

**THE HISTORY OF ENGLISH PODCAST
TRANSCRIPTS**

EPISODE 123: A MATERIAL CHANGE

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Welcome to the History of English Podcast – a podcast about the history of the English language. This is Episode 123: A Material Change. In this episode, we’re going to explore an important development that took place in Western Europe in the 1300s. During this period, we have the first signs of a shift in the way scribes compiled their manuscripts. This change wasn’t a new language or a new script. And it wasn’t a new style of writing. It was actually a change in the material that the scribes wrote on. Around this time, we have the first evidence that paper had made its way to England. This new writing material had its ultimate origin in China, and the introduction of paper reflects a more fundamental change that was about to take place. That change was the transition from animal hides like parchment and vellum to a plant-based material like paper. Over the long term, paper proved to be cheaper and could be mass produced, and it provided the key ingredient for the printing press when it arrived in the next century. So the events of this episode laid the groundwork for the printing revolution that took place a couple of generations later. This time, we’ll explore those developments, and we’ll see how this material change impacted the English language

But before we begin, let me remind you that the website for the podcast is historyofenglishpodcast.com. And you can sign up to support the podcast and get bonus episodes and transcripts at Patreon.com/historyofenglish.

Now this time, I want to look at the introduction of paper to western Europe, but I also want to put this topic into a broader context. Up to this point in the podcast, I’ve talked a lot about writing. The evolution of language and the evolution of writing are fundamentally linked. Up until now, most of the documents I’ve discussed were recorded and preserved on animal hides – specifically parchment and vellum. Back in Episode 97, I explored the use of those materials in the Middle Ages. But now, in the mid-1300s, we have evidence that a plant-based material was starting to be used. Of course, that material was paper. And the advent of paper marks a fundamental shift from the use of animal hides to plant-based textiles. So this time, I want to discuss paper, but I also want to explore this more fundamental connection between language and textiles.

So let’s pick up where we left off last time – with the oldest surviving poetry of Geoffrey Chaucer. In the last episode, I noted that at some point during the 1360s, he was one of several writers who worked on an English translation of a French poem called the Romance of the Rose.

The translation survives in three fragments which represents three different parts of the poem. The first fragment represents the first part of the poem, and it is generally believed to have been the work of Chaucer. The other fragments are composed in a different style and are generally thought to be the work of other translators. For example, the second fragment from the middle of the poem has a lot of northern dialect features like the use of the northern ‘th’ pronouns – *they*, *them* and *their* – rather than the southern ‘h’ forms which Chaucer used. The third fragment from near the end of the poem is closer to Chaucer’s style, but modern scholars still think it was the work of a different translator. At any rate, this third fragment contains the following passage:

Sek the book of Seynt Austyn,
Be it in papir or perchemyn,
There as he writ of these worchynges,

In Modern English, it reads:

Seek the book of Saint Augustine
Be it in paper or parchment
There as he wrote of these workings or deeds

I read that passage because it contains one of the first recorded uses of the word *paper* in the English language. And it is specifically used in contrast to parchment. It says to seek out this book, whether written in paper or parchment. Passages like that indicate that paper was starting to be used as an alternative to parchment in the 1360s when the translation was composed.

A few years after this translation, Chaucer composed the Book of the Duchess. That's the poem I discussed in the last episode which was an ode to Duchess Blanche, the late wife of the king's son, John of Gaunt. Last time, I read several passages from that poem. One of those passages describes how the poet had insomnia, but he finally fell asleep while reading a book. When he awoke from his sleep, his chamber was filled with color and light. And the entire text of the Romance of the Rose was written on the walls. So Chaucer once again references that poem which he had translated a few years earlier. Chaucer writes:

And all the walls with colors fine
Were painted, both text and gloss,
Of all of the Romance of the Rose.

That passage is important to this episode because it contains the first use of another common word in English. That word is the word *text*. He wrote that the text of the poem appeared on the walls.

So why is the word *text* important? Well, obviously it can refer to the words set forth in a book or a manuscript. When you read a document, you read the text. And of course, it can also refer to the entire document. A writer might compose a text. And that writer might compose his text on paper which is a textile. And as you might have guessed, the words *text* and *textile* are closely related. They're derived from the same Latin root word.

That original Latin root word was *texere* which meant 'to weave or braid or join.' That literal sense of weaving gave us the word *textile*. It also gave us the related word *texture*. And from a sense of clothing or something woven together, it also gave us the word *text*. In the Middle Ages, the word was extended from the weaving of threads to the weaving of words. The craft of putting words together in a particular way was considered to be similar to the craft of the weaver who spun yarn into cloth. Even today, we might say that a story teller is 'spinning a yarn' as a euphemism for telling a long-winded or far-fetched tale. So that sense of weaving words led to the modern sense of the word *text*.

We also have another common word related to *textile* and *text*, and that's the word *technology*. A text book or treatise that outlined how certain raw materials were turned into a finished product was called a *technology*. That could literally apply to the turning of fibers into textiles, but it could also apply to any industry or craft where raw materials were transformed into an altogether new product. Over time, the word *technology* was extended to the specific mechanical innovations which aided the process. And as we'll see, the story of paper involves a combination of textiles, texts and technological innovations. And all three of those terms are related through both the literal and figurative sense of weaving.

That is what Geoffrey Chaucer was doing when he composed his translation of the Romance of the Rose and his ode to Duchess Blanche. He was weaving words in a particular style and pattern in the same way that a weaver made textiles by literally weaving threads together.

