Nineteen Reams of Cartridge paper." The Mr. Lux mentioned was a general storekeeper and it is assumed that he acted as selling agent for William Hoffman. The date of May 27, 1776 was at least a few days previous to the time (June 5 or 6, 1776) the money was granted to James Dorsett for the erection of his mill. According to Mrs. Seitz, the William Hoffman paper mill was actually established in 1775. William Hoffman arrived in Philadelphia from Germany in 1768 and learned the papermaking craft with the Scheetz (Sheetz, Schultz, or Shütz) family of Pennsylvania papermakers before going to Maryland to set up his own mill. The original Scheetz family is thought to have emigrated to Pennsylvania from a village near Frankfurt am Main, Germany, where they had long carried on the art of papermaking. It was probably a member of this well-known family, Johann Conrad Scheetz, who was responsible for the erection of the first paper mill in Virginia for William Parks. In turn, William Hoffman learned his trade at the Scheetz mill in Pennsylvania, and Johann Schmidt, also a German, gained his knowledge of papermaking from Hoffman. This same Johann Schmidt, about 1810, was head vatman at the Christian Waldschmidt mill in Ohio, the second paper mill to be established in that state. We can therefore trace the direct influence of the Scheetz family of Pennsylvania papermakers in Virginia, Maryland, and Ohio. The most common watermark of the William Hoffman mill was a fleur-de-lis with the initials "W II" and a line underneath. The fleur-de-lis is of great size, measuring six inches in height and four inches in width, with the initials in proportion.

Stephen Crane, the brother of Zenas, sold on January 4, 1776 thirteen reams of "money paper" to Major Fuller and John Brown; the payment was made in 1778 by Paul Revere, who probably engraved the notes. This was the earliest instance of the Crane family making paper for money.

Crane and Company commenced the making of bank-note paper in 1857–8 and in the "Government Mill," Dalton, Massachusetts, continues to manufacture the United States money paper to the present time.

By this year linen and cotton rags for papermaking had become so scarce that the Massachusetts General Court appointed a Committee of Safety in each locality to encourage the saving of rags. So great was the need for paper in America at this time that legislation obtained exemption from military service for all skilled papermakers. This same exemption prevailed in 1812.

1777 In central Massachusetts the price paid by the papermakers for their rags was about threepence a pound; the following year (1778) the price had risen to eightpence and by 1779 it varied from twelvepence to two shillings a pound. By the year 1780 the price had reached three shillings and in 1781 clean rags soared to ten shillings a pound. In 1792 the price became normal, with prices from twopence to threepence being customary.

The first paper mill in North Carolina may have been established this year, although the record is not clear and no authentic information has been forthcoming after considerable research. The statement that paper was made in North Carolina in 1777 rests upon the two following statements: in August 1775 the Provincial Congress offered a subsidy of 250 pounds to aid in the establishment of a paper mill; and in the November 14, 1777 issue of the North Carolina Gazette there appeared an advertisement appealing for rags. The paper mill is said to have been set up near Hillsboro. To rely upon subsidy offers and the numerous "save rags" advertisements as concrete evidence that paper mills have been established may lead to faulty information. The appearance of a "save rags" notice at a certain date does not necessarily mean that a paper mill had been established in the vicinity of the newspaper's influence. Rags were scarce in the eighteenth century and it was not unusual to transport them over long distances, as there was always a
ready market at any paper mill. Also, the desire for the erection of a paper mill might lead local governments to offer subsidies without results; papermakers were not plentiful in pioneer America, especially skilled workers able to erect and equip proper mills for the making of usable paper. It is possible that there was a paper mill in North Carolina as early as 1777, but when we set 1791 as the date when writing and printing paper was first made in this state, in the mill of Gottlieb Schober, we are on much firmer ground. Authentic data regarding this mill are contained in the Records of the Moravians of North Carolina. In these Records (Volume V, pages 2369–2376) the following occurrences with dates are set down: "Gottlieb Schober secured the approval of the Church Board to his plan for building a paper mill. On September 8, 1789, Christian Stauber left for Pennsylvania to learn the art of papermaking at Ephrata. . . . Schober secured from the state of North Carolina a loan of 300 Pounds, which he was to have for three years free of interest. . . . November 11, 1789, Johann Krause, a carpenter, left for Ephrata to find out just what kind of a house was needed for the work. . . . It was decided that the mill should be built on the Petersbach, a small stream about a mile west of the centre of Salem, March 4, 1790. . . . Stauber returned from Pennsylvania, April 21, 1790. . . . April 29, 1791, blotting paper will be made this week. . . . June 30, 1791, printing and writing paper are being made." The Salem, North Carolina, Moravians were in close contact with the Moravians of Pennsylvania and it is likely that Christian Stauber journeyed to Ephrata through this connection, but the Brethren of the Ephrata community had little in common with the Moravians in so far as religious life was concerned. The North Carolina paper used in early Moravian diaries and minute-books reveals that the Schober watermark consisted of a modest letter "S" sewed to the moulds midway between two chains. In 1792 this initial was 5/8ths of an inch in height and by 1806 the size was reduced to barely 9/16ths. From the minute size of the simple "S" watermark we may assume that Gottlieb Schober was a man of modesty. In his manuscripts it is noted that when writing in German he spelled his name Schober, but in all of his writings in English he spelled it Shober.

The earliest treatise on papermaking materials appeared in the New World, issued in Philadelphia.

"Wove" paper exhibited in Paris by Benjamin Franklin.

1778 First spurious watermarks in imitation of English banknotes made by John Mathesoon.

1779 The "wove" paper exhibited in 1777 by Benjamin Franklin was imitated in France by M. Johannet, Annony. The paper was so well received that in 1781 Louis XVI presented Johannet with a gold medal. This type of paper was known in France as papier vêlin.

1780 Earliest use of steel pens for writing upon paper; previous to this date quill pens were in use.

Charles Price began the counterfeiting of Bank of England notes, which baffled the authorities; Price hanged himself in Bridewell prison.

In America about this time the old stamping-mills gave way to the Hollander for the maceration of materials for papermaking.

1782 First Bible printed in America in the English language, by Robert Atken, Philadelphia. The volume embraces more than 1400 unnumbered pages, the page size being 3½ by 6 inches.

1783 Joseph Michel Montgolfier (1740–1810), famed papermaker of France, invented first practical balloon.

1784 First complete book to be printed in Europe on paper made from material other than linen and cotton. The paper was
manufactured from an admixture of grass, lime-tree bark, and other vegetable fibres. France.

1785 European printed "all-over" pattern papers identified by the maker's name on the margins were in use in America at this period.

1786 The Society of Sciences, Philadelphia, offered a prize for the best suggestion to protect paper from the ravages of insects, for both the American and the West Indian market.

The Society for the Encouragement of Arts, Manufactures, and Commerce, London, granted its medal for the best English-made paper suitable for copperplate printing. Mr. Lepard and Mr. Bates submitted the finest specimens, which were judged to be superior to the French plate-printing papers that had been previously imported.

In this year there was printed in London a book of poems by C. M. de Villette (1736-93). Part of the edition was on paper made from lime-tree bark, the remaining part on paper fabricated from marshmallow.

