

A VISIT TO PINE CREEK GRIST MILL WILD CAT DEN STATE PARK MUSCATINE IOWA

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Pine Creek Grist Mill. This is the third mill to be built on this part of the creek. Construction by Ben Nye began in 1848 and the mill began operation in 1850.

The mill from the creek side. The mill is powered by a 20 HP water turbine located in the basement. During times of low water, a estimated 40 HP steam engine powered the mill.

Originally there was a tall sheet metal chimney for the boiler located on the left hand portion of the building.

The building is constructed of hand cut native oak beams using mortise and tendon joints connected with wooden pegs.





The current dam was built in the 1960's. The original dam was a timber and rock rubble structure about 5' higher than the current one. One of the Friends of the Mill future projects will be to raise the level of the dam. As it now stands there is not enough head to power the turbine properly.



The three flour milling roller mills. Each machine has two separate mills in it. They are driven by a line shaft in the basement below them.

Pine Creek Mill originally had two sets of millstones and produced flour from locally grown wheat. The mill used a milling process called "New Process" in the trade. When this technology became obsolete, the mill was completely reequipped in the 1880's with the latest "state of the art" milling technology (of 1880!).

The "new" mill has three almost completely separate plants in it. The main plant is a "three stand" double roller mill for the production of wheat flour. This plant occupies all floors of the mill. A single stand triple roller milling plant was added for corn milling and a set of 36" grind stones installed for the production of Buckwheat flour.

This is the three roller corn mill. In addition to producing flour from locally grown wheat, the mill also ground feed and produced corn meal for human consumption. This mill could be adjusted to produce anything from feed to fine corn flour. Like the other machines, it is powered by a line shaft in the basement and can be powered either by water or steam power.



Pine Mill is equipped with a Barnes and Lee "Little Victory" combination corn sheller and grain cleaner. Here it is shown being removed for restoration (since completed). The machine is mounted in the basement hanging from the ceiling joists. Farmers carried their ear corn into the mill in bags and dumped it into the sheller through a hole in the floor. Cobs accumulated in the basement where they were used as boiler fuel. An elevator carried the shelled corn to the second floor where it dropped down into the mill.



Above is what we think is one of the original 1848 bolters. The construction is quite different from the other machines and appears to date from an earlier period. The bolter is used in the corn milling plant to sift (bolt) corn meal from raw ground corn. Originally the hexagonal rotating reel was covered with silk cloth for bolting flour. For corn meal it was covered with fine metal screen wire. This machine will be restored in 2003.



Pine Creek Mill third plant consists of a set of 36" French millstones. These were used to grind Buckwheat and Rye. Buckwheat is not a wheat at all. Its a member of the Rhubarb family and is used only for making pancakes. The black triangular shaped seeds make a grayish pink flour.

Pine Mill's 36" stones are classic French millstones. These are a very hard gray quartz mined only at one quarry just outside of Paris France. In operation the stones are covered by a wooden shroud called the "tun." On top of the tun sits the "horse" that holds a shaker device that feeds the grain at a constant rate into the stones. The hopper that holds the grain is not in place in this photo. The cloth chute at the top right feeds the grain into the hopper.

The bottom stone is called the "bed" stone and the top rotating stone is called the "runner." A set of 36" stones rotated at 160 RPM and could grind 50 bushels of grain in a eight hour day.

A radial pattern of grooves and lands on the surface of the stone did the actual grinding. The grooves moved the grain out from the center "eye" of the stones and cut, like shears, the grain into pieces. The flat lands had fine grooves cut in them called "cracklings" that did the grinding. A particle of grain made two and half revolutions around the stones as it was being ground.





At a busy mill the stones would have to be sharpened at least once a week. The surface of the stone would have to be trued up using paint and straight edge much as a machinist would use bluing.

Then the grooves and lands would be renewed using a mill pick. This photo shows milling expert Bob Grassi teaching the author the art. The design of the pick has not changed in the last 3,000 years with the exception

that now the cutting edge is carbide. Note the bags of grain (called a "Bisk") used to support the arms while using the mill pick. The secret of using the pick is that the wrist is used only to guide the fall of the tool. The lifting is done right hand using the elbow and not the wrist. The tool is lifted and then released and left to fall on the stone with the left hand only guiding its fall. The force of the blow is controlled by how far the pick is lifted. Using this method the wrists do very little work and you have a surprising degree of control.

At right is another of the mill's original 1848 bolters. The grist from the millstones drops through the floor to an elevator boot. The elevator brings the grist up to this bolter. The bolter has two meshes of screen giving us both fine flour and grits. The Bran "tails over" out of the end of the bolter. This bolter is designed to have flour and grits directly scooped from it for bagging. The machine is mostly held together with wooden wedges and pegs.



Counting the basement, Pine Mill has four floors of machinery. Most is in good condition and can be made to run again. The mill is rare in its completeness and is a living museum of 19th century manufacturing technology.



At left are the heads of just three of the many bucket elevators in the mill. From the elevators a complex system of chutes (trunks) lead to various bins and machines. By setting the gates in the chutes the flow chart of the mill could be changed as suited the milling work to be done.