One popular textile made by weavers was linen. It was made from a plant fiber – specifically the plant known as flax. Flax grew throughout Europe and Asia, and its was comprised of long, flexible fibers that extended from its roots all the way through the plant. When extracted, these fibers were several feet in length and they had a hair-like quality. They could be spun into thread which was then woven into the fabric known as linen. Linen is simply flax that has been processed into cloth, and it was one of the most important fabrics of the Middle Ages.

A few episodes back, I talked about the importance of the wool industry in England. Of course, wool was made from the hair of sheep. Well, wool tended to be thick and heavy which was great if you lived in England or other parts of northern Europe which tended to be cold and wet. But in summer months it could be uncomfortable, so people wore linen when it was warmer. Linen was also a soft comfortable fabric, and it absorbed water very well. So people tended to wear linen shirts underneath their heavier outer tunics which were usually made of wool. This use of linen as undergarments produced the word *lining* as in the lining of a coat. It meant the fabric underneath the outer fabric. Again, *lining* comes from the same root as *linen*. And via French, the sense of linen as undergarments or underwear produced the later French word *lingerie*. The pronunciation tends to disguise the connection, but it's right there in the first three letters – L-I-N. All of these words – *linen*, *lining*, and *lingerie* – are derived from the same Latin root word *linum* which meant a flax or linen.

Within Latin, this root word also produced the word *linea* meaning a line or string of linen. We have that root in modern English words like *lineal*, *linear*, and *lineage*. The same root was also borrowed by the early Germanic tribes or the early Anglo-Saxons, and it gave us the word *line* via Old English. But notice that the word *line* takes us right back to that same basic connection between textiles and texts. The word *line* was originally a string or thread like a fishing line or clothes line. Over time, the word evolved from a sense of a thread or line pulled tight, to a straight line, to anything organized in a straight line or row. And that produced a literary sense of the word. A row of letters or words on a page was called a *line* – or *linan* in Old English. Today, we might read a document 'line by line.' If we're looking for a subtle or implied meaning, we might read 'between the lines.' And if you're in a play, you have to memorize your lines. So word pairs like *text* and *textile* and *line* and *linen* illustrate some of the basic connections between language and fabrics. We can 'weave words' and 'spin a yarn' when we tell a story.

And as we develop the narrative, we try not ‘lose the thread’ of the main story. So just as weavers can turn plant fibers into fabric, writers can also turn words into literature. And our language reflects that analogy, but the connection between plants and language is even more fundamental than that.

Let’s consider a tree. What does a tree have to do with the language? Well languages can be organized into family trees, but I’m not talking about that. I’m talking about something much more literal. What do the various parts of a tree have to do with the words we use and the way we use words?

Well words are often organized into a book. And you might remember from an earlier episode that the word **book** is derived from the same root as the word **beech** in a beech tree. In fact, **book** is derived from the early Proto-Germanic word for beech tree. Apparently, those early Germanic speakers carved runes into beech trees or into boards made from beech trees. And the word for the tree became our modern word **book**.

Now today, you might read an old-fashioned book made of paper or you might read a digital book with a tablet. Well, the word **tablet** shows a similar connection to trees. And that connection is more obvious when you consider that **tablet** and **table** are cognate. They’re both derived from the same root word which meant a board or plank. I’ve noted this before, but the Romans also wrote on parts of trees. They took boards and covered them with a thin layer of wax, and then they wrote on the wax with a stylus. A board or plank was called a **tabula** in Latin. So a board used for writing became known as a **tablet**, and a board with legs became known as a **table** – both from that same root word related to trees.

Now the French word for book is **livre**, and it comes from the same Latin root as the word **library** which is a collection of books. Well guess what, both of those words also come from a word that meant part of a tree. The Latin word **liber** meant the inner bark of a tree or a strip of that bark. So again, those strips of tree or tree bark were used for writing, and the word **liber** eventually came to mean a book within Latin. It produced the word **library** which meant a collection of books or a bookseller’s shop. By the way the word **library** is found for the first time in English in the writings of Geoffrey Chaucer. So it also entered the English language around the current point in our overall story in the second half of the 1300s.

Now it appears that the Latin word **liber** meaning the inner bark of a tree, or a strip or peel from a tree, is an old word that goes all the way back to the Indo-Europeans. And many scholars think that that ultimate root word also gave us the word **leaf** via Old English. So if that is true, it means that **leaf** and **library** are cognate.

With respect to **leaf**, it’s obviously a part of a tree, but in Old English it also acquired a meaning related to documents. A page of parchment or vellum was called a **leaf**. And you might still hear the page of an old manuscript referred to as a **leaf**. But that literary sense is more common today as a verb. You might ‘leaf’ through the pages of an old book.

By the way, Latin shows an almost identical development. The old Latin word for a leaf was *folia*. Of course, we have that word today as *foliage*. But it also gave us the word *folio* – also the second part of the word *portfolio*. *Folio* meant a page of parchment or paper. Within English, the word has also come to mean folded paper or a book.

I noted earlier that Romans sometimes used wooden tablets for writing which gave us the word *tablet*. Well, sometimes they put several of those tablets together and tied them at the side. This was an early form of a book, but it was made of wood rather than parchment or paper. Once again, the Romans named this early proto-book after part of a tree. A tree trunk was called a *caudex* in Latin, and since that type of early book was made from wood which came from a tree, they called that type of bound book a *caudex*. And that word passed into English as *codex* – often used to mean a law book. It also gave us the word *code* as in a law code. And an amendment to a legal document like a Will is called a *codicil* from the same root.

