Ancient Printing Materials

* Papyrus
* Parchment
* Codex

# Papyrus

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*For papyrus plant in the sedge family Cyperaceae, see*[*Cyperus papyrus*](https://en.wikipedia.org/wiki/Cyperus_papyrus)*. For other uses, see*[*Papyrus (disambiguation)*](https://en.wikipedia.org/wiki/Papyrus_%28disambiguation%29)*.*

Papyrus (P. BM EA 10591 recto column IX, beginning of lines 13-17)

The word **papyrus** [/pəˈpaɪrəs/](https://en.wikipedia.org/wiki/Help%3AIPA_for_English) refers to a thick [type of paper](https://en.wikipedia.org/wiki/Paper) made from the [pith](https://en.wikipedia.org/wiki/Pith) of the papyrus plant, [*Cyperus papyrus*](https://en.wikipedia.org/wiki/Cyperus_papyrus). *Papyrus* can also refer to a document written on sheets of papyrus joined together side by side and rolled up into a [scroll](https://en.wikipedia.org/wiki/Scroll), an early form of a book. The plural for such documents is papyri.

An official letter on a papyrus of the 3rd century BCE

Papyrus is first known to have been used in [ancient Egypt](https://en.wikipedia.org/wiki/Ancient_Egypt) (at least as far back as the [First Dynasty](https://en.wikipedia.org/wiki/First_Dynasty_of_Egypt)), as the *Cyperus papyrus* plant was a wetland [sedge](https://en.wikipedia.org/wiki/Cyperaceae) that was once abundant in the [Sudd](https://en.wikipedia.org/wiki/Sudd) of [Southern Sudan](https://en.wikipedia.org/wiki/Southern_Sudan) along with the [Nile Delta](https://en.wikipedia.org/wiki/Nile_Delta) of [Egypt](https://en.wikipedia.org/wiki/Egypt). Papyrus was also used throughout the [Mediterranean](https://en.wikipedia.org/wiki/History_of_the_Mediterranean) region and in [Kingdom of Kush](https://en.wikipedia.org/wiki/Kingdom_of_Kush). The [Ancient](https://en.wikipedia.org/wiki/Ancient_history) [Egyptians](https://en.wikipedia.org/wiki/Egyptians) used papyrus as a [writing material](https://en.wikipedia.org/wiki/Writing_material), as well as employing it commonly in the construction of other [artifacts](https://en.wikipedia.org/wiki/Artifact_%28archaeology%29) such as [reed boats](https://en.wikipedia.org/wiki/Reed_boats), [mats](https://en.wikipedia.org/wiki/Mat), [rope](https://en.wikipedia.org/wiki/Rope), [sandals](https://en.wikipedia.org/wiki/Sandals), and [baskets](https://en.wikipedia.org/wiki/Basket).

## History

A section of the Egyptian [*Book of the Dead*](https://en.wikipedia.org/wiki/Book_of_the_Dead) written on papyrus

[Roman portraiture](https://en.wikipedia.org/wiki/Roman_portraiture) fresco of a young man with a papyrus [scroll](https://en.wikipedia.org/wiki/Scroll), from [Herculaneum](https://en.wikipedia.org/wiki/Herculaneum), 1st century AD

Papyrus was first manufactured in Egypt as far back as the fourth millennium BCE. The earliest archaeological evidence of papyrus was excavated in 2012 and 2013 at [Wadi al-Jarf](https://en.wikipedia.org/wiki/Wadi_al-Jarf), an [ancient Egyptian](https://en.wikipedia.org/wiki/Ancient_Egypt) [harbor](https://en.wikipedia.org/wiki/Harbor) located on the [Red Sea](https://en.wikipedia.org/wiki/Red_Sea) coast. These documents date from c. 2560–2550 BCE (end of the reign of [Khufu](https://en.wikipedia.org/wiki/Khufu)). The papyrus rolls describe the last years of building the [Great Pyramid of Giza](https://en.wikipedia.org/wiki/Great_Pyramid_of_Giza). In the first centuries BCE and CE, papyrus [scrolls](https://en.wikipedia.org/wiki/Scroll_%28parchment%29) gained a rival as a writing surface in the form of parchment, which was prepared from animal skins. Sheets of parchment were folded to form quires from which [book-form codices](https://en.wikipedia.org/wiki/Codex) were fashioned. [Early Christian writers](https://en.wikipedia.org/wiki/List_of_early_Christian_writers) soon adopted the codex form, and in the Græco-Roman world, it became common to cut sheets from papyrus rolls to form codices.

Codices were an improvement on the papyrus scroll, as the papyrus was not pliable enough to fold without cracking and a long roll, or scroll, was required to create large-volume texts. Papyrus had the advantage of being relatively cheap and easy to produce, but it was fragile and susceptible to both moisture and excessive dryness. Unless the papyrus was of perfect quality, the writing surface was irregular, and the range of media that could be used was also limited.

Papyrus was replaced in Europe by the cheaper, locally produced products [parchment](https://en.wikipedia.org/wiki/Parchment) and [vellum](https://en.wikipedia.org/wiki/Vellum), of significantly higher durability in moist climates, though [Henri Pirenne](https://en.wikipedia.org/wiki/Henri_Pirenne)'s connection of its disappearance with the Muslim conquest of Egypt is contested. Its last appearance in the [Merovingian](https://en.wikipedia.org/wiki/Merovingian) chancery is with a document of 692, though it was known in [Gaul](https://en.wikipedia.org/wiki/Gaul) until the middle of the following century. The latest certain dates for the use of papyrus are 1057 for a papal decree (typically conservative, all [papal bulls](https://en.wikipedia.org/wiki/Papal_bull) were on papyrus until 1022), under [Pope Victor II](https://en.wikipedia.org/wiki/Pope_Victor_II), and 1087 for an Arabic document. Its use in Egypt continued until it was replaced by more inexpensive [paper](https://en.wikipedia.org/wiki/Paper) introduced by Arabs who originally learned of it from the Chinese. By the 12th century, parchment and paper were in use in the [Byzantine Empire](https://en.wikipedia.org/wiki/Byzantine_Empire), but papyrus was still an option.

Papyrus was made in several qualities and prices; they are listed, with minor differences, by [Pliny the Elder](https://en.wikipedia.org/wiki/Pliny_the_Elder) and [Isidore of Seville](https://en.wikipedia.org/wiki/Isidore_of_Seville).

Until the middle of the 19th century, only some isolated documents written on papyrus were known. They did not contain literary works. The first modern discovery of papyri rolls was made at [Herculaneum](https://en.wikipedia.org/wiki/Herculaneum) in 1752. Until then, the only papyri known had been a few surviving from medieval times.

## Etymology

The [English](https://en.wikipedia.org/wiki/English_language) word "papyrus" derives, via [Latin](https://en.wikipedia.org/wiki/Latin), from [Greek](https://en.wikipedia.org/wiki/Greek_language) πάπυρος (*papyros*), a loanword of unknown (perhaps [Pre-Greek](https://en.wikipedia.org/wiki/Pre-Greek)) origin. Greek has a second word for it, βύβλος (*byblos*, said to derive from the name of the [Phoenician](https://en.wikipedia.org/wiki/Phoenicia) city of [Byblos](https://en.wikipedia.org/wiki/Byblos)). The Greek writer [Theophrastus](https://en.wikipedia.org/wiki/Theophrastus), who flourished during the 4th century BCE, uses *papyros* when referring to the plant used as a foodstuff and *byblos* for the same plant when used for nonfood products, such as cordage, basketry, or writing surfaces. The more specific term βίβλος *biblos*, which finds its way into English in such words as 'bibliography', 'bibliophile', and 'bible', refers to the inner bark of the papyrus plant. *Papyrus* is also the etymon of 'paper', a similar substance.

