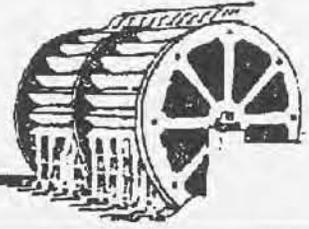


MILLWORK



Spring, 2004

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Vol. 18 - No. 1

What's News?

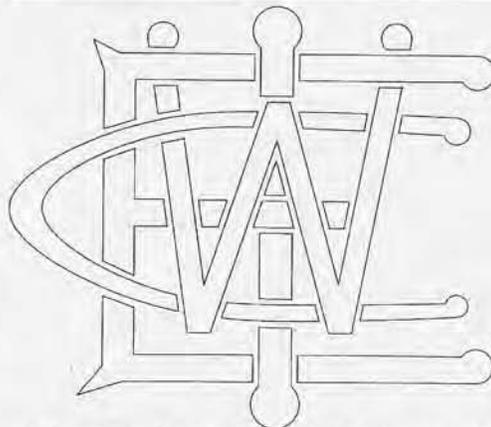
Feedmill Work - The staff at Hanford Mills Museum is constantly monitoring and restoring the site's historic buildings. Recent attention has been focused on the Feedmill. This is usually the first historic structure visitors enter. It houses exhibits, restrooms and the video theater. In the past few years its large, gray grain elevator has begun to leak.

In 2003, Hanford Mills Museum received funds from the New York State Council on the Arts (NYSCA) to write a preservation and maintenance plan. Part of that plan will include information on the feedmill, its history and restoration needs. To help fund this work, director Liz Callahan has written grant proposals to the New York State Department of Parks, Recreation, and Historic Planning; and the Robinson-Broadhurst Foundation. We are waiting to hear their decision.

As part of the restoration of the Feedmill, the museum staff has been taking a look at its exhibits. At the end of 2003 the Museum was awarded a Small Museums Assistance Collaborative grant to redesign the Feedmill's exhibits. This will provide approximately \$8,000 worth of design work which will be done by the Exhibition Alliance of Hamilton, NY. Assistant director, Caroline de Marrais, and assistant curator Suzanne Soden, have been working closely with designer, Kristen DiStefano. 

Steaming Along - Work is still progressing on the Museum's Steam Project, although much of the present work is taking place away from the Museum site. Almost all the pipe work has been completed in the mill and we are now waiting for two major off-site projects to be completed.

The first is the casting of a reproduction boiler front. Based on old catalog illustrations and the memories of a former Erie Boiler employee, a new Erie Boiler Works boiler front has been drafted, patterns made, and is presently in the process of being cast by



A logo similar to this will be cast on the boiler doors - Erie City Iron Works.

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In Memoriam

Hanford Mills Museum is sad to report the deaths of two people who were great friends of the Museum. Each contributed to the Museum, helping to make it what it is today - one as a tour guide and the other as a local historian and Hanford family member.

Charles Gardner of Sidney, NY passed away on January 26th of this year at the age of 70. Charlie Gardner came to work at Hanford Mills in the spring of 2002 and immediately fit right in. He had hoped to return last year, but health problems kept him away. We will miss Charlie, he has been impossible to replace.

Then on March 24th of this year, Elma Hetherington Mitchell of Oneonta, NY passed away at the age of 88. Elma, whose mother was a cousin of the Hanfords, grew up in East Meredith. After

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The Power of History at Work

At this writing, thanks to the wild spring storms sweep- ing through Central New York, the

“power” is out – the electric power upon which

we all rely to wake us, warm or cool us and our food, facilitate our communications, and power our sources of news and entertainment and so many of the other things we take for granted in our daily lives. And, as gas prices top \$2/gallon, we’re all very much aware of our dependence on gas power.

Today, the challenges of cutting back on our use of gas-powered vehicles and making due without electric power for an hour (or a day) may have us long- ing for “simpler times”... yet the historic power generation we demon- strate at Hanford Mills Museum certainly had (and has) its challenges.



