

PAPER PAST AND PRESENT

Introduction

Paper is a product made from the broken-down fibres of a plant material woven in a random pattern. Since its invention it has played a pivotal role in the development of human culture by documenting social, economic, cultural, political and religious history.

It has also been central to the hobby of philately since most stamps and covers are of course made of paper. Philatelists need to understand the way production and usage of paper impact on the components of a stamp.

The Industrial Revolution fuelled mass production of paper which led to its adoption for many other uses besides communication. Today we see paper products everywhere. Even the recent reduction in production of paper for printing due to the rise of electronic information is more than compensated for by the production of packaging and board, in part to meet the online ordering and delivery market. Environmental concerns today favour paper as a product from renewable sources, where it plays an important role in replacing plastic.

All these factors make the subject a relevant one for a philatelic study, and so this display sets out to tell the history of paper manufacture and its role today.

Fonts used: thematic information in plain text, philatelic information in italics.

Key references used throughout the text

- Hunter, D. (1947) *Papermaking: the history and technique of an ancient craft*
 Kurlansky, M. (2016) *Paper: paging through history*
 Monroe, A. (2014) *The Paper Trail: an unexpected history of the world's greatest invention*
 Sansom, S. (2012) *Paper: an elegy*

The Quarterly: Journal of the British Association of Paper Historians

Paper History: Journal of the International Association of Paper Historians

Articles published by the exhibitor

- Paper Trail *Stamp Magazine* vol. 78 no. 6 June 2012
 Watermarks: a philatelic primer *Philateli-Graphics* vol. 34 no. 4 Oct. 2012
 John Dickinson and his Silk Thread Paper *Topical Time* vol. 67, No. 3, May-June 2016
 Paper and the Post Office *The Quarterly: Journal of the British Association of Paper Historians* nos. 107 - 108, July - October 2018
 Paper mills at Fabriano *Philateli-Graphics* vol. 41 no. 4 Oct. 2019

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Berlin Paper Trade Fair 1913

This display is mounted on a non-standard size Canford 150 gsm, 210 micron paper, made from acid-free pulp supplied by St. Cuthbert's Paper Mill, Wells, Somerset

1. Before the invention of paper

1.1 Man's ingenuity led him to use minerals

Wet clay, the most common raw material in the Near East, was used for one of the first codified system of writing: cuneiform. It was widely used from around 3,300 BCE.

Clay



Wet clay was impressed with a reed stylus.



It was then either dried in the sun or baked in a kiln, ensuring the message could not be altered.



Clay was used for official pronouncements as well as daily correspondence. Stamp shows the Cyrus Cylinder, 6th century BCE

The clay mineral known as kaolin referred to in this cancel of St. Yrieix La Perche commemorates its discovery there in 1766.



Stone

Stone could be scratched or painted, and thus has an ancient history, but a more sophisticated use required specialist tools.



Roman monumental inscription



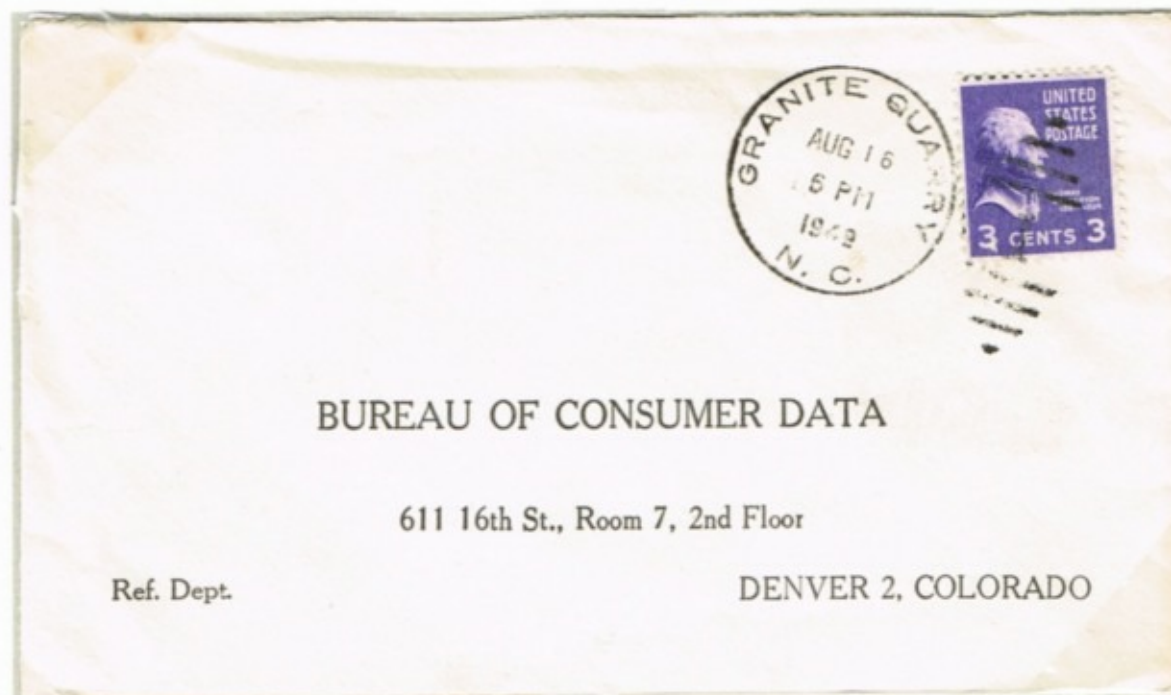
Because it is nearly indestructible stone has always been a favoured medium for official pronouncements. An example from 196 BCE is the decree of Ptolemy V, now known as the Rosetta Stone.



Stone is still used today for items that require longevity, such as tombstones, often made from granite.



'Granite' paper, so-called because of the visible fibres embedded in it
Austria 1933 variety



Originally called Woodville, the Post Office adopted the name Granite Quarry in 1905, named after the stone quarried there.
3c domestic first class surface letter rate

1.1 Man's ingenuity led him to use minerals

Like stone, metals require tools and a degree of technical knowledge.



Salt cellar by Benvenuto Cellini
Euro-rate miniature sheet printed with gold leaf



100g special delivery rate, mounted on security backing paper. De La Rue printing.



Decorative border embossing
Silver



22 carat Gold

Precious metals were, and still are, used to stress the value of an item, or to demonstrate the wealth of the owner



Bronze tablet



Copper has the earliest known use: around 2,800 BCE.



Iron scroll, Ming Dynasty



GB Greetings Telegram envelopes were made from gold coated brown paper, overprinted with a design in red and blue. Various printings in the 1930's resulted in variations of colour from yellow-gold to a coppery gold. This example dates from 1939.

1.2 Vegetable fibres

Cheap, readily available, and easy to prepare and write on, wood has been used world-wide since at least 3,000BC. Wood could be left in its natural state or treated by polishing, varnishing or lacquering.

Wood



Divination written on wood c.100AD



Lacquered wood, 12th century



Commemoration of Battle of Trafalgar Hull, mast and spars overprinted by thermographic process using real wood from H.M.S. Victory. Wood is finely ground, applied to the stamp as powder and then heated.



Veneer made from sustainable wood

Bark

Bark needs a minimal amount of processing to produce a smooth pliable material. It has been used since before the Christian era in countries where wood is plentiful.



Various tropical countries used tapa, made by beating bark very thin. It can be made from mulberry, fig or breadfruit bark. More usually used for artefacts or clothing, historically it was also a writing material

Tonga postal stationery 1909. Nuku'alofa, via Suva (Fiji) to Canada 26 June 1909.

One of a set of 10 different issued in 1906.



Cork is harvested about every nine years. The bark is stripped from the mature cork oak tree; a process that does not cause damage to the tree



Envelope and letter-sheet made from birch bark Sweden T.P.O. PLK.317.A 28th July 1912 to USA

1.2 Vegetable fibres

Papyrus

Known from at least 3,000 BCE, papyrus was a state monopoly of first Egypt and later Rome and Byzantium. While various cultures used plants, only papyrus became a commercial product traded throughout the known world.



The papyrus plant



Papyrus was made from the inner layers of the papyrus plant, a kind of giant swamp grass. They were unrolled and laid out in sheets then moistened, pressed or hammered together with weights. When dry, they were rubbed with stone, ivory or shell to get them smooth.



C. Galeron



Ebers papyrus, c.1550 BCE



The issued stamp

Papyrus plants to the left of the scribe
Monochrome proof signed by the
designer C. Galeron

1.3 Animal skins

These became the standard writing material in Europe from the 2nd century AD until the Middle Ages.

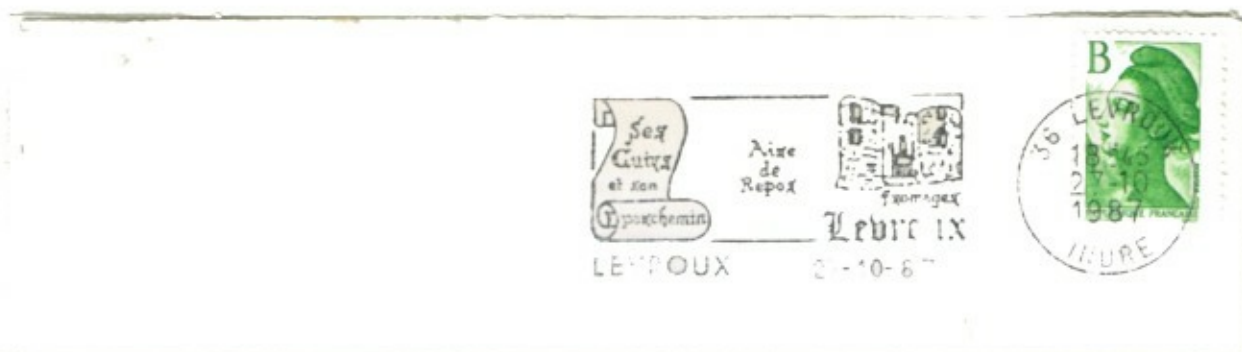
Parchment and vellum



City of Bergama



When the Egyptians stopped exporting papyrus the citizens of the Greek city of Pergamon developed a new writing material made from calfskin, called 'pergamina' after the city. 'Parchment' is a corruption of Pergamina. Pergamon today is part Turkey and known by its Turkish name Bergama



Levroux has been a centre for leather and parchment production since the middle ages. Today it has a Museum, the "Musée du Cuir et du Parchemin"



Treated properly, animal skins, primarily parchment and vellum, are a very durable and flexible material. True parchment is made from sheepskin or goatskin and vellum from calfskin, although in general terminology all writing skins are referred to as parchments



The raw material: goatskin. Photo proof from the printer's archive. About 5-10 printed as a test print prior to full print run. Back has official Korea Post stamp



Calfskin



Pergamino was named in 1626 after a Spanish document relating to its founding 27 May 1941 to Canada Opened and resealed by Canadian censor

But animal skins were expensive; papyrus was controlled by a state monopoly; something else was needed ...

2. A great invention

2.1 Invented by the Chinese

It is not known when paper was first made, but archaeological excavations in north-west China, where arid conditions aided preservation, have produced scraps of paper dating back to the second century BCE.



Cai Lun and his invention

Chromalin proof mounted on card, plus issued stamp

By tradition the Chinese credit Cai Lun (Ts'ai Lun in alternative transliterations) with the invention of paper whilst working at the court of the Han Emperor He. Under He's successor the Empress Deng he organised experiments in making paper in order to reorganise the keeping of imperial records, and documented these around 105 CE.



Early Chinese paper



中国邮政
 (有獎)明信片
 Post of China



領獎人填寫內容
 姓名 地址或单位名称
 證件名稱 證件號碼

市列东中学

老师转骆方舟同学收

小学三(2)张玥

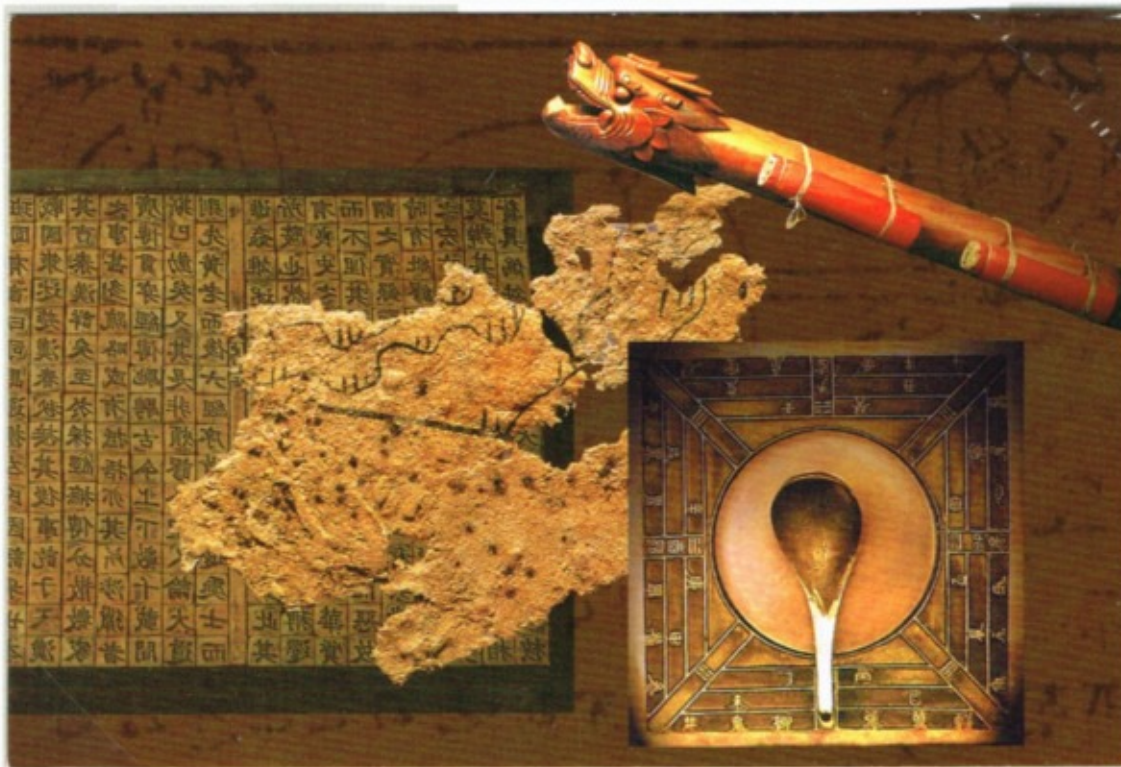
邮政编码 365506

1998

邮电部发行 定价1.00元

The Chinese word for paper is *zhi*, the word being first documented on bamboo texts found in a tomb at Shuihudi Qin dated to 217 BCE.

紙 The character *zhi* features in this cancel of the place name "Green Paper"
 China postal stationery lottery card 1998



Early paper, which the Chinese celebrate as one of the "Four Great Inventions"
 China postal stationery card 2000



Manufacturing
 paper at the
 Chinese Imperial
 Court



2.2 As knowledge spread, paper mills were built

The Chinese held this monopoly for about 500 years before it spread to Japan and Korea. By 751 CE it had reached Samarkand, on the Silk Route to the West. Eventually the knowledge spread through Persia, Arabia, the southern Mediterranean, and eventually by the 11th century to Europe.

Through Asia to North Africa



Samarkand was the first paper manufacturing centre outside eastern Asia. Arabs in Central Asia learnt the skill from the Chinese and switched from parchment and papyrus to paper



The oldest surviving manuscript written on Arab paper (now in the Vatican Library) was probably copied at Damascus in about 800



By 900 CE Cairo had become a centre.

Fez in Morocco became a centre by 11th century, and from here the knowledge was exported to the Mediterranean coast of Spain



Tracing the route from North Africa to Europe



Monochrome die proof signed by the engraver Pierre Gandon. Blank value tablet. Design issued in values of 5f, 8f and 10f



Official 1944 Christmas Airgraph addressed to the UK from a soldier of the 'Central Mediterranean Forces' operational in Libya. Partial crowned shield PASSED BY/ CENSOR.



2.2 As knowledge spread, paper mills were built

The knowledge of papermaking was brought to Europe by the Moors of North Africa who had ruled Andalusia and Sicily since the ninth century.

Spain and Italy



Stained glass window of the papermill in Burgos, where today Spanish banknotes are printed. Design shows the papermaking process.



Abd al-Rahman I, the founder of a Muslim dynasty that oversaw the introduction of papermaking to Spain.

Spain was the first European country to make paper. The first mention of paper being made in Andalusia was in 1056, in Xátiva, by River Albaida.



Italy was the second European country to produce paper. The earliest documented site is Fabriano, next to the Giano River, known from a document dated 1283. By the fourteenth century Fabriano had at least 40 paper mills. In 1785 a mill was founded at Fabriano by Pietro Miliani.



The Subiaco paper mill was in continuous existence from 1587 to 1994

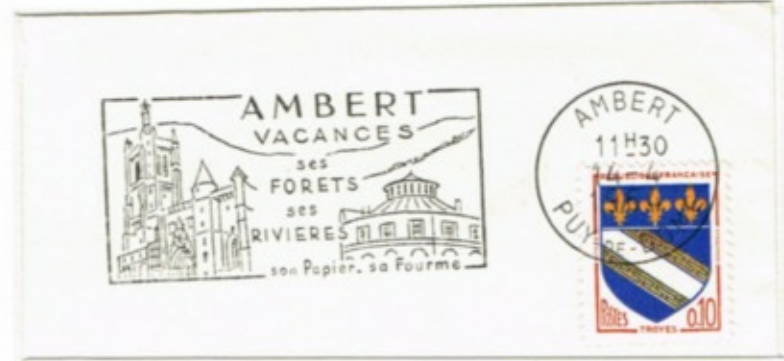
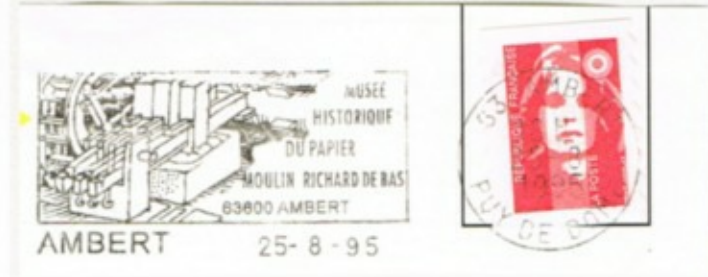
Postmark: CARMIGNANO BRENTA-CARTIERA (PADOVA)
i.e. Paper Mill of Carmignano Brenta

The company was founded as Lanaro G. & Co. in Carmignano di Brenta, and is now part of Cham Paper Group

2.2 As knowledge spread, paper mills were built

Paper rapidly became a commodity in demand. Italy exported its paper across Europe, prompting businessmen in countries including France to invest in mills locally.

Paper was being made in the Auvergne region of France by the 1340s. The paper museum Richard de Bas is the last functioning paper mill in the Auvergne; first built in the 14th century it now produces about 200 sheets a day



Ambert in the Auvergne supplied paper for the first edition of Diderot's Encyclopédie

Perhaps the most famous French papermakers - though for another reason - were the Montgolfier Brothers, Joseph and Etienne. They were born into a family of owners of a paper mill in Annonay, in the Auvergne. They lined their first trial balloon with three layers of thin paper underneath sackcloth



Pierre de Baume purchased three paper mills in the 1780s

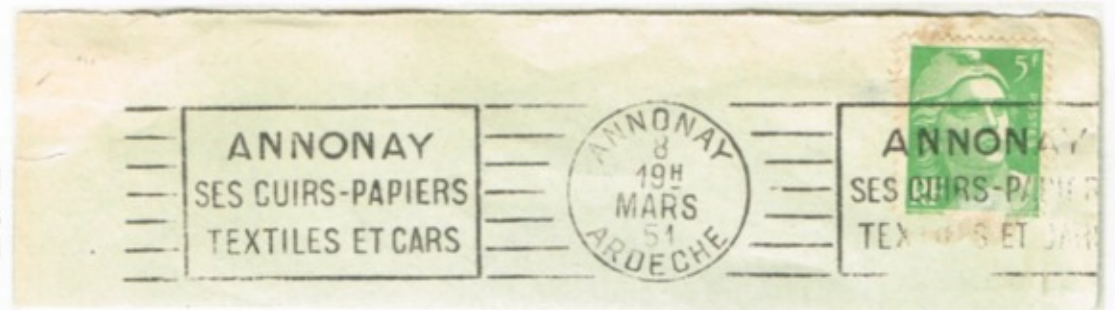


6 September 1879 Annonay to Lyon with Montgolfier Freres Annonay merchant mark



When Etienne died his son-in-law, Barthélémy Barou de la Lombardière de Canson succeeded him as head of the company. The company became "Montgolfier et Canson" in 1801, then "Canson-Montgolfier" in 1807.