In the [Egyptian language](https://en.wikipedia.org/wiki/Egyptian_language), papyrus was called *wadj* (*w3ḏ*), *tjufy* (*ṯwfy*), or *djet* (*ḏt*).

## Documents written on papyrus

Bill of sale for a donkey, papyrus; 19.3 by 7.2 cm, MS Gr SM2223, Houghton Library, Harvard University

The word for the material papyrus is also used to designate documents written on sheets of it, often rolled up into scrolls. The plural for such documents is papyri. Historical papyri are given identifying names—generally the name of the discoverer, first owner or institution where they are kept—and numbered, such as "[Papyrus Harris I](https://en.wikipedia.org/wiki/Papyrus_Harris_I)". Often an abbreviated form is used, such as "pHarris I". These documents provide important information on ancient writings; they give us the only extant copy of [Menander](https://en.wikipedia.org/wiki/Menander), the Egyptian [Book of the Dead](https://en.wikipedia.org/wiki/Book_of_the_Dead), Egyptian treatises on medicine (the [Ebers Papyrus](https://en.wikipedia.org/wiki/Ebers_Papyrus)) and on surgery (the [Edwin Smith papyrus](https://en.wikipedia.org/wiki/Edwin_Smith_papyrus)), Egyptian mathematical treatises (the [Rhind papyrus](https://en.wikipedia.org/wiki/Rhind_papyrus)), and Egyptian folk tales (the [Westcar papyrus](https://en.wikipedia.org/w/index.php?title=Westcar_papyrus&action=edit&redlink=1)). When, in the 18th century, a library of ancient papyri was found in [Herculaneum](https://en.wikipedia.org/wiki/Herculaneum), ripples of expectation spread among the learned men of the time. However, since these papyri were badly charred, their unscrolling and deciphering is still going on today.

## Manufacture and use

Different ways of cutting papyrus stem and making of papyrus sheet

Papyrus plant *Cyperus papyrus* at Kew Gardens, London

Papyrus plants near [Syracuse, Sicily](https://en.wikipedia.org/wiki/Syracuse%2C_Sicily)

Papyrus is made from the stem of the papyrus plant, [*Cyperus papyrus*](https://en.wikipedia.org/wiki/Cyperus_papyrus). The outer rind is first removed, and the sticky fibrous inner [pith](https://en.wikipedia.org/wiki/Pith) is cut lengthwise into thin strips of about 40 cm (16 in) long. The strips are then placed side by side on a hard surface with their edges slightly overlapping, and then another layer of strips is laid on top at a right angle. The strips may have been soaked in water long enough for decomposition to begin, perhaps increasing adhesion, but this is not certain. The two layers possibly were glued together. While still moist, the two layers are hammered together, mashing the layers into a single sheet. The sheet is then dried under pressure. After drying, the sheet is polished with some rounded object, possibly a stone or seashell or round hardwood.

Sheets could be cut to fit the obligatory size or glued together to create a longer roll. A wooden stick would be attached to the last sheet in a roll, making it easier to handle. To form the long strip scrolls required, a number of such sheets were united, placed so all the horizontal fibers parallel with the roll's length were on one side and all the vertical fibers on the other. Normally, texts were first written on the [*recto*](https://en.wikipedia.org/wiki/Recto), the lines following the fibers, parallel to the long edges of the scroll. Secondarily, papyrus was often reused, writing across the fibers on the [*verso*](https://en.wikipedia.org/wiki/Verso). [Pliny the Elder](https://en.wikipedia.org/wiki/Pliny_the_Elder) describes the methods of preparing papyrus in his [*Naturalis Historia*](https://en.wikipedia.org/wiki/Naturalis_Historia).

In a dry [climate](https://en.wikipedia.org/wiki/Climate), like that of Egypt, papyrus is stable, formed as it is of highly rot-resistant [cellulose](https://en.wikipedia.org/wiki/Cellulose); but storage in humid conditions can result in molds attacking and destroying the material. Library papyrus rolls were stored in wooden boxes and chests made in the form of statues. Papyrus scrolls were organized according to subject or author, and identified with clay labels that specified their contents without having to unroll the scroll. In European conditions, papyrus seems to have lasted only a matter of decades; a 200-year-old papyrus was considered extraordinary. Imported papyrus once commonplace in [Greece](https://en.wikipedia.org/wiki/Greece) and [Italy](https://en.wikipedia.org/wiki/Italy) has since deteriorated beyond repair, but papyrus is still being found in Egypt; extraordinary examples include the [Elephantine papyri](https://en.wikipedia.org/wiki/Elephantine_papyri) and the famous finds at [Oxyrhynchus](https://en.wikipedia.org/wiki/Oxyrhynchus) and [Nag Hammadi](https://en.wikipedia.org/wiki/Nag_Hammadi). The [Villa of the Papyri](https://en.wikipedia.org/wiki/Villa_of_the_Papyri) at [Herculaneum](https://en.wikipedia.org/wiki/Herculaneum), containing the library of [Lucius Calpurnius Piso Caesoninus](https://en.wikipedia.org/w/index.php?title=Lucius_Calpurnius_Piso_Caesoninus_(consul_58_BCE)&action=edit&redlink=1), [Julius Caesar](https://en.wikipedia.org/wiki/Julius_Caesar)'s father-in-law, was preserved by the eruption of [Mount Vesuvius](https://en.wikipedia.org/wiki/Mount_Vesuvius), but has only been partially excavated.

Sporadic attempts to revive the manufacture of papyrus have been made since the mid-18th century. [Scottish](https://en.wikipedia.org/wiki/Scotland) explorer [James Bruce](https://en.wikipedia.org/wiki/James_Bruce) experimented in the late 18th century with papyrus plants from the [Sudan](https://en.wikipedia.org/wiki/Sudan), for papyrus had become extinct in Egypt. Also in the 18th century, [Sicilian](https://en.wikipedia.org/wiki/Sicily) Saverio Landolina manufactured papyrus at [Syracuse](https://en.wikipedia.org/wiki/Syracuse%2C_Italy), where papyrus plants had continued to grow in the wild. During the 1920s, when Egyptologist [Battiscombe Gunn](https://en.wikipedia.org/wiki/Battiscombe_Gunn) lived in [Maadi](https://en.wikipedia.org/wiki/Maadi), outside Cairo, he experimented with the manufacture of papyrus, growing the plant in his garden. He beat the sliced papyrus stalks between two layers of linen, and produced successful examples of papyrus, one of which was exhibited in the [Egyptian Museum](https://en.wikipedia.org/wiki/Egyptian_Museum) in Cairo. The modern technique of papyrus production used in Egypt for the tourist trade was developed in 1962 by the Egyptian engineer Hassan Ragab using plants that had been reintroduced into Egypt in 1872 from France. Both Sicily and Egypt have centers of limited papyrus production.