So *codex*, *code* and *codicil* all came from a Latin word meaning a tree trunk. But Latin also had another word for a tree trunk, and that was the word *materia*. It meant a tree trunk, and more specifically, it meant the hard inner wood of a tree. By extension, it came to mean the most basic part of something or the thing from which something is made. And that gave us the words *matter* and *material*. And both of those words have a literary sense as well. We might discuss the ‘subject matter’ of a book, and we might compose a document with ‘writing materials.’ *Matter* is first found in English in that old religious guidebook from the early 1200s called the Ancrene Wisse. I discussed that book in an earlier episode. And the word *material* is recorded for the first time in the writings of Geoffrey Chaucer around the current point in our story in the second half of the 1300s.

So in summary, words like *book*, *tablet*, *library*, *leaf*, *folio*, *portfolio*, *codex*, *code*, *codicil*, *matter*, and *material* are all words that have a literary sense and all words derived from parts of a tree. And we sometimes read a ‘line of text’ from a book, and we’ve seen that *line* and *text* are both words related to the weaving of plant fibers – *line* being connected to *linen*, and *text* being connected to *textile*. So hopefully, you can see that many of our words for written documents, and the various parts of written documents, are related to trees and plants. These words point to a basic connection between plants and writing. And that connection is both figurative and literal. We can compare the weaving of words to the weaving of plant fibers, and we can literally use plants as writing materials. And those connections go back to the beginning of writing.

Despite the early use of plants as writing materials, people eventually shifted away from plant-based fibers, and they elected to use animal hides instead. Animal hides were used to make parchment and vellum which were very durable, but also very expensive. Through most of the Middle Ages, parchment and vellum remained the dominant writing materials used in England. But around the current point in our overall story in the 1300s, all of that started to change. Scribes started to return to a plant-based material. That new material was cheaper than parchment, and over the next couple of centuries, it largely replaced parchment. Of course, that plant-based material was paper.

Now paper may have been a new material in England and northern Europe, but it had been around for a long time. In fact, by this point, it had been around for over a thousand years. So paper actually has a long history, and to find the ultimate source of paper, we have to go all the way back to ancient China.

According to Chinese legend, a man named Ts'ai Lun first discovered how to make paper in the early part of the second century. Supposedly, he noticed some rotting rags and tree bark floating on water. He retrieved the scraps with a screen and then let the material dry in the sun. As it dried, the fibers fused together, and it turned in a thin flexible material. This man Ts'ai Lun was a member of the Chinese royal court, so he wrote down how to make this material in a report. And that report is the origin of this legend. It's a good story, and Ts'ai Lun apparently did know how to make paper, but archaeologists have discovered paper fragments in Chinese tombs that are a couple of centuries older than Ts'ai Lun's report. So it seems likely that he took an existing technology and just documented it for the first time. And that report led to the legend that he was the one who actually discovered how to make paper.

The process of making paper was actually pretty simple. You began with plant fibers. The Chinese typically used the fibers of the mulberry tree, but it was often mixed with flax or other fibers as well. These fibers were beaten and mashed so that they broke down completely. The fibers were then mixed with water to create a thick milky pulp. The pulp was then poured into a mold with wire mesh on the bottom. That wire mesh allowed a lot of the water in the pulp to drain out. And that left a thin layer of wet pulp on top of the mesh. That layer of pulp was then pressed to squeeze out much of the remaining water. That left a thin sheet of partially dried pulp which was then hung up to finish drying out. The resulting material was paper.

Paper is considered to be one of the four great inventions of ancient China. The other inventions were the magnetic compass, gunpowder and moveable type used for printing – all of which I've mentioned in earlier episodes. Of course, moveable type and paper are fundamentally connected. But that connection was never fully exploited by the Chinese. The full potential of moveable type combined with paper wasn't realized until Joannes Gutenberg invented his printing press in the 1400s.

For the Chinese, paper wasn't just a writing material. It was a multi-purpose material. It was used for lots of things like wrapping paper, kites, fans, lanterns, playing cards, and even toilet paper which was another Chinese innovation. In the 800s, they also started using it for money.

[SOURCE: *'Cathedral, Forge and Waterwheel,' Giles*]

It appears that there was a shortage of metals like copper and gold, so they looked for another type of currency. Since notes and IOUs were written down on paper and passed back and forth between merchants, the government took this idea and started issuing paper currency. And the Mongols embraced the idea when they conquered China. In an earlier episode, we saw that Marco Polo was fascinated by the use of paper money during his travels in China in the 1200s.

Now over time, paper made its way to the West, but whereas the Chinese used paper for a lot of different purposes, the people to the west of China were mainly interested in writing on it.

The next stop for paper was the Arab world. In the mid-700s, Chinese forces and Muslim forces encountered each other along the Silk Road at the city of Samarkand in modern-day Uzbekistan. This contact soon led to a military confrontation between the two sides. In the year 751, the two sides fought a great battle, and the Muslim army emerged victorious. In the process, they took several Chinese prisoners. According to legend, two of the prisoners were paper-makers, and the Muslim captors offered to release the two men if they agreed to explain how paper was made. Supposedly, the men agreed, and the Arab world acquired the ability to make paper through this event. Again, this is the legend. And whether or not the Arabs actually learned to make paper from two prisoners-of-war, they definitely acquired the knowledge around this time. A few decades later in the year 794, the first paper mill in the Arab world was established in Baghdad.

This first paper mill corresponded with the beginning of that scholarly movement in the Near East which I discussed back in Episode 90. It was a period when the Arab World was starting to emerge as a major academic center. A lot of ancient Greek manuscripts were being translated into Arabic and preserved. A lot of Greek literature was discovered in Europe via these Arabic translations. It was also a place where mathematical innovations were taking place. Words like *algorithm* and *algebra* have their roots in the Arab world during this period. Also, the massive Muslim empire which extended from the Near East across north Africa and the Mediterranean required a large bureaucracy and extensive record-keeping. So there was a great demand for a cheap and abundant writing material. So paper was embraced and became somewhat common in the Arab world during this period.