Annonay is still known for its leather, paper, textiles and coaches, and the Papeteries Canson & Montgolfier SA is still based there, now specialising in fine art and photographic papers



2.2 As knowledge spread, paper mills were built

The next European country to introduce papermaking was Germany. Its first mill was built in 1390 by Ulman Stromer outside the gates of Nuremberg; he employed Italian paper makers brothers Marco and Francisco di Marchia. The economic imperative for locating it in Nuremberg was because at that time the city was the largest printing centre in Germany.

Germany

Poensgen & Co.
Papierfabrik Kieppemühle.

Berg-Gräblich, 21. 11. 11



The Kieppemühle, which from 1885 was owned by Poensgen & Co, first started as a paper mill in 1670
Perfin P C (reversed)



One of Nuremberg's biggest presses was run by Anton Koberger. His *Nuremberg Chronicle* contained 654 woodcuts, including the Stromer paper mill, the first depiction of a paper mill in a European book, the basis of the design for this cancel



The town of Papiermühle was named after its local industry (pmk 04 June 1906)
Merchant mark for Sommerfrische Papiermühle, situated in Stadtroda



RARE imperforate proof from the Archives of the former East German printer. With normal. (About 10 copies exist)

The invention of printing by Gutenberg in the 1450s soon resulted in an increased demand for paper.

Gutenberg printed 45 copies of his great Bible on vellum, and 135 copies on paper



A testament to the demand for books, and hence paper, is the Frankfurt Book Fair, which has been held annually almost continuously since 1454

2.2 As knowledge spread, paper mills were built

Switzerland

The requirements for a suitable site for a mill were a river with a swift downhill run, clean water with low iron content, and a nearby population that could provide rags; all conditions easily fulfilled by Switzerland which started its own production in 1411



Dalat, Annam (Indo-China) 03 June 1922 to Bern, annotated 'Papiermühle', that crossed out and readdressed to Balingen, Wurtemberg. With Papiermühle Bei Bern receipt 05 July 1922



500th anniversary of printing in Geneva

John Calvin established his ministry in Geneva in 1541. Protestant printing turned Geneva into a major publishing centre, which itself created a huge demand for paper.

Named after its main product, Papiermühle was a village in the Canton of Bern. Now part of the municipality of Ittigen it retains its name only as a transport hub. The first paper mill there started in 1466.



Papiermühle
19 January 1940
Postal telegram to Bolligen with telegraph handstamp



Zürcher Papierfabrik was founded in 1863. It is situated on Papierwerd, an island in the River Limmat in Zurich. The first paper mill on this site has been dated to 1471. Privately printed postal stationery 20.10.17

2.2 As knowledge spread, paper mills were built

Finland, from 1809 a Grand Duchy of Russia, exploited its ready supply of softwoods with an expanding paper and pulp industry.



10 kopek red postal stationery envelope manufactured by the Tervakoski paper mill. With watermark TERVAKOSKI

TERVAKOSKI

Tervakoski Paper Mill in Finland, founded in 1818, and later used to manufacture postal stationery. Part of the current Tervakoski output is still handmade paper.



19th century lithograph of Tampere shows the Frenckell paper mill to the left, built in 1842.



Tampere became a paper and pulp producing centre with its skyline dominated by the tall chimneys of its mills. Shown here is the the Tampere Pulp Mill, built in 1866. One of a set of 6 cards issued as part of a promotional project for the 1952 Olympic Games. Scene design and artwork by Signe Hammarsten Jansson, printed by the Bank of Finland Security Printing House. Cachet for transport by boat

Viborg to Helsingfors 8 March 1862
Inland letter rate 10k
Rate valid 1 January 1844 - 31 December 1874
With black boxed receiving mark



Thomasböle Mill, Finland's first, was founded in 1667



In the background of Kotka Harbour is the Sunila mill.

2.2 As knowledge spread, paper mills were built

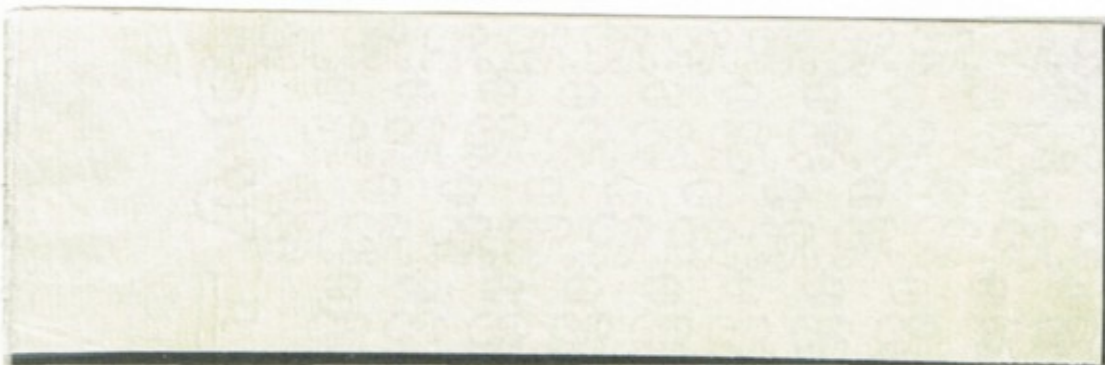
Paper started to be used in England from the early 14th century, imported from France and the Low Countries. The first reference to a paper mill in the United Kingdom was in a book printed about 1495. In the next 80 years the price of paper rose 30 - 60%, but parchment rose 70%, making paper the more economic product.

United Kingdom



Alexander Cowan & Sons founded a paper mill at Penicuik, Midlothian.

The first issue of the Virgin Islands, 1866 6d (rose-red, toned paper), was printed in part showing the paper maker's watermark. This stamp shows part of the monogram A C & S



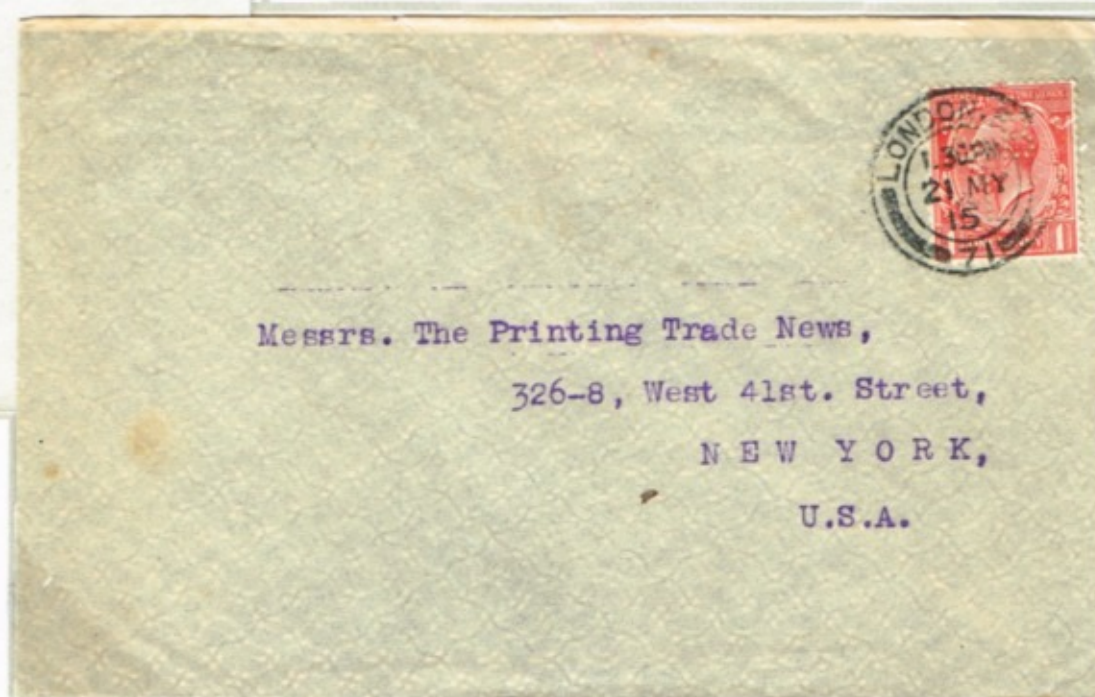
Basted Mills in Kent began production in around 1750, probably by adapting existing corn mills. From the nineteenth century they provided paper for stamps.

George V Multiple Cypher Watermark paper showing marginal watermark TAG of POSTAGE.



Spicers original mill was in Alton, Hampshire. It was taken over by John Edward Spicer in 1796 to become what is now a multi-national company.

Spicers perfin (SB / L)



High Wycombe became a major paper making centre from the 17th century, using water power from the River Wye (Buckinghamshire), whose waters were rich in chalk, and therefore ideal for bleaching pulp.

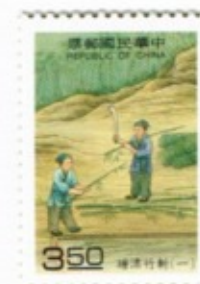
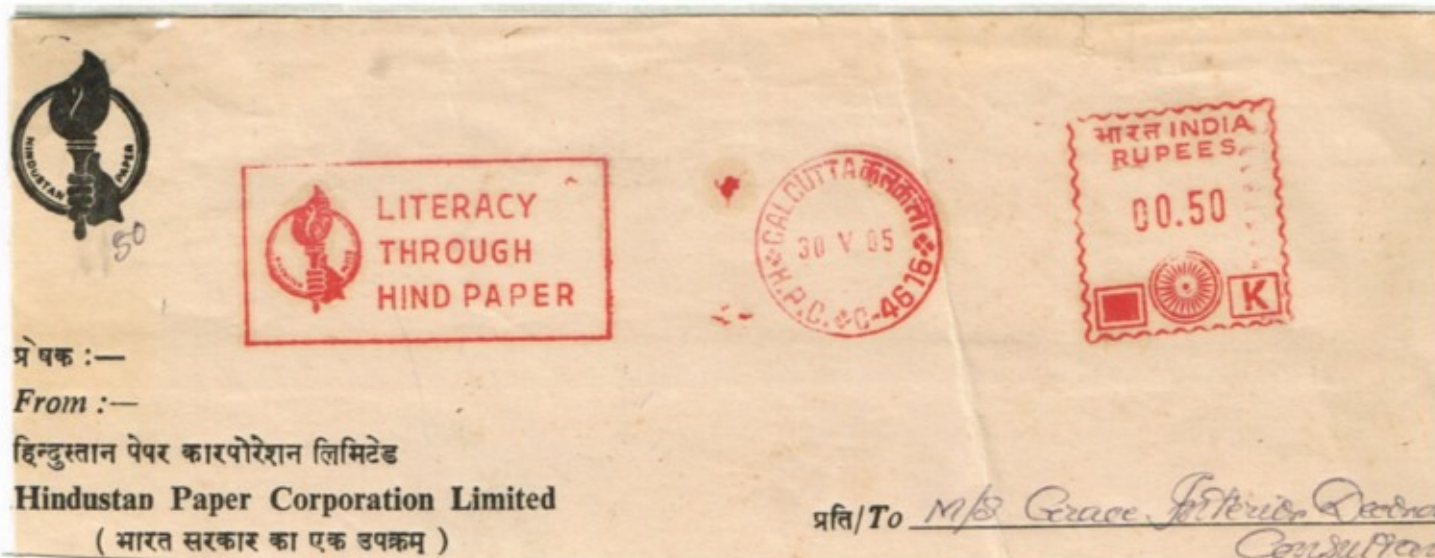
Perfin C M for Charles Morgan & Co. Ltd.
Censored High Wycombe to USA 11 Nov 1941.
USA airmail rate zone 3

EXAMINER 4352

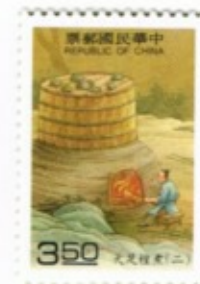
2.3 Raw materials depended on local supplies

Paper is made from broken-down cellulose fibres, so many different plants have been used. Makers used whatever was plentiful in their area. The earliest Chinese paper was made from silk rags, mulberry and later bamboo.

Asia and the Far East



Cutting bamboo



Cooking it

Bamboo was used from around 1,000 AD. Fresh-cut stalks of young green bamboo shoots were cut into tubes, split open into a strip, the outer green skin scraped off and bound together with other strips.

Hindustan Paper Corporation has four mills in India, making writing and printing paper and newspaper. All use bamboo as their raw material.



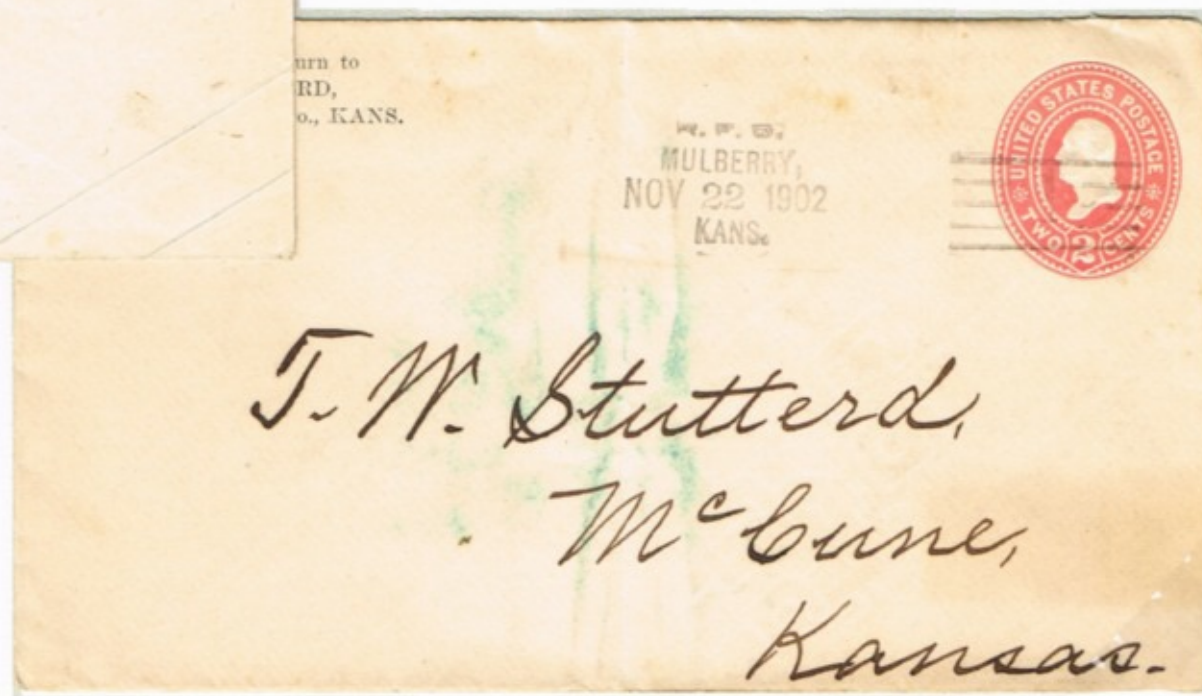
Mulberry is known to have been used in China from at least 200 AD.



Indore, 1889

Made from mulberry leaf paper

Silk itself had been used as a writing material before the invention of paper, so it was logical to use ground-up fibres from silk rags for paper. John Dickinson silk-thread paper, named after the threads of material embedded in the paper. Blue threads bottom right-hand corner and reverse. 1851, envelope folded by hand.



Rubber handstamp indicating Rural Free Delivery, Mulberry, Kansas, 22 November 1902. Handstamp in use 1850 - 1903. Domestic first class letter rate 1885 - 1917

2.3 Raw materials depended on local supplies

In Africa, different plants were used. In Madagascar paper is still made today in the traditional way, using pulp made from the bark of the avoha tree. It is known as Antaimoro paper from the ethnic group in Madagascar who make it, in centres including Ambalavao.

Africa



Photographic proof used as the final design. Mounted on posterboard with acetate window for lettering. Plus photographic proof of final design, showing changes of spelling listed on the pasted-in slip.

Signed by the Director of Postal Financial Services



написали
сэт.
марку
нам. 60фМГ
Кевел.



Mettre: -"Republikan'i Madagasikara" au lieu de
"Republika'i Madagasikara"
- "Paositra 1993" au lieu de "Poste aérienne"
- "Antaimoro" au lieu de "Antaimore"

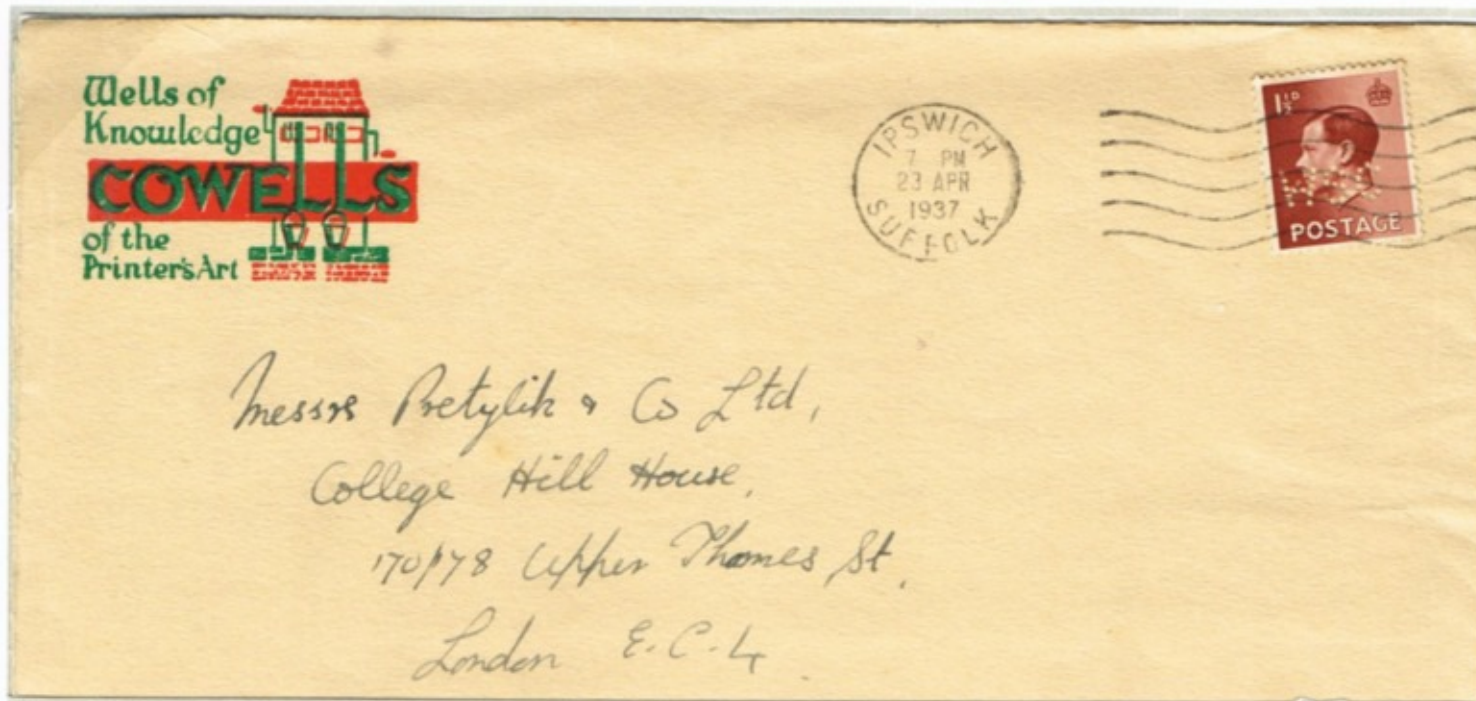
урабумона

Le Directeur des Prestations
Financières Postales

BOTO Ferdinand

2.3 Raw materials depended on local supplies

The first choice of European paper makers was linen, which they obtained by buying old rags which they ground down to fibres. The fibres of the flax plant, from which linen is made, gave particular strength to the pulp.



Special security linen rag paper
De La Rue printer's trial, plus
issued stamp



W. S. Cowell started a printing and stationery business in 1818. In 1885 they added a "rag business" to the company to provide the raw material for their output. *Perfin W S C*



All stamps show part sheet watermark:
PURE LINEN WOVE BANK
and W.C.S. & CO. Monogram.
Trademark of the makers William
Collins, Sons & Co.



