

Noxontown Mill, circa 1740
Two miles west of Highway 13 on Road 38
Middletown
New Castle County
Delaware

HAER DE-9

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
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HISTORIC AMERICAN ENGINEERING RECORD

NOXONTOWN MILL
HAER DE-9

Location: Near Middletown, Newcastle County, Delaware. 2 miles west of Highway 13 on County Road 38 (Noxontown Road).
UTM: 18.44123.4365130
Quad: Middletown

Date of Construction: Circa 1740. Last technical changes made in circa 1935.

Present Owner: Mrs. W. Y. Ellison
Box 65
Middletown, Delaware.

Present Use: Discontinued milling operations in mid-1940's. Served as distribution store until mid-1950's. Presently in disuse.

Significance: Noxontown Mill was typical of the small grain-milling establishments that predominated in Delaware throughout the colonial period. But it was atypical in the sense that it survived so long. In 1976, despite the fact that the mill had been closed for over 20 years, it was in excellent condition, and its machinery was intact. Consequently, it served well to document not only the colonial mill, but also the adaptable mill--the mill capable of absorbing technical changes which allowed it to operate into the mid-twentieth century.

Historian: Larry D. Lankton, August 1976.

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GENERAL HISTORY

In the years immediately following the Civil War, Noxontown Mill quickly passed through a succession of owners. Two brothers, Samuel and Jonathan Hand, purchased the mill--but neither brother could turn a profit. Each brother, in turn, lost the mill back to Edward Silcox, a local money-lender. The next owner was William E. Evans, Samuel Hand's son-in-law, who purchased the mill in circa 1870. [1] Evans, of Welsh descent, was an experienced miller who had operated grist mills in Dover and Blackbird, Delaware. Evans proved to be the man to turn around the fortunes of the faltering mill. Instead of running Noxontown Mill for only a short time, as his immediate predecessors had done, Evans transformed the mill into a profitable proposition--and his descendants have retained ownership of the mill until the present time (1976).

When Evans purchased the Noxontown Mill, it was already 130 years old. Thomas Noxon constructed it in or around 1740, and at the same time he built a residence near the mill and two other grist mills in the area, at the head of the Appoquinimink River. [2] Noxon's mills were in most respects typical of the small, localized, grain-milling establishment that predominated in Delaware--and in the rest of the country--during the colonial period, and indeed throughout much of the 19th century. Water-powered, the mills handled locally harvested grain. In the colonial period, Noxon's mills did benefit from one important advantage which many similar mills lacked: the navigability of a nearby river, in this instance the Appoquinimink. In an era of dreadfully poor overland transportation, the river afforded Noxon's mills cheap transportation and access to a larger marketplace. Largely because of their advantageous location at the head of the Appoquinimink, Noxon's mills flourished, and around them a village sprang up which bore Noxon's name.

Chartered in 1742, colonial Noxontown boasted a hotel, malt-house, brew-house, and bake-house. Noxontown for a brief period served as a major activity center for its part of Delaware; it was especially noted for its annual fair. At this event, Delawarians gathered to buy and sell livestock, to purchase locally produced goods, and to sample imported goods from England. But Noxontown faltered in the 19th century, giving way to nearby Middletown and Odessa. By 1870, when William E. Evans purchased Noxon's last surviving mill on the Sassafras Branch of the Appoquinimink, Noxontown had already, in a sense, disappeared. The name of "Noxontown" lingered on, but the "town" consisted of Noxon's house, the mill and milltown, farm acreage, farm buildings, and a tenant house. William E. Evans owned the whole of these properties, and he set about making Noxontown Mill a profitable flour mill.