Papyrus is still used by communities living in the vicinity of swamps, to the extent that rural householders derive up to 75% of their income from swamp goods. Particularly in East and Central Africa, people harvest papyrus, which is used to manufacture items that are sold or used locally. Examples include baskets, hats, fish traps, trays or winnowing mats and floor mats. Papyrus is also used to make roofs, ceilings, rope and fences. Although alternatives, such as [eucalyptus](https://en.wikipedia.org/wiki/Eucalyptus), are increasingly available, papyrus is still used as fuel.

## Collections of papyri

The [Heracles Papyrus](https://en.wikipedia.org/wiki/Heracles_Papyrus)

* [*Amherst Papyri*](https://en.wikipedia.org/wiki/Amherst_Papyrus): This is a collection of [William Tyssen-Amherst, 1st Baron Amherst of Hackney](https://en.wikipedia.org/wiki/William_Tyssen-Amherst%2C_1st_Baron_Amherst_of_Hackney). It includes biblical manuscripts, early church fragments, and classical documents from the Ptolemaic, Roman, and Byzantine eras. The collection was edited by [Bernard Grenfell](https://en.wikipedia.org/wiki/Bernard_Grenfell) and [Arthur Hunt](https://en.wikipedia.org/wiki/Arthur_Hunt) in 1900–1901. It is housed at the [Pierpont Morgan Library](https://en.wikipedia.org/wiki/The_Morgan_Library_%26_Museum) (New York).
* [*Archduke Rainer*](https://en.wikipedia.org/wiki/Archduke_Rainer_Ferdinand_of_Austria)*Papyri*: One of the world's largest collection of papyri (about 180,000 objects) in the [Austrian National Library](https://en.wikipedia.org/wiki/Austrian_National_Library#Papyrus_collection_and_Papyrus_Museum).
* [*Berlin*](https://en.wikipedia.org/wiki/Berlin)*Papyri*: housed in the [Egyptian Museum and Papyrus Collection](https://en.wikipedia.org/wiki/Egyptian_Museum_of_Berlin).
* [*Berliner griechische Urkunden*](https://en.wikipedia.org/wiki/Berliner_griechische_Urkunden)*: BGU*, a publishing project ongoing since 1895
* [*Bodmer Papyri*](https://en.wikipedia.org/wiki/Bodmer_Papyri): This collection was purchased by [Martin Bodmer](https://en.wikipedia.org/wiki/Martin_Bodmer) in 1955–1956. Currently it is housed in the [Bibliotheca Bodmeriana](https://en.wikipedia.org/wiki/Bodmer_Library) in [Cologny](https://en.wikipedia.org/wiki/Cologny). It includes Greek and [Coptic](https://en.wikipedia.org/wiki/Copt) documents, classical texts, biblical books, and writing of the early churches.
* [*Brooklyn Papyrus*](https://en.wikipedia.org/wiki/Brooklyn_Papyrus): This papyrus focuses mainly on snakebites and its remedies. It speaks of remedial methods for poisons obtained from snakes, scorpions, and tarantulas. The Brooklyn Papyrus currently resides in the [Brooklyn Museum](https://en.wikipedia.org/wiki/Brooklyn_Museum).
* [*Chester Beatty Papyri*](https://en.wikipedia.org/wiki/Chester_Beatty_Papyri): collection of 11 codices acquired by [Alfred Chester Beatty](https://en.wikipedia.org/wiki/Alfred_Chester_Beatty) in 1930–1931 and 1935. It is housed at the [Chester Beatty Library](https://en.wikipedia.org/wiki/Chester_Beatty_Library). The collection was edited by [Frederic G. Kenyon](https://en.wikipedia.org/wiki/Frederic_G._Kenyon).
* *Colt Papyri*: it is housed at the [Pierpont Morgan Library](https://en.wikipedia.org/wiki/The_Morgan_Library_%26_Museum) (New York).
* The [*Herculaneum papyri*](https://en.wikipedia.org/wiki/Herculaneum_papyri): These papyri were found in Herculaneum in the eighteenth century, carbonized by the eruption of [Mount Vesuvius](https://en.wikipedia.org/wiki/Mount_Vesuvius). After some tinkering, a method was found to unroll and to read them. Most of them are housed at the [Naples National Archaeological Museum](https://en.wikipedia.org/wiki/Naples_National_Archaeological_Museum).
* The [*Heroninos Archive*](https://en.wikipedia.org/wiki/Heroninos_Archive) is a collection of around a thousand papyrus documents, dealing with the management of a large Roman estate, dating to the third century CE, found at the very end of the 19th century at [Harit](https://en.wikipedia.org/w/index.php?title=Harit&action=edit&redlink=1), the site of ancient [Theadelphia](https://en.wikipedia.org/w/index.php?title=Theadelphia&action=edit&redlink=1), in the [Faiyum](https://en.wikipedia.org/wiki/Faiyum) area of Egypt by Bernard Pyne Grenfell and Arthur Surridge Hunt. It is spread over many collections throughout the world.
* The *Houghton's papyri*: the collection at [Houghton Library, Harvard University](https://en.wikipedia.org/wiki/Houghton_Library) was acquired between 1901 and 1909 thanks to a donation from the [Egypt Exploration Fund](https://en.wikipedia.org/wiki/Egypt_Exploration_Fund).
* [*Saite Oracle Papyrus*](https://en.wikipedia.org/wiki/Saite_Oracle_Papyrus): This papyrus located at the [Brooklyn Museum](https://en.wikipedia.org/wiki/Brooklyn_Museum) records the petition of a man named Pemou on behalf of his father, Harsiese to ask their god for permission to change temples.
* [*Martin Schøyen Collection*](https://en.wikipedia.org/wiki/Martin_Sch%C3%B8yen_Collection): biblical manuscripts in Greek and Coptic, [Dead Sea Scrolls](https://en.wikipedia.org/wiki/Dead_Sea_Scrolls), classical documents
* [*Michigan Papyrus Collection*](https://en.wikipedia.org/wiki/University_of_Michigan_Papyrus_Collection): this collection contains above 10 000 papyri fragments. It is housed at the [University of Michigan](https://en.wikipedia.org/wiki/University_of_Michigan).
* [*Oxyrhynchus Papyri*](https://en.wikipedia.org/wiki/Oxyrhynchus_Papyri): these numerous papyri fragments were discovered by Grenfell and Hunt in and around [Oxyrhynchus](https://en.wikipedia.org/wiki/Oxyrhynchus). The publication of these papyri is still in progress. A large part of the Oxyrhynchus papyri are housed at the [Ashmolean Museum](https://en.wikipedia.org/wiki/Ashmolean_Museum) in [Oxford](https://en.wikipedia.org/wiki/Oxford), others in the [British Museum](https://en.wikipedia.org/wiki/British_Museum) in [London](https://en.wikipedia.org/wiki/London), in the [Egyptian Museum](https://en.wikipedia.org/wiki/Egyptian_Museum) in [Cairo](https://en.wikipedia.org/wiki/Cairo), and many other places.
* [*Princeton Papyri*](https://en.wikipedia.org/wiki/Princeton_Papyri): it is housed at the [Princeton University](https://en.wikipedia.org/wiki/Princeton_University)
* [*Rylands Papyri*](https://en.wikipedia.org/wiki/Rylands_Papyri): this collection contains above 700 papyri, with 31 ostraca and 54 codices. It is housed at the [John Rylands University Library](https://en.wikipedia.org/wiki/John_Rylands_University_Library).
* *Tebtunis Papyri*: housed by the Bancroft Library at the University of California, Berkeley, this is a collection of more than 30,000 fragments dating from the 3rd century BCE through the 3rd century CE, found in the winter 1899–1900 at the site of ancient Tebtunis, Egypt, by an expedition team led by the British papyrologists Bernard P. Grenfell and Arthur S. Hunt.
* *Washington University Papyri Collection*: includes 445 manuscript fragments, dating from the first century BCE to the eighth century AD. Housed at the [Washington University Libraries](https://en.wikipedia.org/wiki/Washington_University_Libraries).
* [*Will of Naunakhte*](https://en.wikipedia.org/wiki/Will_of_Naunakhte): found at [Deir el-Medina](https://en.wikipedia.org/wiki/Deir_el-Medina) and dating to the [20th dynasty](https://en.wikipedia.org/wiki/Twentieth_dynasty_of_Egypt), it is notable because it is a legal document for a non-noble woman.
* *Yale Papyrus Collection*: numbers over six thousand inventoried items and is cataloged, digitally scanned, and accessible online for close study. It is housed at the [Beinecke Library](https://en.wikipedia.org/wiki/Beinecke_Library).