1787 In the September 1, 1787 issue of John Bradford's Kentucke Gazette, Lexington, the following advertisement appeared: "Lincoln, August 15, 1787. The subscriber begs leave to inform the Public that he is now engaged in erecting a Paper Mill, on a branch of Dicks river near his grist mill, and expects to have it fully completed by the first of November next. He flatters himself that in the execution of an undertaking which promises such advantages to the District, he will meet with the greatest encouragement from every good citizen who wishes to see Arts and manufactures flourish in Kentucke. But as a paper manufactory cannot be carried on without rags, he therefore most earnestly recommends it to all persons to be particular in saving all their old linen and cotton. Proper persons will be appointed in different parts of the county to receive rags, for which he will give a higher price in cash than is given for that article in Maryland or Pennsylvania. Jacob Myers." From the text of this advertisement it would appear that Jacob Myers operated the first paper mill in the state of Kentucky; it is definitely stated ". . . he is now engaged in erecting a Paper Mill . . . " Here is another of those harmless-appearing pitfalls into which an over-zealous historian might unwittingly plunge. Jacob Myers did not build a paper mill in Kentucky and there was no paper made in that state until 1793, and then not by Myers. The county records of Kentucky show that Jacob Myers acquired thousands of acres of land in the state, at least on paper, and the local historians are not hesitant in calling him a "land hog." He arrived in Kentucky from Philadelphia as early as 1780 and at once began acquiring land and property with the thought, no doubt, of building up a small empire for himself in the "western country." In 1790 he erected an iron furnace on Slate Creek in what is now Bath County, and in 1793 he became interested in a line of packet boats operating between Cincinnati and Pittsburgh. Myers was a pioneer promoter and had many schemes, a few of which he carried to termination, but in so far as his paper mill was concerned the notice itself in the Kentucke Gazette was all that materialized of this ambitious undertaking. For the earliest papemaking in Kentucky see 1783.

The Society for the Encouragement of Arts, Manufactures, and Commerce, London, gave its silver medal to Thomas Greaves, Mill-Bank, near Warrington, for his successful experiments in manufacturing paper from "within twigs . . . with a few green nettles" (? black willow, Salix nigra).

This is the probable date of the beginning of papemaking in the state of Delaware. The mill, located on the Brandywine two miles north of Wilmington, was operated by Thomas and Joshua Gilpin. The Gilpins were descendants of an old Norman family with the original name of De Gaylnyn. The land along the Brandywine was acquired by
the family as early as 1745 and the original mill was used for grinding corn, the second mill to be located on this part of the stream. The Gilpins, who were inventors of no little accomplishment, devised pumping and dredging machines that were acclaimed by their friend Benjamin Franklin. The approximate time of the beginning of the Gilpin paper mill may be placed about 1787, although there is no definite basis for this date. A letter dated April 30, 1788, written by Joshua Gilpin to Benjamin Franklin, reads: "I beg to present His Excellency, Benjamin Franklin, Esq., with samples of such kinds of paper as have been made at the Brandywine Mill." It may be assumed that specimens of the various papers made by the Gilpins would naturally have been sent to Franklin immediately upon completion of the first well-made paper. No doubt at least a year was required before the mill was in production, hence the probable date of 1787 as the establishment of the first paper mill in Delaware. The watermarks used by the Gilpins were various, with the initials "J G & Co.," the name "BRANDYWINE," and the well-known post-horn predominating.

1788 John Davis, Salisbury-court, Fleet Street, London, was presented a medal by the Society for the Encouragement of Arts, Manufactures, and Commerce, London, for the excellence of his marbled papers used in bookbindings.

Nicholas Desmarets (1725–1815) issued in Paris his fine work on papermaking: Traité de l'art de fabriquer le papier.

On August 12 an English patent was granted to Charles Lewis Ducrest for his invention of "making paper for the building of houses, bridges, ships, boats, and all sorts of wheel carriages, sedan chairs, chairs, tables and book-cases either entirely of paper, or wood and iron covered with paper." (See: 1772, 1868.)

Benjamin Franklin on June 20 read before the members of the American Philosophical Society, Philadelphia, a treatise on papermaking and stated that the Chinese had overcome the difficulties of making paper in unusually large sheets.

1790 By act of Congress of April 10, 1790, the first United States patent system was founded. From this date until 1812 most of the patents that were issued pertained to agriculture. Owing to the Patent Office fire of 1836 the records previous to this date are incomplete, but the following eighteenth-century papermaking patents were known to be issued; no complete details are extant: J. Bidlis, May 31, 1794; C. Austin, December 14, 1798; R. R. Livingston, October 28, 1799.

There is a legend that the first blue paper made in England was the result of an accident; the vatman's wife dropped a bag of blueing in the pulp. The paper so coloured was accepted at an advanced price and the vatman's wife was rewarded with a new cloak.

On April 24 of this year George Washington visited the paper mill owned by Hendrick Onderdonk, Hempstead Harbour, Long Island, an early paper mill in New York State. It is said that Washington formed a sheet of paper at the vat upon this occasion; the sheet was supposed to have been retained in the mill as a remembrance of the visit, but no record of it now exists.

The hydraulic press invented in England by Joseph Bramah. This improved press was not used in English paper mills until about 1800. It then supplanted the ancient screw press for expelling the water from the newly formed sheets of paper as they were held between the felts.

John Phipps, an Englishman, patented a method of teaching writing by means of watermarked lines in paper. (See: 1825.)

Some time between this year and 1795 Vermont's first paper mill was established. The founder of this mill was Matthew Lyon, one of the most discussed American politicians of
the nineteenth century, certainly the most publicized papermaker of the period; but unfortunately his publicity did not centre on the craft of making paper. Matthew Lyon was born near Dublin, Ireland, July 14, 1790, and in 1783 he was apprenticed to a Dublin printer, where he worked at type-case and hand press for the following two years. He then emigrated to the New World, landing in Connecticut. With his two-year knowledge of printing as a means of livelihood he journeyed to Vermont, where he settled in a community that became known as Fairhaven, now Fair Haven, Rutland County. Here he set up a printing office and paper mill. According to Joel Munsell (1876 edition, page 52), Lyon manufactured paper from the bark of the basswood tree, but this statement cannot be verified and is most doubtful. In 1793 Matthew Lyon established a newspaper, the Farmer’s Library, later the Fairhaven Gazette. The paper mill was built for the purpose of furnishing paper for his own publications; apparently no watermarks were used. Lyon is much more fully recorded in history on account of his political exploits than for anything he may have accomplished in pioneer American papermaking. Through the publicity of a physical encounter with another member of Congress Lyon’s prestige began to wane in Vermont and he decided to leave his paper mill and printing office and move west. He settled in Kentucky, where he founded the town of Eddyville and the county of Lyon, named after him. Matthew Lyon later moved farther west, to Arkansas, where he died on August 1, 1822. Eleven years later the remains of Vermont’s first papermaker were brought to Kentucky, where they now rest in Lyon County. The files of contemporary newspapers devote columns to the political adventures of Matthew Lyon in Vermont, Kentucky, and Arkansas, but nothing whatever is mentioned relative to his pioneer papermaking.

1792 The date when papermaking is thought to have been introduced into the state of New Hampshire. As with the establishment of other paper mills, the information is based on a “save rags” advertisement, which appeared in the Cheshire Advertiser for March 22, 1792. The proprietor of this paper mill is thought to have been Moses Johnson, who inserted the advertisement in the Keene newspaper (see page 310). The earliest printing in New Hampshire was done at Portsmouth by Daniel Foule in 1756, and as there was no paper being made in the state at this period, the paper was brought in from New England mills or imported from Europe. In Ray Nash’s Pioneer Printing at Dartmouth (1941) it is noted that some of the paper used by Judah Padock and Alden Spooner at Dresden, Vermont (now Hanover, New Hampshire), bears the watermark of Christopher Leffingwell, the first papermaker in Connecticut, and also the watermarks of French papermakers. In the Dresden Mercury and Universal Intelligencer for August 9, 1779, apparently the last issue of this newspaper, the following interesting “save rags” advertisement appeared: “Cash Given at the Printing-Office, for Linen Rags fine or coarse. When the great Importance of collecting and saving of such rags as are entirely useless in Cloathing, and the absolute Necessity we stand in of a Sufficiency of such to furnish Paper for the daily Consumption of this growing Country, are duly considered, the Printers flatter themselves that the good people of this and the neighbouring Towns will manifest their Zeal for the public Good, by saving and supplying them with such Quantities as they may be able to procure, for which a generous Price will be given.” Here again we have an advertisement for rags at a time when there was no paper mill in either Vermont or New Hampshire. During the eighteenth and nineteenth centuries there was always a demand for good linen and cotton rags and it was not unusual to haul the bales and bags of rags over long distances to the paper mills; the appearance of a “save rags” notice does not necessarily mean that a paper mill was near by.