It seems likely that William E. Evans altered and updated Noxontown Mill shortly after acquiring it, but any early modifications

he might have made are unverifiable. While he owned the mill, the major changes which can be documented occurred in the late 1880's and the early 1890's. At that time, Evans' son, William D. Evans, returned from college and began working in the mill with his father. Apparently filled with new ideas, the son encouraged his father to allow him to renovate the mill. Working within the confines of the existing structure, William D. Evans revamped the milling process. [3] He retained one old pair of millstones on the first floor, but he stocked the rest of the mill with some of the most modern milling machinery available. In the mill race he installed two vertical turbines manufactured by T.H. Risdon & Co., of Mount Holly, New Jersey. [4] On the first floor he placed three new roller mills manufactured by the Philadelphia firm of Thompson & Campbell. [5] On the third floor he located a Thompson and Campbell rolling screen, and on the second and third floors he positioned Thompson and Campbell bolting reels. [6] On the second floor he also installed two machines manufactured in Silver Creek, New York: an H. W. Allen middlings purifier, [7] and a Eureka Separating and Scouring Machine manufactured by Howes and Ewell. [8]

Because William D. Evans introduced all this new machinery, he also had to install a new power transmission system: a new set of shafts, gears, pulleys and belts. In addition, he rearranged the mill's elevators, gravity spouts and bins. At the same time, although the mills' foundation and main framing timbers remained unchanged, the younger Evans perhaps installed new joists and floors. Most likely he installed new flooring beneath the roller mills, because the machines were much heavier than any other machines which had come before.

After William D. Evans completed his alterations, Noxontown Mill, from a structural standpoint, still reflected its colonial heritage, but the processes undertaken within the mill, on the whole, represented the "modern" 1890's milling practices, although on a small scale. [For structural views, see Photos DE-9-1, 19-24.] Perhaps because of space limitations, or because of a lack of capital or water power, Evans did not totally modernize the mill. For example, he did not install any new magnetic separating machines, dust collectors, or any mechanical packing or bagging machines. Nevertheless, his improvements undoubtedly represented the most widespread and important technical changes that the mill was ever to go through, and these changes brought new life to the mill. Despite its small size, Noxontown Mill at the turn of the century managed to support the Evans families (those of William E. and William D.) in a very comfortable style. Mrs. Rosetta Hand Ellison, the daughter of William D. Evans, was born in Noxontown on 2 August 1896. In remembering her childhood and her life in the "big house" built by Thomas Noxon (which was staffed with servants), she recalls that, "We had all we needed of everything, but not any excess." [9] Besides supporting the Evanses, the mill, through employment, supported as many as four other families, which were treated paternalistically.

The labor turn-over at Noxontown Mill was minimal, and a close association existed between the employer and the employees. One of the millers, "Uncle" John Cook, lived with the Evanses in Noxon's house. When he died in the 1920's at the age of 87, "Uncle" John left the Evans family his inheritance.

At the turn of the century, Noxontown had two outlets, stores in Townsend and Middletown, and it also provided home delivery. The mill regularly produced 3 or 4 grades of flour, white and yellow corn meal, and middlings and bran which it sold for feed. [10] It would also do custom milling for its clientele, providing a product such as whole wheat flour. The mill either bought grain outright from neighboring farmers, or it accepted grain on deposit. When the mill ground deposited grain for a farmer, the miller extracted a toll; he withheld a percentage of the product as payment for his services.

Besides the main affair of milling grain, peripheral activities went on within and near Noxontown Mill. A teamster tended draught horses and repaired harnesses; [11] the millers and helpers sewed and repaired cloth bags on a treadle operated machine. During the winter, the mill's employees harvested ice from Noxontown Pond, which they stored in an insulated ice house. In the summer, this ice was a saleable commodity. Besides providing power for the mill and ice for sale, the mill pond also provided fish-- a resource that was not neglected. Workers mended their fish nets in the mill, and after 1912, miller John Cook operated a boat livery out of the mill for sport fishermen. In addition to these activities, the mill workers occupied themselves during slow periods with all kinds of small repairs, and several of them spent idle hours carving small wooden objects. This last activity can be witnessed today by the outlines of small ships which were cut into the mill's doors. Finally, the mill served a social function: it was a meeting place, a stop-off for neighboring farmers. It should be noted that the mill was the domain of the adult male. Women and children were allowed in the mill only occasionally, because it was a dusty place and, with its flapping leather belts and running machines, a dangerous place as well.