Now I said that paper gradually replaced the alternatives. So what were the alternatives? Well, in the early Middle Ages, the alternatives were parchment and vellum just like in Europe. But again, parchment and vellum tended to be quite expensive. There was also another alternative which was one of the most common writing materials throughout the Mediterranean. And like paper, it was also made from plants. That material was papyrus. And it had been a common writing material in the Near East for centuries, and it was still being used when paper was introduced from China. So let's look a little closer at papyrus.

Papyrus is the name of both the writing material and the plant from which it is made. The plant is a reed-like plant, and it was once common throughout the Mediterranean. The key part of the plant was the stalk. The stalk was made up a series of inner layers which could be peeled apart sort of like the layers of an onion. To make the writing material, these stalks were cut – and the layers inside were peeled or sliced into thin strips. The strips were laid side by side vertically on a flat surface. A second layer of strips was then placed on top horizontally. Then another vertical layer on top of that, and another horizontal layer, and so on. So the strips were not actually woven together. They were just laid on top of each other in a criss-cross pattern. The sap from the freshly cut papyrus actually served as a glue binding the layers together. Sometimes an additional glue or binding agent was added. When the layers were thick enough, they were pressed and left to dry. As the material dried, the layers would bind together and form a flat material that could be used for writing. When finished, it was typically rolled into scrolls. And those papyrus scrolls were the primary writing material used by many ancient people of the Near East. In fact, it was so common in ancient Greece and Rome that the language of both cultures had several words for papyrus. And not surprisingly, many of those words have filtered into

Modern English. We use those words all the time without realizing that they ultimately meant papyrus.

For example, the Romans called a strip of papyrus *scheda*. It was derived from an old Greek word that meant ‘to split.’ After paper was introduced, the word *scheda* came to refer to a piece of paper, and it started to acquire the sense of an additional page added to a document with supplemental information. English later borrowed that word as *schedule* – or /shed-ule/ – depending on your pronunciation. We still have that original sense when we attach a separate page as an appendix or exhibit to the back of another document. We might do that with a tax form, or a legal document, or some other technical document. We might label it ‘Schedule A’ or ‘Schedule B.’ Well, that was the sense that the word had in Late Latin. It wasn’t until the 1800s that the word came to mean a time-table or specific plan of events that was written down. The word was first borrowed into English in the late 1300s, and when it first appeared, it was still used in the sense of a scroll of parchment or a piece of paper.

By the way, I discussed the alternate pronunciations of that word back in Episode 51. In case you forgot, the word was apparently pronounced as /sed-ule/ throughout Middle English and early Modern English. It was originally spelled S-E-D-U-L-E or C-E-D-U-L-E, but it was one of those words where later scholars changed the spelling to reflect the original Latin spelling. So in the 1500s, it started to be spelled with its modern S-C-H at the beginning. And that spelling change apparently led to the confusion in pronunciation with American English going with /sked-ule/ and British English preferring /shed-ule/. But again, regardless of pronunciation, the word originally meant a strip of papyrus.

Another common word for a strip or layer of papyrus was the Greek word *khartes*. We’ve actually seen this word before. It was borrowed into Latin as *carta* where it continued to mean a piece of papyrus. It later came to refer to any type of formal document. That is the sense we have in the term Magna Carta. The word then passed through French into English as *charter* and as *card*. *Card* originally meant a playing card, but later came to mean any kind of thick or stiff paper. We also have that sense in the word *cardboard*. It also gave us the word *carton* meaning a container made from thick paper or pasteboard. By the way, *carton* also gave us the word *cartoon* which was originally a drawing made on thick paper.

The Latin word *carta* produced the French word *carte*, and that word has several related meanings in Modern French. One of those meanings is a menu which has been borrowed into English in the phrase ‘a la carte.’ It also exists in English as the phrase *carte blanche* which literally means ‘white paper.’ Last time, we looked at Geoffrey Chaucer’s poem about Duchess Blanche, and he gave her the name ‘White’ in the poem because ‘white’ was the literal translation of Blanche. Well in the phrase *carte blanche*, we have the same word, and that’s why it translates as ‘white paper.’ If we give someone *carte blanche*, we give them free rein to do as they please. So what does white paper have to do with free rein? Well, the French word *blanche* also gave us the word *blank*, and that’s probably a more accurate translation. *Carte blanche* is literally a ‘card blank’ – or a ‘blank card’ – or a blank piece of paper. It referred to an authorization that was signed at the bottom, but the details were left blank. And the person who received the authorization or blank document was allowed to fill in his or her own terms. So the

recipient effectively had permission to do as he or she pleased. We have that same sense in the English phrase ‘blank check.’ If you give someone a blank check, they can write in any amount they choose, and it came to mean a free pass. So *carte blanche* is the same idea, and it’s another term derived from the French word for paper, and ultimately from the Latin and Greek word for papyrus.

Also, in earlier centuries, guns fired bullets using a specific amount of gunpowder wrapped in paper. And that gave us the word *cartridge* which originally meant a gun cartridge, but today the word has a much broader sense as a small container

Again, these are all common English terms derived from a Latin and Greek word that originally referred to a strip of papyrus.