This firm is one of three mould-makers that continue in operation in England. The "dandy-roll" was invented or perfected by this firm between 1825 and 1830.

1793 The earliest mention of a Kentucky paper mill that actually materialized (see: 1787, Jacob Myers) appeared in the Kentucky Gazette, Lexington, April 7, 1792, and reads: "A PAPER MILL. The Subscribers inform the Public, that they have undertaken the building a PAPER MILL, at Craig's Fulling Mill, Woodford County. They flatter themselves they will be able to supply the District with Paper the ensuing Winter, if the Public will be so obliging to save their Rags for that purpose, without which (we need not inform them) the Mill will be useless. We therefore earnestly request the considerate part of the people, to encourage so useful a branch of business, by encouraging the less thoughtful part, (servants, etc.) to save them; and that as soon as possible, proper plans will be adopted for collecting them, and a generous price given. CRAIG, PARKERS & CO." This mill was erected in Georgetown, in what is now Scott County, and was in actual operation in the spring of 1793. In the Kentucky Gazette for March 30, 1793 and several succeeding issues, the following advertisement appeared: "CRAIG, PARKERS & CO.'S. PAPER MANUFACTORY is now actually making paper, and we make no doubt but that in the course of this spring, we shall be able to furnish this state in all kinds of paper, provided we can get a sufficient supply of rags; nor have we any reason to fear, from the success we have already had in collecting rags, but that we shall be plentifully supplied, provided the good people of this state can be prevailed on to give them, and as the prosecution of this business depends entirely upon that article, we earnestly hope that the importance of the manufactory to the state at large, is a sufficient argument to the individuals to save their rags. CRAIG, PARKERS & CO., March 29, 1793." In the History of Kentucky by Lewis Collins (Vol. I, 1882) there is given a description of this pioneer Kentucky paper mill: "The first paper mill was built at Georgetown by the Baptist preacher, Rev. Elijah Craig, and his partners, Parkers & Co. The enterprise was begun in the summer of 1791, but the manufacture of paper successfully was not accomplished until March, 1793. The mill house (as seen in 1815 by E. H. Stedman, who is still living (1874) a few miles distant, in Franklin County) was 40 by 60 feet in size, the basement of stone, and the two and a half stories above of wood—the best frame Mr. Stedman ever saw, with not a cut-nail in the building, even the shingles being put on with oak pins. The large volume of clear water from the Royal spring, running over a limestone bottom, was an attractive sight. The mill dam was erected in 1789. Here was turned out the first sheet of paper in the Great West, made by hand, sheet by sheet. . . . This first mill was burnt down in 1837. Some printed sheets of the paper still exist; and one other elegant relic, now in the paper mill of Mr. Stedman, on Elk horn, in Franklin County—a powerful iron screw, of finished English make, 6 inches in Diameter, 4½ feet long, and weighing 500 pounds. . . ." The E. H. Stedman mentioned by Collins was Ebenezer Hiram Stedman, whose diary forms one of the most interesting documents in pioneer American paper-making. The "powerful iron screw" used in the pressing of paper has long since disappeared and nothing remains today of the old Craig, Parkers & Company mill except a few embedded stones along the brook which may have been the foundation of the dam built in 1789. Elijah Craig was a prominent Baptist minister of Kentucky and he had a wide acquaintance among the preachers of the "western country." In the diary of Reverend David Barrow, of Virginia, the entry for June 8, 1795 reads: "This evening went home with Elder Elijah Craig in Georgetown, Scott County, 12 miles. Elder Craig has been a great blessing to this new country for he has a paper mill, fulling mill, a distillery, merchant mill, tavern, and a store." The Parkers were evidently merchants of Kentucky, as an advertisement appeared in the Kentucky Gazette, January 1, 1791, setting forth "A large and general assortment of goods for sale by
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Alexander and James Parker. The most common watermark of Craig, Parkers & Company consisted of the initials “C & P” (1-1/16 inches in height) on the left with a small eagle on the right side of the sheet of paper. The initials are usually carelessly executed and out of position on the moulds, but the eagles, with a wing-spread of one and one-half inches, were made of heavy wire and show a fair amount of ability in execution. A watermark with the initials “C & P” within a rugged heart is found in papers from the 1812 period. From an examination of manuscripts, deeds, maps, wills, letters, etc., written on paper from this mill, it may be determined that Craig, Parkers & Company possessed at least four pairs of laid moulds previous to the year 1812. Paper manufactured by this pioneer Kentucky mill was used extensively in Kentucky, Tennessee, Ohio, and throughout the West as this was the first paper mill west of the mountains.

A church constructed of paper was built at Hop, near Bergen, Norway. The builder was Cancelleriaad Christie, who used papier-mâché soaked in vitriol water, then mixed with lime that had been treated with curdled milk and white of egg. This pulpy material was used in the manner of plaster, and even the roof was composed of it. The church was 48 feet in diameter, with a seating capacity of 800. The best description of the church of paper was written by Captain Cornelius de Jong, a Dutchman who visited the paper edifice in June 1797. The church of paper was demolished in 1830 after thirty-seven years of service.

Earliest English patent relating to the heating of papermaking vats by steam was granted to William Scott and George

1794 In the issue of the Centinel of the North-Western Territory, Cincinnati, the first newspaper in Ohio, for December 30, 1794, the following significant notice appeared: “Being disappointed in getting of paper according to expectations, has obliged us to Print on so bad equality. We hope our subscribers will consider the great inconvenience that we labour under in procuring paper at so far a distance from where it is manufactured.” The nearest paper mill to Cincinnati at that time would have been that of Craig, Parkers & Company, Georgetown, Kentucky, which had been in operation over a year when this notice appeared.

1795 Massachusetts had twenty paper mills of two vats each; twenty workers were employed by each mill.

Isaiah Thomas, printer of Worcester, Massachusetts, used “wooe” paper for the first time in an American book, a small volume of poems by Charlotte Smith. (See: 1737.)

1796 The first English patent granted for the embossing of paper, to John Gregory Hancock. The embossing was produced by placing paper upon an engraved die and subjecting it to pressure.

The erection of the first paper mill in western Pennsylvania was begun this year. The mill was operated by Jonathan
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Sharpless and Samuel Jackson, both Quakers from eastern Pennsylvania. The earliest mention of this paper mill appeared in the January 12, 1796 issue of the Western Telegraph & Washington Advertiser, Washington, Pennsylvania: “We are happy in being able to announce to the public with a considerable degree of confidence, that a paper mill will shortly be erected on this side the Mountains—that there is little doubt of its being completed by the ensuing fall. The Gentleman who undertakes it, is of an enterprising disposition, and capable of going through with the business with spirit. The work, for which several preparations are already made, will be erected on a never failing stream, in a thick settled part of the county, and close to navigation. The advantages accruing to our community from this addition to its manufactures will be very great, and it behooves every well-wisher to the community, to contribute his mite towards the supporting it. It cannot be carried on without a supply of rags:—Of these every family can supply more or less; and there will be stores in every town, and various parts of the country ready to receive them. Every patriotic family then, will doubtless cause all their Rags to be preserved, and forwarded to some place where they are collected, not so much for the pecuniary advantage to be derived from them, as for the pleasure arising from having deserved well of their Country...”