In 1901, William D. Evans purchased the mill from his father and continued to operate it. In the first decades of the 20th century, the mill remained quite profitable, but there were definite signs of decline. The outlet store in Townsend closed, and a larger local mill in Middletown offered strong competition. In addition the large western mills--such as General Mills--were well underway, and their products were to be found on local grocers' shelves.

In 1922, when William Y. Ellison and Rosetta Hand (Evans) Ellison purchased the mill from her father, the mill's machinery was all at least 30 years old, and the mill's products were becoming less and less competitive in the marketplace. As soon as William Ellison

assumed control of the mill, he added a new product: cider. Cider-making was only a seasonal business, but for a brief period it did bring in new revenue. The mill produced cider into the early 1930's using a press manufactured by the Hydraulic Press Manufacturing Company of Mount Gilead, Ohio. [12]

In the late 1920's, Ellison began shifting the focus of the mill away from wheat and flour and towards corn and animal feeds. Between 1926 and 1935, he purchased the last machines to be installed in the mill: A Monarch corn cracker (manufactured by Sprout-Waldron Co., of Muncy, Pennsylvania)--and a C. O. Bartlett and Snow corn sheller (manufactured in New Holland Pennsylvania). [13] In order to make room for this last machine, the roller mills, no longer used for flour production, were pushed aside into a corner of the mill's first floor. The mill was through with flour. From 1935 to the mid-1940's it produced corn meal (using the old millstones) and various grades of corn-based animal feeds, using the machinery Ellison installed. After the mid-1940's, all the mill's machinery stopped operating, and Noxontown Mill served only as a distribution center for cattle and poultry feeds, dog food, seeds, and patent medicines for livestock and poultry--all of which were manufactured elsewhere. Finally, in the mid-1950's, the mill closed down completely.

TECHNICAL DESCRIPTION circa 1885 to 1935

Power and Power Transmission

The machinery in Noxontown Mill was exclusively water-powered, except for a brief period in the early 20th century when a small gas engine served as an auxiliary power source. [14] The water to drive the machinery came from Noxontown Pond, whose surface area measured approximately 178 acres. Thomas Noxon created this pond by throwing a low earthen dam across Sassafra Creek, at a point just upstream of where the creek joined the Appoquinimink River. Subsequent owners modified Noxon's dam, but it remained an earthen structure (presumably built over wooden piles). [15]

Two sets of simple gates controlled the water discharge from Noxontown Pond. Instead of being raised and lowered by rack and pinion gearing, the rectangular wooden gates were moved by crowbars and pinned up at the desired height. [16] One set of waste gates controlled the pond's water level; these gates were fully opened only when the pond was flushed out to remove sediment. The second set of gates stood at the head of the mill race; these gates were fronted by a screen which kept debris out of the narrow channel

The short race leading from Noxontown Pond to the mill was little more than a trench cut in earth; it was lined with stone in only a

few places where erosion had proved a problem. Just as the water reached the mill, it passed from the race into a wooden flume [Photo DE-9-2]. Within this flume, which was protected by a light roof, stood two turbines, one mounted directly behind the other [Photos DE-9-3, 4 & 5]. Both turbines, of the vertical, inward-flow type, were manufactured by T. H. Risdon & Company. The front turbine appears to have been a size 50 "Register Gate" model, and the rear a size 43 model. The two turbines acted independently. The speed of each turbine was set by its gate-control wheel located on the first floor of the mill.

The front turbine powered the upper runner millstone on the first floor and the shaking screen which was part of the cornmeal sifter located in the basement. The power to drive these machines was taken off the turbine's vertical shaft via a wide leather belt running on a pulley 7 1/2 feet in diameter [Photo DE-9-6]. The front turbine also drove the corn cracker on the first floor; the power to drive the corn cracker came off the front turbine via bevel gears connected to a horizontal shaft in the basement. Pulleys and belts carried power from this shaft up to the first floor.