Note the open drive chain with no guards. It runs 20' across the room. No OSHA then!

Pine Mill has several grain cleaning machines such as the separator at right. Wheat went through four cleaning operations before milling. Note the duct work on the right from the aspirator that cleans dust and smut from the grain.

There are also a few mystery machines like the "crumbler" below. Located on the third floor, no one knows what its exact purpose is.



Powering Pine Creek Mill

When we think of old grist mills, we always picture a water wheel turning next to the mill. Pine Mill like many cold climate mills does not use a water wheel. Wooden water wheels quickly deteriorated and in the winter the ice damaged them. Ben Nye used the latest up to date technology in his mill by installing a modern (1850) turbine. This photo shows the body of the turbine after it was removed for restoration. The water from the dam penstock enters through the square opening on the right and exited from the bottom.



With the original dam the turbine had a head that could generate 20 HP at 220 RPM.



At the left you can see the restored turbine rotor. Extensive work had to be done to restore the worn blades. A new shaft was manufactured and the original Lignum Vitae wood thrust bearing replaced with UHD plastic.

The turbine was reinstalled in 2002 and is now in back in full operation.



Some time in the late 1870's a steam engine and boiler were added to power Pine Mill. It powered the mill during times of low water in the creek and handled the additional load of the new roller flour mill.

Oral history tells us that the boiler had a tube failure in 1914. Due to decreasing business the owner decided not to repair the boiler and flour milling ceased.

Old photos indicate that this is the second boiler used in the mill. During the 1935 WPA restoration of the mill the sheet metal smoke stack and the smoke box were removed.

As far as we can determine the boiler did not have an injector. A feed water pump driven by a system of pulleys from the engine drove this piston type boiler feed pump.

The pump is a one piece casting. We think it may predate the civil war. The piston is a wrought iron forging that never was round in cross section! The bushings and seals have worn 0.250" of metal from the center of the piston! A new piston is being made to allow us to put the pump back in operation.

When Jim Tomasson disassembled the pump, he discovered that a horse shoe had been forged into a ring for use as a bushing to hold the leather packing in place.



Pine Creek Mill's Steam Engine



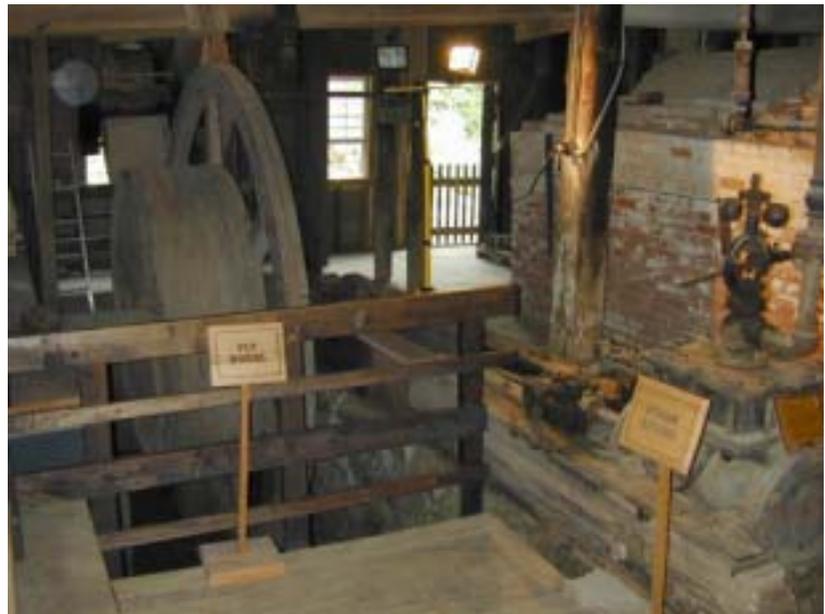
One of the more interesting mysteries in Pine Creek Mill is its steam engine. Historical references tell us the engine originally powered a work boat on the Mississippi river. After the boat, the engine powered a stave mill in Muscatine. The owner of Pine Mill located the engine in a Muscatine scrap mill and installed it in the mill.

Unlike most mill engines, this engine does not have a cast iron bed or frame. Its mounted on two large wooden beams. This is typical of a marine engine of the period. One problem with the marine engine theory is that the engine does not have any reversing gear! This has led to the theory that the engine could have been a pre civil war portable mill engine. The engine is built in sections that would allow for easy transport in the era of horse and wagons.

The cylinder bore is 10" and the stroke is 20". Based on the line shaft speed and the pulley ratios, the engine operated at 82 RPM.

The engine's cast iron flywheel is made in sections bolted together. Next to the flywheel is the 72" diameter wooden pulley that drives the main line shaft via a 18" wide flat belt.

A Gardner governor controlled the engine's speed. Above the governor the remains of the hydrostatic oiler can be seen.





This photo shows the interior of the steam engine cylinder and the piston. The cylinder was about 1/4 filled with fine sand when we removed the head. The head is retained by three bolts and three studs. The head gasket was completely gone. It took a four foot "helper" bar on the wrench to break the nuts free. When opened we found the cylinder partly filled with sand from the frequent flooding the mill endured during the spring thaws.