In an advertisement in the same newspaper, May 24, 1796, the names of the proprietors of the mill and its location are given, along with the ever persistent appeal for rags. The notice reads: “To the Public. Samuel Jackson & Co. Inform the inhabitants of the Western Country, that they are making every exertion to forward the completion of their Paper Mill, which they are erecting, on Big Redstone, about four miles from Brownsville, in Fayette County, a never failing Stream; That they have experienced Workmen engaged to carry on the work, and hope to be able before the expiration of the present year to furnish their fellow Citizens with the different kinds of paper usually in demand of their manufacture, and as good quality as any brought from below the mountains. They request their fellow Citizens generally, to promote their undertaking by encouraging the using and collecting of rags, and inform Merchants and Store-keepers in particular, that they will give them a generous price in Cash for such clean Linen or Cotton rags as they may collect. Redstone, May 19, 1796.” It was probably the summer of 1797 before the first usable paper was made, for in the June 20, 1797 issue of the Western Telegraph & Washington Advertiser this notice appeared: “The paper which you now read was manufactured at Redstone, by Messrs. Jackson and Sharpless, and forwarded with a request to publish thereon a number of the Telegraph, that the public might judge of their performance.”

Also the Pittsburgh Gazette, June 24, 1797, states that the paper used was from the Redstone mill and sets down the accustomed appeal to “save rags.” It is recorded that the paper mill was 40 by 75 feet, three storeys high, with a half-storey cellar on the creek side. If these dimensions are correct, the Redstone mill was somewhat larger than the Georgetown, Kentucky, mill of Craig, Parkers & Company. These two pioneer mills supplied much of the paper used in western Pennsylvania, Kentucky, Ohio, Indiana, Illinois, and even Missouri during the late eighteenth and early nineteenth centuries; both establishments played a very considerable part in the opening of the West. The watermarks used by Jackson and Sharpless were the initials “J & S” in various sizes in outline letters, along with a well-executed crouching beaver; also a dove and olive branch with the initials “J & S” were used. The dove emblem was no doubt suggested by the abundant use of this mark by eastern Pennsylvania papermakers, as Jonathan Sharpless gained his knowledge of the craft in Chester County, Penn-
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sylavia. The single word "Redstone" in neat outline lettering was also a familiar watermark of Jackson and Sharpless.

1797 A pamphlet was issued in London setting forth the use of jute as a papermaking material. The brochure was printed on paper made from this substance.

Earliest use of yellows and browns (lead chromate) in dyeing European paper.

1798 The paper-machine invented by Nicholas-Louis Robert, a Frenchman. The small, undeveloped machine was set up in the Essones paper mill and the French government granted Robert a fifteen-year patent and advanced money for the perfection of the machine. Aside from the models made by Robert little was accomplished in France and it was not until a number of years later that a really practical machine was built in England by John Gamble and Bryan Donkin.

1799 In France at this time the largest paper mill was located in Montargis, with thirty vats, requiring 810 tons of rags each year. Another large mill in France, at Vougeot, had twelve vats. The capacity of a paper mill of the pre-machine era was computed by the number of vats in operation, each vat capable of producing from two and a half to five reams of paper each day.

Experiments made in England in imitating the Swedish stone paper, or slate. The material consisted of sheets of paper pulp, bole, chalk, linseed oil, etc. The sheets were made about 14 by 23 inches in size and in the thickness of pasteboard. They were used in sheathing ships and in house construction. An account of this paper is given in the Philosophical Magazine, London, January 1799.

G. A. Senger, a German naturalist, compiled a pamphlet suggesting the use of conferva ("water-wool") as a paper-making material. The treatise was printed upon paper manufactured from this marine plant.

1800 Connecticut had sixteen paper mills in operation, employing 160 workmen and consuming 320 tons of rags annually. By 1840 Connecticut was listed as being the fourth state in the country in production of paper. At this time, Hartford, Connecticut, as a publishing centre was surpassed only by New York, Philadelphia, and Boston.

Matthias Koops, living in London, began his experiments in the use of wood, straw, and the de-inking of paper. Three books were compiled by Koops using these materials for the paper upon which they were printed. The greater part of the present-day paper industry is founded upon the pioneer work of Koops.

The Original Society of Papermakers founded in England, the first organized union of this trade. As early as 1784 there was a labour strike among the papermakers of England, but it was not until 1800 that the artisans were actually organized into a society. (See: 1390.)

Germany operated 500 paper mills, producing 1,250 tons of paper a year; Spain had 200 mills, Sweden 24, and Russia 26. The largest Russian mill of this period operated 28 Hollanders and 70 vats, with a production of 1,100 reams of paper a week. The consumption of rags of this Russian mill was 800 tons annually.

The invention of rosin sizing for paper by Moritz Friedrich Illig (1777–1845), but not mentioned by him until 1807, when he made known his discovery in Erbach, Germany. The earliest practical rosin sizing of paper in the United States was probably done by a German papermaker, Joseph Krah, who emigrated to Baltimore in 1830.

Although blotting paper was made hundreds of years previous to this date, it did not come into general use until the
beginning of the nineteenth century. The customary method of blotting ink upon paper was by the use of sand. (See: 1465.)

1801 First paper mill in Massachusetts west of the Connecticut River, founded in Dalton by Zenas Crane, John Willard, and Henry Wiswell. This was a one-vat mill with a daily production of twenty posts, or between five and six reams of paper. The personnel of this mill consisted of an engineer at $3.00 a week; a catman and aoucher “at $3.50 per week and board themselves”; a layboy at sixty cents a week and board; and Mr. Crane, the superintendent and general manager, whose partners allowed him $9.00 a week. By the year 1822 Zenas Crane had bought out his partners, as well as another mill that had been established in Dalton in 1809. Zenas Crane continued the business until his death, in 1845, when his two sons, Zenas Marshall and James B., succeeded to the property and carried it on as Crane and Company.

John Gamble on April 20 received the earliest English patent pertaining to the paper-machine. The title of this patent is: “An invention of making paper in single sheets without seams or joining, from one to 12 feet and upwards wide & from one to 45 feet and upwards in length.” The machine is described as follows: “a sheet of copper [screen] joined at both ends, passing round two cylinders, forms an endless web, and this receives the pulp, which, travelling along, passes between two cylinders. The paper is afterwards wound from between the cylinders upon a wooden roller, which, when loaded, another is substituted in its place without stopping the machine.” (The paper was dried in lofts, as had been previously done with the handmade product.) (See: 1820, Crompton.)

Johann Christoph Ludwig suggested that the German papermakers adopt windmills for the maceration of paper-

making materials and published a pamphlet in 1820 outlining his proposal.

1802 The importance of the Craig, Parkers & Company and the Jackson and Sharpless mills (see: 1793 and 1796) to newspaper publishing in the West is shown by the following notice that appeared in the Scioto Gazette, Chillicothe, Ohio, for November 13, 1802: “By reason of the Menogne-halia River not having been navigable for some time past, we have been disappointed in receiving a supply of paper from Red-Stone, which was contracted for and to have been delivered at the mouth of the Scioto River last month; in order to obtain a supply we sent to the mills at Georgetown, Kentucky, but in this effort we were also disappointed, there not being a ream to be had, we have therefore been under the necessity of sending by land to Red-Stone, at a very heavy expense, from whence we shall be furnished in two weeks, our readers will therefore excuse our issuing half a sheet, during that period. From the circumstance of the high price at which paper now comes at, the Editor earnestly calls on those indebted, to come forward and make payment.” In the December 18, 1802 issue of this same newspaper it was stated that owing to lack of paper it was impossible to publish for two weeks; the notice further states that arrangements have been made for a constant supply of paper, but does not mention the source.

Probably the earliest use of bleached wood-pulp paper in English book production. The book, an edition of The Mathematical and Philosophical Works, to which is prefixed the author’s life, by the Right Rev. John Wilkins, was printed in London by C. Whittingham.