The rear turbine drove a greater variety of machinery. A bevel gear on the turbine's vertical shaft turned a horizontal line shaft in the mill's basement [Photo DE-9-7]. Leather belts took power from this shaft across the basement to the cider press [Photo DE-9-8] and up to the first floor to drive the corn sheller and cob grinder. Using bevel gears, the line shaft in the basement also drove a vertical power-transmission shaft which passed through the first and onto the second floor. On the first floor, this vertical shaft powered no machinery, except for a small belt-driven speed (rpm) indicator, which was conveniently mounted on a wall above the rear turbine's gate-control wheel [Photo DE-9-9]. On the second floor, where the vertical shaft terminated, a pulley mounted directly on the shaft powered a separating and scouring machine [DE-9-10]. Through bevel gearing, the vertical shaft also drove a horizontal line shaft on the second floor [Photo DE-9-11]. This horizontal shaft, using both belts and sprocket chains, drove the second floor's belting reels and a middlings purifier. Via chains and belts, it also transmitted power up to the mill's third floor, where it drove the bolting reels there, as well as all of the belt-and-cup elevators [Photo DE-9-12]. [17]

The exact head of water available at Noxontown Mill is unknown, as the amount of horsepower generated by the two turbines. The head, however, was low, and this undoubtedly served as a limiting factor on the size of the mill. Another limiting factor was the fact that the Appoquinimink River, behind the mill, was tidal. Because of its location, the mill certainly suffered from high back-water conditions which rendered its wheels less efficient.

Flour Production

After the mill ceased flour production in circa 1935, certain parts of the flour system were dismantled. The roller mills were pushed aside, and some of the mill's elevators and spouts were removed. [18] Consequently, it is not possible to trace exactly the mill's last flour production system. That system, however, can be outlined.

When wheat arrived at the mill, it always contained a variety of impurities that had to be removed in order to assure uncontaminated flour. These impurities included, among other things, grass seed, garlic, oats, chaff, dirt balls, and small pieces of metal, such as pieces of baling wire. At the head of the flour production, then, were steps designed to clean the wheat, and two machines in the mill were specifically for this purpose. The first was a rolling screen manufactured by Thompson & Campbell. [19] Located on the third floor, the rolling screen resembled a bolting reel, except the reel was covered with hardware cloth instead of fine silk [Photo DE-9-13]. The mesh of this hardware cloth grew finer from one end of the rotating reel to the other. When the grain was introduced into the reel, the screening separated impurities by size. As a further aid to separation, the machine incorporated a blower to extract impurities which were lighter than the wheat; these impurities were simply blown out of the mill through a spout.

A Eureka Model No. 0 Separating and Scouring Machine performed a second cleaning operation. This machine, located on the second floor, rapidly revolved the wheat within a vertical, perforated steel cylinder. As the grain was forced against the cylinder, it was polished; the machine removed the fuzz from the end of each berry. After passing the cylinder, a blast of air acted against the grain to remove dust and chaff, which were blown through a spout to the outside of the mill.

One other cleaning operation was performed in Noxontown Mill: the separation of iron particles. The mill had none of the magnetic separating machines used by many mills during this period. Instead, the millers simply set horseshoe magnets into the mill spouting in numerous locations. The magnets caught any pieces of iron that were traveling downward with the grain.

