

Curtis Paper Mill, circa 1887  
Paper Mill Road (State Route 72)  
Newark  
New Castle County  
Delaware

HAER DE-1

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Department of the Interior  
Washington, D. C. 20240

HISTORIC AMERICAN ENGINEERING RECORD

Curtis Paper Mill

HAER-DE-1

Location: Newark, Delaware  
WTM: 18.435660.439490  
Quad: Newark East

Date of construction: Late eighteenth century, with  
extant buildings dating from 1887.

Present owner: Curtis Paper Company.

Significance: In 1975, this paper mill continued  
to manufacture high-quality rag  
content papers using 19th-century  
Fourdrinier machinery.

Historian: Raymond W. Smith, 1976.

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The location of the present Curtis Paper Mill complex has a long if somewhat obscure history. Though it is not possible to establish when the first mill on the site was erected, fragmentary evidence from local histories points to industrial use of the property prior to 1789. On 24 March of that year, a deed conveyed from Samuel Painter, Jr., et al, to Thomas Meteer, land in Mill Creek Hundred on the north side of White Clay Creek. This document used "Edward Meter's mill dam" as a point of reference. [1] The earliest direct reference to a paper mill on the site appears in a 1798 advertisement requesting the return of a runaway slave. Because the runaway was friendly with a black man "sold to Thomas Meteer who owns paper-mills on Whiteclay Creek near Newark," the owner believed the slave might have gone there. [2]

With the advent of the 19th century, the historical record becomes clearer. In 1805, the Meteer, or "Millford," paper mill was advertised for sale. Its features included:

- 300 acres of land on White Clay Creek;
- A Paper mill with three vats, although only two used at present;
- Saw mill;
- Brick house near paper mill;
- Large frame house;
- Five small tenements, three convenient to the paper mill, suitable for families who are to be employed in the papermaking business--the other two calculated for tenants on the farm;
- Log and frame barn.

The location, half a mile from Newark, was deemed healthy and "possibly in as convenient a part for carrying on the paper-making business as any in the United States." [3] Despite such promotion, however, the Millford mill remained the property of the Meteer family until after the death of Samuel Meteer, in 1838. The industrial returns of the 1820 census indicate a successful papermaking enterprise employing 21 men, 28 women, and 7 children, with a capital investment of \$50,000. [4] By 1832, the male labor force at Millford paper mill had decreased to 8, reflecting a probable shift from hand papermaking to use of a papermaking machine. [5] The mill continued to be operated by the Meteer family until 1841, and it was not until 1843 that the water rights and mill structures were sold to a Joseph E. Perry of Mill Creek Hundred for \$6,000. [6]

#### Advent of the Curtis Brothers--1848

Joseph Perry's management of the Millford mill apparently was totally unsuccessful, for the new property became the object of a public sheriff's sale on 14 January 1848, at which time ownership passed into the hands of George B. and Solomon Minot Curtis of Newton Lower Falls, Massachusetts. [7] What first attracted the attention of the Curtis brothers to the Newark mill site is uncertain. George B. Curtis evidently was an entrepreneur who took a greater interest

in developing than in managing paper mills, [8] and in 1848 he saw the potential for success if the Meter mill could be refurbished. Toward this end, Solomon Minot Curtis came to join brother George in organizing the Newark venture.

The condition of the mill property at the time the Curtis brothers acquired it offered little to encourage them. Local historians note the mill as being "in ruins" from years of neglected repairs. [9] Lacking the personal capital necessary to make needed improvements, the Curtis brothers borrowed \$7500 from Newark creditors. With these funds, the two men purchased the water rights and began rebuilding the mill. [10] The new enterprise incurred a further debt of \$3067 when it purchased the mill's first Fourdrinier endless-wire papermaking machine in 1849. [11] [Photo DE-1-14] This sum was advanced to the Curtis brothers by the Philadelphia stationers Charles Megarge and Edwin R. Cope. The loan agreement also stated that Megarge (subsequently spelled Megargee) & Cope would purchase for the Curtis brothers "all the rags and other materials they may want except domestic rags, also to sell and guarantee the sale of all the paper made by them, and to make such advances as may be mutually agreed upon between the parties." [12]