The mechanical agitator, or “hog,” for the agitation of papermaking fibre in the vat was introduced in England.
On June 7 John Gamble received a supplementary patent to his patent of 1801.

First paper produced in Lower Canada, at Saint André d'Argenteuil (St. Andrews East), Quebec, by New Englanders from Newton Lower Falls, Massachusetts. The enterprise was headed by Walter Ware and the paper was made for printing the Montreal Gazette. (See: 1819.)

The American Company of Booksellers offered a gold medal for the greatest quantity and best quality of paper made from material other than linen and cotton rags. At the same time a silver medal was offered for the best wrapping paper made from materials not before used in the manufacture of paper.

Aloys Senefelder (1771–1834), a Bavarian, accomplished the first successful lithography, thereby creating a demand for still greater quantities of paper.

On April 25 Joseph Bramah, the inventor of the hydraulic press (see: 1790), received an English patent for "an application of machinery by which sheets of much larger dimensions can easily be made than can possibly be done by hand in the usual way." Apparently Bramah's patent was not carried to any termination, as this inventor appears to have had but little influence upon the final development of the paper-machin

In the United Kingdom during this year there were 760 vats in operation, producing 16,502 tons of handmade paper; this same year there were six paper-machines with an output of 557 tons. In thirty years (by 1835) the number of machines had increased to 83, with a production of 24,475 tons, while the number of vats had decreased to 490, with an output of 11,215 tons. In the following thirty years (by 1865) the number of machines had grown to 390, with a production of 103,700 tons; at this time there remained only 109 vats, with an output of 8,310 tons. By the year 1900 the remaining vats totalled 104, producing 3,586 tons, but the number of paper-machines had increased to 428, manufacturing 647,764 tons of paper. Thus in ninety-five years of papermaking in the United Kingdom the number of handmade papermaking vats fell from 760 to 104, and the number of paper-machines in operation advanced from 6 to 428. In the early days of the paper-machine, when the widths were comparatively narrow, it was stated that a machine of thirty inches could supplant the work of four vats; a machine of forty inches could produce the paper ordinarily made at 6 vats; a forty-four-inch machine could duplicate the production of 8 vats; and a fifty-four-inch machine the output of twelve vats.

The name Fourdrinier appears for the first time in relation to the paper-machine now bearing this well-known appellation. A patent dated July 24, 1806 was taken out by Henry Fourdrinier under the following specifications: "A number of moulds, of the description called laid and woven, are hooked together to form one long mould. A platform to hold the said moulds in such a manner that the moulds shall slide along backwards or forwards, but in no other direction. A vessel or trough from which the paper stuff or material is caused to flow upon the moulds through holes, each provided with one or more registers to limit or mark the flow of stuff. A set of cylinders, upon which is passed, in the manner of a jack towel, an endless web of felting. There is a third cylinder in contact with one of these cylinders, and this third cylinder communicates by means of another web of felt with an additional pair of pressing cylinders. When the moulds arrive at the first cylinder, the felt web takes off the paper and conveys it to the first pair of pressing cylinders, whence it proceeds to the second pair, and afterwards to any fit place of reception, so that continuing the process, paper of any length may be made, and with separate moulds." On August 14, 1807, additional improvements in the machine were granted to Henry Fourdrinier and his brother Sealy.
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John Pine established the Hayle mill, Tovil, Maidstone, Kent, England. This mill was acquired in 1811 by the Green family and is now under the firm name of J. Barcham Green and Son. The handmade paper fabricated from Japanese mulberry-bark fibres used in the printing of one copy of the Oxford Lectern Bible (1935), designed by Bruce Rogers, was made in this mill. This copy of the Bruce Rogers masterpiece is in the Congregational Library, Washington, D. C.

A United States patent was procured by Francis Gay, Baltimore, for the manufacture of floor coverings composed of paper. It was claimed that the paper carpets were equal to the regulation product at about half the cost.

The commencement of the use of moiré papers, embossed by heated cylinders, used in bookbindings.

The date of the establishment of the earliest known paper mill in South Carolina. Prior to the American Revolution the provincial governors of South Carolina were constantly assuring the King's Ministry that "positively no manufactures of any kind inimical to British commerce are, or are to be, established in the Province." It is only natural that under such conditions had there been a pre-Revolution paper mill in South Carolina the owners would have been reluctant to advertise it widely. On September 8, 1768 Lieutenant-Governor William Bull sent a message to Lord Hillsborough in which it was officially stated that there were "no Paper-Mills" in the province. Through a series of letters still intact in Charleston, the date of the first known paper mill in South Carolina has been established. These letters in the possession of Dr. Joseph J. Waring, a descendant of the original mill-owner, have been copied by Dr. John Bennett, also of Charleston. The first letter relative to the paper mill is dated November 12, 1806, and was written in Columbia, from Benj. Waring to Richard Waring. The letter reads: "... I suppose you have heard of my erecting a Paper-Mill. Let me know if it would be convenient for you to purchase or receive old Rags and send up here by boat.

1807 Additional improvements in the paper-machine were patented by Thomas Cobb, an Englishman; and Léger Didot, a Frenchman, received further English patents in 1812 and 1817.
The first paper mill in Ohio was established this year by Jacob Bowman, Brownsville, Pennsylvania, John Bever, George Town, Beaver County, Pennsylvania, and John Coulter, Brook County, Virginia. An agreement among these three men was drawn August 1, 1806 "... for the erection of a paper mill near the mouth of Little Beaver Creek..." Perhaps the earliest mention of this pioneer Ohio mill in a contemporary publication appeared in Zadok Cramer's Navigator, published in Pittsburgh in 1808. The notice appears on page 44 and reads: "Little Beaver Creek, left side. A quarter of a mile below George Town. Near the mouth of this creek are two grist, one saw, and a paper mill erected in 1807-08 by Messrs. Coulter, Bever [sic] and Bowman." This would place the mill in Ohio, near Fawcettstown, now East Liverpool, Columbiana County.

Both Bowman and Bever came to Ohio from western Pennsylvania, not far from the Jackson and Sharpless "Redstone" mill, and it is reasonable to surmise that they were influenced by the success of this mill. The only contemporary description of the building of the Fawcettstown mill or the paper made there is given in Browne's Cincinnati Almanac for the year 1810, after John W. Browne, the publisher, had made a visit to the vicinity some time previous to 1809, when the Almanac was actually printed. Browne's description reads: "... the creek is full of large rocks, and affords a romantic scene. About 2 m. up from the mouth is a paper mill, built of stone, and admirably calculated to perform a great deal of business. The paper made at this mill is equal, if not superior, to any made this side the mountains; and there is every reason to suppose, from the attention paid to the manufactory, that a large stroke of business will be satisfactorily carried on. How strange to say, that though there are not less than ten or twelve printing presses in the state of Ohio, yet the only paper mill in the state is situate within one mile of its eastern boundary. There does not appear a better, or more sure and lucrative speculation, than what might be deserved from a well conducted paper mill; and it is sincerely to be wished, that some adventurous gentlemen would permit their attention to be directed to that object." The watermark used by Coulter, Bever and Bowman consists of a badly drawn eagle with spread wings, the eagle claws clutching a branch; underneath the eagle is the word "Ohio" in outline letters, also crudely executed. This emblem appears on the right and the initials "C B & B" on the left side of the sheets of paper; the "&" is usually placed backwards on the moulds. The spread of the eagle wings is about 2½ inches, but a decided variation in the twisting of the wires makes it possible to determine the number of moulds possessed by the mill. For the most part the moulds were of the "woof" style capable of forming paper measuring approximately 13 by 16 inches. The paper produced by this pioneer Ohio mill is of very good quality, having been made from well-selected linen and cotton rags without being subjected to detrimental chemical treatment. What was probably the second paper mill within the confines of Ohio was the mill of Christian Waldschmidt, the son of Simon Waldschmidt, the master of a paper mill in Gengenbach, on the Kinzig, Germany. Young Waldschmidt (Anglicized to Waldsmith) emigrated to America in 1785 and readily found work in a paper mill in Montgomery County, Pennsylvania. The Ohio Waldsmith mill was established on a bend of the Little Miami River, near a locality known as "Germany," but during the Civil War the name of the settlement was changed to Camp Dennison. The earliest contemporary mention of this mill may be found in the January 16, 1810 issue of Liberty Hall, Cincinnati, which states: "Christian Waldsmith announces his intentions of building a paper mill on the Little Miami River." It was not until a year later, however, that the mill was in actual operation, as is evidenced by the following editorial in the Western Spy, Cincinnati, January 28, 1811: "Our impression appears for the first time on paper manufactured at Mr. Waldsmith's new paper mill in Sycamore township. Much praise is due Mr. Waldsmith for his unremitted exertions to furnish the neighboring printers with
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an early and constant supply. Nothing appears to be want-
ing to render this establishment of the greatest utility, ex-
cept the care of the industrious housewife in saving her
rags. The ladies of the community are informed that we
shall hereafter give three cents a pound for rags in cash,
or four cents in books and stationery. The

