturing process is complete, the parchment appears roughly oblong in shape (illus. 6). Volumes copied on parchment are almost all codices and are rectangular, more rarely square, in form, though there also survive examples of rolls, known as rouleaux, on which the written lines lie perpendicular to the longer side.

Characteristics of parchment

The quality of a piece of manuscript was also affected by other characteristics, quite apart from those of size, factors which in turn also had repercussions on the final price paid by the purchaser or the individual commissioning the manuscript. Two animals of the same species and variety do not necessarily yield parchment of identical quality since, as has already been observed, the state of health of an animal – and more specifically that of its skin – has an effect on the finished product. Injuries, stings, or mistreatment prior to slaughter might leave marks on the hide, and it could also be damaged in places during preparation: these lesions will inevitably leave traces on the parchment, in the form of either roughness defects or glassy patches (illus. 7). Areas of translucency are caused by the tension applied to the skin during the drying phase (a case in point is MS. Paris BNF arabe 6090, f. 47). It sometimes happens
that a skin is nicked during processing, leaving a perforation of a circular or oval shape. Attempts have occasionally been made to remedy this defect — as well as subsequent accidental tears — by sewing together the two rims of the hole (illus. 9). For example, on folios 3, 5, and 28 of MS. BNF arabe 6095 a thin membrane of parchment — an infill — has been stuck over holes that needed masking (see illus. 9) 82.

Such details aside, the manufacturing process itself is another factor that should be taken into account in assessing the quality of the end product, since craftsmen are known to have performed the tasks required with varying degrees of skill, care and energy. One salient feature of parchment is the pronounced difference between the two sides of the hide: the outer 'hair side' (illus. 10a), and the inner 'flesh side' (illus. 10b). Even after processing, parchment generally preserves some trace of this dissimilarity, just as it tends to roll up naturally around an axis formed by the animal's spine, the orientation of which determines what is termed the 'direction' of the skin.

82 FAMMAD 16; also in MS. Paris BNF arabe 6499, f. 164f; FAMMAD 65; see Chapter ‘The Queen of a codex’). Transparent parchment also existed in medieval times: see Renn, op. cit., pp. 143–145, together with his observations on 'goldbacher's parchment', p. 131.
The process of depilating the hair side was not always totally effective. In some places, for instance around the circumference of the above-mentioned holes or close to the natural edges of a pelt, depilating could be a delicate operation; but residual hairs are also found in areas that should be easier to deal with simply because the parchmenters did not perform the task with sufficient care. On several Maghrībi manuscripts (such as MS, Paris BNF arabe 9195⁸⁸ and 6690⁹⁹), the roots of hairs remain in view protruding slightly above the surface of the parchment. The 'flesh' side will obviously bear no traces of hair, though the tool used for fleshing might leave striations on the skin. These various factors affecting parchment explain the considerable diversity observed among manuscripts copied on this type of writing material. Certain surviving parchments, for instance, are of poor quality, though others are remarkably well finished: in the MS, Nuruosmaniye 27 in Istanbul⁸⁵, the two sides of the

parchment have been so carefully prepared that the difference between them is to all intents and purposes undetectable. In general, however, the makers do not seem to have overexerted themselves to try to eradicate the difference in appearance between the 'hair' and 'flesh' sides of the skin. It is not altogether impossible that other processes were introduced to lessen this contrast. Herein lies a possible explanation for the presence of chalk found spread over the parchment, as revealed by microscopic examination of leaves from Qur'āns written in Ḥijālī style (and thus datable to the end of the first/seventh or beginning of the second/eighth century) and in others copied in the Maghrībi in the seventh/thirteenth and eighth/fourteenth centuries.⁹⁵

Palimpsests

Another aspect of the use of parchment relates not only to the durability of the material and to the ease with which tracings of prior use can be removed from its

surface more or less flawlessly, but also to its price having been high enough to make re-use an attractive proposition. In the *hiṣb* treatise edited by Lévi-Provençal mentioned above, he states that Ibn `Abdīn’s recommendation (‘only scraped parchment should be prepared’),

is by no means certain that palimpsests are meant in this specific case, since it was surely superfluous to advocate scraping the writing off an old parchment with the intention of using it again. Washing and scraping were both well-established processes for re-using leaves already written on, and references to these methods abound in the literature. Special recipes designed to erase less extensive areas of text appear in Ibn Bāḍī’s treatise.

In addition to such literary references, there survive several Arabic palimpsests confirming that this operation actually took place. One of the oldest examples could well be a Qur’ānic fragment sold at auction in London in 1992 (illus. 11).

The reverse situation is also met with: in the Lewis-Mingana palimpsests Christian texts in Arabic datable to the tenth or even eleventh century cover a page from the Septuagint in Greek, and some fragments in Syriac, together with three Qur’ānic passages in Hijāzī style. That shows that the lapse of time between one text being copied and the next was not necessarily very long: indeed, a scribe, on noticing he had made a mistake, might use the same process to correct his own copy.