Now much of the papyrus used throughout the Mediterranean was exported from the ancient Phoenician port of Byblos. And over time, the name of the city also became synonymous with papyrus, so much so that the Greeks sometimes referred to papyrus as *biblion* from that city name. From the original sense of papyrus, the word *biblion* came to mean a document or book made from papyrus, and then it came to mean any type of book. *Biblion* ultimately gave us the word *Bible*. And it passed through Latin and French and gave us the word *bibliography* which is a list of books or resources. The word also produced the French word *bibliothèque* and the Spanish word *biblioteca* meaning a library or collection of books. Of course, English uses the word *library* which as I noted earlier comes from a word meaning the inner bark of a tree. So *library*, *bibliothèque* and *biblioteca* all have the same meaning, as well as similar origins as words for plants.

Another Greek word for papyrus was the word *papyrus*. It comes from Greek and apparently has its ultimate origins within the ancient Egyptian language. As I noted earlier, the word referred to both the plant and the writing material made from the plant. It was borrowed into Latin, and within Late Latin, it came to mean any kind of writing material made from plants – not just papyrus, but any plant. And then the word passed into French, where it became *papier*, and then it passed into English as *paper*. So the word *paper* itself is ultimately derived from *papyrus*. And as I noted at the beginning of the episode, it first appeared in English in the mid-1300s, and Geoffrey Chaucer was one of the first English writers to use the word in his poems.

So over time, paper replaced papyrus, both as a writing material and as a common word to refer to writing materials made from plants. And that process really began when the Chinese introduced paper to the Arab world in the 700s. But if the Arabs already had papyrus, why were they so curious about paper? And why were they so quick to embrace it? Well, the answer lies in the way papyrus was made.

As it turns out, even though papyrus plants grew throughout the Mediterranean, not all papyrus could be used to make the writing material. It took papyrus with a very thick reed so that the layers were firm enough to be pressed together to make a writing material. And the main place where that type of thick papyrus grew was along the Nile. That meant that Egypt had a virtual monopoly on the production and export of the writing material. And the limited supply,

combined with the fact that one particular region controlled the price, meant that papyrus tended to be expensive – if you could get it. There was only so much papyrus that could be made from the reeds that grew along the Nile. So the demand was high and the supply was always limited, and those two factors guaranteed high prices. So that’s why the Arab world was looking for a cheaper alternative. Parchment was also used in the Arab world, but again, it was expensive. And that’s why the Arabs were so intrigued by paper. Paper was cheaper. It wasn’t necessarily cheap at this point, but it was cheap enough to compete with papyrus and parchment. And paper could be made from plants other than papyrus. So paper broke the monopoly of the Egyptian papyrus makers. [SOURCE: ‘Paper: Paging Through History,’ Mark Kurlansky]

Interestingly, the Arab paper makers didn’t just look for local plants other than papyrus. They actually came up with another innovation. Chinese paper relied heavily on the bark of the mulberry tree which was common in the Far East, but those trees didn’t grow in the Arab world. So Arab paper makers had to look elsewhere. And the innovation they developed became the standard way to make paper in the western world until the 1800s. Rather than using raw plant fibers, they actually used old rags. Now today, we think of paper as coming from trees, but that didn’t become common until the 1800s. So that’s actually a recent innovation. Until then, the Arab world – and later Europe – primarily used old rags. [SOURCE: ‘The Written Word,’ Martin Puchner]

The rags were soaked and beaten until the fibers completely broke down. Those fibers turned into pulp which was then strained and pressed and hung out to dry. The reason why rags were preferred over raw materials is because cloth fibers had already been processed. The fibers had already been partially broken down when they were turned into thread. So old rags tended to rot and deteriorate very quickly.

This process allowed the Arab world to produce a type of paper that was relatively cheap and abundant. The shift to paper was further encouraged by Arab political leaders who insisted on the use of paper in government offices. When ink was placed on paper, it soaked into the paper and became permanent. On parchment, the ink could be scraped off and the writing changed. So paper actually discouraged fraud, and that’s why political leaders preferred paper for many tax and legal documents. [SOURCES: ‘On Paper,’ Nicholas Basbanes; ‘The Arabs in History,’ Bernard Lewis, p. 94]

Now Arab scribes didn’t completely abandon parchment. They still used animal hides for important books and manuscripts like the Quran, but by the year 1000, even the Quran was being written on paper.

The importance of paper in the Arab world is still reflected in the word *ream* – R-E-A-M. It means a bundle of paper, and it is the basic unit used for the bundling and sale of paper. Today, it generally means 500 sheets of paper. The word *ream* is an Arabic word which can be traced back to the Mediterranean paper trade in the Middle Ages.

Now, like so many other things we've explored in the podcast, paper eventually found its way to southern Europe. Remember that much of Spain was also under Muslim rule during this earlier period. So a lot of these products and innovations entered Europe via Spain. And that's what happened with paper as well.

Paper apparently reached Spain by the 11th century. The first paper mills in Europe were built there. In fact, the first reference to a paper mill in the region is one constructed on the east coast of Spain in the year 1056. [SOURCE: 'On Paper,' Nicholas Basbanes]

A short time later, the paper industry spread to Sicily and southern Italy. From there it spread to the central Italian city of Fabriano which became a major center of paper production in the 1200s. The local craftsmen shifted from the manufacture of clothing to the production of paper. And their paper was of such high quality that it rivaled some of the parchment being used at time. The paper mills of Fabriano used water power to operate a drop hammer which helped to create the pulp needed for the paper, and that process allowed them to produce a very high quality paper at a relatively low price. It was cheaper than imported paper from the Arab world and far cheaper than the parchment used throughout Europe. [SOURCE: 'Paper: Paging Through History,' Mark Kurlansky] So paper now had both a foothold and a competitive advantage in southern Europe.

