

Chronology of Papermaking Technology

Adapted from T. Collings and D. Milner. *The Paper Conservator*. vol. 14 1990

BC		1282	Earliest Western watermarks produced at Fabriano consisting of simple crosses and circles sewn onto the mould surface.
3000	Use of papyrus as a writing material especially in Egypt.		
2200	Egyptian papyrus industry well established.	1285	Introduction of the Fleur d’Lys watermark.
500	Bamboo strips bark paper and palm leaves used as writing material in China.	1322	Possible date for start of papermaking in Holland.
200	Parchment perfected as writing material at Pergamum, Asia Minor, Kusadasi.	1326/38	First manufacture of paper in France.
140-AD23	Early papers found in China made from hemp.	1390	First paper mill in Germany.
AD		1400	Most Western and near Eastern papers made from linen and hemp.
105	Ts’ ai-Lun perfects the process of manufacture of paper for use for writing and drawing. May have used Tapa, a textile made from paper mulberry fiber (kozo) as the source for papermaking.	1494	First paper mill in England.
450	Chinese paper made from hemp, paper mulberry, and ramie fiber with starch sizing and gypsum surface treatment.	1550	Use of smalt (blue ground glass) to produce blue paper.
600	Papermaking spreads into Korea.	1650	Possible date for the invention of the Hollander beater.
6/700	Paper made by the Arabs	1690	First paper mill in North America (Germantown, PA).
610	Japanese start papermaking.	1750	“India” paper made from bamboo and/or rice straw fiber imported to Europe from China.
784/95	Papermaking in Damascus and Baghdad.	1756	Wove paper first introduced in Europe by James Whatman for John Baskerville
800	Paper gradually replacing papyrus as the major writing support in Africa.	1780	China clay loadings in general use
900	Probable date for the first use of stampers by Chinese and Arabs.	1793	Invention of the cotton gin, which made cotton rags common.
1000	Paper appears in Spain made from linen and hemp rags. Starch sizing. Papyrus use declines.	1798	First patent for a papermaking machine by Nicholas Louis Robert in France.
1268-76	Papermaking in Italy at Fabriano. Made from rags with animal glue sizing.	1800	Possible date for the improvement in wire mould design eliminating pulp build-up around chain lines.
		1803	First practical papermaking machine, financed by Fourdrinier brothers.

- 1807 Alum rosin sizing developed in Germany.
- 1825 Dandy roll patented, to make machine made chain/laid lines.
- 1830 Alum-rosin sizing in general use in Europe. Introduced in USA.
- 1860 Straw fiber being regularly used.
- 1861 Esparto grass fiber in quantity production in Europe.
- 1869 Mechanical wood in general use in Europe.
- 1870-90 Straw used in cheap printings, writing and newspaper.
- 1890 Art and Chromo papers appear in UK.
- 1900 Casein used as a binder for high quality coated papers.
- 1920 Cotton linters used in papermaking.
- 1925-7 Calcium carbonate loadings introduced.
- 1947 Fluorescent whitening agents (optical brighteners) begin to be used.
- 1948-60 Considerable growth in coated paper production.
- 1950 Textile waste no longer a major fiber source except for specialty papers.
- 1952 Polyvinyl alcohols used as adhesive for coated papers.
- 1965 Eucalyptus wood fiber farmed as fiber crop. [Most common hardwood fiber pulped in 2013.]
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Paper Qualities

Qualities conservators and paper historians evaluate when examining paper include:

- Raw materials in the paper furnish
- Hand-made or machine-made manufacture
- Sheet dimension and thickness
- Degree of processing: crude or refined
- Edges: deckle or cut
- Handle and flexibility of the sheet
 - o stiff or limp
 - o rattle or soft
 - o brittleness
- Observations in transmitted light
 - o laid and chain lines, wove
 - o pulp distribution in the sheet
 - o watermarks
- Surface texture
 - o felt or wire impression
 - o embossed texture
 - o smooth or glazed

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