1945 overprint "Collect all rags"
Mis-placed perforation

This wartime plea for raw materials was nothing new; in 1799 a Massachusetts paper mill produced a paper with the watermark "Save rags".



Postmark: Cloughmills 02 March 1929
Placename refers to the linen mill in the area, County Antrim

2.3 Raw materials depended on local supplies

Cotton fibres contain about 91% cellulose, making it the purest form of cellulose available to the paper maker. As supplies of linen dwindled, cotton became cheaper and more plentiful due to the expansion of the cotton textile industry, which from the late eighteenth century was fuelled by cheap and plentiful supplies of the raw material from the USA and Western European colonies.

Europe



Uppermill village in Saddleworth is named after the cotton mills in the area
 Aug 30 1850 Uppermill to New York
 Backstamped UPPERMILL, transit marks for Manchester and Liverpool.
 Front: numeral cancel 498 for Manchester.



Postmark for Cotton Town, Tennessee 20 November 1901.
 (Now called Cottontown)
 Domestic first class letter rate 1885 - 1917



Belgian Minister for the Colonies examining cotton production
 in the Belgian Congo
 Number 114 of a set of 50 different postal stationery cards
 (numbered 73 - 122) published in 1922

Congo Belge - Belgisch Congo
 Congo Belge - Congo

114 Congo Belge

La récolte du coton. M. FRANCK, Ministre des Colonies, en route, examine le coton produit par les cultures des indigènes, dirigés par les agronomes du Gouvernement.

Belgisch-Congo

De Katoenoogst. M. FRANCK, Minister van Koloniën, op reis, onderzoekt het katoen voortgebracht door den inlandischen akkerbouw onder toezicht der staatslandbouwkundigen.

Newfoundland 1862 showing
 partial paper maker's sideways
 watermark ST for Stacey Wise.



The company purchased Rush Mills in 1834,
 manufacturing paper made from cotton.



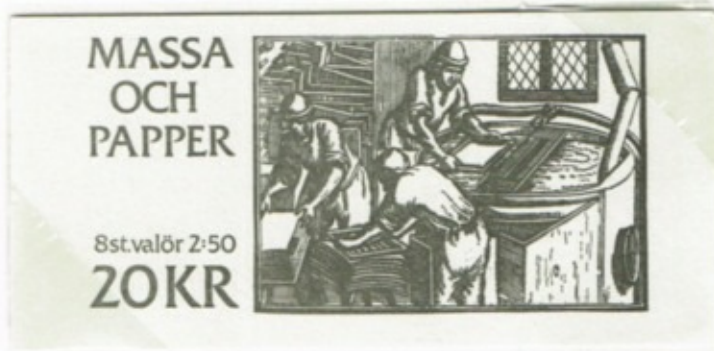
The papermill in Velké Losiny, founded
 in the 1590s, is today a working
 museum which still makes handmade
 paper from cotton and linen.

2.4 The basic process was the same

Irrespective of where paper was made, or what it was made from, the process of its manufacture remained the same. Equipment consisted of a beater to macerate the fibrous raw materials; the vat where fibres were mixed with water; the mould; drying felts; and the the press.

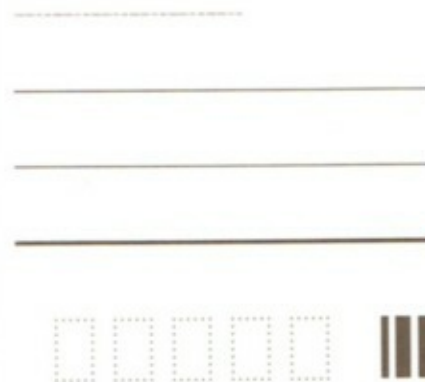


The vatman dipped the mould into the vat holding the fibre suspension and lifted out some of the mixture, giving it a shake. As the water drained off a layer of fibres was left. This wet sheet of paper was tipped out on to a felt. A pile of alternate papers and felts was squeezed in a screw press then hung out to dry



四国の伝統工芸シリーズ
 〈土佐和紙〉高知県
 平安時代の文献にも登場している土佐和紙。精巧で円熟した技法は、評価が高く、清張紙・土佐典具帳紙は国指定の無形文化財となっている。

Dipping and lifting the mould
 Japan postal stationery card



Postal stationery card commemorating 500 years of papermaking in the Czech Republic, or Bohemia as it would have been in 1499. The illustration on the card is taken from "Das Ständebuch" (The Book of Trades), a 1568 work with woodcuts by Jost Amman

2.5 The mould dictated the type of paper

The mould, which is dipped into the pulp, is a metal wire mesh fixed to a solid frame. Early moulds were made of thin wires along the longer length of the mould, interwoven with heavy wires running across: the 'laid' wires. In 1759 James Whatman first used a mould with a fine wire mesh, making a much smoother paper known as wove.

Vertical laid paper

In stamps 'vertical' or 'horizontal' laid refers to the direction of the lines in relation to the design of the stamp.

13 vertical lines per 20 mm, 1 horizontal line per 24 mm



Benjamin Franklin promoted wove paper at an exhibition in Paris in 1777
31 Mar 1854 Charleston to Vermont. 3c first class domestic letter rate.



The appearance of the edge of each sheet is also due to the mould.

The wooden frame was called a deckle. Some of the paper slurry passed under the deckle forming an irregular, thin edge, as illustrated by GB line -engraved issues printed on hand-made paper made at Rush Mills, Hardingstone.

1871 1d rose-red Pl 146. Right hand marginal block with inscription and part ornament Type D



Wove paper

Die proof printed on handmade wove paper impressed with Atelier du Timbre. Signed by the engraver Bequet



2.6 Watermarks were an early addition

Early watermarks were made by weaving a design made from metal threads into the wires of the mould. It is not known exactly what their original use was, but they soon came to be used as paper manufacturer trademarks.



Pietro Miliani paper mill, a successor to the early Fabriano mills
Fabriano to San Severo 08 August 1919, with perfin P M



The Fabriano paper mills, first documented in 1283, were the first to introduce watermarks.

Shown here is the paper museum at Fabriano, housed in the former Monastery of St. Benedict.



The 'mercury and bird' watermark of the Thomasböle Mill, founded in 1667. This watermark was used from 1672.



Early watermark from the Diósgyöri paper mill in Hungary, founded in 1782.



Julius Glatz founded a paper mill at Neidenfels in 1885 and adopted the complicated logo and watermark of a bearded head with wings, which the company used in their meter mark.



Left hand side of stamp shows three sixteenth century watermarks from Hungarian documents.



American Papermaking
1690-1990

Rittenhouse paper mill
circa 1770.



This watermark appears on the first paper made in the United States on this site in 1690.

© USPS 1990

Rittenhouse was the first paper mill in British North America. Its watermark is illustrated on the left of the card. (The card incorrectly claims that this watermark appeared on the first paper made in the USA; in fact it was Rittenhouse's second watermark, introduced in 1704).

3. The impact of the Industrialisation Revolution

3.1 Mill technology

Ideas for the first paper making machine were patented by a Frenchman Louis-Nicolas Robert in 1799, and developed in England by the Fourdrinier Brothers who built the world's first machine to make rolls rather than sheets of paper.

The Endless Web

Model in the Smithsonian Institution based on Louis-Nicolas Robert's patent. The pulp was drawn up from the circular vat, passed along the web and then passed through rollers.
Post Office postal stationery with privately printed illustration.



John Dickinson bought Apsley Mill in 1809, installing his own patented paper making machine, developing and improving the Fourdrinier Brothers ideas to produce the world's first commercially successful continuous web of paper

Perfin: J. D. & Co.

Hemel Hempstead to Birmingham 19 Feb 1901. Hemel Hempstead duplex 353 and same day Birmingham receipt



The long rolls of paper were known as the "endless web". But of course they were a finite length.
Double thickness of paper on the bottom pair and partial double thickness on the top pair at the join, caused by repair to roll or end of roll

Paper mills soon converted to machine-made paper. Patentpapierfabrik mill had made paper by hand from 1537 and converted to machine-made paper in 1838.

3.1 Mill technology

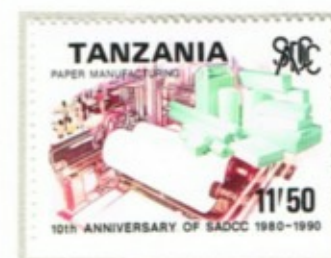
The machine was an endless moving belt of wire mesh over which stock was poured. As the belt travelled the water drained away from the mesh leaving a continual web of fibres which were pressed via rollers and felts to remove the remaining water. The resulting roll of paper was then dried with steam-heated cylinders and finally calendared to produce a smooth finish.

The Endless Web



The wire mesh is stitched together to form a continuous belt. This join creates a mark in the paper.

Simple Cypher watermark on George V 1913 ½d green plus stitch watermark on bottom pair caused by the join.



Fancy cancel from Kimberly, Wisconsin, featuring a paper roll for Kimberly-Clark Paper Mills. Founded in 1872 the mills are now a global corporation producing a range of paper-based products including Kleenex paper tissues.

An abundance of fancy cancels in this period led to Post Office regulations banning their use. An order dated 17 November 1928 prohibited use of fancy cancels; an order clearly ignored as a further order of 17 November 1931 again banned the use of unauthorised rubber stamps, many of which "advertise some particular locality..."

This cover of January 1930 falls between those two dated orders. It was used from 01 March 1930 to 01 August 1930 with the correct use of red registration label.

Signed by the Postmaster C. J. Fieweger.

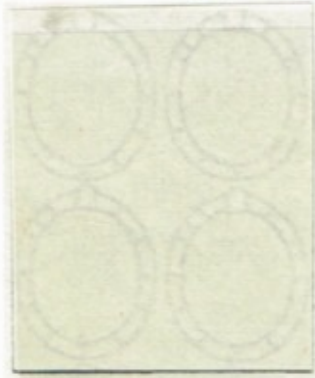
3.1 Mill technology

A light roller called a dandy roll is impressed on the web of paper to aid draining the water from the stock. Where handmade paper used the mould to create watermarks, in machine-made paper the dandy roll creates the watermark, used as a security feature on stamps.

The Endless Web



Watermarks used on Danish stamps



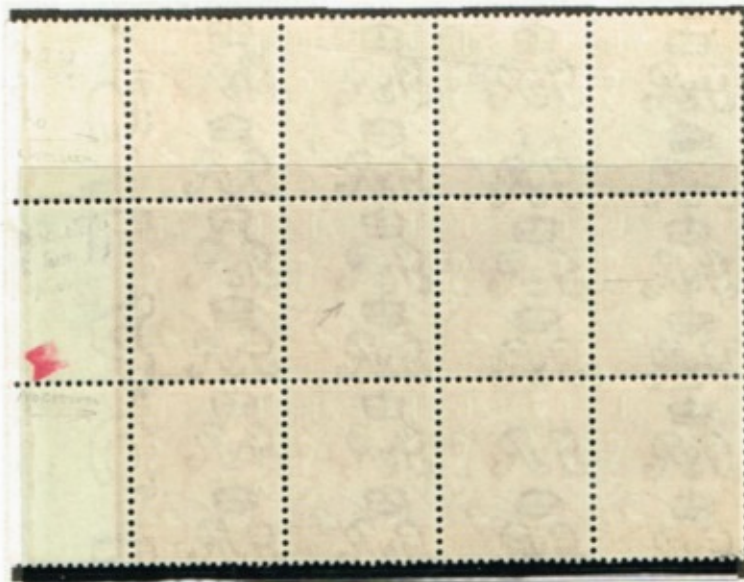
'Large garter' watermarked paper used by De La Rue for Queen Victoria 4d issue 1857



Swedish Crown watermark



Edward VII 1902 Imperial Crown watermark
Marginal block with part portrait offset on reverse



Simple cyper Missing crown Missing tail to R

The mesh of the dandy roll occasionally got damaged, resulting in faulty watermarks. This block shows two examples each of two different errors on a simple cypher watermark. Paper was made at the William Joynson paper mill in Kent.

			Missing crown
	Missing tail to R		Missing tail to R
			Missing crown



Paper has a side intended for printing and watermarks are usually impressed so that they read normally when looked through from the printed side. This is illustrated by this block with POSTAGE watermark clearly seen in the top margin (plus Imperial Crown in each stamp).



Egypt 1884 postage due with star and crescent watermark. Variety: watermark impressed on face.

[RPSL certificate behind sheet] Printed by lithography; four separate drawings made in blocks of four, producing slight differences between stamps. Block of four shows each variety.

Coloured dot inner white frame. White spot upper curve second S in Postes	Partial breaks thick inner frame line. Coloured dot in frame under l
Break in thin frame under TE in Postes. Coloured dot over Arabic numeral 1	Coloured dot at right of Arabic numeral 0. White dot middle central figure 1

3.1 Mill technology

In the early days of the Industrial Revolution mills were still powered by water.

Power supply



'Closed Millwheel' numeral cancel 356 for Nuremberg. Millwheel cancels were used from 01 Aug 1850. Numbers 1 - 603 were attributed twice, being renumbered in 1856. So this cancel for 20 Oct 1861 is the second attribution of number 356.



The water wheel: the earliest form of power



Overshot wheel



Breastshot wheel

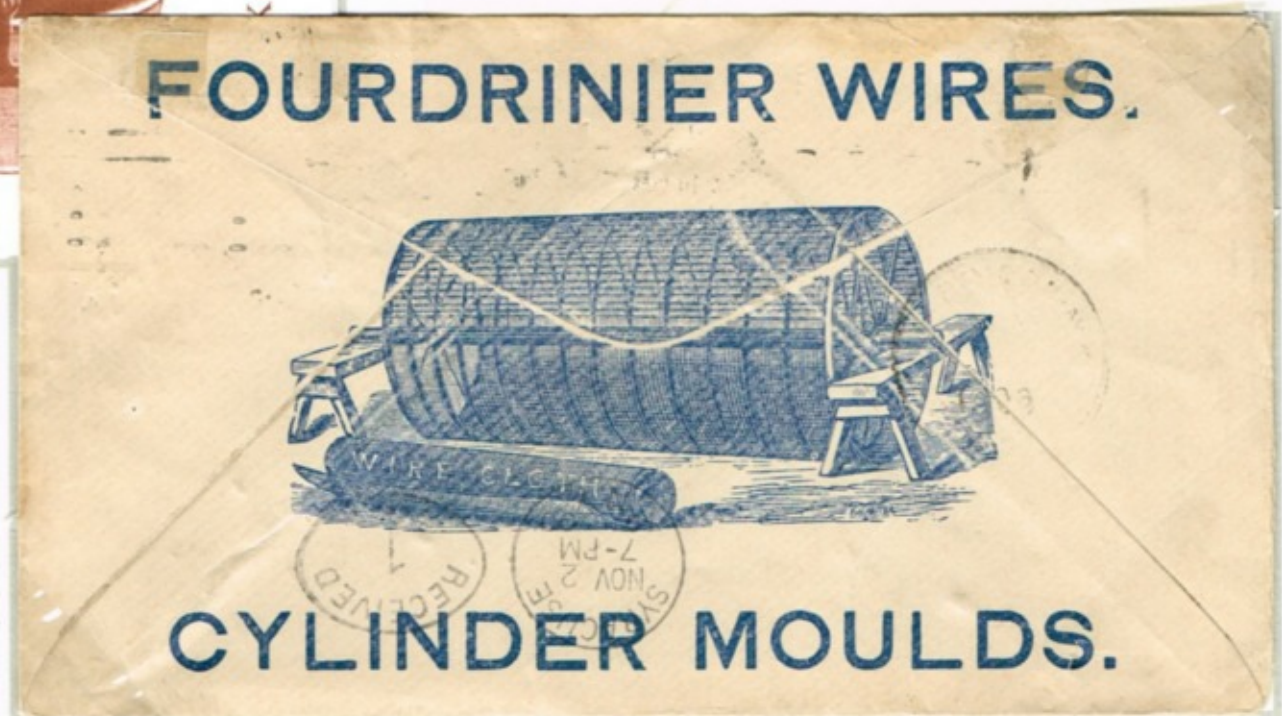
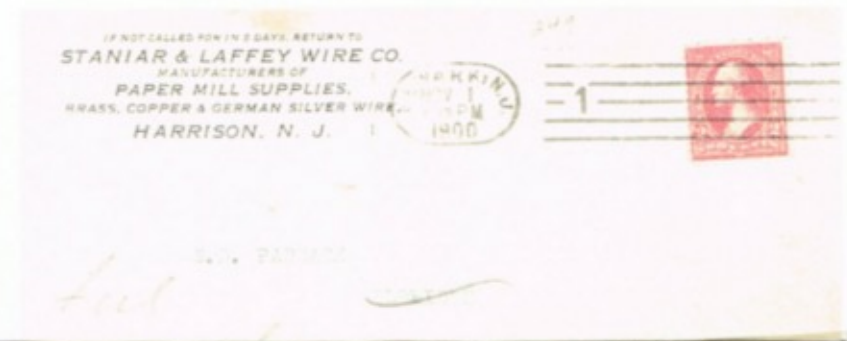
There were various types of waterwheel, all of which could be used in any type of mill



The wheel drove the Hollander machine which beat the fibres to split and ground them down, producing the paper pulp.

Czech Republic booklet 2001

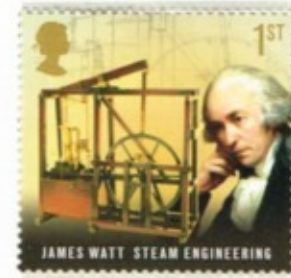
The Hollander was replaced by the cylinder mould. A spinning cylinder pushed the contents of a trough of suspended fibres around repeatedly until the fibres were the desired length.



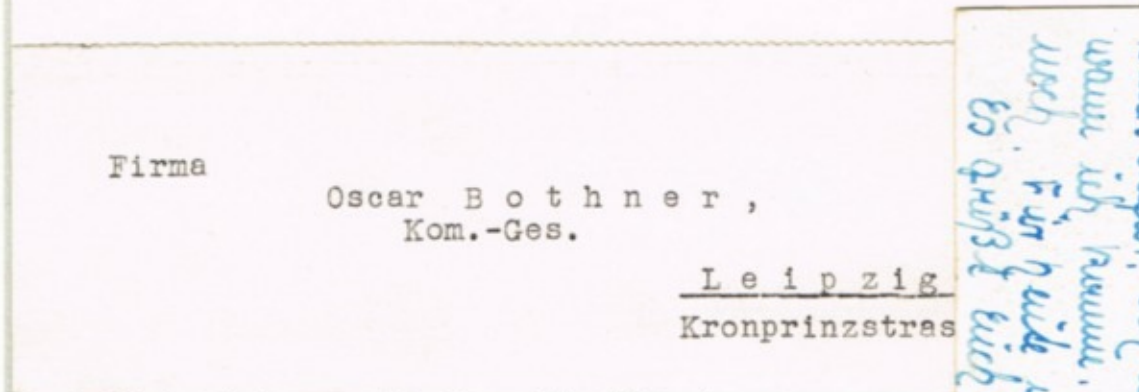
3.1 Mill technology

Throughout the nineteenth century mills converted to steam, or were newly built using steam power.