The paper-makers of Fabriano also came up with another innovation – the watermark. Remember that the pulp was poured into a mold with screen on the bottom to let the water drain out. Well, in Fabriano, they took a piece of wire and formed a specific design with it and then laid it over the mold. That wire left an imprint or mark on the pulp as it dried. And thus, that imprint came to be known as the watermark. The watermark usually indicated where the paper was made, and it was visible when the paper was held up to the light. It was an early case of commercial branding – a type of early trademark. Those marks were being incorporated into the paper of Fabriano from around the year 1276. [SOURCE: 'Paper: Paging Through History,' Mark Kurlansky] And to this day, Fabriano is still well-known for the high quality paper produced in the city.

From Italy, paper production spread northward into the heart of western Europe. In those regions, scribes had come to rely almost exclusively on parchment and vellum. As paper was introduced, many people apparently thought of it as a type of papyrus since it was made from plant fibers. They didn't really appreciate the distinctions between papyrus and paper, and apparently that's how the word *papyrus* evolved into the word *paper* within the languages of western Europe.

It's amazing that it took about five centuries for paper to make its way from the Arab world to northern Europe. At a time when so many innovations from the Near East were reaching Europe through trade and through contact during the Crusades, it seems like paper would have been embraced much sooner. But there were a couple of factors which made Europeans reluctant to switch to paper.

First, scribes, and book makers, and book buyers were concerned about the durability of paper, especially compared to parchment. It was still a common belief that an important and valuable

document needed to be written on parchment so that it would last for a long time. I mean, if you were going to spend a lot of money on a book – maybe the only book you owned – you wanted it to last as long as possible, hopefully for your lifetime and a long time thereafter. And it was thought that paper would break down very quickly. But as people became more familiar with paper, and as production techniques improved, they realized that paper could be an effective alternative to parchment. Paper might not have been as durable as parchment, but it was durable enough. It wasn't going to just crumble and fall apart as many people had feared.

The other reason why paper was slow to enter northern Europe is because it was still being made with rags, and there were only so many rags available at the time. That limited how much paper could be made, and the limited supply tended to keep the price up. So there wasn't a clear economic benefit to paper at first.

In order for Europeans to fully embrace paper, something had to happen make the price of paper so cheap that scribes and book-makers couldn't afford to ignore it. And that something was a sudden increase in linen production around the same time that paper was introduced to Europe. All of that new linen meant there were lots of rags lying around. And those rags gave those paper mills the raw material they needed to produce lots of paper – lots of cheap paper. So why was there a sudden increase in linen cloth and rags?

Well, the answer was a new technology. Actually, two new technologies. The first was a new type of loom. Prior to the 1100s, the loom used in Europe was vertical and weaving was a tedious process. The vertical loom consisted of a frame that stood upright. Lines of string hung down vertically, and the weaver passed a new line of thread horizontally back and forth through those vertical strings using an alternating pattern. So the weaver would go over one vertical string, then under the next. Over, under, over, under, all the way to the end. It was tedious and time-consuming. Then at some point in earlier centuries, someone had invented a horizontal bar that was tied to every other vertical string. That bar could be pulled forward and pushed backward to raise and lower every other vertical string. That made it easier to weave the horizontal thread through, but it was still slow and tedious.

Then in the 1100s and 1200s, a new loom appeared. This was a horizontal loom that resembled a table. It probably had its ultimate origins in China where it had been used in making silk. But in Europe, it was applied to native fabrics. In this new horizontal loom, the strings were stretched from the near side of the loom where the weaver sat to the far side of the loom on the other side. And every other one of those strings was raised and lowered just like with the old vertical loom, but in this case, the bars that raised and lowered the strings were controlled by foot pedals. So sitting down, the weaver could raise the even numbered strings by pressing the left pedal. He could then pass the thread through the gap from one side to the other using a shuttle. The shuttle was a weight that the thread was tied to, and since both hands were now free, the weaver just tossed the shuttle from left to right through the gap created when the even-numbered strings were raised. Then the weaver pressed the right pedal which raised the odd-numbered strings. He then passed the shuttle back through the gap in the opposite direction from right to left. And you can start to see how quickly the process worked with this new loom. Press the left pedal, toss the shuttle one way. Press the right pedal, toss the shuttle the other way. Left foot, right foot. Passing

the shuttle and thread back and forth from one hand to the next. Over and over again. Using this process, an entire sheet of linen cloth could be produced in no time.

In fact, it was so efficient that the spinners and spinsters who made the thread couldn't keep up. They could barely produce enough thread or yarn to satisfy the demands of the weavers with new horizontal loom. But that problem was solved with the second technological advance which I mentioned in that earlier episode about the wool industry. That new device was the spinning wheel. It made it much easier to produce thread and yarn from raw fibers. So the spinning wheel increased the production of thread, and the horizontal loom turned that thread into linen quicker and more efficiently than ever before. The two inventions were the perfect complement to each other. And during the 1200s and 1300s, they allowed for a major increase in the production of woven fabrics. Estimates suggest that there was a ten-fold increase in cloth production in Europe as a result of the horizontal loom and the spinning wheel. [SOURCE: 'Connections,' James Burke, p. 94]

Now this cloth included linen, and linen was in very high demand. It was comfortable and relatively cheap – especially with the increase in production. So people started to buy linen in large quantities, not only for clothing, but also for other products like bed sheets, table cloths, towels, veils, and so on.