Having at their disposal the most current papermaking technology and an agent to market their product, the new firm emerged as "Curtis & Bro., Nonantum Mill," the name derived from the Indian name for the Newton, Massachusetts vicinity where the Curtis family successfully began its papermaking tradition. [13] This skilled tradition, coupled with careful management, soon brought prosperity to the Nonantum Mill, and the superiority of its paper was widely recognized. So successful was the Curtis enterprise, that its heavy debt was repaid to Newark businessmen by 1850. [14]

From the middle of the 19th century, Curtis & Brother devoted its efforts to the production of specialty products: card, envelope, colored and fine printing papers. Its high-quality products earned the Curtis mill an esteemed position among the paper mills of Delaware. By 1882, the mill was producing 2500 pounds of paper daily, and a local history of that year noted of Curtis and Brother, "They have kept up with most of the improvements in the machinery for the manufacture of paper, and a visit to their mill will prove interesting and instructive. At present it produces about \$70,000 worth of paper per year, and the monthly payroll is a \$1000." [15]

Despite numerous consolidations of ownership, Curtis & Brother remained under family control as a partnership until 1926, when the firm's controlling interest was purchased by outside stockholders. The name Curtis & Brother was retained by the new corporation, and in 1932, the name Curtis Paper Company was adopted. The Newark paper mill is the only one which Curtis operates, and it continues to produce the high-quality text and cover papers which established the firm's reputation during the 19th century.

### Structural and Technical History

When the Curtis brothers purchased the former Millford mill property in 1848, the need for rebuilding and refitting the dilapidated structure was obvious. The funds borrowed from Newark businessmen were applied to this purpose, and a new paper mill was erected on the site. The earliest graphic representation of the Nonantum Mill is an insurance map of 1880 [Photo DE-1-10, 11]. An 1877 "Sketch of Nonantum Paper Mill near Newark, Delaware" corresponds exactly to the 1880 line drawing, and provides dimensions and technical identification of various sections of the mill. [Photo DE-1-12] The buildings were all of frame construction, and within the mill complex were the following structures (numbers correspond to the 1880 map):

1. Main Building--housed pulp preparation, including rag sorting, cutter & duster, rag (beater) engine, and bleaching rooms--  
first floor stone; second, frame: 70-1/2 x 30 feet (1877)  
90 x 30 feet (1880)

Attached Bleach & Sizing, or "Drug" Room, frame: 16 x 20 feet.

Attached Rag Boiler Room, frame: 45 x 17-1/2 feet.

2. Machine Room--housing 62-inch paper machine, frame: 86 x 22 feet.
3. Boiler House, frame; brick stack: 35 x 12 feet.
4. Outbuildings--Stock House & Stable. [16]

From the insurance map, it appears that in 1880 the Nonantum Mill was utilizing water provided by the race running beneath the mill to operate its rag processing and pulping machinery, while a steam engine was used as the power source for the Fourdrinier machine. [17] The race still flows beneath the mill, though it no longer serves any useful function in the papermaking process.

The complex of wood frame buildings erected by Curtis & Brother served its purpose well for nearly 40 years, though in time the firm found itself limited in its ability to meet the increasing demand for its product. By 1887, the sons of the original Curtis brothers determined that thorough renovation and modernization of the paper mill was imperative. On 18 April 1887, the dismantling of the frame structure began. At the time, Thomas Scharf noted in his History of Delaware, "The capacity of the old mill was only three thousand pounds per day, while the new one will probably produce eight thousand pounds. The very best machinery is being placed in it by well-known and reliable firms, and the intention is the manufacture only first-class paper." [18]

The major program to construct a new mill began in May of 1887. By 31 December, over \$61,000 in new construction and renovation had been undertaken. [19] The new facilities were constructed of brick and, in the case of the principal structures, closely paralleled the earlier frame buildings in layout and function, simply by enlarging their floorspace. [Photo DE-1-3] Major improvements included detached buildings for rag sorting and storage, attached storage rooms for pulp and finished paper, and an attached finishing room. [20] [Photo DE-1-13]

Modernization carried over to the technology as well. The existing 62-inch papermaking machine was removed, and in May 1887, Curtis installed a new 82-inch Fourdrinier endless-wire machine purchased from the machine-building firm of Pusey & Jones, Wilmington, Delaware, at a cost of \$12,800. [21] [Photo DE-1-6]

The decade of the 1890s witnessed other improvements. During the summer and fall of 1892, Curtis constructed 4 new tenement dwellings next to the paper mill to house mill workers. [22] During 1896, a brick steam plant and stack were erected, along with several auxiliary mill structures, the total cost of which was in excess of \$18,000. [23]

To expand its productive capacity, Curtis & Brother purchased a 66-inch Fourdrinier machine second hand in August 1896 from the American Wood Paper Company, Spring City, Pennsylvania. [24] [Photo DE-1-7] This second machine, also manufactured by Pusey & Jones, was soon installed alongside the 83-inch paper machine. Both continue to produce all the paper currently manufactured by the Curtis Paper Company.