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# Parchment

From Wikipedia, the free encyclopedia

Central European (Northern) type of finished parchment made of [goatskin](https://en.wikipedia.org/wiki/Goatskin_%28material%29) stretched on a wooden frame

**Parchment** is a material made from processed animal skin and used—mainly in the past—for writing on.

Parchment is most commonly made of [calfskin](https://en.wikipedia.org/wiki/Calfskin), [sheepskin](https://en.wikipedia.org/wiki/Sheepskin), or [goatskin](https://en.wikipedia.org/wiki/Goatskin_%28material%29). It was historically used for writing documents, notes, or the pages of a [book](https://en.wikipedia.org/wiki/Book). Parchment is [limed](https://en.wikipedia.org/wiki/Liming_%28leather_processing%29), scraped and dried under tension. It is not [tanned](https://en.wikipedia.org/wiki/Tanning_%28leather%29), and is thus different from [leather](https://en.wikipedia.org/wiki/Leather). This makes it more suitable for writing on, but leaves it very reactive to changes in [relative humidity](https://en.wikipedia.org/wiki/Relative_humidity) and makes it revert to [rawhide](https://en.wikipedia.org/wiki/Rawhide_%28material%29) if overly wet.

It may be called **animal membrane** by libraries and museums that wish to avoid distinguishing between "parchment" and the more restricted term "[vellum](https://en.wikipedia.org/wiki/Vellum)" (see below).

## Parchment and vellum

Today the term "parchment" is often used in non-technical contexts to refer to any animal skin, particularly [goat](https://en.wikipedia.org/wiki/Goat), [sheep](https://en.wikipedia.org/wiki/Sheep) or [cow](https://en.wikipedia.org/wiki/Cow), that has been scraped or dried under tension. [Vellum](https://en.wikipedia.org/wiki/Vellum) (from the [Old French](https://en.wikipedia.org/wiki/Old_French) *velin* or *vellin*, and ultimately from the [Latin](https://en.wikipedia.org/wiki/Latin) *vitulus*, meaning a calf) in theory refers exclusively to calfskin, and is used to denote a finer quality of material, the finest being "uterine vellum", taken from a calf [foetus](https://en.wikipedia.org/wiki/Foetus).

The term "parchment" originally referred only to the skin of sheep and, occasionally, goats. It is said to be only in relatively modern times that confusion between the terms has arisen: traditionally the distinction was more strictly observed, for example by [lexicographer](https://en.wikipedia.org/wiki/Lexicographer) [Samuel Johnson](https://en.wikipedia.org/wiki/Samuel_Johnson) in 1755, and by master [calligrapher](https://en.wikipedia.org/wiki/Calligrapher) [Edward Johnston](https://en.wikipedia.org/wiki/Edward_Johnston) in 1906. However, when old books and documents are encountered it may be difficult, without scientific analysis, to determine the precise animal origin of a skin in terms of its species, let alone the age of the animal; and for this reason many [conservators](https://en.wikipedia.org/wiki/Conservator-restorer), [librarians](https://en.wikipedia.org/wiki/Librarian) and [archivists](https://en.wikipedia.org/wiki/Archivist) prefer to use either the broader term "parchment", or the neutral term "animal membrane".

## History

German parchmenter, 1568

The word parchment evolved (via the Latin *pergamenum* and the French *parchemin*) from the name of the city of [Pergamon](https://en.wikipedia.org/wiki/Pergamon) which was a thriving center of parchment production during the [Hellenistic period](https://en.wikipedia.org/wiki/Hellenistic_period). The city so dominated the trade that a legend later arose which said that parchment had been invented in Pergamon to replace the use of [papyrus](https://en.wikipedia.org/wiki/Papyrus) which had become monopolized by the rival city of [Alexandria](https://en.wikipedia.org/wiki/Alexandria). This account, originated in the writings of Pliny the Elder (Natural History, Book XII, 69-70), is dubious because parchment had been in use in Anatolia and elsewhere long before the rise of Pergamon.

[Herodotus](https://en.wikipedia.org/wiki/Herodotus) mentions writing on skins as common in his time, the 5th century BC; and in his *Histories* (v.58) he states that the Ionians of Asia Minor had been accustomed to give the name of *skins* (*diphtherai*) to books; this word was adapted by Hellenized Jews to describe scrolls. In the 2nd century BC a great [library](https://en.wikipedia.org/wiki/Library_of_Pergamum) was set up in [Pergamon](https://en.wikipedia.org/wiki/Pergamon) that rivaled the famous [Library of Alexandria](https://en.wikipedia.org/wiki/Library_of_Alexandria). As prices rose for [papyrus](https://en.wikipedia.org/wiki/Papyrus) and the reed used for making it was over-harvested towards local extinction in the two [names](https://en.wikipedia.org/wiki/Nome_%28Egypt%29) of the [Nile delta](https://en.wikipedia.org/wiki/Nile_delta) that produced it, Pergamon adapted by increasing use of parchment.

Writing on prepared animal skins had a long history, however. [David Diringer](https://en.wikipedia.org/wiki/David_Diringer) noted that "the first mention of Egyptian documents written on leather goes back to the [Fourth Dynasty](https://en.wikipedia.org/wiki/Fourth_Dynasty_of_Egypt) (c. 2550–2450 BC), but the earliest of such documents extant are: a fragmentary roll of leather of the [Sixth Dynasty](https://en.wikipedia.org/wiki/Sixth_Dynasty_of_Egypt) (c. 24th century BC), unrolled by Dr. H. Ibscher, and preserved in the [Cairo Museum](https://en.wikipedia.org/wiki/Cairo_Museum); a roll of the [Twelfth Dynasty](https://en.wikipedia.org/wiki/Twelfth_dynasty_of_Egypt) (c. 1990–1777 BC) now in Berlin; the mathematical text now in the [British Museum](https://en.wikipedia.org/wiki/British_Museum) (MS. 10250); and a document of the reign of [Ramses II](https://en.wikipedia.org/wiki/Ramses_II)(early thirteenth century BC)." Though the [Assyrians](https://en.wikipedia.org/wiki/Assyria) and the [Babylonians](https://en.wikipedia.org/wiki/Babylonians) impressed their [cuneiform](https://en.wikipedia.org/wiki/Cuneiform) on clay tablets, they also wrote on parchment from the 6th century BC onward. Rabbinic traditionally maintains that the institution of employing parchment made of animal hides for the writing of ritual objects such as the [Torah](https://en.wikipedia.org/wiki/Torah), [mezuzah](https://en.wikipedia.org/wiki/Mezuzah), and [tefillin](https://en.wikipedia.org/wiki/Tefillin) is [Sinaitic](https://en.wikipedia.org/wiki/Revelation_at_Sinai) in origin, with special designations for different types of parchment such as [gevil](https://en.wikipedia.org/wiki/Gevil) and [klaf](https://en.wikipedia.org/wiki/Klaf).