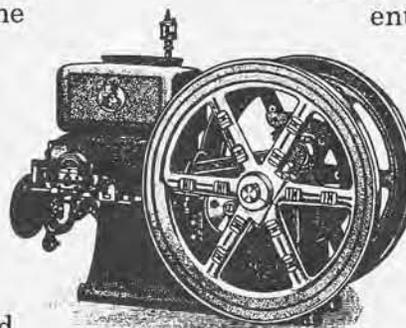
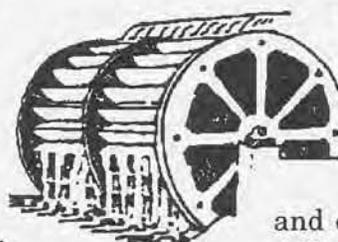
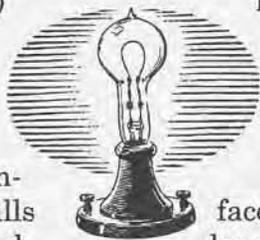
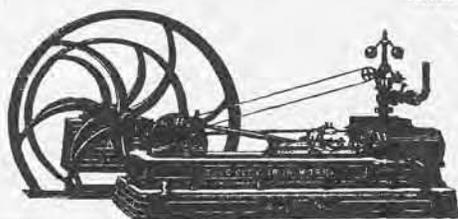
At Hanford Mills, we see great historic irony in today’s short power outage, and last

August’s “great black-out”, since our daily activi- ties – win- ter, spring, summer and fall

– revolve around historic power generation – water, steam, gas, and yes, electric power. Will there be enough water in the pond to run the saw- mill? Can

we reestab- lish the water turbine system with historic accuracy? Has the ice-

house been well packed and insulated so the ice can be used to preserved food in the icebox and for ice cream making? And later this summer we will face a multitude of chal- lenges that accompany generating live steam



power... just as the Hanfords, and so many businesses like theirs, did a century ago.

Why is it so important to preserve, recreate, interpret and demonstrate the history of power at Hanford Mills? These unique examples of historic power help us to generate very powerful his- toric lessons for our visitors as we bring alive the power of history at work.

When the electricity comes back on, boot up that computer and e-mail your friends – tell them that it’s worth every drop of gas they use to visit Hanford Mills Mu- seum. The true power of Hanford Mills is the enthusiasm gener- ated by the visitors, volunteers, members, and friends who support and celebrate Hanford Mills.

Thank you.

Elizabeth Callahan

Memoriam - con't. from page 1 she left the village to become a teacher, Elma never forgot her hometown and wrote a three volume history of East Meredith. She has been a supporter of the Museum, donating historic documents and photographs from her

family. The quotes we use from diaries come from Elma's great grandmother, Elizabeth Hanford, aunt of D.J. Hanford. Hanford Mills Museum plans to republish Elma's three volume history in the next year. With the present advances in printing

technology, we should be able to include more historic photographs, including many from Elma's collection.

Each of these people will be missed by the museum, its staff and members. We are sorry to see them go.



Turbine Restoration

by James Kricker,

Editor's Note: James Kricker of Rondout Woodworking in Saugerties, NY has been Hanford Mills Museum's waterwheel restoration expert for years. This year we sent him a turbine to restore.

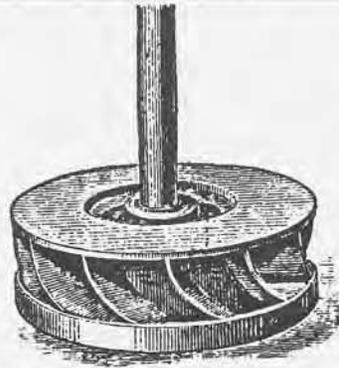
Water turbines are normally submerged during their working life, and as such, will frequently run for years with little or no maintenance.

Once they are taken out of service, they start to suffer from silting up, physical damage from ice or rocks, oxidation, and the hazards of sitting beneath deteriorating buildings. Of all these conditions, oxidation (otherwise known as rust) is frequently the most debilitating. We have pulled out old turbines that were completely submerged in muck for decades only to have them dissolve into a pile of rust within a few short years of sitting in open air.