Power supply

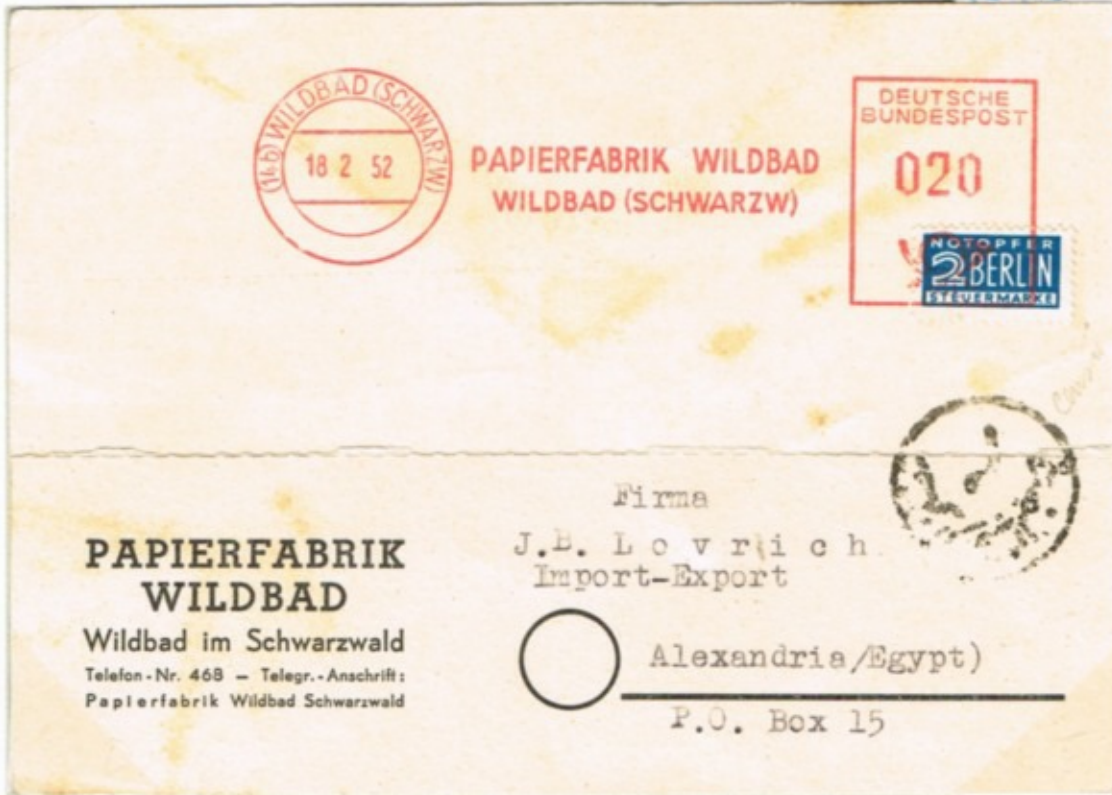


James Watt's improvements on the early steam engine paved the way for steam driven mills



Papierfabrik Sebnitz opened its first mill in 1827 using water power from the Obere Schleuse. It converted to steam power in the 1850s. Perfin PS

Papierfabrik Neidhardtsthal
A steam-driven mill established in 1875 near Aue
Cachet for rural mail



Rijeka paper mill was founded in 1821 and converted to steam in 1833

Papierfabrik Wildbad were founded in 1863.
Steam engines were built on the site in 1884 and 1908
Wildbad to Alexandria 18 Feb 1952.

With 2p surtax stamp for Berlin Emergency Levy; in use 01 Dec 1948 - 31 March 1956.
Plus Egyptian censor

3.2 Transport of the end product

Bundles of hand-made paper could be transported by cart, but rolls of paper required a more efficient system. Canals, and later railways, were used.



Canal building was an early feature of the Industrial Revolution, led by James Brindley who built 567 km of canals in the UK



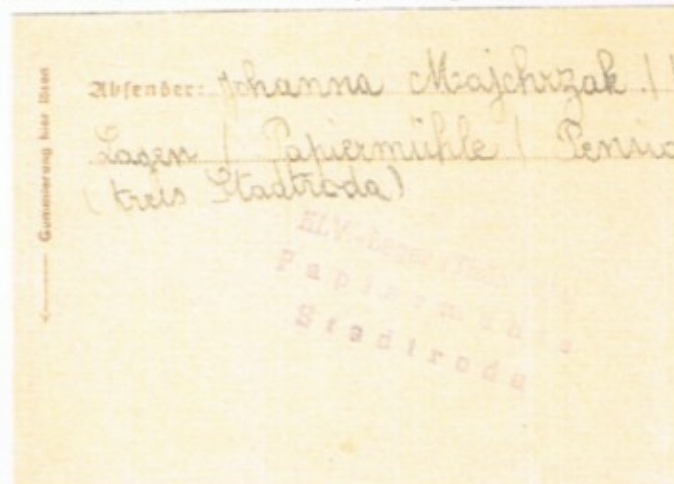
In England the Grand Junction Canal opened in 1800. It ran beside John Dickinson's Apsley Mill. Dickinson used it to take paper to London. The Regent's Canal was built to provide a junction with the Grand Junction Canal at Little Venice, extending the route right through London.

As the railway system grew in the nineteenth century it took over a lot of mill traffic. Railways were faster and carried greater bulk.

A railway was constructed in 1879 between Rumania and Transylvania, giving access and an economic boost to the timber of Prahova Valley. The Schiel paper mill was founded in the valley at Buşteni in 1882.



Bahnhof Papiermühle was the railway station for Stadtroda. After the last paper mill there closed the station continued to keep its name until its own closure a few years ago. *Cachet for rural mail.*



4 September 1944, Feldpost letter card
Reverse has three-line cachet for
KLV. - Lager (Thur. 204) / Papiermühle / Stadtroda
This was a World War II Children's evacuation camp



BUŞTENI - Fabrica de hirtie

CARTE POSTALA



Destinatar _____

Strada _____ Nr. _____

Blocul _____ Scara _____ Etajul _____ Apart. _____

Localitatea _____

Raionul _____ Reg. _____

Oficiul poştal: _____

Expeditor: _____

Preţul de vânzare 30 bani

3.3 Supporting Infrastructure

Industrial output meant large scale production, which gave the impetus to specialised fields, including wholesalers and plant manufacturers



James Spicer and Sons were paper merchants and wholesale stationers who by the 1860s were acting as intermediaries between paper manufacturers and retailers. In 1922 they bought Eynsford Mills in Kent and the Sawston Mills in Cambridgeshire.

Perfin JS (reversed) with London double-ring cancel 03 January 1901



Versäumen Sie nicht

bei eintretendem Bedarf in Pack- und Einwickelpapieren, Schreibpapieren, Briefumschlägen usw. ein Angebot einzuholen von der

Papiergroßhandlung J. Obholzer, Papierfabriklager
Kontor: Bergstraße 6 Münster i. Westf. Fernsprecher 2026

Ein Versuch überzeugt Sie von der Leistungsfähigkeit dieser Firma.

Lieferung nur an Großabnehmer.

9

Karl Krause, founded in 1855, manufactured specialist plant machinery for paper mills. At the end of the Second World War plant from the factory was dismantled and sent to the Soviet Union as war reparations.

Obholzer were a paper warehouse and distribution company
Telegram sent Münster 19 Nov 1922

3.3 Supporting Infrastructure

The skill of the craftsman was recognised. Guilds, and later trade unions, trade associations and fairs flourished.



Paper makers were a recognised guild from mediaeval times, with their own coat of arms



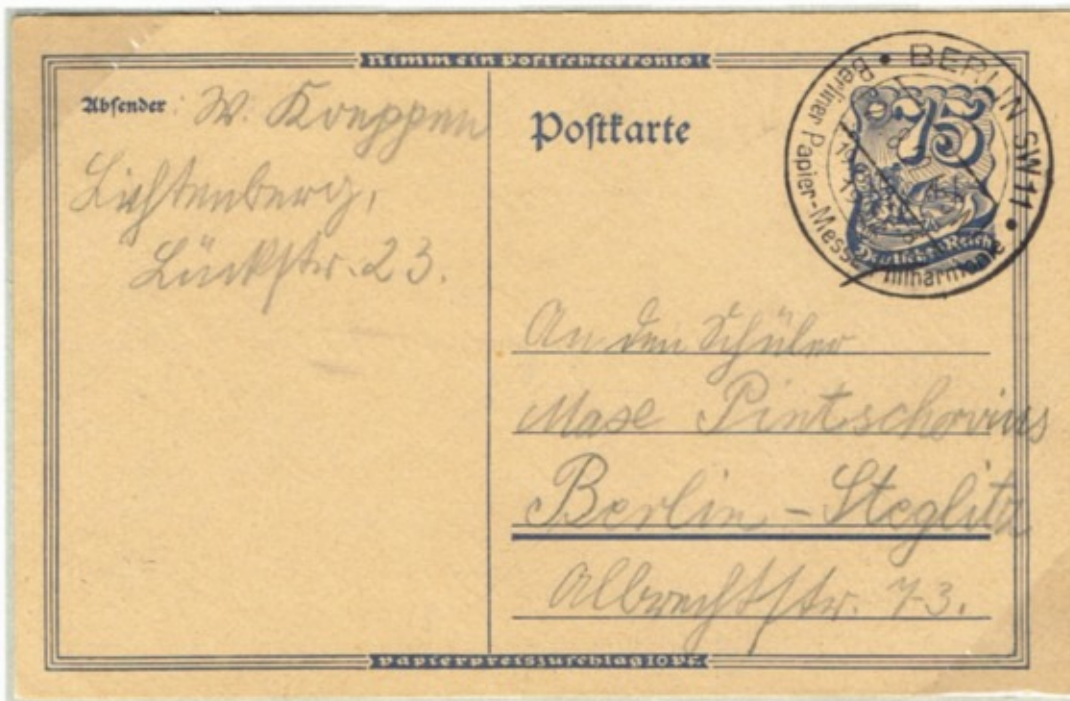
Austrian World of Work:
printing and papermaking
Black print



Centenary of Hungarian Printers and Paper Makers Union



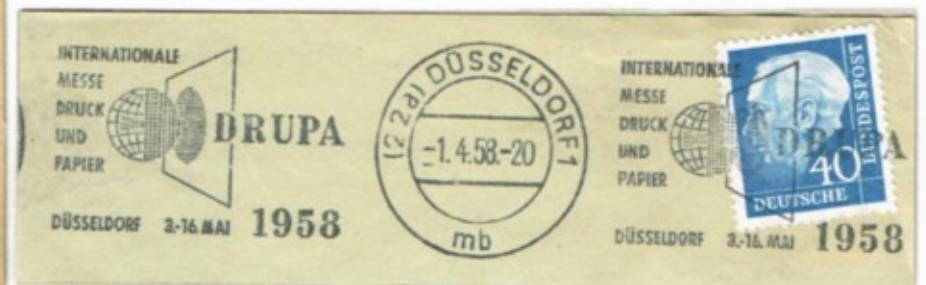
Dresden Paper Exhibition June to September 1927
Dresden has long been a centre for papermaking; the Dresdner Druck-und Verlaghaus still produces newspapers and magazines
Postal stationery card shows the logo for the Exhibition designed by Willy Petzgold



Commemorative cancel in use during the Berlin paper trade fair
19 - 22 August 1922



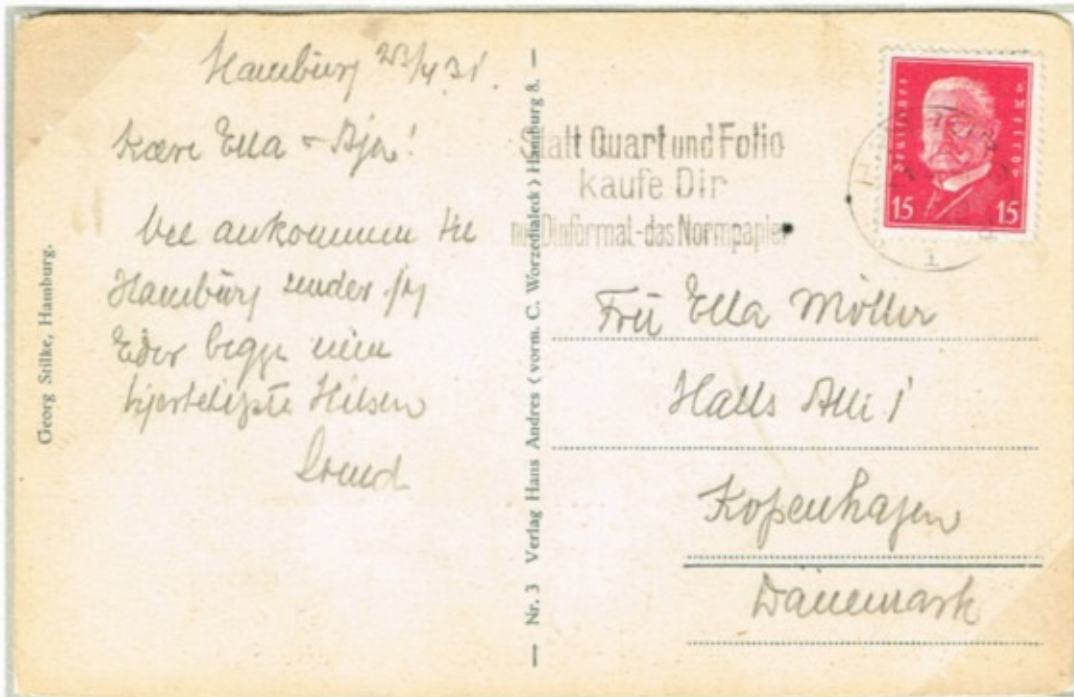
DRUPA (DRuck Und PAPIer) is the largest paper and printing trade fair in the world, held in Dusseldorf every four years
Meter mark used by companies as well as Dusseldorf post



3.3 Supporting Infrastructure

Sizing systems

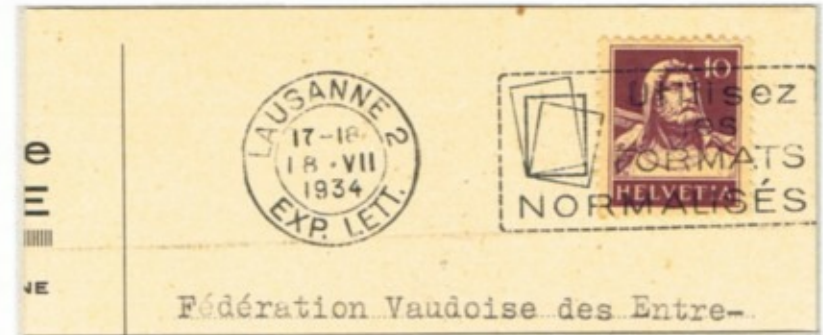
Paper originally had its own system of sizes, but the twentieth century saw metric-based systems gradually introduced.



Slogan cancel: "Instead of folio and quarto buy the new Din format standard paper"



Foolscap, 13.5 x 17 inches, has been used since early European handmade paper. It gets its name from the watermark of a jester's hat, or fool's cap that was once used to identify it. Full-size foolscap sheets were divided into halves, quarters and eighths to produce other standardized paper sizes: folio, quarto and octavo.



Slogan cancel: "Use standardised formats". Switzerland adopted the metric system in 1929



Slogan cancel: "Use dinformat for business and private correspondence"

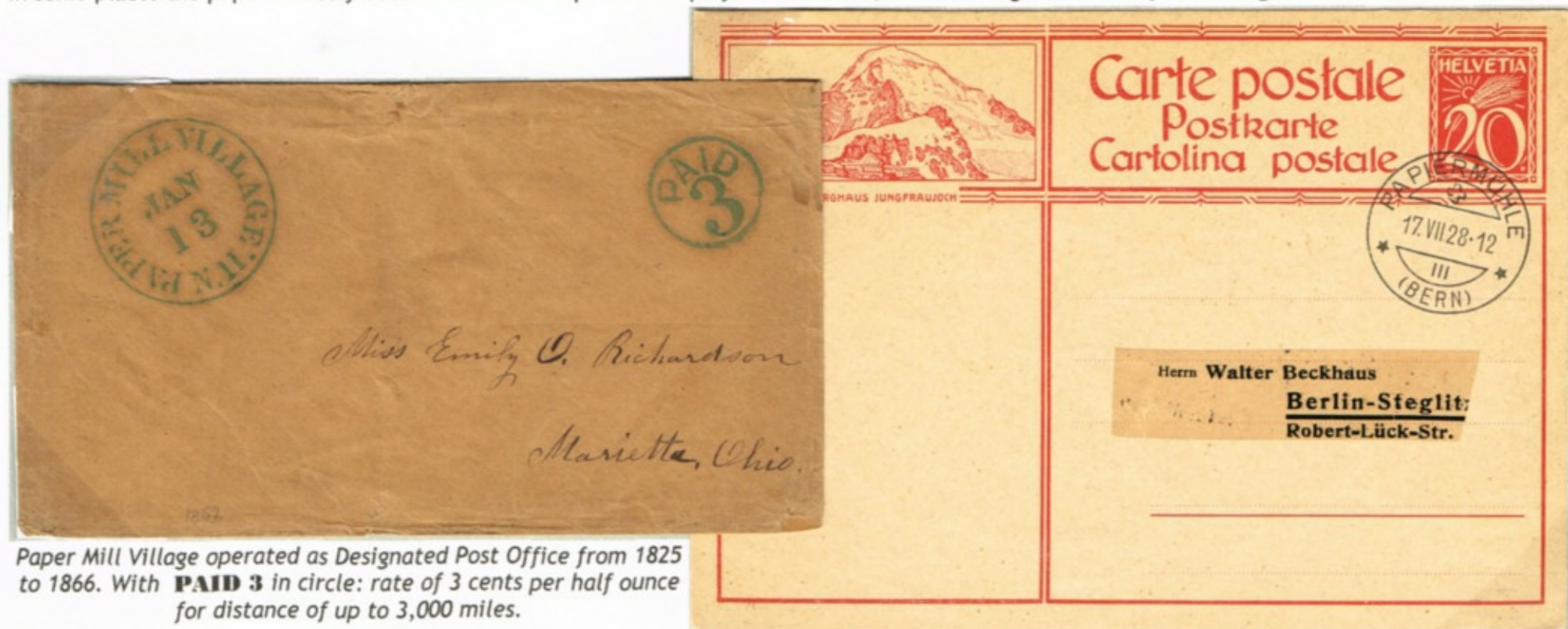
Slogan cancel exhorting the Czech technical standard (CSN)

Standard paper sizes today are defined by ISO 216, based on the German DIN 476 standard. The base A0 size has an area of 1 m², and all succeeding sizes are scaled down from this

"Use a standard format of paper and envelopes according to CSN 1010 . . . Uniform commercial official format A4". With illustrations of A2 to A8 sizes plus pre-metric surrounding A4

3.4 Economic impact

In some places the paper industry became the most important employer in the area, transforming the economy of the region.



Paper Mill Village operated as Designated Post Office from 1825 to 1866. With **PAID 3** in circle: rate of 3 cents per half ounce for distance of up to 3,000 miles.

Towns and villages were built around paper mills, the importance of which sometimes dictated the place name



By 1812 the city of Düren had 17 paper mills. Its importance to the area is now recognised by its Papiermuseum



Arnau, part of the Sudetenland in 1942 and now the town of Hostinné in the Czech Republic, was a paper making centre by 1835. Major firms later merged and today the town is dominated by KRPA Holding

4 A mill and a postal service: John Dickinson and silk-thread paper

4.1 Postal reform

John Dickinson was the world's first commercially successful manufacturer of machine-made paper, and his silk-thread paper had an important role in the introduction of the 1840 postal reform.

In 1829 Dickinson had patented paper with threads embedded in it, used by the government for Exchequer Bonds. In response to Rowland Hill's 1837 pamphlet *Post Office Reform* Dickinson prepared essays of prepaid postal stationery and had them printed by Charles Whiting. He gave evidence to the 1838 Post Office Commission of Enquiry and in 1839 he submitted the essays to the Treasury competition.