Early Islamic texts are also found on parchment.

In the later [Middle Ages](https://en.wikipedia.org/wiki/Middle_Ages), especially the 15th century, parchment was largely replaced by [paper](https://en.wikipedia.org/wiki/Paper) for most uses except luxury manuscripts, some of which were also on paper. New techniques in paper milling allowed it to be much cheaper than parchment; it was still made of textile rags and of very high quality. With the advent of [printing](https://en.wikipedia.org/wiki/Printing) in the later fifteenth century, the demands of printers far exceeded the supply of animal skins for parchment.

Latin [Grant](https://en.wikipedia.org/wiki/Grant_%28money%29) written on fine parchment or [vellum](https://en.wikipedia.org/wiki/Vellum) with [seal](https://en.wikipedia.org/wiki/Seal_%28device%29) dated 1329

There was a short period during the introduction of printing where parchment and paper were used at the same time, with parchment (in fact vellum) the more expensive luxury option, preferred by rich and conservative customers. Although most copies of the [Gutenberg Bible](https://en.wikipedia.org/wiki/Gutenberg_Bible) are on paper, some were printed on parchment; 12 of the 48 surviving copies, with most incomplete. In 1490, [Johannes Trithemius](https://en.wikipedia.org/wiki/Johannes_Trithemius) preferred the older methods, because "handwriting placed on parchment will be able to endure a thousand years. But how long will printing last, which is dependent on paper? For if ... it lasts for two hundred years that is a long time." In fact high quality paper from this period has survived 500 years or more very well, if kept in reasonable library conditions.

The heyday of parchment use was during the medieval period, but there has been a growing revival of its use among artists since the late 20th century. Although parchment never stopped being used (primarily for governmental documents and diplomas) it had ceased to be a primary choice for artist's supports by the end of 15th century Renaissance. This was partly due to its expense and partly due to its unusual working properties. Parchment consists mostly of [collagen](https://en.wikipedia.org/wiki/Collagen). When the water in paint media touches parchment's surface, the collagen melts slightly, forming a raised bed for the paint, a quality highly prized by some artists.

A 1385 copy of the [Sachsenspiegel](https://en.wikipedia.org/wiki/Sachsenspiegel), a German legal code, written on parchment with straps and clasps on the binding

Parchment is also extremely affected by its environment and changes in humidity, which can cause buckling. Books with parchment pages were bound with strong wooden boards and clamped tightly shut by metal (often brass) clasps or leather straps; this acted to keep the pages pressed flat despite humidity changes. Such metal fittings continued to be found on books as decorative features even after the use of paper made them unnecessary.

Some contemporary artists prize the changeability of parchment, noting that the material seems alive and like an active participant in making artwork. To support the needs of the revival of use by artists, a revival in the art of preparing individual skins is also underway. Hand-prepared skins are usually preferred by artists because they are more uniform in surface and have fewer oily spots which can cause long-term cracking of paint than mass-produced parchment, which is usually made for lamp shades, furniture, or other interior design purposes.

The [radiocarbon dating](https://en.wikipedia.org/wiki/Radiocarbon_dating) techniques that are used on papyrus can be applied to parchment as well. They do not date the age of the writing but the preparation of the parchment itself. While it is feasibly possible also to radio carbon date certain kinds of ink, it is extremely difficult to do due to the fact that they are generally present on the text only in trace amounts, and it is hard to get a carbon sample of them without the carbon in the parchment contaminating it.

## Manufacture

Parchment is prepared from pelt – i.e. wet, unhaired, and limed skin – by drying at ordinary temperatures under tension, most commonly on a wooden frame known as a stretching frame.

### Flaying, soaking, and dehairing

After being flayed, the skin is soaked in water for about a day. This removes blood and grime from the skin and prepares it for a dehairing liquor. The dehairing liquor was originally made of rotted, or fermented, vegetable matter, like beer or other liquors, but by the [Middle Ages](https://en.wikipedia.org/wiki/Middle_Ages) an unhairing bath included [lime](https://en.wikipedia.org/wiki/Lime_%28mineral%29). Today, the lime solution is occasionally sharpened by the use of sodium sulfide. The liquor bath would have been in wooden or stone vats and the hides stirred with a long wooden pole to avoid human contact with the [alkaline](https://en.wikipedia.org/wiki/Alkaline) solution. Sometimes the skins would stay in the unhairing bath for eight or more days depending how concentrated and how warm the solution was kept—unhairing could take up to twice as long in winter. The vat was stirred two or three times a day to ensure the solution's deep and uniform penetration. Replacing the lime water bath also sped the process up. However, if the skins were soaked in the liquor too long, they would be weakened and not able to stand the stretching required for parchment.

### Stretching

After soaking in water to make the skins workable, the skins were placed on a stretching frame. A simple frame with nails would work well in stretching the pelts. The skins could be attached by wrapping small, smooth rocks in the skins with rope or leather strips. Both sides would be left open to the air so they could be scraped with a sharp, [semi-lunar knife](https://en.wikipedia.org/wiki/Blade#Patterns_of_knife_blades) to remove the last of the hair and get the skin to the right thickness. The skins, which were made almost entirely of [collagen](https://en.wikipedia.org/wiki/Collagen), would form a natural glue while drying and once taken off the frame they would keep their form. The stretching aligned the fibers to be more nearly parallel to the surface.

## Treatments

*See also:*[*Purple parchment*](https://en.wikipedia.org/wiki/Purple_parchment)

To make the parchment more aesthetically pleasing or more suitable for the [scribes](https://en.wikipedia.org/wiki/Scribe), special treatments were used. According to Reed there were a variety of these treatments. Rubbing [pumice](https://en.wikipedia.org/wiki/Pumice) powder into the flesh side of parchment while it was still wet on the frame was used to make it smooth and to modify the surface to enable inks to penetrate more deeply. Powders and pastes of calcium compounds were also used to help remove grease so the ink would not run. To make the parchment smooth and white, thin pastes (starch grain or staunch grain) of lime, flour, egg whites and milk were rubbed into the skins.