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Other types of parchment re-use

The way of re-employing parchment described above, though the best-known process, is far from being the only one encountered. The study of early bookbinding, for example, shows how binders were also in the habit of ailing themselves of pre-used parchment. In the case of bindings laid on wooden boards, it appears that a leaf taken from some old manuscript would frequently be stuck over the interior face of the board like a doublet.\textsuperscript{95} It is not uncommon to find sheets cut into strips and used either to reinforce the back of the block of gatherings\textsuperscript{96} or to serve as ‘body’ for the type of casing characteristic of old Qur’\textsuperscript{n} binders.\textsuperscript{97} If dimensions allowed, a folio of parchment could also be converted into a binding.\textsuperscript{98} It would be a mistake, however, to reduce the role of bookbinders to that of ‘recyclers’ of second-hand parchment. Bakr al-Ishbili mentions the material at several junctures in his treatise on binding, \textit{K\=ul\=a\=l al-Tayy\=ir fi t\=i\=s\=a\=l al-
\=tas\=r}, and, although the author is not specific, it can be supposed that his remarks also apply to fresh, unused parchment.\textsuperscript{99} He mentions the uses noted above as occurring in old bindings – such as inner lining (‘doublet’)\textsuperscript{100} – as well as the practice of affixing a strip of parchment to the point (or hinge) where the wooden board joins the text block.\textsuperscript{101} The existence of a type of covering known as \textit{shid} is also noted. This consisted in gluing two to three leaves of paper, followed by a sheet of parchment, onto a piece of leather, thereby forming a kind of multi-layered board.\textsuperscript{102} Finally, the author recommends using a special adhesive for parchment.\textsuperscript{103}

\textsuperscript{95} Marçais and Poinset, \textit{Objets} 1, pp. 16, 63-67, etc.; F. Déroche, ‘Quelques reliures médiévales de provenance damasqoise’, \textit{Rih} 54 (1986) [L. Kahn (ed.), \textit{Mélanges D. Sowerby}], p. 89. \textsuperscript{96} This form of re-use should be carefully distinguished from that of the preservatives discussed in Chapter ‘The Quest of a scribe’. \textsuperscript{97} Marçais and Poinset, \textit{Objets} 1, pp. 19 and 72; Déroche, ‘Quelques reliures’, p. 89. \textsuperscript{98} The collection of manuscripts from the Great Mosque of Damascus now in Istanbul provides one example of just such a practice. Another, also from Damascus, is MS. Paris BNF suppl. tune 984 which takes the form of an anthology of short treatises in Arabic, each forming a gathering of its own, protected by a piece of parchment cut to the required dimensions from leftovers sheets covered in script – in Arabic, Armenian, Greek and Latin – see G. Vajda, ‘Trois manuscrits de la bibliothèque du savant damasqin Yûn\textsuperscript{a}f ibn ‘Abd al-
\=Allah’, \textit{Dâr al-Ma\=‘arif} 270 (1982), pp. 229-236, 99 Bakr the Bookbinder in al-Muhibb al-Lahhami al-Ishbili, \textit{K\=ul\=a\=l al-Tayy\=ir fi t\=i\=s\=a\=l al-
\=tas\=r}, ed. ‘A. A. Karmn, \textit{Revista del Instituto de estudios islámicos en Madrid} 7-8 (1959-1960), pp. 1-42 (Arabic text) and 197-99 (summary in Spanish); A. Gacek, ‘Arabic bookbinding and terminology as portrayed by Bakr al-Ishbili in his \textit{K\=ul\=a\=l al-Tayy\=ir fi t\=i\=s\=a\=l al-

It is in theory possible to identify the animal from which a parchment has been made by observing the way the hairs remain implanted on the finished product, though often the treatment the hide receives – if even mildly vigorous – has eliminated every trace. The follicles, i.e. the organs located in a cavity in the epidermis that secrete the hair, the form of which is characteristic of each species,\textsuperscript{104} can also be examined under the microscope. In the absence of any more precise identification, the word ‘parchment’ is used; the term ‘vellum’ should be reserved for parchment made from the skin of a very young or stillborn calf.

The hair and flesh sides of the parchment can be distinguished (see illus. 10a, 10b) by the fact that the flesh side is paler in colour than the hair side, which possesses a velvety texture that is more receptive to ink. This can be noted particularly on specimens of the Qur’\textsuperscript{n} copied in one or other of the old ‘Abbasid scripts of larger size.\textsuperscript{105} If one holds the manuscript open in such a manner as to make the margins of a number of consecutive leaves visible simultaneously, the distinction between the two sides of the skin normally appears quite clearly. In carrying out a thorough examination it is advisable to look very carefully for the various types of defect outlined above. The marginal areas occasionally bear tell-tale signs of the grain side: hairs remain affixed more often around the circumference of any eventual holes or near the edges (a prime example appears on f. 39 v of MS. Paris BNF arabe 6095).\textsuperscript{106} Whenever depletion has been imperfectly executed, fragments may even persist in more extensive areas. In several Maghribi manuscripts (such as MSS. Paris BNF arabe 5953\textsuperscript{107} and 6090\textsuperscript{108}), the hair roots are still conspicuous, appearing on the surface of the parchment in the form of minute black spots. As to the observers, the tool used for fleshing can also leave its mark, as for example on sheet 17 of a manuscript in Paris (BNF arabe 6095; illus. 7).\textsuperscript{109} By the end of such an examination, not only the sequence of the sides of the parchment, but also its various other characteristics will have been accurately noted, data which will prove invaluable when it comes to examining the arrangement of gatherings. Further microscopic observations may add to our knowledge of the use of this writing material in the Islamic world. In this way, for instance, the presence, if any, of chalk as well as the type of animal skin used to make the parchment (if that has proved impossible to establish in any other manner), may also be determined.