Sir Rowland Hill

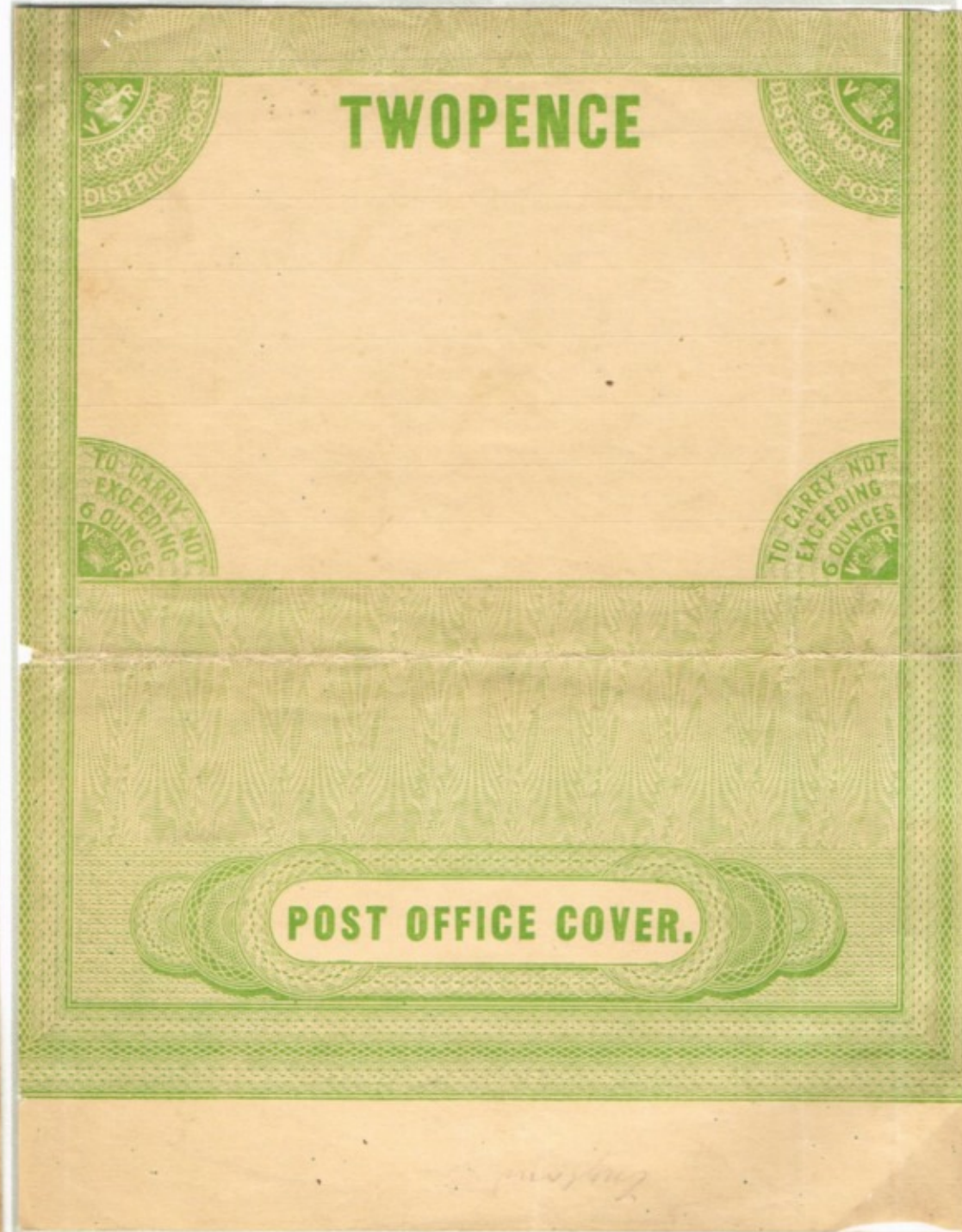
NB: The term 'silk-thread' was used as Dickinson's Patent no. 5754 refers to "cotton, flaxen or silken thread". However, scientific analysis by Christopher Earland in 1990 proved that they are actually cotton threads.



Proposal for an envelope or 'pocket'

Essay of an envelope to be used for prepayment of the one penny rate, for up to 1 oz within the London District Post. The threads run diagonally and are grouped in pairs.

The proposal was as a letter-sheet and an envelope.



Proposal for a single sheet

Essay of a two pence letter sheet, to be used for prepayment up to 6 oz within the London District Post. It has ten blue threads, approximately 10 mm apart, running horizontally across the middle (address) panel.

The 2d was only made as a letter-sheet.

4.2 Postal stationery

The reform resulted in the introduction of 'adhesive labels' (i.e. stamps) and prepaid covers. Letter-sheets and envelopes were each printed to value of 1d for letters up to half ounce and 2d for letters up to one ounce. They were designed by William Mulready, engraved by John Thompson and printed by William Clowes on John Dickinson silk-thread paper. The Mulready paper was made on two machines at Nash Mill supervised by three excisemen.



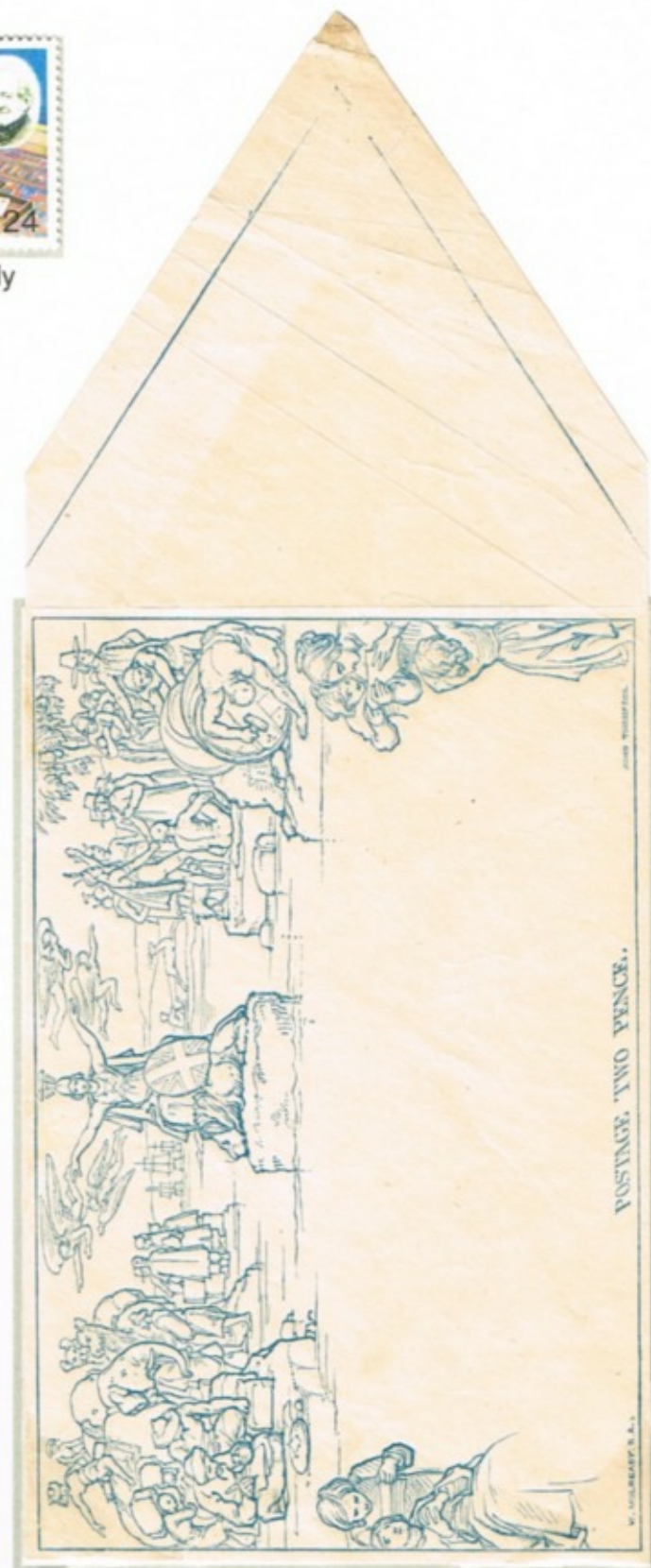
Mulready envelope on 1995 GB booklet commemorating the Uniform Penny Post.



William Mulready



Mulready one penny letter-sheet, stereo A30 with three silk threads at the top and two at the bottom fold.



Mulready two pence envelope, stereo a203 with three silk threads diagonally across top flap.

4.2 Postal stationery

Following public ridicule the Mulreadys were withdrawn from sale. They were replaced by embossed postal stationery printed on Dickinson 'silk-thread' paper.

The 1d pink and 2d blue envelopes were first issued within the Twopenny Post area of London before being supplied throughout the UK.

TO ALL POSTMASTERS.

GENERAL POST OFFICE,

Edinburgh, April, 1841.

REFERRING to Instructions, No. 3, 1841, and to the Circular which accompanied them, I now enclose you Specimens of the *New Two-penny Envelopes*, which you will permit to pass at the rate of Postage marked upon them.

The *Sale of these*, as well as the *New Penny Envelopes*, is, for the present, confined to the Limits of the London Two-penny Post.

By Command,

E. S. LEES,

Secretary.

Postmr.

of



SPECIMEN.

RARE example of Notice issued by the General Post Office in April 1841 supplying postmasters with specimens of the 2d envelope. Whilst Specimen envelopes are well-known they are usually found detached from the Notice.

*Ex- Colin Baker.
Huggins & Baker. Collect British postal stationery*

4.2 Postal stationery

Envelopes were introduced nationally in 1841 and letter-sheets in 1844. They all remained in use until 1857.



January 1841 envelope. Small size.
Groups of threads spaced 115 mm apart
Threads on right hand flap



April 1841 envelope. Largest size.
Groups of threads spaced 153 mm apart. Threads above stamp



1844 letter-sheet
Groups of threads parallel to top edge of sheet
12 July 1844
London to Manchester with London numeral cancel 1
and Manchester receipt



1841 largest size. Error: threads should have been positioned across the top right-hand corner, but variety EP6ba (Huggins) shows them mis-placed on the flap.

Huggins, A. (1970) British postal stationery

4.3 Stamps

Whilst silk-thread paper was used mostly for postal stationery it was also used for a few issues of stamps.



1 shilling green, with two vertical blue threads approx 5 mm apart

In 1847 silk-thread paper was used for Britain's only issue of embossed stamps. William Wyon submitted a rough design which included lines ruled across them to indicate the threads.



One shilling commemorated in 1970. Threads not shown.

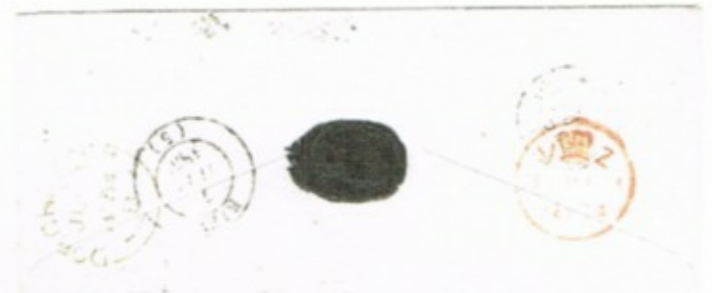


Ten pence brown paying the rate to France, cut to shape.

To Riez, Alpes-de-Haute-Provence 02 June 1854

With 256 numeral cancel for Dorchester and cachet P.D. To indicate Paid to Destination

Reverse has Dorchester CDS and Riez receipt 07 Jun 1854



Dickinson granted the Bavarian Paper Mill at Pasing a licence to manufacture this paper, which was used by Switzerland and Bavaria



Magnification of coloured thread
Munich printing

Switzerland 1854



Munich printing



Berne printing
Identified by colour
around Helvetia head



Bavaria 1867

5. Types of paper and paper products

5.1 Content of the raw material

By the nineteenth century ever increasing demand for paper led to the adoption of softwoods as the major raw material. Canada is particularly rich in these, including balsam fir, larch, and white and black spruce.

Wood pulp



Grand Fall Mill, Newfoundland, opened in 1909 specifically for the production of newsprint.

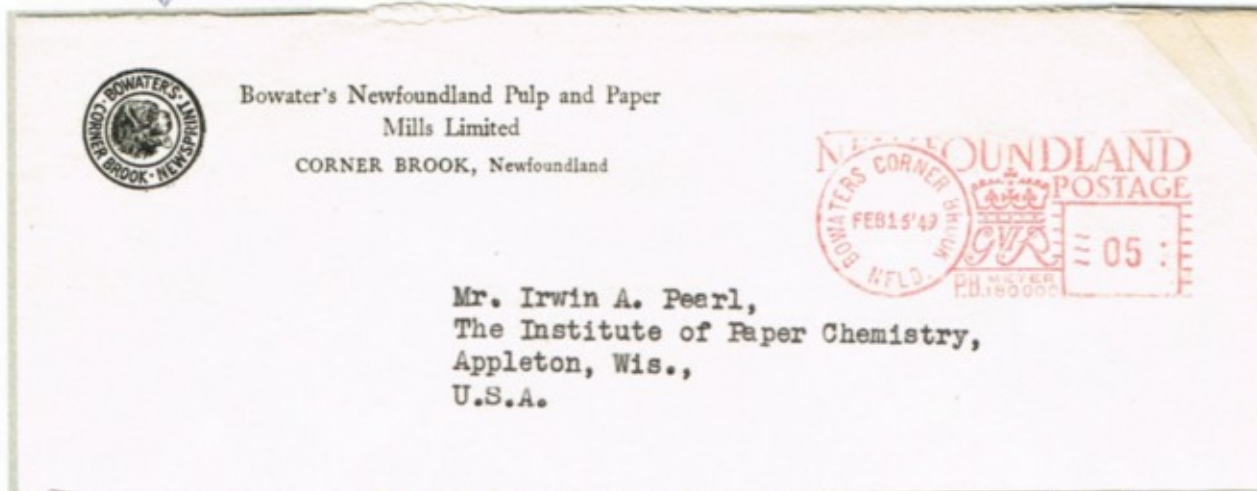
Error: imperf pair (with normal)



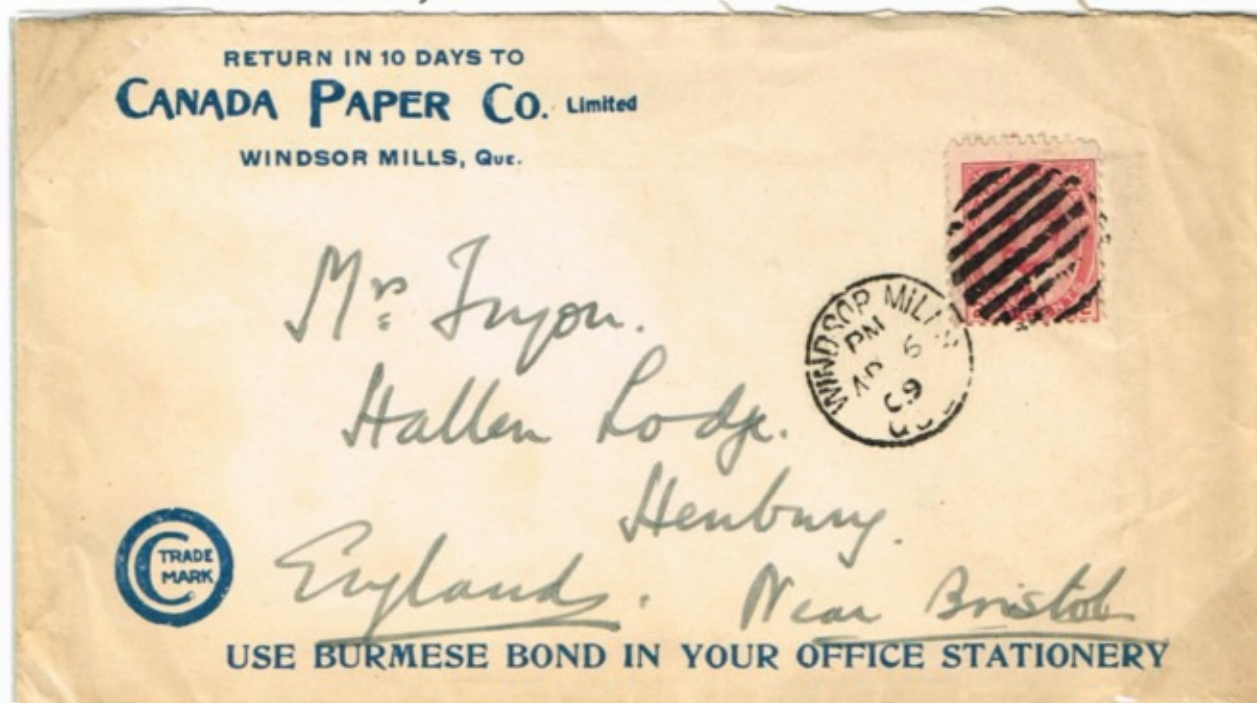
The province of Quebec has large forested areas and major rivers. Lachute was named after the various mills in the area

Ayers Limited were the largest Canadian producer of woollen felts for paper making

Back of cover



By the 1930's the largest producer in Canada was Bowater's, who had bought out Corner Brook and Grand Fall Mills
Pitney Bowes meter mark in use 1949-1977



Corner Brook Mill was built in 1923 by the Newfoundland Power and Paper Company.

Error: imperf pair (with normal)

Windsor Mills was founded in 1876 and its economy has always been built around the paper and pulp industry.

5.1 Content of the raw material

The forestry industry was now largely organised around the demand from pulp mills.

The felled logs were trimmed on site:



... and transported to the mill



Normal

Error colour shift

Error mis-placed perf



Die proof in black signed by the designer and engraver R. Serres. With issued stamp.

The mill takes in raw timber and sends out rolls of paper



The importance of forestry is illustrated by the University of Grenoble, whose international school of paper has organised symposia on the subject.



Error: misplaced perforation (with normal)



The process was complete: from tree to roll of paper

5.1 Content of the raw material

However wood needs treatment to produce good quality paper. There are specific terms for each treatment. The most basic is mechanical wood pulp, which uses all the wood except the bark. Lignin and other substances which cause the paper to discolour and crumble are not removed. It produces poor quality paper which quickly deteriorates. Newsprint (the paper for newspapers) has traditionally been made from mechanical wood pulp derived from softwood species of trees.

Wood pulp for newsprint



Charles Fenerty invented a wood pulp process for papermaking in 1844 which became widely used for making newsprint.



Although Fenerty is always credited with the invention, Friedrich Gottlob Keller was working on an experimental wood grinding machine at the same time.



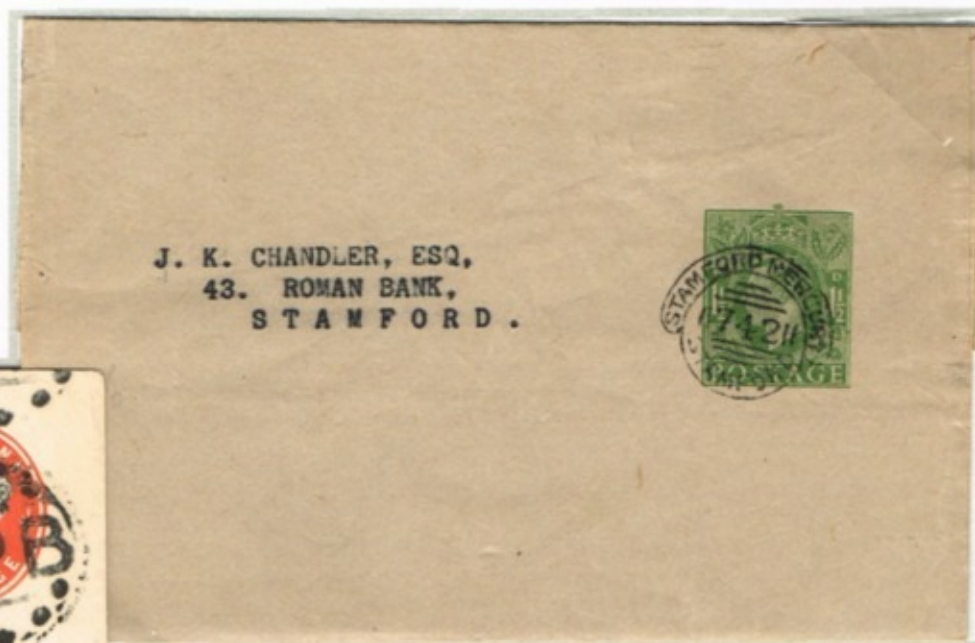
Swedish newsprint production used by foreign newspapers



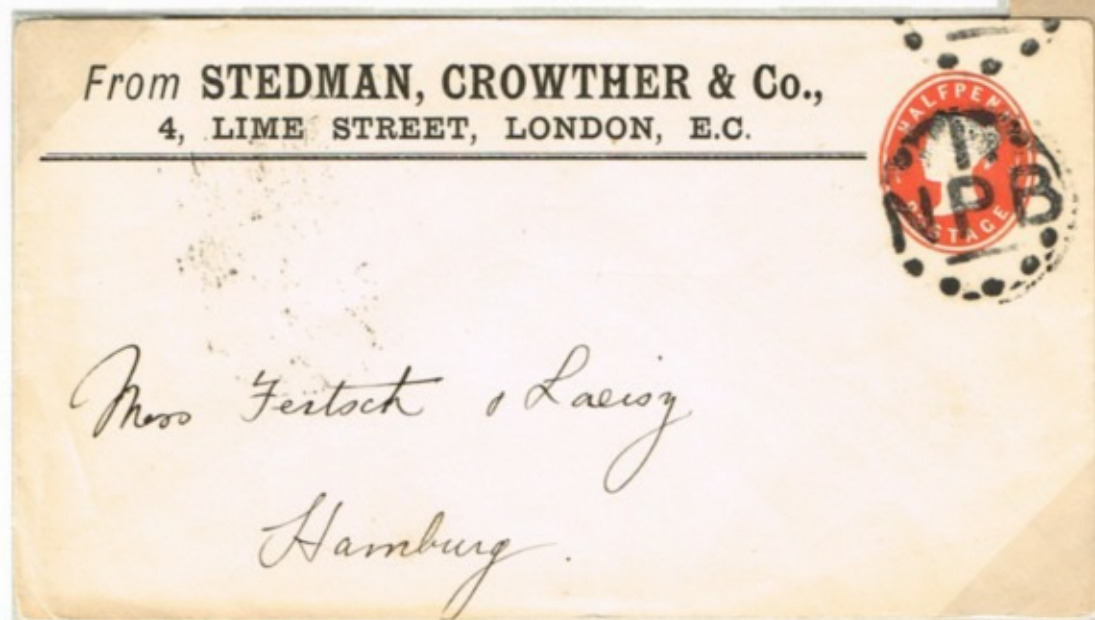
Yellowish paper in comparison with the rest of the set
Printed in Paris on newsprint



The Günther and Richter wood mill was built in 1880 to manufacture spruce wood pulp for newspapers



The Stamford Mercury newspaper has used a special cancellation on its wrappers since the 1870s
Duplex cancellation 742 applied at Stamford Head Post Office



Undated London Newspaper Branch cancel to Hamburg
NPB mark, introduced following the 1870 Newspaper Act,
was used for bulk-posted mailings overseas

5.1 Content of the raw material

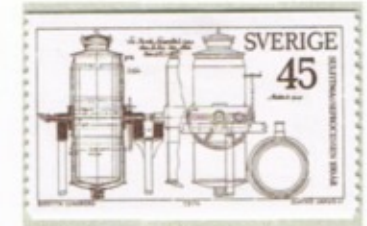
Better quality paper requires the pulp to be treated to remove impurities. The term 'chemical wood pulp' refers to pulp which has been boiled with chemicals in order to remove its unwanted constituents.