W & Co

MIAMI

was the single word “MIAMI” on one
half of the sheet of paper and the letters “W & Co” on the
other half, in the regulation outline lettering, well executed
for the period.

1809 Samuel Green, New London, Connecticut, was given a
United States patent for making paper from seaweed, and
Francis Bailey, Salisbury, Pennsylvania, received a patent
for the hot-pressing of paper, a method still in use.

John Dickinson, an English papermaker, invented and pat-
ented the cylinder paper-machine.

1810 It was probably this date before the Fourdriner paper-
machine reached any degree of perfection, after patient
work by John Gamble and Bryan Donkin. It was not until
January 13, 1812, however, that the machine was started
on a thorough commercial basis, the machine on this date
being operated by Marchant Warrell, in the mill at Two
Waters, Hertfordshire. It has been stated that many of the
handmade papermakers regarded the advent of a perfected
machine as a detriment to their craft. Riots are thought to
have taken place outside the mill, and in anticipation of
trouble the windows had been boarded; also as an extra
precaution large carboys of vitriol were placed on the roof
of the mill so that the liquid might be poured upon the dis-
gruntled handmade-paper workers should they attempt to
harm the newly perfected machine. There is no authentic
record upon which this information might be based.

According to The History of Printing in America by Isaiah
Thomas, there were the following paper mills in America:
“New Hampshire 7; Massachusetts 38; Rhode Island 4;
Connecticut 17; Vermont 9; New York 12; Delaware 4;
Maryland 3; Virginia 4; South Carolina 1; Kentucky 6; Ten-
nessee 4; Pennsylvania about 60; in all other states and ter-
ritories, say 16.” These figures are taken from Vol. II, page
530, of the 1810 edition of the Thomas work. In Laurence
C. Wroth’s excellent book The Colonial Printer (1935),
pages 152, also quoting from Thomas, the number of mills
credited to Massachusetts is 40; Delaware 10; and all other
states and territories 18. This makes a difference of ten
mills, but Thomas gives the total number as 185, so it is
possible that the number of mills was changed in the vol-
ume examined by Mr. Wroth. Isaiah Thomas does not men-
tion a mill in Ohio (see: 1807). The mills listed by Thomas
(1810) manufactured 50,000 reams of paper annually, which
was consumed in the publication of 22,500,000 newspa-
papers. This paper averaged about three dollars a ream.

The paper made for book-printing was about 70,000 reams,
which sold for approximately three dollars and fifty cents a
ream. Thomas also states that about 111,000 reams of writ-
ing paper and 100,000 reams of wrapping paper were prob-
ably manufactured in 1810. Some of the mills in New Eng-
land had two vats, but there were mills in New York,
Pennsylvania, Delaware, and Maryland that operated three
or more vats, according to Thomas. A mill with two vats
meant a capital investment of about $10,000 and such a
mill employed twelve or more persons. A two-vat mill was
capable of producing 2,000 to 3,000 reams of paper a year.
Thomas further states that the collecting of rags, making
paper, etc., gave employment to at least 2,500 persons in
the United States.

In Europe and America the Fatsia papyrifera pith “paper”
of Formosa was seen for the first time when it was brought
from China by sailing-ship captains and sailors. Western
people thought the material a manufactured substance and
mistakenly gave it the name “rice-paper” on account of the
resemblance to rice and to true paper. The material is used
in the Orient for painting and for the making of artificial
flowers; also it is used in China as a tea in the healing of lung and throat diseases.

This date was the probable beginning of papermaking in the state of Georgia. In Augustin Smith Clayton’s Compilation of the Laws of the State of Georgia, from 1800 to 1810 (page 697), we find the following “Resolutions” relative to the earliest paper mill in the state: “The select committee to whom was referred the petition of Zachariah Sims, praying a loan of four thousand dollars, to enable him to complete the establishment of a paper manufactory in Greene county in this state, are of opinion, that the prayer of the petitioner is reasonable and ought to be granted. . . . Resolved that there shall be appropriated to the said Zachariah Sims, out of any monies unappropriated, the sum of three thousand dollars, to enable him to carry into operation a paper manufactory, upon his giving bond and sufficient security to his Excellency the Governor for the return of the said money with interest, into the treasury of this state, at the expiration of three years next after the said Zachariah Sims shall receive the same. Approved, 10th December, 1810.” It is not definitely known whether this mill actually made paper, or exactly where it was located. It is a matter of record that the sum stated was turned over to Sims, and his paper mill was supposed to be almost completed when he asked the state for aid. The records of the Clerk of Courts of Greene County show that Governor David B. Mitchel brought suit against Sims and his bondsmen in 1814, and that the paper mill was sold by “public outcry” and was bought by Thomas Stocks, President of the Georgia Senate. The description of the property purchased by Stocks would indicate that the mill was in Greene County, on the Oconee River, near Scall Shoals. The earliest printing to be executed in Georgia was in 1763, so the date of 1810 as the commencement of papermaking in the state does not appear unreasonable. The making of paper in each state naturally followed the introduction of printing, and even with the date 1810 there was a lapse of forty-seven years between the earliest printing and the establishment of the first paper mill. Regardless of the date of the pioneer handmade-paper mill in Georgia, it may be definitely stated that the first machine-made paper was produced in 1849, in a mill erected at Marietta, Cobb County, on Soap Creek, a rocky tributary of the Chattahoochee River. The name Soap Creek is probably a corruption of Old Soto, the title of a Cherokee chief who remained in the locality after the removal of the Cherokee in 1838. This old Indian chief is said to be buried at Sewell’s Cemetery, not a great distance from the paper mill. During the War Between the States the Marietta mill was operated by James Byrd, an uncle of William S. Whiteman, who owned a paper mill in Tennessee where was made much of the paper used in printing the Confederate money and bonds. It is said that the first twisted paper twine to be made in the South was produced by Byrd in this mill. At this period it was not possible to procure woven wire or felting in the South, and as these materials were essential to the operation of a paper-machine, it was necessary to smuggle them through the Union lines. This was done by blockade-runners who brought the wire and felt in wagons over the rough roads of Virginia, Kentucky, Tennessee, and Georgia. On his march to the sea General Sherman commanded his soldiers to destroy all the records of Cobb County and to burn the Marietta mill, which he said was too valuable to the Southern cause to be allowed to remain. The mill was built of granite and the ruins stand to the present day.