It also became common during this period for people to wear linen underwear. Underwear as we know it today started to become common. I noted earlier that the word *lingerie* is derived from the word *linen*. And we also have another word which can be traced back to medieval linen cloth. That word entered English around the current point in our story in the mid-1300s. During that period, you might have heard a linen tablecloth referred to as a *diaper*. The word *diaper* in the sense of a linen cloth is first recorded in English around the year 1350. The word was borrowed from French, and it referred to a type of linen cloth made with a specific weave or pattern. It happened to be soft and absorbent, and by the 1600s, it was being used as underwear for babies which is of course the modern sense of the word *diaper* – especially in North America.

Now I've talked a lot about linen, but linen wasn't the only fabric made from plants. Europeans also made fabric and textiles from hemp.

Now today, you may associate hemp with cannabis or marijuana. And in fact, all three terms can refer to the same type of plant, but there are actually different types of cannabis. Some are high in THC which is the narcotic that gets people high. Others are very low in THC, and that is the type that was commonly used to make fabrics. This plant was known as *hemp* in Old English. It was actually similar to flax in that it produced long strands of fiber which were ideal for weaving, but it tended to produce a much coarser fabric than linen. Because it was coarse, it tended to be used for things like rope and twine.

As I noted, *hemp* is an Old English word. The original Old English version was *hænap*. Now this word is an ancient word found throughout the Germanic languages. And as we know, the Germanic languages are distinguished from the other Indo-European languages by the sound shifts known as Grimm's Law. We covered those changes early on the podcast series, and two of

those changes are at work in the word *haenap*. The Germanic ‘h’ sound evolved out of an older Indo-European ‘k’ sound. And the Germanic ‘p’ sound evolved out of an older Indo-European ‘b’ sound. So if we apply those two sound changes in reverse, that would convert *haenap* into *caenab*. And of course, we have that word *cannabis* from the same root. *Cannabis* was the Greek and Latin version of the word, and it was borrowed into English in the 1600s. So *hemp* and *cannabis* are cognate.

Now even though the word *cannabis* was borrowed in the 1600s, English already had a version of the word which had been borrowed at an earlier date. That earlier version of the word *cannabis* had passed through French, and the ‘b’ sound in the middle had shifted to a ‘v’ sound which was a common sound change within early French. So *cannabis* became *canevaz*. And in the 1200s, English borrowed that word as *canvas*. And of course, *canvas* still refers to a sturdy or coarse cloth. So believe it or not, *canvas* is just a variation of the word *cannabis*, and both words are also cognate with *hemp*. All three words are derived from the same root word.

Now given that Greek had this word and the Proto-Germanic language had this word, you might assume that the word can be traced back to the original Indo-Europeans. But most scholars think that both the Greeks in the south of Europe and the pre-Germanic tribes in north of Europe both borrowed the same root word from a nomadic people who lived in the Eurasian steppe region called the Scythians. They lived in the same general region as the original Indo-Europeans north of the Black Sea and Caspian Sea, and they had a very similar nomadic culture, but the Scythians lived in the first millenium BC, so more than a thousand years after the original Indo-Europeans.

One of the reasons why scholars think the word was borrowed from the Scythians is because the Scythians apparently encountered that form of cannabis that was high in THC somewhere in south-central Asia. That is the variety that is known today a marijuana. And they apparently realized that it could get you high. In fact, The ancient Greek historian Herodotus spent time with the Scythians, and he wrote about them placing cannabis on hot coals inside of a tent. He wrote that they breathed in the smoke and they would laugh and have good time while doing so. It seems that the Scythians introduced this variety of cannabis to western Europe. And it also seems that they called it something like **canab* which was borrowed by both the pre-Germanic tribes and the Greeks. It also passed into other languages of central and eastern Europe. It isn’t clear if the Scythians coined this word or acquired it from somewhere else, but one theory is that they borrowed the word from the Assyrian language in Mesopotamia because the Semitic languages have a very similar word which may be derived from the same root.

At any rate, whatever the ultimate source of the word, it gave us the modern words *hemp*, *cannabis* and *canvas*.

As I noted, hemp was popular for things like rope. It also produced a coarse fabric like canvas. Since it tended to be coarse, people didn’t wear much pure hemp. But hemp fibers could be combined with flax fibers when making linen. So linen was often a combination of both of these materials.

So now, let's put all these pieces together. We have hemp and flax which were both grown throughout western Europe. And both of those plants had long fibers which were ideally suited for making textiles. The spinning wheel appeared and made it much easier to turn those fibers into thread. And the horizontal loom appeared which made it much easier to turn that thread into cloth – like linen. And that increase in linen production meant that it became cheaper for people to buy linen. And linen was thin, comfortable and versatile, so people consumed a lot of it. And when it wore out, they threw it away. And voila! By the 1300s, there were linen rags and scraps everywhere. And all of those rags fueled the new paper industry that was starting to be introduced into central and northern Europe.

Those new paper mills became one of the first major recycling industries. Old rags were turned into paper, and that meant that paper was suddenly abundant – and cheap. In fact, paper production increased so much in Europe that Europeans were soon exporting paper back to the Arab world where they had originally learned how to make it.

All of this was dependent on the collection of those rags. And that also led to a new occupation – the rag collector. It had been common for centuries for people to travel door to door collecting certain scrap materials, usually bones which were ground into fertilizer. But now those scrappers started to collect linen rags as well. Over time, they became known as 'rag and bone collectors' or 'rag and bone men.' By the 1800s, that term was being used to describe someone who collects old clothes and then resells them. And it's still used today.

Another term used for these rag collectors in 1300s was *raggeman* – literally 'rag man.' It first appeared as an occupational surname in the late 1200s. In the mid-1300s, a variation of that term appeared – *ragamuffin*. Again it first appeared as a surname. It isn't clear where the '-muffin' part came from at the end or what it originally meant. It may have been an Anglicized version of a French word that mean a scoundrel or demon. At any rate, *raggamuffin* eventually came to mean a boy who was ragged, dirty or disreputable.