After the grain was cleaned, it passed through roller mills located on the first floor. The mill operated three of these machines, all manufactured by Thompson & Campbell. (The cast-iron rolls in the machines were prepared differently, to allow for production of varying grades of flour.) After wheat passed through a roller mill for the first break, it fell into an elevator boot in the basement, and was then carried back up the mill and delivered to Thompson and Campbell bolting reels covered with silk [Photo DE-9-14]. These bolters sifted or graded the flour produced on the first break, and

tailed over middlings and bran. Flour fine enough to pass through the silk bolting cloth was carried by horizontal screw conveyors and spouts to storage bins. The tailings went to an Excelsior Purifier manufactured by H. W. Allen. The machine separated any flour which clung to the middlings, and also separated any bran. The middlings themselves, after passing the machine, could be collected and sold, or they could be spouted down to the roller mills for further breaks, in order to produce more flour. By "recycling" material through the roller mills, and by sending it through bolting cloths of varying mesh, the mill could produce three or four grades of flour.

Cornmeal and Feed

The corn processing system last operated in Noxontown Mill was a simple one, installed (except for the millstones) between 1926 and 1935. If a farmer brought husked corn in on the ear, a miller fed it into a sheller on the first floor manufactured by the C. O. Bartlett & Snow Company [Photo DE-9-15]. This machine discharged cobs at one end that were scooped up by hand. The cobs were discarded, or, if wanted for litter, they were fed by hand into a cob grinder on the first floor built by the New Holland Manufacturing Company.

The corn shelled by the Bartlett & Snow machine fell through a grating in the first floor and into a hopper in the basement that led to an elevator boot. Carried up the mill by a cup elevator, the shelled corn could be spouted into any one of several storage bins. The primary corn bin, however, was located on the second floor, directly above the first floor's millstones and corn cracker. By opening the appropriate spouting, a miller could feed corn to either the stones or the cracker [Photo DE-9-16].

The millstones produced cornmeal. The bottom or bed stone sat on wooden beams and was shimmed into alignment. The upper stone, mounted on a vertical shaft, was the runner [Photo DE-9-17]. The cornmeal falling into the basement from the stones passed into a "home-made" sifter [Photo DE-9-18] which used a screened tray. One end of this tray was mounted on a revolving crank that provided a shaking motion. Standing next to the sifter, a miller could examine the fineness of the meal, and if necessary, he could, using a screw acting on a lever, adjust the clearance between the millstones.

Noxontown Mill used a Monarch corn cracker manufactured by Sprout-Waldron & Co. to process corn for feed. The machine used planer-like knives bolted onto a horizontal, rotating cutter head. After passing the knives, the cracked corn was graded by screens in the machine, and different grades passed into three or four spouts leading down to the basement. Nails on the ends of the spouts held burlap bags which were being filled.

Materials Handling

As many as 9 cup elevators transported material up Noxontown Mill; numerous gravity spouts moved materials down the mill; and screw conveyors moved material horizontally. But the existence of these labor-saving devices should not disguise the fact that much burdensome handwork was done. Wagons (and later, trucks) were loaded and unloaded by hand; grain spouted into storage bins was dispersed across the floor by hand; the corn sheller and cob grinder were fed by hand. Also, Noxontown Mill never used any baggers or compactors. Consequently, every bag of flour, meal, or feed that came out of the mill was filled and weighed by hand. [20]

Lighting and Heating

The mill was never electrified. Workers relied for the most part on natural lighting, which in many parts of the structure was quite poor. To supplement natural light, or to permit night work at harvest time, the millers used kerosene lamps.

It appears that the mill at one time had a large hearth located at the base of the chimney in the basement. It is not known when this hearth was removed, but in later years the only source of heat in the mill was a small coal stove in the first-floor office. To aid in fire prevention, the stove stood in a shallow, sand-filled box.

Rodent Control

Grain mills naturally attract a rodent population. In order to keep small pests out of Noxontown Mill--pests that would both consume and foul grain--the millers kept predators on the premises. Some chose to combat rodents with black snakes which were encouraged to frequent the structure. Other millers preferred to keep cats.

NOTES

[1] Oral interview with Mrs. Rosetta Hand Ellison and Mrs. Hope Motter, conducted 15 July 1976.