The papermaking process as conducted at the Curtis Paper Mill was typical of mills of its type throughout the 19th century. Prior to 1867, paper was made exclusively from cotton and linen rag fibers. Cities were the major source of rags, and brokers such as the Philadelphia stationery firm Megargee & Cope bought and sold the rags which were the papermaker's vital raw material. Rags brought to the Nonantum Mill were sorted, and buttons removed by hand. The rags were next shredded and dusted mechanically in large cylindrical baskets rotated by water power. Then the shredded rags were subjected to prolonged washing, boiling, beating, and bleaching with lime, the end result being "stuff," the clean, fibrous pulp from which the paper would ultimately be made. [Photos DE-1-4, 5] The processed pulp was (and still is) mechanically agitated prior to use, and from the large covered vats known as "stuff chests" where it was stored, the pulp was diluted to the desired consistency with clean water before being molded into paper on the Fourdrinier machine.

Though numerous alterations have been made over the years to the Curtis machines (including conversion from steam to electric power), the arrangement of parts comprising the "wet end" and the "dry end" of the papermaking machines, and the basic papermaking process itself are virtually unchanged from their 19th century predecessors. Still

an integral part of the process is the Fourdrinier, upon whose "endless wire" the stock solution of 1% pulp to 99% water is deposited by a vat agitator. [Photo DE-1-19] A shaking motion is imparted to the frame of the Fourdrinier which mats the fibres, while a suction box extracts much of the water mechanically. [Photo DE-1-15] The press section [Photo DE-1-16] removes more water, and passing the paper through a sequence of steam-heated dryer rollers completes the process. [Photo DE-1-8, 17] Sizing the sheet with a vegetable size gives a surface resistant to blotting. Calender rolls smooth the finished paper (the more rolls, the smoother the finish), and it is finally wound onto rolls for subsequent cutting into sheets of uniform size. [Photos DE-1-9, 18]

An historian of the paper industry in Delaware wrote that the 1887 Curtis mill was the first in the country to use a suction couch roll on its papermaking machine, "the purpose of which was to produce a very fine book paper with a uniform finish on both sides of the sheet, thereby eliminating the imprint of the Fourdrinier wire." [25] The suction roll absorbed water internally as the endless roll of formed paper passed over the roll face.

In 1975, all cutting, trimming, and packaging was performed on the Newark mill premises, and a warehouse constructed in 1969-70 provided storage space for finished paper awaiting shipment. [Photo DE-1-2] Curtis Paper Company maintained its own truck fleet for shipping its product.

NOTES

[1] Francis A. Cooch, Little Known History of Newark, Delaware and its Environs (Newark, 1936), p. 20. Cooch apparently had access to this deed. He was unable to discover when Edward Meteer acquired the mill, believing the record may have been among Newark documents destroyed during the Revolutionary War.

[2] Delaware and Eastern Shore Advertiser, 1 March 1798 (Wilmington Free Library).

[3] Mirror of the Times & General Advertiser, 24 August 1805, p. 534 (Wilmington Free Library).

[4] "Meteer Mills," 1820 Census, Delaware, Industrial Returns (Raw returns on deposit, National Archives Building, Washington, D.C.)

[5] "Meteer Paper Mill," Research notes on deposit, Eleutherian Mills Historical Library, Greenville, Wilmington, Delaware.

[6] J. Thomas Scharf, History of Delaware, 1609-1888 (2 vols.; Philadelphia, 1888), Vol. II, p. 926; Patricia M. Brown, "History of the Curtis Paper Company" (Unpublished thesis, University of Delaware, 1951), p. 10.

[7] Brown, p. 11. Brown cites records from Curtis Paper Company files, though these were not found among the company papers currently on deposit, EMHL.