Meliora di Curci in her paper "The History and Technology of Parchment Making" notes that parchment was not always white. "[Cennini](https://en.wikipedia.org/wiki/Cennino_Cennini), a 15th century craftsman provides recipes to tint parchment a variety of colors including purple, indigo, green, red and peach." The Early medieval [Codex Argenteus](https://en.wikipedia.org/wiki/Codex_Argenteus) and [Codex Vercellensis](https://en.wikipedia.org/wiki/Codex_Vercellensis), the [Stockholm Codex Aureus](https://en.wikipedia.org/wiki/Stockholm_Codex_Aureus) and the [Codex Brixianus](https://en.wikipedia.org/wiki/Codex_Brixianus) give a range of luxuriously produced manuscripts all on [purple vellum](https://en.wikipedia.org/wiki/Purple_vellum), in imitation of Byzantine examples, like the [Rossano Gospels](https://en.wikipedia.org/wiki/Rossano_Gospels), [Sinope Gospels](https://en.wikipedia.org/wiki/Sinope_Gospels) and the [Vienna Genesis](https://en.wikipedia.org/wiki/Vienna_Genesis), which at least at one time are believed to have been reserved for Imperial commissions.

Many techniques for [parchment repair](https://en.wikipedia.org/wiki/Parchment_repair) exist, to restore creased, torn, or incomplete parchments.

### Reuse

*Main article:*[*Palimpsest*](https://en.wikipedia.org/wiki/Palimpsest)

During the seventh through the ninth centuries, many earlier parchment manuscripts were scrubbed and scoured to be ready for rewriting, and often the earlier writing can still be read. These recycled parchments are called [palimpsests](https://en.wikipedia.org/wiki/Palimpsest). Later, more thorough techniques of scouring the surface irretrievably lost the earlier text.

## Jewish parchment

A *Sefer*[*Torah*](https://en.wikipedia.org/wiki/Torah), the traditional form of the [Hebrew Bible](https://en.wikipedia.org/wiki/Hebrew_Bible), is a scroll of parchment.

*See also:*[*Gevil*](https://en.wikipedia.org/wiki/Gevil)*,*[*Klaf*](https://en.wikipedia.org/wiki/Klaf)*, and*[*Duchsustus*](https://en.wikipedia.org/wiki/Duchsustus)

The way in which parchment was processed (from hide to parchment) has undergone a tremendous evolution based on time and location. Parchment and vellum are not the sole methods of preparing animal skins for writing. In the [Babylonian Talmud](https://en.wikipedia.org/wiki/Talmud) ([Bava Batra](https://en.wikipedia.org/wiki/Bava_Batra) 14B) Moses writes the first Torah Scroll on the unsplit cow-hide called [*gevil*](https://en.wikipedia.org/wiki/Gevil).

Parchment is still the only medium used by traditional [religious](https://en.wikipedia.org/wiki/Religious) [Jews](https://en.wikipedia.org/wiki/Jews) for [Torah scrolls](https://en.wikipedia.org/wiki/Sefer_Torah) or [tefilin](https://en.wikipedia.org/wiki/Tefilin) and [mezuzahs](https://en.wikipedia.org/wiki/Mezuzah), and is produced by large companies in [Israel](https://en.wikipedia.org/wiki/Israel). For those uses, only hides of [kosher](https://en.wikipedia.org/wiki/Kosher) animals are permitted. Since there are many requirements for it being fit for the religious use, the liming is usually processed under supervision of a qualified [Rabbi](https://en.wikipedia.org/wiki/Rabbi).

## Additional uses of the term

In some universities, the word parchment is still used to refer to the certificate (scroll) presented at graduation ceremonies, even though the modern document is printed on paper or thin card; although doctoral graduands may be given the option of having their scroll written by a calligrapher on vellum. The [University of Notre Dame](https://en.wikipedia.org/wiki/University_of_Notre_Dame) still uses animal parchment for its [diplomas](https://en.wikipedia.org/wiki/Diploma). Similarly, [University of Glasgow](https://en.wikipedia.org/wiki/University_of_Glasgow) and [Heriot-Watt University](https://en.wikipedia.org/wiki/Heriot-Watt_University) use goat skin parchment for their degrees.

### Plant-based parchment

*See also:*[*Parchment paper (baking)*](https://en.wikipedia.org/wiki/Parchment_paper_%28baking%29)

**Vegetable (paper) parchment** is made by passing a waterleaf (an unsized paper like blotters) made of pulp fibers into [sulfuric acid](https://en.wikipedia.org/wiki/Sulfuric_acid). The sulfuric acid hydrolyses and solubilises the main natural organic polymer, cellulose, present in the pulp wood fibers. The paper web is then washed in water, which stops the hydrolysis of the cellulose and causes a kind of cellulose coating to form on the waterleaf. The final paper is dried. This coating is a natural non-porous cement, that gives to the vegetable parchment paper its resistance to grease and its semi-translucency.

Other processes can be used to obtain grease-resistant paper, such as waxing the paper or using [fluorine](https://en.wikipedia.org/wiki/Fluorine)-based chemicals. Highly beating the fibers gives an even more translucent paper with the same grease resistance. Silicone and other coatings may also be applied to the parchment. A [silicone](https://en.wikipedia.org/wiki/Silicone)-coating treatment produces a cross-linked material with high density, stability and heat resistance and low surface tension which imparts good anti-stick or release properties. [Chromium](https://en.wikipedia.org/wiki/Chromium) salts can also be used to impart moderate anti-stick properties.

## Parchment craft

*Main article:*[*Parchment craft*](https://en.wikipedia.org/wiki/Parchment_craft)

Historians believe that parchment craft originated as an art form in Europe during the fifteenth or sixteenth century. Parchment craft at that time occurred principally in Catholic communities, where crafts persons created lace-like items such as devotional pictures and communion cards. The craft developed over time, with new techniques and refinements being added. Until the sixteenth century, parchment craft was a European art form. However, missionaries and other settlers relocated to South America, taking parchment craft with them. As before, the craft appeared largely among the Catholic communities. Often, young girls receiving their first communion received gifts of handmade parchment crafts.

Although the invention of the printing press led to a reduced interest in hand made cards and items, by the eighteenth century, people were regaining interest in detailed handwork. Parchment cards became larger in size and crafters began adding wavy borders and perforations. In the nineteenth century, influenced by French romanticism, parchment crafters began adding floral themes and cherubs and hand embossing.

Parchment craft today involves various techniques, including tracing a pattern with white or colored ink, embossing to create a raised effect, stippling, perforating, coloring and cutting. Parchment craft appears in hand made cards, as scrapbook embellishments, as bookmarks, lampshades, decorative small boxes, wall hangings and more.

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# Codex

From Wikipedia, the free encyclopedia

*This article is about ancient and medieval books. For other uses, see*[*Codex (disambiguation)*](https://en.wikipedia.org/wiki/Codex_%28disambiguation%29)*.*

The [*Codex Gigas*](https://en.wikipedia.org/wiki/Codex_Gigas), 13th century, Bohemia.

A **codex** (from the [Latin](https://en.wikipedia.org/wiki/Latin) *caudex* for "trunk of a tree" or *block of wood*, [*book*](https://en.wikipedia.org/wiki/Book); plural *codices*) is a book constructed of a number of sheets of [paper](https://en.wikipedia.org/wiki/Paper), [vellum](https://en.wikipedia.org/wiki/Vellum), [papyrus](https://en.wikipedia.org/wiki/Papyrus), or similar materials, with hand-written contents. The book is usually bound by stacking the pages and fixing one edge, and using a cover thicker than the sheets. Some codices are continuously folded like a [concertina](https://en.wikipedia.org/wiki/Concertina). The alternative to paged codex format for a long document is the continuous [scroll](https://en.wikipedia.org/wiki/Scroll). Examples of folded codices include the [Maya codices](https://en.wikipedia.org/wiki/Maya_codices). Sometimes people use the term for a book-style format, including modern printed books but excluding folded books.