Mrs. Rosetta Hand Ellison is the granddaughter of William E. Evans and the daughter of William D. Evans; she is the present owner of Noxontown Mill. Mrs. Hope Motter is Mrs. Ellison's daughter. Mrs. Ellison was born in Noxontown in 1896; her daughter was born there in 1923. Together, they served as the primary source of information on the Hands, Evanses, and Ellisons. They also served as the source of information on the mill's products and the activities which surrounded the mill.

[2] This brief summary of Thomas Noxon's founding of the mill is based on the following: Harold Donaldson Eberlein and Cortlandt V. D. Hubbard, Historic Houses and Buildings of Delaware (Dover, 1962), pp. 132-133; Henry C. Conrad, History of the State of Delaware (Wilmington, 1908), pp. 566-567; and J. Thomas Scharf, History of Delaware, 1609-1888 (Philadelphia, 1888), II, 1015.

[3] Oral interview, 15 July 1976. Information gathered in the interview concerning the machinery in the mill was verified by an examination of extant machinery in the structure. All data regarding machine types and manufacturers was gathered during several personal inspections of the mill made in July and August, 1976.

[4] The Eleutherian Mills Historical Library (Greenville-Wilmington) has an 1896 "Descriptive Catalogue of the Risdon Balanced Cylinder Gate and Register Gate Turbines," published by T. H. Risdon & Co., Mount Holly, New Jersey.

[5] Thompson & Campbell was located at 1030 Germantown Avenue in Philadelphia. Each of the three roller mills bore the name of "Quaker City Roller Mill" and patent dates of 12 May 1885 and 17 December 1889. These roller mills, according to Mrs. Ellison, stood in a line on the first floor, where the New Holland cob grinder is shown in the HAER drawings.

[6] These machines all carried the maker's name and model "No. 2".

[7] This machine carried the trade name of "New Excelsior Purifier," the model number "417, No. 1," and patent numbers 303763, 400720, and 429909.

[8] The maker's name was carried on the machine, as was "Model No. 0."

[9] Oral interview, 15 July 1976.

[10] The flour at varying times was marketed under such names as "Best," "Purity," "Silver Wave," "Baker's," and "Exchange."

[11] A leather-worker's or harness-maker's bench was stored on the top floor of the mill.

[12] The manufacturer's name was carried on the machine. In addition, Mrs. Ellison possessed trade literature published by the Hydraulic Press Manufacturing Company dated 1922. According to this literature, the press cost \$448 and had a daily capacity of 30 to 40 barrels.

[13] All machines were examined in situ. The Sprout-Waldron machine was a "Size No. I," and the New Holland machine was a "No. 110." The C. O. Bartlett & Snow machine was marketed as the "Triumph Corn Sheller," and is described in a trade catalogue published by the W. J. Savage Co. which is in the collection of the Eleutherian Mills Historical Library.

[14] This gas engine, maker unknown, was located where the cider mill is shown in the HAER drawings.

[15] Some wooden piles were exposed (and removed) in 1966 when a new county road was built across the dam.

[16] These gates were destroyed in 1966 when the county put in a new road across the dam. The description of the gates came from the 15 July 1976 interview.

[17] Unfortunately, the power drive to the roller mills was dismantled in circa 1935 when they fell into disuse, and it is impossible to reconstruct that drive. In all likelihood, the roller mills were driven by belts passing through the floor from the basement to the first story, but it cannot be stated with certainty whether they were driven by the front or rear turbine.

[18] For example, when the mill was examined, there were 9 elevator heads located on the third floor, but only 5 boots in the basement.

[19] The author is indebted to Peter Cousins, Curator of Agriculture at the Henry Ford Museum, for his identification of this machine.

[20] Weighing was done on one of two Fairbanks platform scales in the mill. As bags of flour were filled, they were compacted by being dropped onto a block of wood roughly a foot square.

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Oral interview conducted 15 July 1976 by Larry D. Lankton with Mrs. Rosetta Hand Ellison and Mrs. Hope Motter.

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