[8] George Curtis sold his interest to another brother, Frederick A. Curtis, in 1850.

[9] Cooch, p. 21; Scharf, Vol. II, p. 296.

[10] Ibid.

[11] Perfected in England during the first decade of the 19th century, the Fourdrinier machine revolutionized the manufacture of paper, producing it on a continuous roll. The resultant saving in time and labor over the hand molding of individual sheets led to the rapid proliferation of papermaking machines by the 1830s. The first Fourdrinier machine in an American paper mill was installed in 1827.

[12] Articles of Agreement, Charles Megarge & Edwin R. Cope with George B. & Solomon M. Curtis 1 December 1849, Curtis Paper Company Papers, Accession 394, Box 1 (on deposit, Eleutherian Mills Historical Library, Greenville, Wilmington, Delaware.)



[13] Henry C. Conrad, History of the State of Delaware (3 vols.; Wilmington, 1908), Vol. II, p. 492. See also, Clarence A. Wiswall, One Hundred Years of Papermaking on the Charles River at Newton Lower Falls, Massachusetts (Reading, Massachusetts, 1938), p. 35.

[14] Cooch, pp. 21-22.

[15] Egbert G. Handy and James L. Vallandigham, Jr., Newark, Delaware: Past and Present (Newark, 1882), p. 81.

[16] Data derived from Insurance Map No. 6245, Nonantum Paper Mill, 1880, in possession of Curtis Paper Company; Sketch of Nonantum Paper Mill, 21 June 1877, Curtis Paper Company Papers, accession 394, Box 1, EMHL.

[17] According to Cooch, p. 28, Curtis installed the steam engine in 1873. This is the only source encountered which establishes this date.

[18] Scharf, Vol. II, pp. 926-7.

[19] "Building Account, New Mill," Ledger 8(1868-1906), p. 306, Curtis Papers, accession 394, EMHL.

[20] Insurance Map, Curtis & Bro., Inc., Philadelphia Manufacturers Mutual Fire Insurance Company, Serial No. 15826, Index No. 42236 (Surveyed 31 October 1923); map in possession of Historic American Engineering Record, Washington, D.C.

[21] Specifications, "83-inch-82-inch-78-inch Fourdrinier Paper Machine, No. 55," Pusey & Jones Co., Wilmington, Delaware, 28 May 1887; original machine drawing in possession of Curtis Paper Company.

[22] Ledger 8 (1868-1906), p. 398. Curtis Papers, Accession 394, EMHL.

[23] Ibid., p. 412. A subsequent renovation program took place in 1963-64, at which time new roofs and interior walls were erected over the existing machine and finishing rooms.

[24] The 66-inch Fourdrinier machine was purchased but never used by the American Wood Paper Company; hence, Curtis & Brother first operated this machine.

[25] Frederick Curtis Clark, "A History of Papermaking in Delaware," H. Clay Reed, ed., Delaware: A History of the First State (2 vols.; New York, 1947), Vol. I, p. 493.

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Brown, Patricia M. "History of the Curtis Paper Company." Unpublished thesis, University of Delaware, 1951. On deposit, Morris Library, University of Delaware, Newark. 29 pp.

A senior thesis of value primarily for its concise nature and for establishing the various changes in corporate structure from 1848 through the early 1950s.

Curtis Paper Company Papers. Accession 394, on deposit, Eleutherian Mills Historical Library, Greenville, Wilmington, Delaware.

Many gaps exist, though the collection is important for any subsequent study of the Curtis firm. Finding aid: inventory of Accession 394, EMHL.

Hancock, Harold B. "Delaware Papermakers and Papermaking, 1787-1840." Museum Research Study, 1955. On deposit, Research Department, Eleutherian Mills Historical Library.

A section devoted to the Meteer paper mill gathers most of the information on the mill property prior to Curtis Brothers' ownership, 1848.

Insurance Map, Nonantum Paper Mill, Newark, Delaware; Number 6245, 1880.

This map is the property of Curtis Paper Company and is available for examination. It depicts the mill as it existed prior to 1887 when the present structures were erected, and is a highly significant document. Together with the Insurance map of 1923 currently in the possession of the Historic American Engineering Record, a fairly precise and accurate record of mill structures and their alteration is currently available.

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