Note the long bolt hanging free on the right side of the cylinder. This bolt originally held the engine frame to the wooden foundation beam. This part of the beam had completely rotted away. A major part of the restoration will be the complete replacement of the two large oak beams that the engine was mounted on.



The engine does not use the typical "D" valve. Instead it has a figure 8 shaped box that slides back and forth on a square box mounted on the top of the cylinder. The box has the inlet and exhaust ports on its sides.

Apparently it gave its owners quite a bit of trouble over the years. Most of the bolts that held it together had been twisted off and a variety of shims were found between the various surfaces.

Pine Creek Mill's History

In 1833 Iowa territory opened for settlement. Shortly after Benjamin Nye became what would be Muscatine Counties first white settler. Nye and his cousin Stephen claimed land on either side of Pine Creek and built cabins to secure their legal claim to the land. In 1834 Nye opened a trading post and post office on Pine Creek trading furs for food to the local Indians. In 1835 Nye seeing the need for lumber by the increasing population of settlers in the area built a saw mill.

He built his first saw mill down stream from the location of the present mill. Back water from the flooding of the Mississippi interfered with the operation of the mill wheel. This prevented the mill from operating during high water. Nye then moved the saw mill to a location up stream from the present mill. Nye soon had competition from steam saw mills being built in Muscatine. He then built his first grist mill in 1837 directly across the creek from the saw mill and began producing flour and feed from locally grown wheat and corn.

Nye's milling business proved successful and he began construction of the present mill in 1848 at a cost of \$10,000. Hand hewn Oak timbers as large as 14" X 14" were used in the post and beam construction. Flooring is native Oak and the original siding all Walnut. All lumber was planed so it would not hold flour dust. The old mills were dismantled and a new dam built from wooden cribbing and rock against native rock abutments. At first a large water wheel located in the Northeast corner of the building supplied power to the mill. In later years the wheel was replaced with a turbine.

Pine Mill became the site of one of Muscatine Counties first celebrated cases of violent death. Ben Nye's daughter had eloped a local man named George McCoy. Nye never forgave McCoy for eloping with his daughter and had a life long hatred of the young man. McCoy, had recently been elected Sheriff in Cedar County and was a respected man of the community. Like many others he went to California during the gold rush of 1849 and unlike most made a considerable success there.

Before leaving his young wife and three children behind with Nye and his wife Abuzza, McCoy asked his best friend to look after his family in his absence. Upon his return from the gold fields McCoy discovered he now had four children, one fathered by his friend. McCoy incensed by his wife's infidelity McCoy filed for divorce in Muscatine County court. Determined that his children would not "live in a house of sin," McCoy removed his children from his father-in-laws home. He took his children in a wagon back to Muscatine with Nye and his other son-in-law Patterson in pursuit.

Upon overtaking McCoy's wagon, a fight ensued between McCoy and Nye. Nye, a man well known for his violent temper struck at McCoy with a large club. McCoy fighting off an attack from Patterson from the rear found himself forced to first shoot Nye in self defense. McCoy's powder being damp the bullets failed to harm Nye. Finally to save himself McCoy stabbed Nye to death.

After Nye's death his widow sold the mill to Patterson. At the time Iowa's main crop was wheat. Pine Mill made a low grade flour that was sold to Southern plantations to feed their slaves. The outbreak of the civil war ruined Patterson's business. After his death in 1864 the mill passed through the hands of several owners. All made various improvements to the mill. In 1873 Herman Huchendorf purchased the mill and made many technical improvements. This included the South addition to the building for the storage of flour. Huchendorf also survived the flood of 1883 when water reached the second floor of the mill.

In 1893 the Missel family purchased the mill and produced bread flour for the local market under the "White Lily" brand. Business slowly declined and the mill ceased producing flour in 1914. By 1923 feed milling operations ceased and the business closed. In 1927 Pine Mill was sold to the Iowa Conservation Commission with the plan that the mill would be incorporated into planned Wild Cat Den State Park.

In 1935 the WPA did the first restoration of the badly deteriorated building. The modern restoration work began with the organization of the Friends of the Mill six years ago. Since work began the state of Iowa has invested over \$400,000 in the mill. After several years of work, the millstones turned for the first time since 1923 in 2002. By the end of 2003 the entire power train of the mill will be restored and the corn milling plant returned to operation as well.

Pine Creek Mill's Heritage Day

Every September the Friends of the Mill and the Iowa Department of Natural Resources sponsors Heritage Day.

The mill is in operation throughout the day along with many other historic exhibits.



On the hill above the mill is the restored Melpine school an original Iowa one room school house. The mill and the school are open to the public on Sunday afternoons through out the summer months.



Wild Cat Den State Park is located 15 miles East of Muscatine, Iowa on highway 22. Highway 22 is a scenic drive along the Mississippi river between Muscatine and Davenport, Iowa. The park offers camping, hiking trails, picnic grounds, Pine Creek Grist Mill and Melpine school. There is riverside RV camping and boat ramps at several parks located on the river along the highway.

For more information on the mill and park check the Friends of the Mill web page at:
<http://www.pinecreekgristmill.com/>