A much later term for a rag collector was the word *guttersnipe*. It first appeared in the 1800s, and it referred to a person who gathered rags and papers from gutters.

Again, these rag collectors were early recyclers. They gathered old rags and linens and sold them to the paper mills that were starting to pop up around western Europe.

During the 1300s, paper mills spread across continental Europe. By the late 1300s, paper mills had spread northward to France, Austria, Germany and Flanders – but not England. The first paper mill appeared in England in the middle of the next century.[*SOURCE: 'On Paper,' Nicholas Basbanes*] So at the current point in our overall story in the late 1300s, the rags that were being collected around England were being exported to paper mills across the Channel to be turned into paper. And then the paper produced on the continent was being imported into England to be used by scribes and bookmakers.

The oldest surviving paper document in England is a record book maintained in a local registry in the town of King's Lynn on the eastern coast of England. It's called the King's Lynn Red Register, and it was compiled in the year 1307. Presumably, the town had access to paper because it was a seaport, and some early paper was starting to arrive on ships from across the Channel in the early 1300s. It's fascinating that such a small local registry was keeping records with paper at that early date. The people who made that decision were definitely ahead of their time.

Even though paper was introduced to England in the 1300s, most scribes continued to use parchment and vellum. But over time, economic forces encouraged the shift to paper. By the early 1300s, paper was already six times cheaper than parchment in northern Italy. [*SOURCES: 'CONNECTIONS,' James Burke (p. 100-101); 'ON PAPER,' Basbanes, p. 63*] And it continued to get cheaper across Europe over time.

Since paper became more and more affordable, you might think that the common people across Europe could suddenly afford to buy cheap books, but that wasn't really the case. There was still one more barrier that had to be overcome for books to reach the masses, and that barrier was the cost of the labor to produce the books. It still took scribes to copy the books. There had always been a limited supply of educated scribes who could do that, and the Black Death made that problem even worse. So just as peasants were able to demand higher wages on the farm after the plague, the same was true for scribes. And that kept the price of books high even though paper was relatively cheap.

That problem wasn't solved until the scribes were replaced by machines – in other words, until automation arrived and allowed book-makers to produce books with few if any scribes at all. That type of automation arrived in the next century when Joannes Gutenberg introduced his printing press. And that final piece of technology is really the key to this story.

Paper was an important innovation. But paper alone didn't cause a revolution in book-making or record-keeping. That revolution had to wait a few more decades for the printing press to appear. The printing press gets most of the credit for the printing revolution that followed. But to be fair, the full impact of the printing press would never have been realized without cheap, abundant paper. We should really put those two innovations together.

And in fact, just as paper enabled the printing press to flourish, the printing press also allowed paper to flourish. As people demanded cheaper books produced with the press, that meant that there was a corresponding increase in the demand for paper. And paper finally reached its full potential in the 1500s and 1600s. It soon replaced parchment for most printing purposes. Some permanent records and manuscripts continued to use parchment, but by the end of the 1600s, paper was the most common writing material in western Europe. [*SOURCE: 'In the Beginning,' Alister McGrath*]

The combination of cheap paper and automated printing brought books to the masses. For the first time, many people could afford to buy their own books because books were relatively cheap. They were no longer luxury items possessed by the upper classes. The spread of books – and the spread of the knowledge contained in those books – changed European civilization.

We'll cover those developments in much more detail when we get to the printing press itself. But for now, it's worth noting how these developments impacted the English language. First, with many commoners able to buy books for the first time, they wanted books in their own language – not Latin or French. So that encouraged the production of books in English. And by the same token, for authors who wanted to compose their works in English, there was now a built-in audience willing and able to consume it. So that encouraged writers to use English rather than Latin or French. And these factors also led to the mass translation of Latin and French manuscripts into English. And as I've noted before, these developments also served to standardize English since most books printed in England were printed in London in the local dialect of London. So that became the accepted standard for the language in early Modern English. And of course, the printing press and paper combination also helped to standardize English spellings as printers adopted certain spellings to ensure consistency among their publications.

So paper, in combination with the printing press, had a tremendous impact on the evolution of English. In fact, that combination, combined with the Great Vowel Shift, are the two major events that mark the transition from Middle English to Modern English.

Despite the overall impact of paper and the printing press, there was still one problem that required a more permanent solution. And that was the supply of rags used to make all that paper. There was such a high demand for old linen rags that people were discouraged from throwing them away. Laws were passed that banned the use of linen for burial garments. That way the linen was preserved so that it could be used at a later date for paper.

Even as late as the early 1800s, a paper maker in Massachusetts used as its watermark the words "Save Rags." But then, in the mid-1800s, paper makers figured out how to make paper using wood pulp obtained from trees. And that was the innovation that eliminated the supply problems associated with rags. And it also led to the modern paper industry.

And interestingly, that development also takes us back to where we began – with the connection between trees and books. As we saw earlier, words like *book*, *library*, *codex*, *code*, *material* are all derived from words that originally referred to part of a tree. And that circle was completed in the mid-1800s when wood pulp ensured that most modern books were once again made from trees.

I'm going to conclude this episode on that note. I hope you've enjoyed this look at the history of paper and the way paper has impacted the English language. Next time, we'll continue our story as we move deeper into the period of Middle English. Over the next few episodes, we'll explore many of the great works of this period like *Piers Plowman*, John Wyclif's English Bible, *Sir Gawain and the Green Knight*, and more of the great works of Geoffrey Chaucer.

So until then, thanks for listening to the History of English Podcast.