The [Romans](https://en.wikipedia.org/wiki/Ancient_Rome) developed the form from wooden [writing tablets](https://en.wikipedia.org/wiki/Wax_tablet). The codex's gradual replacement of the [scroll](https://en.wikipedia.org/wiki/Scroll)—the dominant book form in the [ancient world](https://en.wikipedia.org/wiki/Classical_antiquity)—has been called the most important advance in book making before the invention of [printing](https://en.wikipedia.org/wiki/Printing_press). The codex transformed the shape of the book itself, and offered a form that lasted for centuries. The spread of the codex is often associated with the rise of [Christianity](https://en.wikipedia.org/wiki/Christianity), which adopted the format for use with the [Bible](https://en.wikipedia.org/wiki/Bible) early on. First described by the 1st-century AD Roman poet [Martial](https://en.wikipedia.org/wiki/Martial), who praised its convenient use, the codex achieved numerical parity with the scroll around AD 300,[]](https://en.wikipedia.org/wiki/Codex#cite_note-Oxf-5) and had completely replaced it throughout the now Christianized [Greco-Roman world](https://en.wikipedia.org/wiki/Greco-Roman_world) by the 6th century.

## Origins

Codices largely replaced scrolls similar to this.

The codex provides considerable advantages over other book formats:

* Compactness
* Sturdiness
* Economic use of materials by using both sides ([recto and verso](https://en.wikipedia.org/wiki/Recto_and_verso))
* Ease of reference (A codex accommodates [random access](https://en.wikipedia.org/wiki/Random_access), as opposed to a scroll, which uses [sequential access](https://en.wikipedia.org/wiki/Sequential_access).)

The change from rolls to codices roughly coincides with the transition from [papyrus](https://en.wikipedia.org/wiki/Papyrus) to [parchment](https://en.wikipedia.org/wiki/Parchment) as the preferred writing material, but the two developments are unconnected. In fact, any combination of codices and scrolls with papyrus and parchment is technically feasible and common in the historical record.

The codex began to replace the [scroll](https://en.wikipedia.org/wiki/Scroll) almost as soon as it was invented. In [Egypt](https://en.wikipedia.org/wiki/Egypt), by the fifth century, the codex outnumbered the scroll by ten to one based on surviving examples. By the sixth century, the scroll had almost vanished as a medium for literature.

Technically, even modern [paperbacks](https://en.wikipedia.org/wiki/Paperback) are codices, but publishers and scholars reserve the term for [manuscript](https://en.wikipedia.org/wiki/Manuscript) (hand-written) books produced from [Late antiquity](https://en.wikipedia.org/wiki/Late_antiquity) until the Middle. The scholarly study of these manuscripts from the point of view of the [bookbinding](https://en.wikipedia.org/wiki/Bookbinding) craft is called [codicology](https://en.wikipedia.org/wiki/Codicology). The study of ancient documents in general is called [paleography](https://en.wikipedia.org/wiki/Paleography).

## History

Reproduced Roman-style [wax tablet](https://en.wikipedia.org/wiki/Wax_tablet), from which the codex evolved

The [Romans](https://en.wikipedia.org/wiki/Ancient_Rome) used precursors made of reusable [wax-covered tablets of wood](https://en.wikipedia.org/wiki/Wax_tablet) for taking notes and other informal writings. Two ancient [polyptychs](https://en.wikipedia.org/wiki/Polyptych), a *pentatych* and *octotych*, excavated at [Herculaneum](https://en.wikipedia.org/wiki/Herculaneum) used a unique connecting system that presages later sewing on of thongs or cords. [Julius Caesar](https://en.wikipedia.org/wiki/Julius_Caesar) may have been the first Roman to reduce scrolls to bound pages in the form of a note-book, possibly even as a papyrus codex. At the turn of the 1st century AD, a kind of folded parchment notebook called *pugillares membranei* in Latin became commonly used for writing in the [Roman Empire](https://en.wikipedia.org/wiki/Roman_Empire). [Theodore Cressy Skeat](https://en.wikipedia.org/wiki/Theodore_Cressy_Skeat) theorized that this form of notebook was invented in Rome and then spread rapidly to the Near East.

Codices are described in certain works by the [Classical Latin](https://en.wikipedia.org/wiki/Classical_Latin) poet, [Martial](https://en.wikipedia.org/wiki/Martial). He wrote a series of five [couplets](https://en.wikipedia.org/wiki/Couplet) meant to accompany gifts of literature that Romans exchanged during the festival of [Saturnalia](https://en.wikipedia.org/wiki/Saturnalia). Three of these books are specifically described by Martial as being in the form of a codex; the poet praises the compendiousness of the form (as opposed to the scroll), as well the convenience with which such a book can be read on a journey. In another poem by Martial, the poet advertises a new edition of his works, specifically noting that it is printed as a codex, taking less space than a scroll and more comfortable to hold in one hand. According to [Theodore Cressy Skeat](https://en.wikipedia.org/wiki/Theodore_Cressy_Skeat), this might be the first recorded known case of an entire edition of a literary work (not just a single copy) being published in codex form, though it was likely an isolated case and was not a common practice until a much later time.

In his discussion of one of the earliest parchment codices to survive from [Oxyrhynchus](https://en.wikipedia.org/wiki/Oxyrhynchus) in Egypt, Eric Turner seems to challenge Skeat’s notion when stating, “…its mere existence is evidence that this book form had a prehistory”, and that “early experiments with this book form may well have taken place outside of Egypt.” Early codices of parchment or papyrus appear to have been widely used as personal notebooks, for instance in recording copies of letters sent (Cicero *Fam.* 9.26.1). The [parchment](https://en.wikipedia.org/wiki/Parchment) notebook pages were commonly washed or scraped for re-use (called a [palimpsest](https://en.wikipedia.org/wiki/Palimpsest)) and consequently, writings in a codex were often considered informal and impermanent.

As early as the early 2nd century, there is evidence that a codex—usually of [papyrus](https://en.wikipedia.org/wiki/Papyrus)—was the preferred format among [Christians](https://en.wikipedia.org/wiki/Christianity). In the library of the [Villa of the Papyri](https://en.wikipedia.org/wiki/Villa_of_the_Papyri), [Herculaneum](https://en.wikipedia.org/wiki/Herculaneum) (buried in AD 79), all the texts (of Greek literature) are scrolls (see [Herculaneum papyri](https://en.wikipedia.org/wiki/Herculaneum_papyri)). However, in the [Nag Hammadi library](https://en.wikipedia.org/wiki/Nag_Hammadi_library), hidden about AD 390, all texts (Gnostic Christian) are codices. Despite this comparison, a fragment of a non-Christian parchment codex of [Demosthenes](https://en.wikipedia.org/wiki/Demosthenes)' *De Falsa Legatione* from [Oxyrhynchus](https://en.wikipedia.org/wiki/Oxyrhynchus_Papyri) in Egypt demonstrates that the surviving evidence is insufficient to conclude whether Christians played a major or central role in the development of early codices—or if they simply adopted the format to distinguish themselves from [Jews](https://en.wikipedia.org/wiki/Jews).