1811 The date of the establishment of the first paper mill in Tennessee has not been definitely determined, but the following enlightening advertisement appeared in the March 11, 1811 issue of the Carthage Gazette: “The subscriber informs his fellow-citizens that his paper mill is now in operation. He will give three cents per pound for linen and cotton rags, delivered at his printing office or at the paper mill.” The owner of the mill was probably William Moore, publisher of the Gazette. If the files of the Carthage Gazette
can be relied upon, this mill was built by funds collected through a lottery, as the "Paper Mill Lottery" was first mentioned in Moore's newspaper in the issue of May 25, 1809. The last drawing of the lottery was announced in the Gazette for June 8, 1810. From the above advertisement and from an appeal for "a good, sober Papermaker capable of carrying on the business . . ." we may assume that this paper mill actually existed. According to the pamphlet compiled by R. H. Halley entitled Papermaking in Tennessee (Nashville, 1904), the pioneer papermaker in Tennessee was William S. Whiteman, who established his mill on Middle Broo Creek, about four miles from Knoxville, "many years previous to 1837." Halley states that Whiteman went to Tennessee from Philadelphia about 1806, having been a papermaker in Pennsylvania previous to journeying south. The equipment for this mill was brought by horse and wagon from Philadelphia, there being no other means of transportation. This was, of course, a hand mill. Whiteman died in 1840 and the mill was continued in operation by Gideon Hazen. Isaiah Thomas stated that there were four paper mills in Tennessee as early as 1810, but this assertion cannot be authenticated.

First paper-machine set up in France, by the Berthe and Grevenich establishment at Sorel (Eure-et-Loir). In 1827 there were four paper-machines in France; in 1833 the number exceeded twelve, according to Proteaux. For the most part these machines were built in England.

1812 From 1803 to 1812 there were ten paper-machines constructed in England, and from 1812 to 1823 twenty-five. The making of paper by machine was yet to become a reality in America. (See: 1817.)

In England between this year and 1818 there were circulated 131,331 pieces of forged bank paper. This abundant counterfeiting gave rise to the invention by Sir William Congreve. (See: 1819.)

1814 The London Times for November 29 was the first newspaper to be printed on a cylinder press with the aid of papier-mâché matrices (stereotyping by the use of paper).

1815 The French paper mills began the manufacture of specialties in paper, thus eliminating competition between mills.

The date of the first paper mill in Steubenville, Ohio, probably the fourth to be established in the state. Zadok Craper in his Pittsburgh Almanac, 1815, page 62, says: "Steubenville . . .a steam paper mill with three engines is erecting here, which will shortly be in operation, owned by Messrs. Scott and Bayless." This mill, without the benefit of steam, was probably operating on the banks of the Ohio River several years previous to 1815, but this was the earliest mention of it. William Cooper Howell (the father of William Dean Howell) in his book, Recollections of Life in Ohio, gives the year 1813 as the commencement of this paper mill. This mill is of particular interest because it furnished the paper for the wall hangings designed by Thomas Cole (1801-48). Cole's father emigrated from chorley, England, to Steubenville, Ohio, in 1819, and began the making of decorated paper wall hangings. Young Cole cut the wood blocks, mixed the colours, and printed the papers, each sheet separately, as was necessary before the introduction of the paper-machine with its continuous web of paper. Thomas Cole later became a well-known American artist and founded what is now known as the "Hudson River school," perhaps the most representative style of painting to have its origin in this country. In later years the Steubenville paper mill was taken over by Messrs. Holdship, Hanna, and Turnbull, a firm that published The United States Spelling-Book in 1830 with the imprint on the title-page "at the Clinton paper-mill."

1816 By act of Congress of April 26 a thirty-per-cent duty was placed on all imports of paper into the United States. By 1820 there was being made in this country $3,000,000 worth of paper; by 1830 the volume had risen to $7,000,000.
Bishop records that the first steam paper mill in the United States was put in operation in Pittsburgh, Pennsylvania. The engine was of 16 horse-power and the mill employed 40 workers. The engine required 10,000 bushels of coal annually. The rags consumed amounted to 120,000 pounds, which were made into paper valued at $30,000 a year. (See: 1815).

First paper-machine erected in America, a cylinder machine operated in the mill of Thomas Gilpin, near Philadelphia. The machine was based on the Dickinson principle (see: 1809). The first newspaper to make use of the Gilpin machine-made product was Poulson's Daily Advertiser, Philadelphia. The original machine did the work of ten vats of the handmade mills.

In England, to conserve paper, it was made a punishable offence to produce a newspaper exceeding 22 by 32 inches.

In April of this year Benjamin Owen Tyler produced his quasi-facsimile of the Declaration of Independence, at the price of $5 a copy; in November 1819 a facsimile of the Declaration was issued by John Binns, selling at $10. These facsimiles were printed upon American-made paper, said at the time to have been the finest paper ever produced in this or any other country.

Sir William Congreve (1772–1828) submitted his experiments in watermarking for bank-notes to the Bank of England and a few of his inventions were adopted and are still used.

A. M. Sinsen published in Copenhagen a pamphlet dealing with his experiments in making paper from the fibre of beet-root. To prove the practicability of this fibre as a paper-making material the pamphlet was printed on paper manufactured from beet-root.

During this year began a heated controversy regarding the use by Congress of foreign-made paper, and a series of indignant letters and editorials appeared in Niles' Weekly Register, the most popular and universally read publication of the period. In the issue of August 5, 1820 an editorial said in part: "Last winter we indignantly noticed the receipt of a letter from the clerk of the House of Representatives of the United States, written on paper stamped and marked with the royal crown of England . . . a friend in the Senate sent us a sheet of the paper usually laid on the desks of its members, dignified with the same emblem of royalty, at which we were again mortified. The paper was of a very fine quality, better, perhaps, than four-fifths of the members of Congress ever used, perhaps ever saw, before their arrival at Washington. . . ." In his tirade against the crown watermark Niles goes on to say: "Let it take any shape but that,—a codfish or a hoe-cake—a yoke of oxen or a race horse—anything but the regal crown of England." During the same period newspapers were complaining that Congress was using writing paper watermarked Napoléon empeur et roi. The first American-made writing paper to be used by the U. S. Senate is thought to have been manufactured by Simeon and Asa Butler, Suffield, Connecticut.

The second paper mill established in Canada (see: 1803), at Bedford Basin, near Halifax, by R. A. Holland, who published the Halifax Record. In the village known as Crook's Hollow the first paper mill in what was then known as "Upper Canada" was built in 1825. Here in a building about 30 by 40 feet James Crooks made paper by hand and earned the bounty of 100 pounds offered by the government for the first paper manufactured in Upper Canada. John Eastwood and Colin Skinner succeeded only a few days later in making paper at their mill on the Don River, a few miles from Toronto, and the government recognized their enterprise by remitting the duty on the equipment they had to import from the United States. The first paper-machine to
be set up in Canada was no doubt installed in the Don River valley.

1820 In Niles' Weekly Register, Baltimore, January 15, 1820, under the heading of "Domestic Industry," the following account is given of American papermaking: "... The paper manufacture of the United States produces an annual average value, as to the amount consumed, of about three million dollars, of which cost of the raw materials, and the labour employed thereon, is estimated at two millions, giving employment to about 5,000 persons, of whom only about 1,700 are believed to be males over 16 years of age, the rest being women and children." At this period (1820) there was but one paper-machine in operation in the United States (see: 1817), therefore the majority of these workers were engaged in making paper by hand.

In the issue of Niles' Weekly Register, January 22, 1820, an article gives some interesting details relative to papermaking in Pennsylvania and Delaware; these states "pray that Congress will lay a duty of 25 cents per pound on all writing, printing, and copperplate papers, and 15 cents on all others." The article further outlines that "in the districts represented, it appears there were 70 paper mills, with 95 cats, in full operation, until the importation after the late war. These establishments cost about 500,000 dollars, and employed 950 persons, whose annual wages amounted to 217,000 dollars, consuming 2,600 tons of rags a year, and producing paper worth 800,000 dollars — but now only 17 cats are at work, the wages paid amount to only 45,000 dollars; the production no more than 130,000 — leaving 775 persons out of the employ, with the loss of 2,128 tons of rags unconsumed, and a manufactured amount of 624,000 dollars. When paper was taxed, the average amount paid by a cat was from 200 to 250 dollars."