'Wood-free paper' means that, although made from wood, it does not contain any mechanical wood pulp. *Chinese wood-free paper. Sun Yat-Sen fifth issue 1942-46*



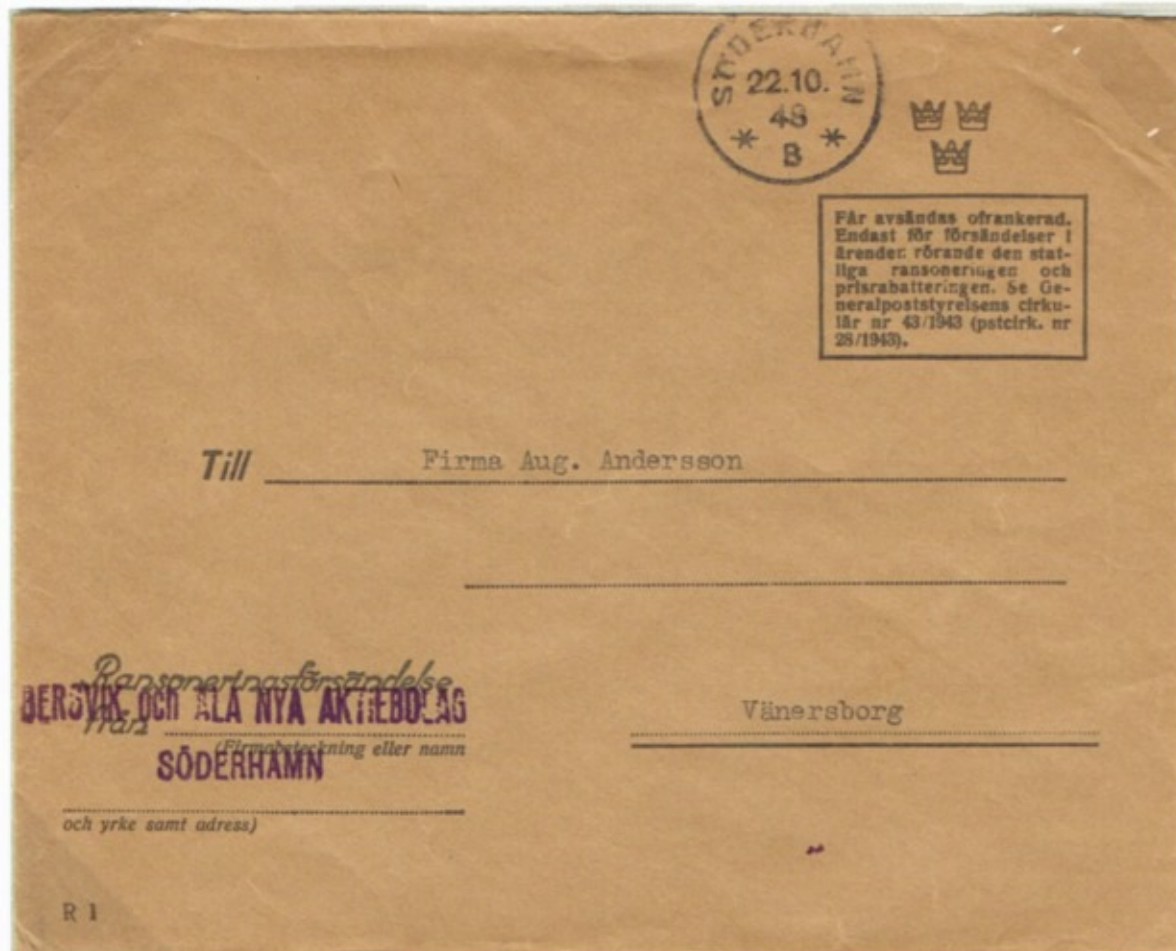
The first used chemical treatment of pulp was the addition of a bleaching agent. In 1775 Carl Wilhelm Scheele discovered chlorine which was soon used to bleach paper.



In 1872 Carl Ekman invented a process for bleaching wood pulp with a sulphite solution, producing a clean, white pulp. Stamp shows a drawing of the first industrial digester.



The Rosenthal Pulp and Paper Mill at Blankenstein was built in 1883. In 1976 a new sulphite pulp mill was built on the site.



Bergvik & Ala Nya Aktiebolag was the world's first sulphite pulp mill, built 1874.

Freepost official cover from Bergvik, Söderhamn, to Aug. Andersson, Vänersborg 22.10.48.

Envelope size R1. (3 sizes were issued).

Authorised for free mail. Both sender and receiver had to be registered with the authorities as being part of the rationing system in operation during the war effort and post-war reconstruction.



The first chemical wood pulp mill in Canada was built at Windsor Mills, Quebec, using the soda process: adding caustic soda to wood pulp to aid breaking up the fibres.

5.2 Treatment of the raw material

The surface of a paper sometimes needs additional treatment to make it suitable for use. Coated papers are those which have been coated by a compound or polymer to impart certain qualities, such as surface gloss, smoothness or reduced ink absorbency.

Coated papers

WIGGINS, TEAPE & ALEX. PIRIE (EXPORT) LTD.,
ALDGATE HOUSE,
46-58, MANSELL STREET,
LONDON,
E. 1.

Back flap



A.G. SIM ESQ.,
c/o GALLE FACE HOTEL.
COLOMBO.
CEYLON.



a Extra superfine, very white
b Special finish, very thin
c Special finish, very thin, glazed on face only
d Special finish, very thin, glazed on both sides

George V Downey Head paper trials 1912, on wove paper.
Type a was printed on paper manufactured by John Dickinson; all others (b - h) were on John Allen paper from Stowford Paper Mill.
Types a - d are in carmine; types e - h in scarlet.
Description of each paper type given.



e Special finish
f Machine finish underside
g Thinner
h Special finish, gummed

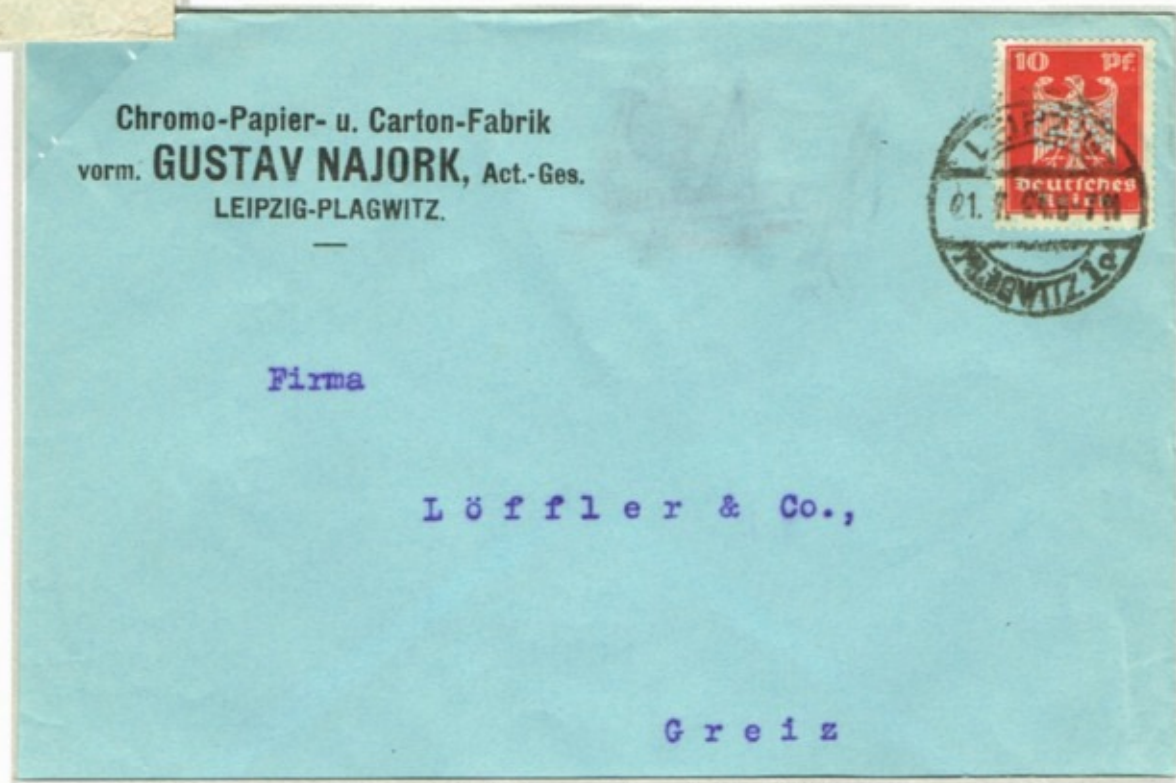
Wiggins Teape opened a mill making greaseproof paper at Dartford, Kent, in 1933. It operated two machines until closed in the 1980s.

W T perfin London to Colombo 7 January 1945
Franked 3s 9d = rate 1s 3d per half ounce, so 1.5 ounces.
Rate valid Dec 1941 - Sept 1945



Chalk-surfaced

Coated with a chalky solution to avoid tampering.
Paper manufactured at Roughway Mill, Tonbridge
1906 De La Rue printings 1909



Gustav Najork were founded in 1868 and specialised in coated papers including art paper
Perfin GN

5.2 Treatment of the raw material

There are a variety of uses for chemically-treated paper.

Chemically treated papers

Photographic paper is light-sensitive

Leo Baekeland is primarily known for his invention of Bakelite; but he also invented Velox photographic paper in 1893, the first commercially successful photographic paper.



Eastman Kodak were founded in 1888, first making cameras. They started manufacturing photographic paper in 1898 after buying the patent from Leo Baekeland

Invented in 1801, carbon paper was coated with a dry ink or pigment in order to make copies of documents



Founded in 1855 Gimborn made carbon paper from 1929 until World War II
Batavia (Jakarta) to Arnhem 30 July 1936



"Gold beaters" paper, saturated with resin to make it transparent. Design printed in reverse on underside; gummed on same side. Extremely thin paper which shows positive impression on face. Could not be removed from a cover without being damaged.

1866 parcel stamp, not sold to the public but affixed in the post office to heavy packets.



Bluish

Bank note paper imported by the German authorities in 1942, initially to produce local notes and subsequently to print stamps. Blue tinge was caused by an unexplained chemical reaction between an agent in the paper and the gum arabic added to the back of the stamp.

Occasionally the chemical treatment can be an accidental reaction



Red-brown



Blued



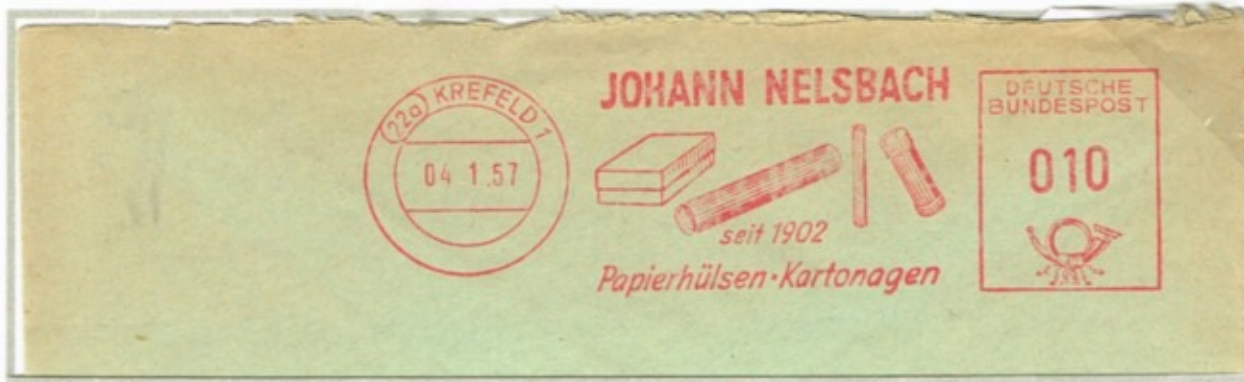
Deep red-brown

Pale blue tinge caused by ingredients used in the manufacture of the printing ink and/or paper, or by the chemical reaction of one on the other

5.3 Characteristic types of paper

Cardboard is a generic term for a heavy-duty paper of various strengths. Robert Gair invented the pre-cut cardboard or paperboard box in 1890.

Heavyweight



Nelsbach manufactured and distributed cardboard products, specialising in cardboard tubes



Symbolic rolls of paper and pasteboard



Bagasse is the fibrous matter that remains after sugarcane or sorghum stalks are crushed to extract their juice. It is used to make containerboard

Stempelbild

Francotyp: Cm 28282	Kennzahl:
Firma: Papierfabrik Kirchberg, Krieger, Meuser & Co. K.G.	
Post: 5171 (220) Kirchberg über Jülich	
Motor: Tornado Nr. K 040231	220 Volt ~ Ps 1,35 Amp.
Geliefert: 12.4.57	
Wertkartenbetrag: DM 500,--	
Permutationsnummer: B 4697	
Klischee: 1 auswechselfest	
Spezialeinrichtungen:	
Merkmale: 275.200	

3000, 12. 56. Fabrik Stolzenberg

Kirchberg were founded in 1897, specialising in corrugated board: a special kind of containerboard with a liner and inner curled card.

Francotype sample card roller cancel, created when the machine was sold, showing technical details of the machine and updated change to the stamp.



1946 postmark commemorating Lucka's fine corrugated cardboard industry



Lozano Hermanos Group were founded in 1966 and produce cardboard and paperboard

5.3 Characteristic types of paper
Lightweight papers have various uses.

Lightweight

Edward VIII booklet



Ford Blotting Paper advertisements, Type D, issued in 1936. Eight different colour advertisements were used, Dark Green is described as SCARCE (Ramsey, GB Journal v.52 (1) 2014).



Thickness and weight do not always correspond. Blotting paper is very thick, but with no sizing it is lightweight



Cartiera Rossi, founded in 1878, now produces crepe and tissue papers.
Perfin CR

Weight could sometimes be critical, for instance for items carried by air. This is an item of siege mail on flimsy paper

Official Feldpost printed on very lightweight paper during Siege of Przemyśl. Feldpost 'cards' were individually numbered, this one 29942, carried on 18 January 1915, landing at Brzesko, southern Poland.



Przemyśl to Marienbad, Bohemia
With flight mark Fliegerpost Przemyśl 1915
Circular IX/54 control "camouflage"
(where "IX" stands for Galicia and "54" for Przemyśl)
Red ZENSURIERT applied at Brzesko



5.3 Characteristic types of paper

Security papers

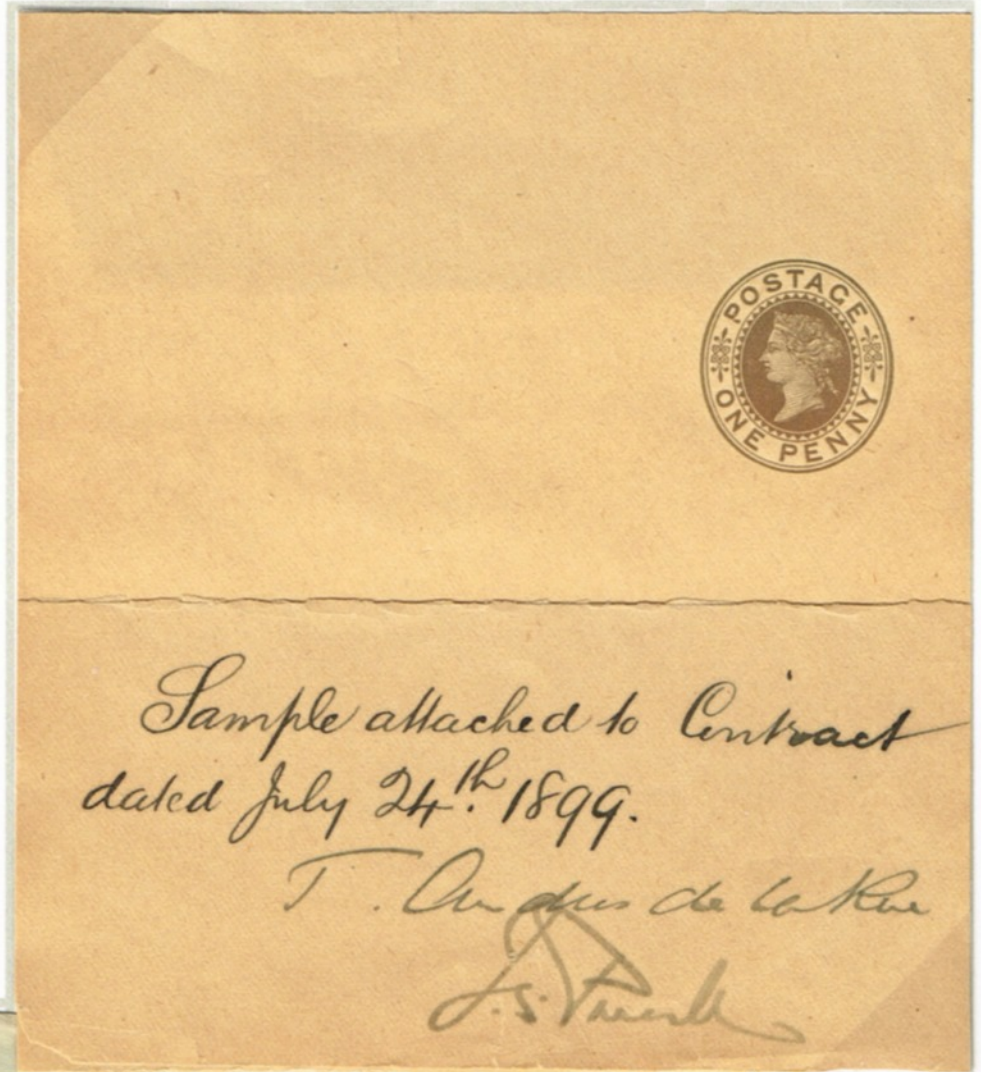
Security papers are required to be tamper-proof and anti-counterfeit. Special features applied directly into the paper structure during the manufacturing process include watermarks, security fibres in the pulp and special coatings.