The earliest surviving fragments from codices come from Egypt, and are variously dated (always tentatively) towards the end of the 1st century or in the first half of the 2nd. This group includes the [Rylands Library Papyrus P52](https://en.wikipedia.org/wiki/Rylands_Library_Papyrus_P52), containing part of St John's Gospel, and perhaps dating from between 125 and 160.

Early medieval bookcase containing about ten codices depicted in the Codex (c. 700)

In [Western culture](https://en.wikipedia.org/wiki/Western_culture#Foundations), the codex gradually replaced the scroll. Between the 4th century, when the codex gained wide acceptance, and the [Carolingian Renaissance](https://en.wikipedia.org/wiki/Carolingian_Renaissance) in the 8th century, many works that were not converted from scroll to codex were lost. The codex improved on the scroll in several ways. It could be opened flat at any page for easier reading, pages could be written on both front and back ([recto and verso](https://en.wikipedia.org/wiki/Recto_and_verso)), and the protection of durable covers made it more compact and easier to transport.

The ancients stored codices with spines facing inward, and not always vertically. The spine could be used for the [incipit](https://en.wikipedia.org/wiki/Incipit), before the concept of a proper title developed in medieval times. Though most early codices were made of [papyrus](https://en.wikipedia.org/wiki/Papyrus), papyrus was fragile and supplies from Egypt, the only place where papyrus grew and was made into paper, became scanty. The more durable [parchment](https://en.wikipedia.org/wiki/Parchment) and [vellum](https://en.wikipedia.org/wiki/Vellum) gained favor, despite the cost.

The codices of [pre-Columbian](https://en.wikipedia.org/wiki/Pre-Columbian) [Mesoamerica](https://en.wikipedia.org/wiki/Mesoamerica) had the same form as the European codex, but were instead made with long folded strips of either fig bark ([amatl](https://en.wikipedia.org/wiki/Amatl)) or plant fibers, often with a layer of [whitewash](https://en.wikipedia.org/wiki/Whitewash) applied before writing. [New World](https://en.wikipedia.org/wiki/New_World) codices were written as late as the 16th century (see [Maya codices](https://en.wikipedia.org/wiki/Maya_codices) and [Aztec codices](https://en.wikipedia.org/wiki/Aztec_codices)). Those written before the Spanish conquests seem all to have been single long sheets folded [concertina](https://en.wikipedia.org/wiki/Concertina)-style, sometimes written on both sides of the local [amatl](https://en.wikipedia.org/wiki/Amatl) paper.

In [East Asia](https://en.wikipedia.org/wiki/East_Asia), the scroll remained standard for far longer than in the [Mediterranean](https://en.wikipedia.org/wiki/Mediterranean) world. There were intermediate stages, such as scrolls folded [concertina](https://en.wikipedia.org/wiki/Concertina)-style and pasted together at the back and books that were printed only on one side of the paper.

[Judaism](https://en.wikipedia.org/wiki/Judaism) still retains the [Torah](https://en.wikipedia.org/wiki/Torah) scroll, at least for ceremonial use.

## From scrolls to codex

Among the experiments of earlier centuries, scrolls were sometimes unrolled horizontally, as a succession of columns. (The [Dead Sea Scrolls](https://en.wikipedia.org/wiki/Dead_Sea_Scrolls) are a famous example of this format.) This made it possible to fold the scroll as an accordion. The next step was then to cut the [folios](https://en.wikipedia.org/wiki/Folio_%28printing%29), sew and glue them at their centers, making it easier to use the papyrus or [vellum](https://en.wikipedia.org/wiki/Vellum) [recto-verso](https://en.wikipedia.org/wiki/Recto_and_verso) as with a modern book. Traditional bookbinders would call one of these assembled, trimmed and bound folios a *codex* to differentiate it from the *case,* which we now know as *hard cover*. Binding the codex was clearly a different procedure from binding the case.

## Preparing a codex

*Further information:*[*Parchment*](https://en.wikipedia.org/wiki/Parchment)

The first stage in creating a codex is to prepare the animal skin. The skin is washed with water and lime, but not together, and it has to soak in the lime for a couple of days. The hair is removed and the skin is dried by attaching it to a frame called a herse. The parchment maker attaches the skin at points around the circumference. The skin attaches to the herse by cords. To prevent tearing, the maker wraps the area of the skin the cord attaches to around a pebble called a pippin. After completing that, the maker uses a crescent shaped knife called a *lunarium* or *lunellum* to clean any surviving hairs. Once the skin completely dries, the maker gives it a deep clean and processes it into sheets. The number of sheets from a piece of skin depends on the size of the skin and the final product dimensions. For example, the average calfskin can provide three and half medium sheets of writing material. This can be doubled when folded into two conjoint leaves, also known as a *bifolium*. Historians have found evidence of manuscripts where the scribe wrote down the medieval instructions now followed by modern membrane makers. Defects can often be found in the membrane, whether from the original animal, human error during the preparation period, or from when the animal was killed. Defects can also appear during the writing process. Unless it is kept in perfect condition, defects can appear later in the manuscript’s life as well.

### Preparation of the pages for writing

Manuscript, [Codex Manesse](https://en.wikipedia.org/wiki/Codex_Manesse). Most manuscripts were ruled with horizontal lines that served as the baselines on which the text was entered.

First the membrane must be prepared. The first step is to set up the quires. The quire is a group of several sheets put together. Raymond Clemens and Timothy Graham point out, in "Introduction to Manuscript Studies", that “the quire was the scribe’s basic writing unit throughout the Middle Ages”. They note “Pricking is the process of making holes in a sheet of parchment (or membrane) in preparation of it ruling. The lines were then made by ruling between the prick marks...The process of entering ruled lines on the page to serve as a guide for entering text. Most manuscripts were ruled with horizontal lines that served as the baselines on which the text was entered and with vertical bounding lines that marked the boundaries of the columns.”

### Forming the quire

From the Carolingian period and all the way up to the Middle Ages, different styles of folding the quire came about. For example, in mainland Europe throughout the Middle Ages, the quire was put into a system in which each side folded on to the same style. The hair side met the hair side and the flesh side to the flesh side. This was not the same style used in the British Isles, where the membrane was folded so that it turned out an eight-leaf quire, with single leaves in the third and sixth positions. The next stage was tacking the quire. Tacking is when the scribe would hold together the leaves in quire with thread. Once threaded together, the scribe would then sew a line of parchment up the “spine” of the manuscript, as to protect the tacking.

## See also

* [Aztec codices](https://en.wikipedia.org/wiki/Aztec_codices)
* [History of books](https://en.wikipedia.org/wiki/History_of_books)
* [List of codices](https://en.wikipedia.org/wiki/List_of_codices)
* [List of florilegia and botanical codices](https://en.wikipedia.org/wiki/List_of_florilegia_and_botanical_codices)
* [List of New Testament papyri](https://en.wikipedia.org/wiki/List_of_New_Testament_papyri)
* [List of New Testament uncials](https://en.wikipedia.org/wiki/List_of_New_Testament_uncials)
* [Maya codices](https://en.wikipedia.org/wiki/Maya_codices)
* [Traditional Chinese bookbinding](https://en.wikipedia.org/wiki/Traditional_Chinese_bookbinding)
* [Volume (bibliography)](https://en.wikipedia.org/wiki/Volume_%28bibliography%29)

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