The first ivory paper, made by S. Einsle, used by miniature artists to take the place of genuine ivory. The paper was made an eighth of an inch in thickness and was said by prominent English painters to be superior to ivory. The invention was sponsored by the Royal Society of Arts.

Thomas Bronzeor Crompton granted a patent in England for drying cylinders for the paper-machine. Previous to this time the semi-moist paper was taken from the machine, cut into sheets, and dried in a loft as had long been the procedure with the handmade product.


1822 The completion of Ree's Cyclopaedia, Philadelphia, up to that time the largest work in the English language. The printing of this 41-volume work with 147 engravings required 30,000 reams of paper.

1823 Gypsum (calcium sulphate) used for the first time in Europe as a "loading" material.

1824 The first machine for pasting sheets of paper together, forming cardboard. The patent was granted to John Dickinson, the inventor of the cylinder machine.

1825 John and Christopher Phipps were granted an English patent for what purports to be the original "dandy-roll" for watermarking paper. The specifications read in part: "the employment of a roller the cylinder part of which is formed of "laid" wire ... the effect produced by said roller is that of making impressions upon the sheet of paper upon which said roller passes and thus the paper so made has the appearance of "laid" paper."
About this time, when cloth bookbindings were first being used, a heavy coated paper with each side a different colour began to appear as end-papers in the larger books.

The first paper-machine in India was set up this year, by Mr. Marsham of Serampur. This was a cylinder machine, but apparently the venture did not prove successful. By the year 1880 machine mills were operating in Lucknow, Gwalior, and Calcutta. In 1903 there were nine machine mills in India, employing 4,500 workers with a yearly production of 22,000 tons of paper. In 1997 British India produced 60,268 tons of paper and imported 140,727 tons, mostly from Japan and Great Britain; no Indian paper, either hand- or machine-made, was exported.

First use in the Occident of the divided papermaking mould, making possible the formation of two sheets at one dipping of the mould into the vat. This type of mould had long since been used in China.

M. Canson, Annay, France, applied to the Fourdrinier machine suction pumps, which caused a suction under the travelling wire on which the paper was formed, to help in removing the water. In 1840 M. de Bergue suggested the employment of sand-traps on the paper-machine, which, as the name implies, removed sand, gravel, and heavy particles of dirt from the pulp, which previously had ruined type, copperplates, etc., when printed upon the paper.

The earliest paper mill in the state of Indiana. The paper made in Indiana previous to the erection of this mill came from the several Ohio, Kentucky, and western Pennsylvania mills. The difficulty of procuring paper from these mills is shown by the following notices in the Vincennes Western Sun and General Advertiser. In the issue of September 11, 1819, we read: “We are compelled to present the Western Sun to its patrons this week on a writing sheet — we expect a supply of paper in a few weeks, when it will again resume its usual appearance.” In the issue of December 18, 1819, we find the following: “In consequence of numerous disappointments we have not been able to procure paper of the usual size, and we have been compelled to let our paper appear on a sheet much smaller than we would have wished. We shall, however, after our next publication, receive a supply which is now ascending the Wabash, after which we shall use every exertion to make a proper remuneration to our patrons for their indulgence.” It was not until March 18, 1826 that this same newspaper proudly stated: “The Indiana Republican, printed at Madison, on the 9th inst. says the Editor, is printed on paper made in that county, it is the first paper mill erected in the state, and the proprietors have my warmest wishes for their success.” The pioneer paper mill of Indiana was operated by John Sheets and was located in Jefferson County, on Indiana-Kentucky Creek, below Manville. William Hughes, an experienced papemaker from Ireland, acted as the superintendent of the mill, which was “one and a half stories and stood erect over the mill-race, visible all the way down the valley to the curves.” It is recorded that the mill was built by Nathaniel Bayless, a carpenter and millwright, who was born in Hartford County, Maryland, March 12, 1796, and journeyed to Indiana in 1817. John Sheets, in common with all other papemakers of the period, was constantly in need of rags, and in the Indianapolis Indiana Journal, May 15, 1828, we find the usual appeal: “Paper Manufactory — The Subscriber takes this method to give general notice that his Paper Mill in the neighbourhood of Madison, is now in complete operation, and he is prepared for making Letter, Writing, Printing and Wrapping Paper, of every description, and he flatters himself, from the particular care which he has taken in the selection of workmen, that the paper will not be inferior to any that is made in the western country. . . . Cash will be given for all kinds of Rags and also for coarse tow. . . . John Sheets.” The first paper-machine set in motion in Indiana, a Fourdrinier, was probably by Phillips and Speer, of Cincinnati, about the year 1837.
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Papermaking by machine established in Denmark, the Fourdrinier machine having been built in England by Bryan Donkin.

1827 First Fourdrinier paper-machine set up in America, built in England by Bryan Donkin. The machine was put in operation at Saugerties, New York, in the mill of Henry Barclay, on October 24.

The first enamelled paper produced and patented by John George Christ, England. The enamelling was accomplished by using a mixture of animal size, isinglass, gum, and white lead. The liquid was applied to the cardboard or paper at three separate times, and finally given a high finish by using a polished steel plate run through a press.

This year David Kizer patented a transparent paper that may well have been the predecessor of Cellophane. Contemporary notices of this material appeared in the New York Enquirer and in that storehouse of useful information, Niles' Weekly Register. In the latter publication for October 27, 1827 the following account of the newly conceived transparent paper is given: “The paper is well suited to cover prints and paintings in place of glass; if put on well there will be but little difference in the appearance of a picture from one covered with glass. The cost of covering a picture with transparent paper will not exceed 50 cents for a frame three feet by four feet; it is also used as a covering for windows, to prevent the rays of the sun from passing through, at the same time to admit as much light as if no paper was on. It can also be used as a cylinder or tube, to put round a lamp or candle, and cause it to emit a more agreeable light. These, are only a few uses to which it can be applied; many more will gradually develop themselves when artists are aware that such an article is to be obtained.”


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William Magaw, Meadville, Pennsylvania, began the making of paper from straw. It is said that an edition of the New Testament was printed upon this cheap yellow paper that sold for five cents a copy. This same year straw paper was also made in Chambersburg, Pennsylvania, the amount being 300 reams daily, selling for less than two dollars a ream for imperial size (22½ by 29 inches). (See: 1800, Koops.)

On August 8 Nicholas-Louis Robert, the French inventor of the paper-machine, died in Vernouillet, France, a poorly paid school-teacher. (See: 1798.)

William Cobbett made paper in England from cornstalks. In America a patent was granted for making paper from this material as early as 1802. In 1834 Dr. Jones, of Mobile, Alabama, also made paper from Indian-corn stalks and husks.

1829 Of the sixty paper mills in Massachusetts, only six had paper-machines; the rest were handmade-paper mills. By this time many of the rags were imported from Germany and Italy. The consumption of rags for these Massachusetts mills was 1,700 tons, producing paper to the value of $700,000 for the year.

Montgolfier, French papermaker, introduced paper tablecloths and paper hangings with embossed designs, known as papier-linge.

John Dickinson, the inventor of the cylinder machine, patented a process for running a silk or other kind of thread through the length of paper as it was formed on a paper-machine. This type of paper is known as "Dickinson thread paper," and its latest use is in the modern English ten-shilling and one-pound notes.

First Fourdrinier papermaking machine to be built in America made in South Windham, Connecticut, and in-