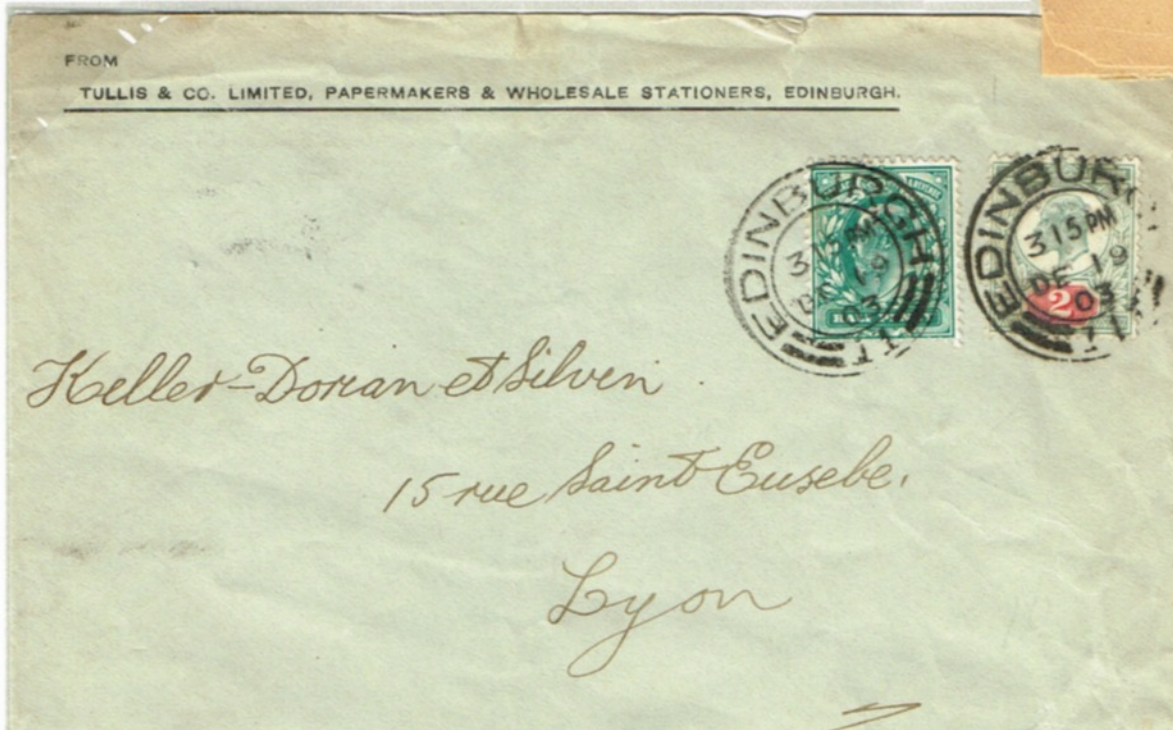
- On 17 July 1862, during the American Civil War, the US Congress authorised the issue of "postage currency" issued on US Treasury paper. They acted as negotiable currency until 27 May 1863



De La Rue (from February 2018 Portals De La Rue) own mills making security paper at Bathford and Overton



De La Rue imprimatur of 1d newspaper wrapper with ms "Sample attached to Contract / dated July 24th 1899" plus signature of Thomas De La Rue



Founded by Robert Tullis in 1809 the company is now Tullis Russell and makes security papers for visas, postage stamps and tickets and vouchers
Perfin T of Tullis & Co
19 Dec 1903 to Lyon. Foreign letter rate 2½d up to ½ oz



Paper for the Penny Black was supplied by Rush Mills, made under official supervision.

5.4 Paper products

Paper has many uses, the earliest being as a writing material. The role of the stationer - suppliers of commercially manufactured writing materials - goes back to the thirteenth century.

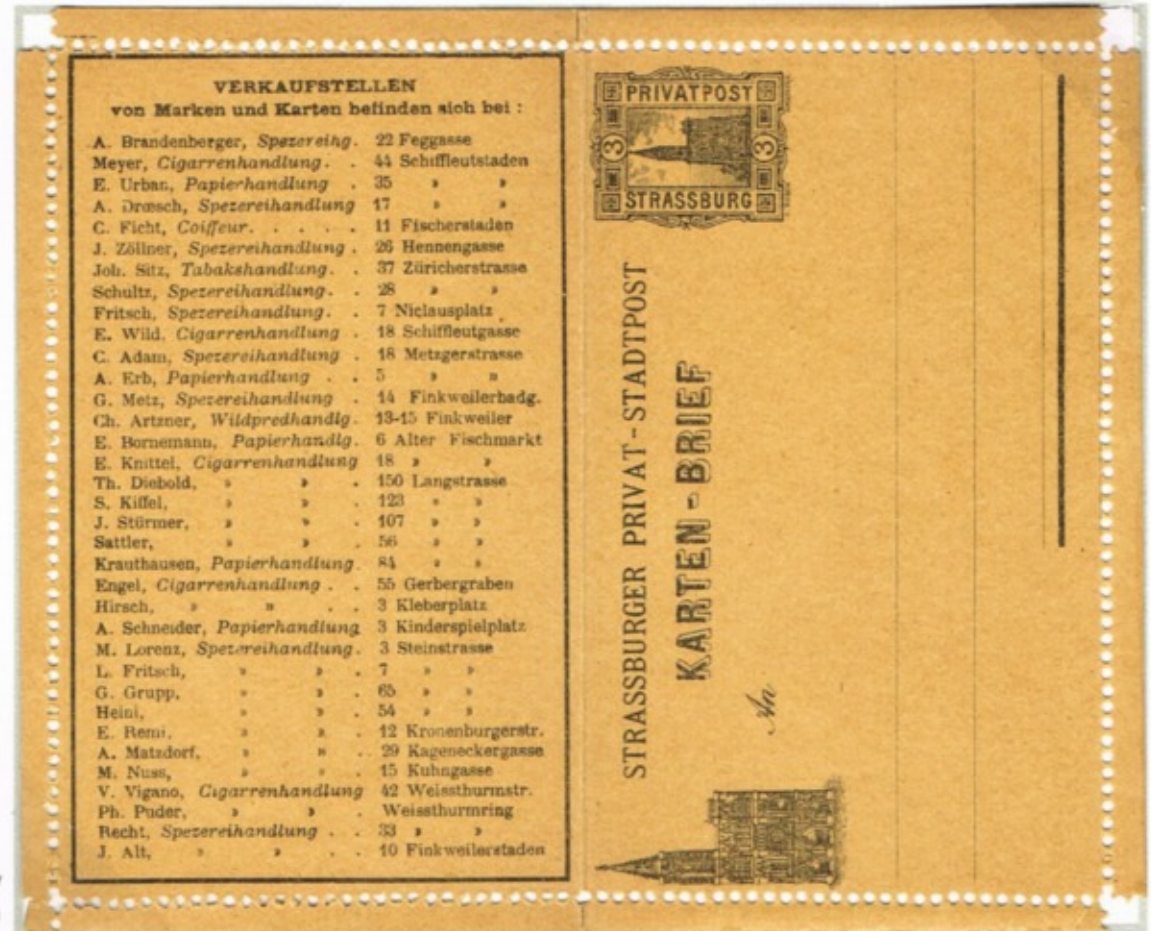
Writing materials



Basildon Bond was created by Millington and Sons in 1911
1929 booklet with PUC stamps, watermark inverted



When Thomas De La Rue first set up in London he ran a fancy stationery business. *Offset printing on reverse (with normal)*



Addresses of shops include five for stationers
Strasbourg privately printed postal stationery
for use within the city, c.1880



W. H. Smith & Sons were established as a stationer and bookseller in 1846
Perfin W H S (sideways)



Good quality notepaper was in demand
Edward VIII booklet pane
(watermark inverted)

5.4 Paper products

Its next use, fuelled by the spread of printing, was for books and magazines.

Books and magazines



International Book Year 1972

Illustration is painting by Jutta Damme "Young Worker Reading". Set of five progressive proofs with partial and final colours, plus issued stamp



Book printer Ohlenroth'sche Buchdruckerei Perfin O B



In 2015 there were 7,293 magazine titles published in the USA. USA postal stationery envelope



1945 booklet



Schematic design representing tree being turned into book
Error: imperf at bottom. With normal



5.4 Paper products

From the sixteenth century cheap paper was made to use as a packaging material.

Packing and Wrapping



E.S. & A. Robinson were founded in Bristol in 1844 making paper bags for groceries.

1/2d stamp with SE/RA [i.e. reversed] perfin tied by Bristol machine cancel
30 June 1924. Inland printed paper rate up to 2oz



Founded in 1921, these days Carl Hanf concentrates on packaging, but historically made papier mâché masks, hence its meter mark



Hinde & Dauch was founded in 1880 and later sold to the West Virginia Pulp and Paper Company



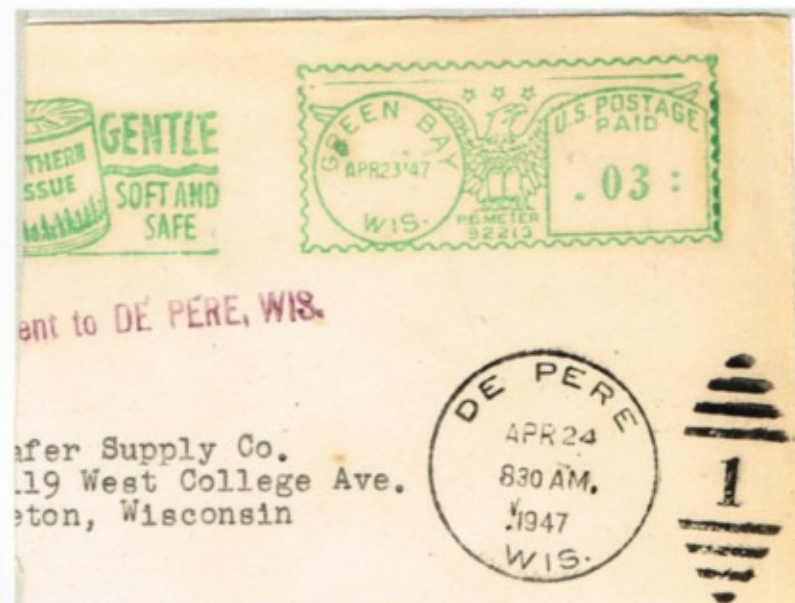
Decorative wrapping paper is a twentieth century feature

Hadrbolec, Czechoslovakia's first paper mill, produced Balicí Papír, i.e. wrapping paper

5.4 Paper products

Domestic items

A range of different paper products have been found in the kitchen and bathroom since the nineteenth century.



Essential in the bathroom!

The company was originally founded as G. W. Dray & Sons in 1856 and was an early producer of rolled - rather than flat sheet - toilet paper. It changed its name to Drayton in 1910 and widened its products, but kept the original perfin.

DRAY perfin

29 March 1939 Fulham to Canada
Overseas surface printed paper rate



The coffee filter was invented in 1908
PostModern private post company operates throughout Germany



Grigiškės make kitchen paper



15 centime postal stationery letter. In 1877 letter cards were sold for 5 centimes, the balance of 10 centimes being financed by advertising revenue



5.4 Paper products

A wall covering today more commonly made from vinyl, historically it was a paper product made from wood pulp and known as 'paper hanging'. It has been made by machine since 1840.

Wallpaper

THE WALL PAPER MANUFACTURERS LTD.
SMITH & BUTLER BRANCH

Back flap

Harehills, LEEDS

USE
Crown
WALLPAPERS



Messrs. Tom Stone & Son, Ltd
1 & 2, Weymouth Street,
BATH.



NORTA
TAPETEN



NORDDEUTSCHE TAPETENFABRIK HOLSCHER & BREIMER

Drucksache!

NORTA (Norddeutsche Tapetenfabrik) were founded in 1903 as specialist wallpaper manufacturers. They closed in 1979.

Smith & Butler Wall Paper Manufacturers Ltd.
2½d stamp with S & B perfin

Crown Wallpapers were founded in the UK in 1899

RETURN IN FIVE DAYS TO
ATLAS WALL PAPER MILLS, INC.
COAL CITY, ILLINOIS



Atlas Wall Paper Mills were founded in 1925

THE WALL PAPER MANUFACTURERS LTD.
ALLAN COCKSHUT BRANCH
Back flap
OLD FORD ROAD,
LONDON, E. 3



"Seaweed" designed at Morris's workshops by John Henry Dearle

From 1862 the company of Morris, Marshall, Faulkner & Co. (later Morris & Co.) led by William Morris, started producing wallpapers.

USE
CROWN
WALLPAPERS



Messrs. Brooks, Thomas & Co., Ltd.,

Sackville Place,
DUBLIN.

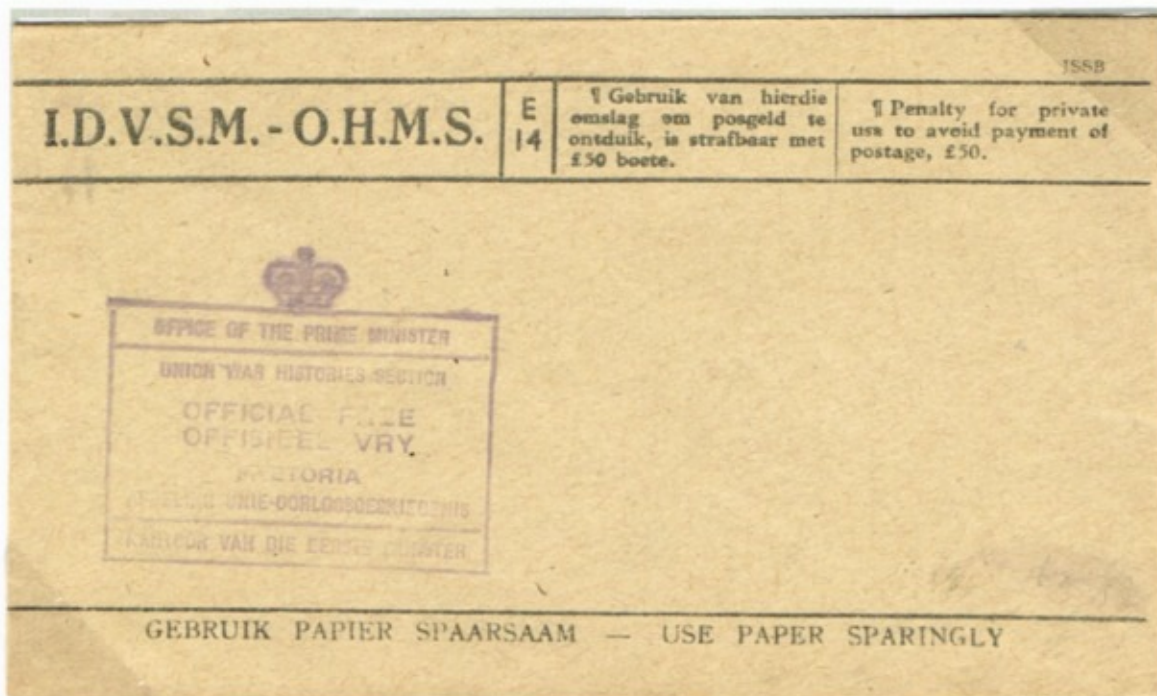
Eire

Allan Cockshut Wall Paper Manufacturers Ltd. Stamps with AC/Co. perfin

6. When supplies ran low

6.1 Paper became a sought-after product

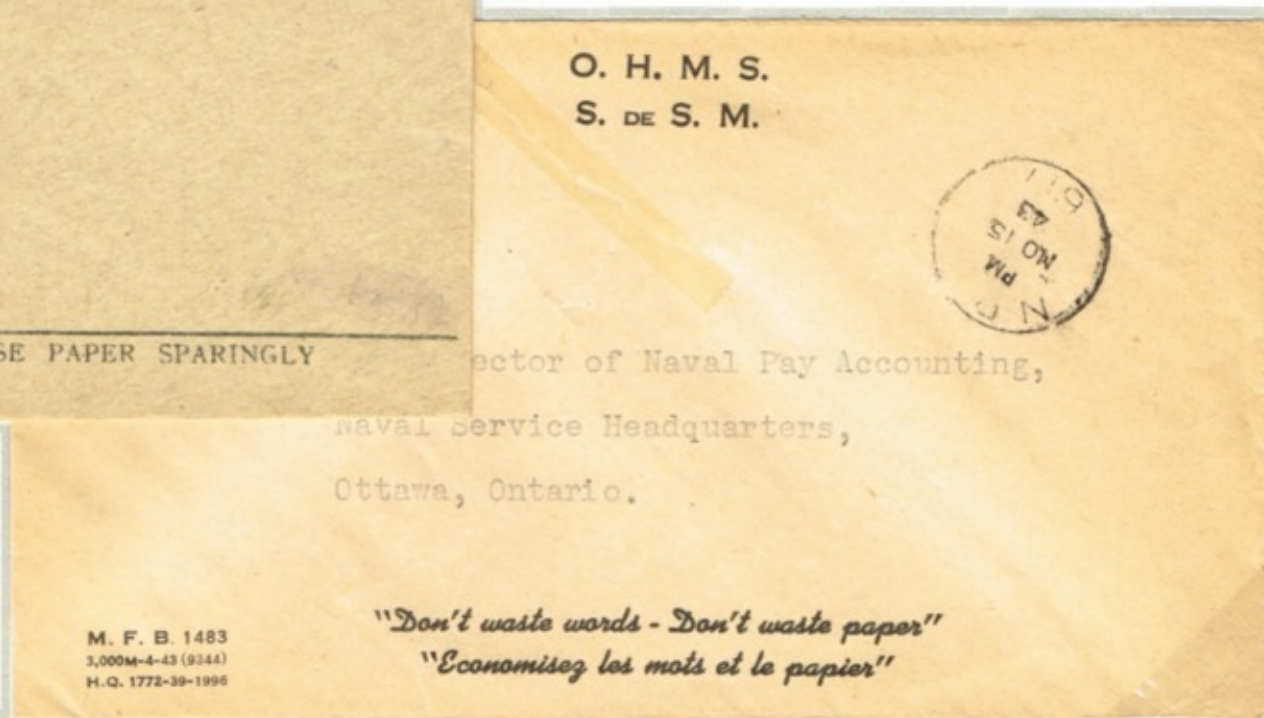
By the twentieth century paper had such a wide range of uses that shortages, often caused by economic depression or the effects of war and its aftermath, caused real problems. In such times the public were encouraged not to waste paper.



South African official mail with printed message
"USE PAPER SPARINGLY"



15 November 1943 Deep Brook Nova Scotia to Ottawa.
Reverse: boxed cachet for H.M.C.S. Cornwallis.



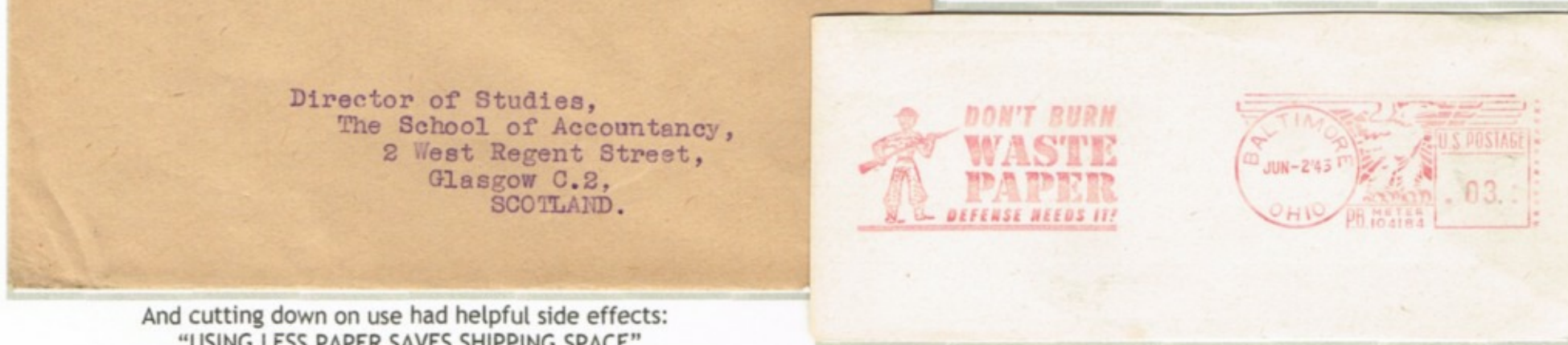
Director of Naval Pay Accounting,
Naval Service Headquarters,
Ottawa, Ontario.

"Don't waste words - Don't waste paper"
"Economisez les mots et le papier"

M. F. B. 1483
3,000M-4-43 (9344)
H.Q. 1772-39-1996



Bilingual slogan on Canada official mail:
"DON'T WASTE WORDS, DON'T WASTE PAPER"
Military free mail. Naval Post Office 617 H.M.C.S.
Cornwallis Training School.



And cutting down on use had helpful side effects:
"USING LESS PAPER SAVES SHIPPING SPACE"

6.1 Paper became a sought-after product
 One way of saving paper was to reduce the amount used.



Registered Durban to Washington
 06 May 1944. Opened and resealed by censor



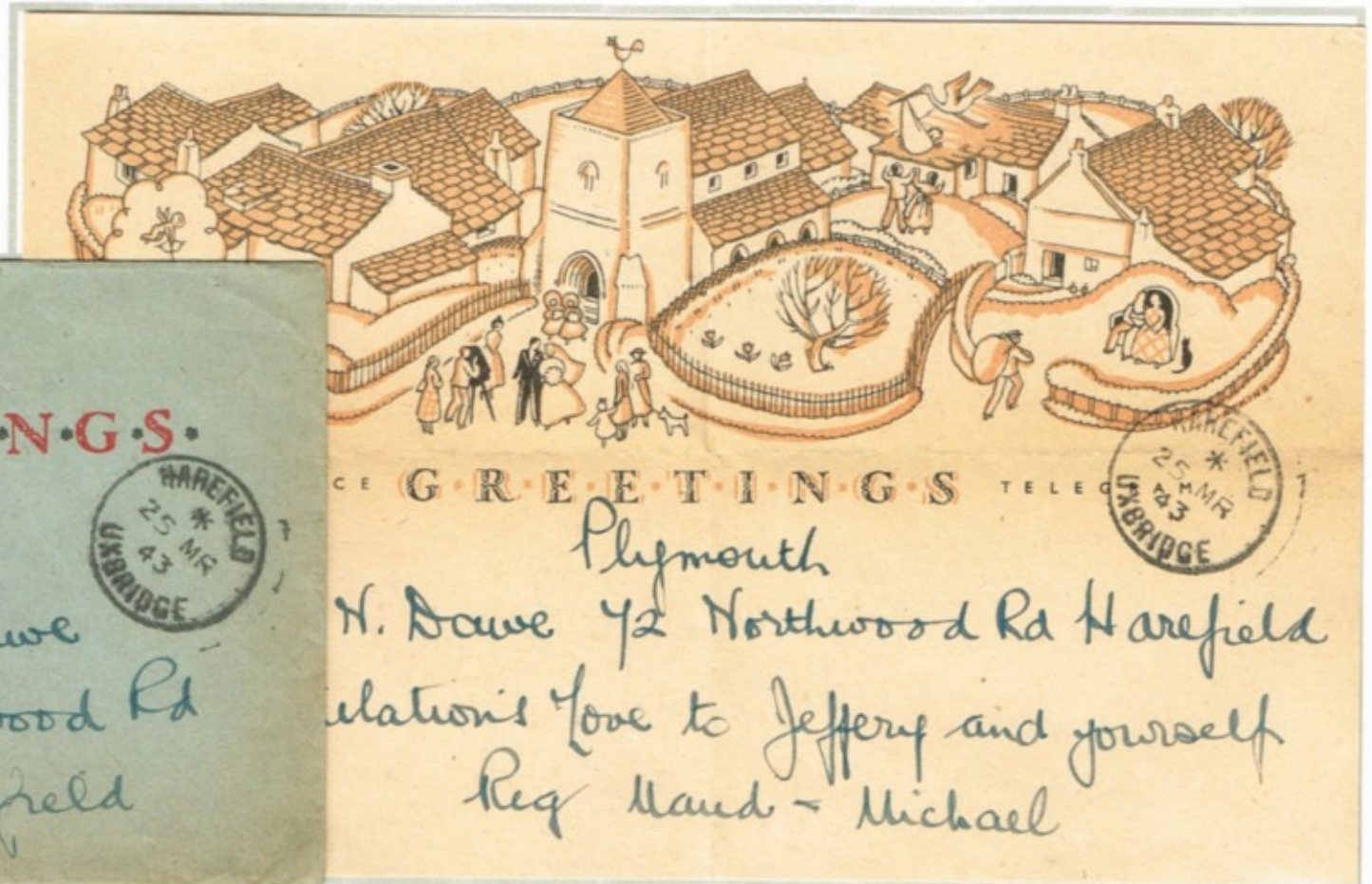
Ladybird started publishing small-sized children's books in the early days of World War II. Each book consisted of 56 pages printed on a single piece of paper 40 inches x 30 inches. This unusual format was a direct result of wartime paper shortages.



Issued in bilingual
 pairs or strips of three



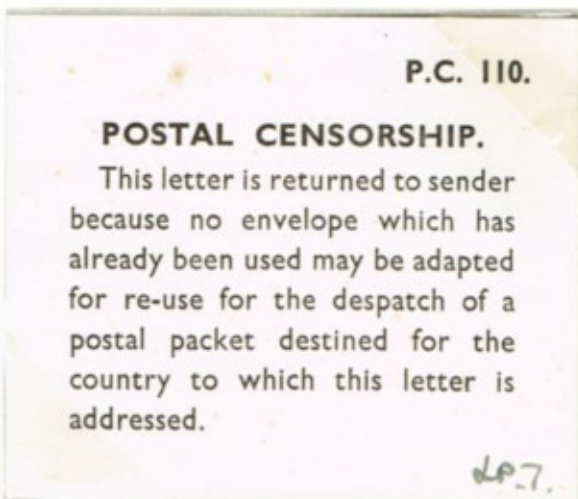
South Africa's 1941 'War Effort' set was reissued in 1942 with the same designs but reduced to half size to save paper and ink.



From the outbreak of World War II the British government introduced paper controls. Raw materials were rationed: by 1942 paper mills were only getting around 25% of the 1939 levels of raw materials to make pulp. Economies were introduced by the British Post Office who amended their greetings telegram service to save paper and ink. In 1940 the size of the telegram was reduced, and in June 1942 an economy form was issued, smaller again in size, printed in black and brown only and on a much inferior paper. The Greetings Telegram service was suspended 30 April 1943, not reintroduced until 20 Nov 1950.

6.2 Recycling became a necessity

Another was to reuse items such as envelopes. War Economy labels were introduced, and slogans encouraged the public.



Censorship labels:

PC23 Returned to sender by the censor. Subtype B, known period of use 01 Sep 1939 - 16 Dec 1943.

P.C. 90 Opened by Examiner 6552.

P.C. 110 Postal censorship. Subtype A, known period of use 13 May 1941 - 14 Nov 1942.

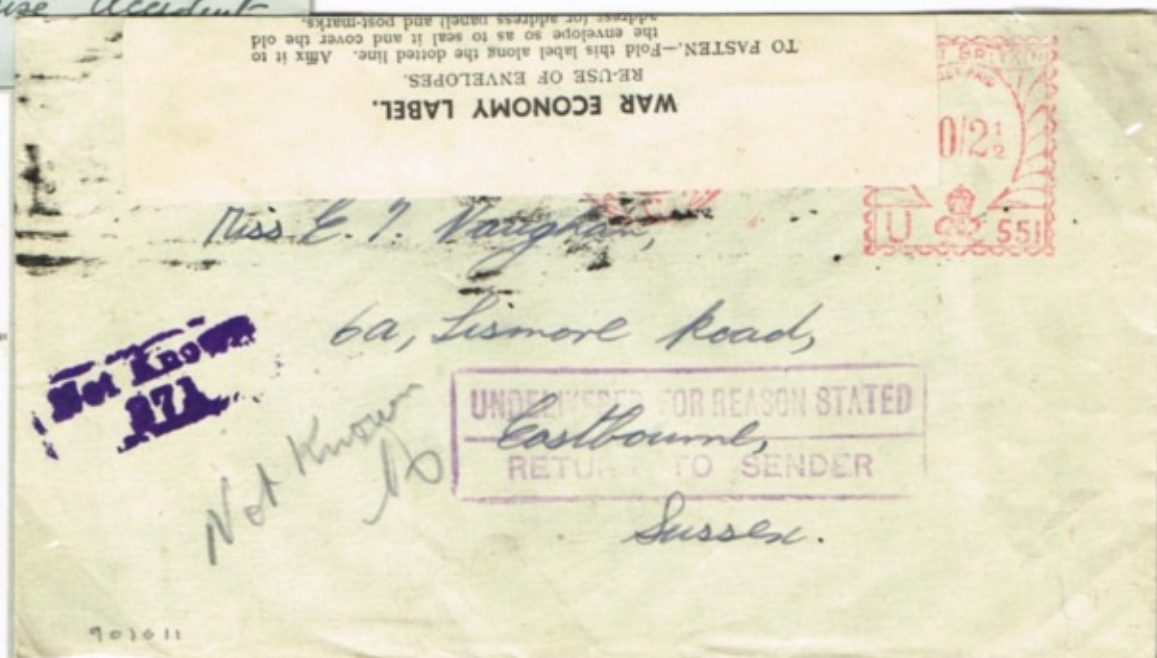


But care was needed when reusing envelopes
 Illegal use of re-use address label
 Originally addressed to Limerick, Eire, posted 23 August 1941, the cover has been opened by censor examiner 6552 and returned to sender. The enclosed memorandum explains that re-use address labels may not be used for mail to the Republic of Ireland. The rule was intended to guard against possible hidden messages written on the back of the label

Translation of slogan:
 "A RETURNED ENVELOPE CAN STILL BE USED"

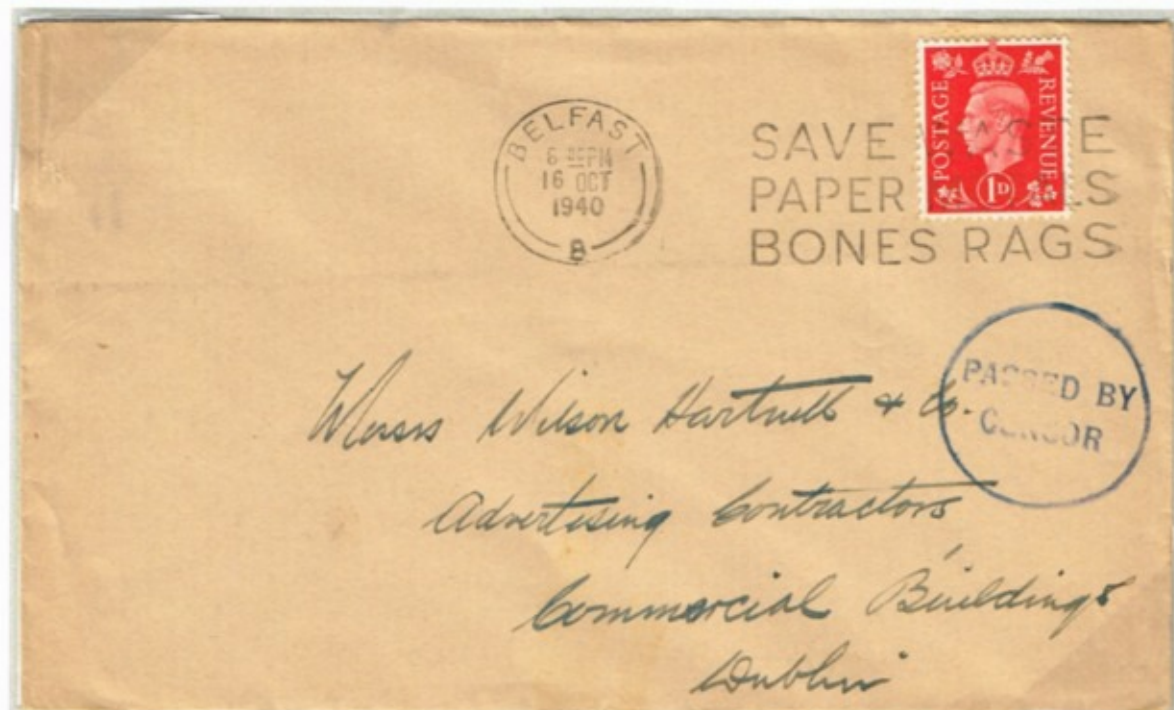


Official war economy label



6.2 Recycling became a necessity

Where paper could not be reused in its original state people were urged to collect it for recycling plants.



"SAVE WASTE PAPER METALS BONES RAGS"

With RARE circular PASSED BY CENSOR. Morenweiser "British civil censorship devices, World War II" states only six covers known in total for this and one other circular design, all used in Belfast. The illustration in Morenweiser shows a poorer strike than this example.



Translation of slogan:
"WASTE MATERIAL IS RAW MATERIAL.
COLLECT OLD PAPER"



1945 overprint "COLLECT WASTE PAPER"



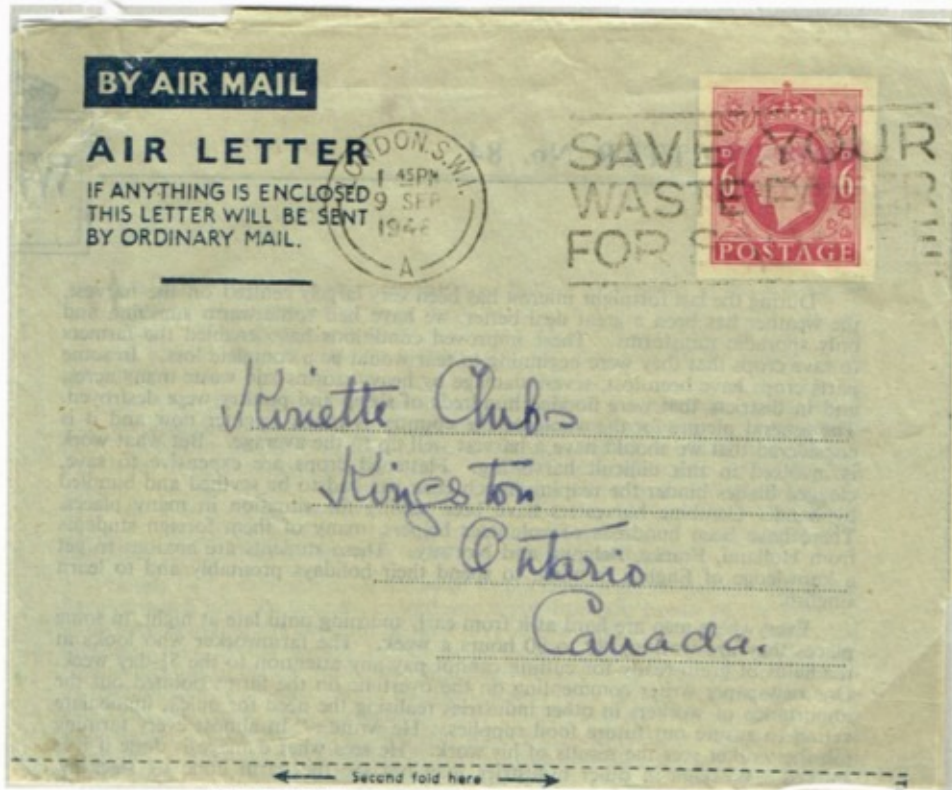
"SAVE METALS RAGS AND WASTE PAPER" Ottawa to Missouri 29 November 1943

Opened, resealed and signed by censor "Opened to verify contents in accordance with requirements of Foreign Exchange Control Board and officially sealed by..." Tied with numbered censor cachet

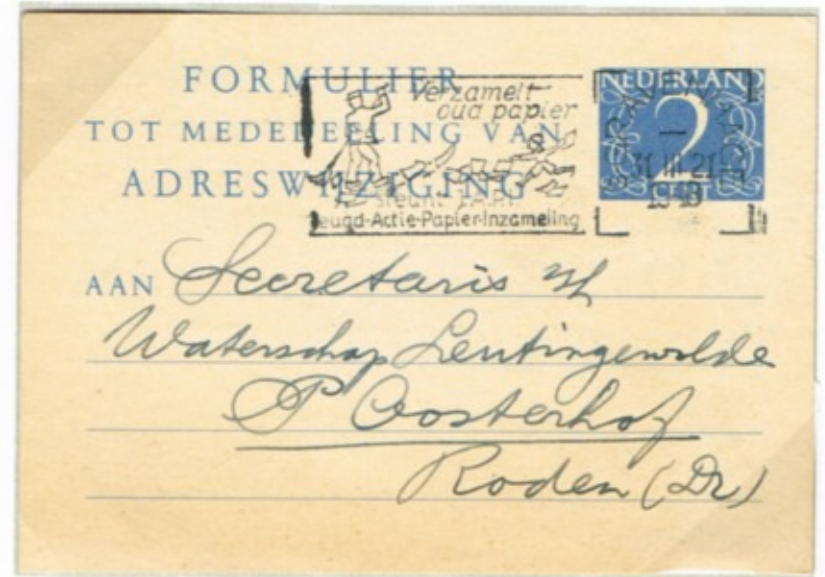


Translation of slogan:
"SAVE OLD PAPER. OLD WHITE BECOMES NEW"
White paper was wanted as it needed less bleaching when recycled
Turned cover, reverse used in 1943
Local to Rotterdam 14 January 1944

6.2 Recycling became a necessity
Governments ran recycling campaigns.



Second fold here
"SAVE YOUR WASTE PAPER FOR SALVAGE"
Slogan cancel in use 06 - 30 Sept 1948



Translation of 1948 slogan:
"COLLECT OLD PAPER. YOUTH ACTION PAPER COLLECTION"



1930 postal stationery showing a picture of people bringing waste to a collecting station. Illustration captioned "RECYCLE RAGS, ROPE, PAPER, BONE"



Translation of slogan:
"PAPER IS SCARCE, SAVE IT"

6.2 Recycling became a necessity
 But recycled paper was of inferior quality.



Pre-war. Scarlet

In Britain in both world wars paper was one of the first things to be restricted by government order. A Department of the Paper Controller was set up under the Board of Trade. Continuing shortages of raw material meant inferior paper was still in use after World War I.

Stamps printed on paper supplied by William Joynson: poorer quality paper, used between 1917 and 1921. Identified by its darker colour.



Inferior paper "toned". Brick-red

Shortages in France resulted in the definitive series being printed on a low quality paper known as GC (Grand Consommation) from its marginal inscription.

Originally intended for the sole use of values that required large printings (hence Grand Consommation, or large consumption) eventually it was used for all values printed between 1916 and 1920.



Translation of overprint: "INDUSTRIAL WAR ECONOMY".
 Paper is darker, thinner and coarser.



6.2 Recycling became a necessity

Postal authorities were sometimes forced to utilise stocks of paper originally intended for other purposes. Latvia suffered paper shortages when it declared independence in 1918, forcing its post office to use whatever paper was available.

Its first issue was printed on the back of German ordnance maps of Western Russia. 63 different maps were used, each identified by the marginal inscription, in this case L17 Wiexznie (that being the largest town on the map).



In 1920 it was forced to use half-printed banknotes, where only one side had been printed. Notes partially prepared by the West Russian Volunteer Army which occupied Riga from January to July 1919



Printed sideways in relation to banknote


6.2 Recycling became a necessity

Postal authorities also used their own supplies of paper.



The Mexican Revolution produced another example of wartime shortages. In 1915 the State of Oaxaca printed provisional stamps on the back of Post Office forms. Complete sheet, printed sideways in relation to form. Examples showing the emblem of the Mexican Eagle are uncommon.

FORMA 693



DIRECCION GENERAL DE CORREOS
MEXICO
SECCION DE INSPECCION
MESA 1^a

*CUESTIONARIO de visita practicada a la Administraci3n
en*

TRANSPORTES. — MESA 2^a

- 1.—Por estar pr3ximo a fenecer el contrato celebrado para la ejecuci3n del servicio en la Ruta n3m..... las Oficinas extremas e intermedias est3n gestionando con eficacia la adquisici3n de propuestas?
- 2.—Las mismas Oficinas han dado la mayor publicidad a la convocatoria que se les remiti3, para obtener dichas propuestas?.....
- 3.—Por haber terminado el contrato celebrado para la conducci3n de correspondencias en la Ruta n3m..... ¿a los correos extraordinarios que actualmente verifican el servicio, se les paga la cantidad prevenida, con regularidad y no tienen liga o parentezco con los empleados de las Oficinas de la l3nea?

6.3 Today we look to alternative technologies

Recycling can only ever provide a small percentage of the paper needed for written communication. Other storage systems have been tried.



Microfilm camera

Microfilm reader

Photographic systems offered an alternative. Microfilm (rolls) and microfiche (flat sheets) started being used from the 1920s, particularly to record, store and make widely available paper-based archives such as census records and newspapers.



By the mid-twentieth century microform was being hailed as the ultimate storage system, but within 30 years it was being replaced by CD-ROM (Compact Disc, Read-Only Memory) technology. CDs hold more information in a much smaller space, and can store text, pictures, audio and visual files.



Punched paper tape was widely used in the 1950s and 1960s

Computers pre-date CD-ROM technology, their early use being for large-scale calculations. However paper still played an important role since the raw data was stored on paper products.



Punched cards were first used to operate Jacquard looms, and eventually to store data for computers. Wiggins Teape provided punched card to IBM, made to an extremely detailed specification.