Hanford Mills' newest addition to its waterpower collection is no exception. What was a viable operating machine in 1850 or 60 was by 2003 completely inoperable. A tally of its ills include many cracked and broken castings, parts too badly rusted to be reused, bolts and nuts wasted away to nothing, bearing surfaces welded together by rust, and missing pieces.

Restoring such a collection of problems to operable condition includes several phases,

each with its own set of challenges. Perhaps a brief description of the turbine would be helpful to understanding



While this runner comes from a different type of turbine, it is similar to the Museum's runner.

the restoration process. The heart of a water turbine is the runner, the revolving horizontal wheel that harnesses the energy stored in the water and transfers it

to the rotating vertical shaft that powers the mill machinery. The runner rotates on, and is held in position by, a wooden step bearing at the bottom of the shaft and a

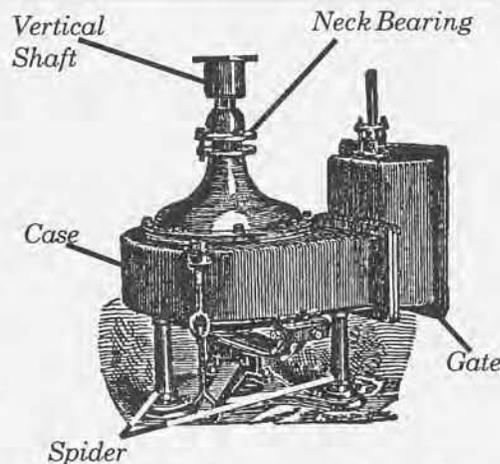
babbit or bronze neck bearing on the shaft above the wheel. The runner is encased by upper and lower cast iron plates separated by a band of sheet steel that is formed in the shape of a scroll.

Water coming down the flume from the pond runs through a gate at the beginning of the scroll and works its way around the case, passing through the blades of the

runner, and exiting out the center. The gate is simply a cast iron plate mounted on a shaft at the entrance to the case that can be opened or closed to regulate the flow of water. The top and bottom plates and the scroll contain the water and direct it through the blades. Other parts include the spider - a three legged cast iron structure supporting the step bearing, couplings used to connect the gate control and main shaft to shafts higher up in the mill, an inspection port, and two separate small castings containing the bearings for the control shaft.

The first phase of the restoration is disassembly. The turbine was carefully examined to determine its condition and to develop a list

of which parts are useable and which must be replaced. Restoration work demands that we save as much of the original fabric of the artifact



This Scroll Turbine is similar to the one owned by Hanford Mills. The Step Bearing is out of view under the turbine.

as possible. Since disassembly can be a destructive process extreme care must be used to insure that the most significant and hard to replace parts

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Cataloging Historic Collections

by Suzanne Soden

Hanford Mills Museum received a 2004 grant from the New York State Council on the Arts (NYSCA) to continue the important process of cataloging the historic collection. This grant will support the documentation of objects in the mill itself. Previous grants received from NYSCA allowed the staff to catalog and document collections in storage.

Cataloging the objects in the mill is going to be a unique process, because it is a "working" saw and gristmill. Think about it - when you hear the words, "wheels on," the head gate opens; the waterwheel, belts, and pulleys turn; the floor vibrates; and the machinery is ready to work. All those objects, pieces, and parts that make the place come alive *are* the historic collections.

As part of the cataloging process, the museum devel-

oped a four-tiered system to designate how the mill will use each object. The first tier is "restricted access," for those items that are fragile and restricted for study use only. The second is "limited exhibition use," for items that are fragile, but can be put on display in a protective situation. The next tier is "building furnishings," for objects that cannot be used but can be handled and displayed. Finally "usable objects;" is the last tier for objects that can be used in demonstrations. For example, the original Hanford turbine in the basement of the mill can stay on display, but can no longer be used and should not be handled, therefore it will be designated to



the "limited exhibition use" tier. On the other hand, the peavy and cant hooks that are on display in the mill and used by school children for hands-on experience, will be designated to the fourth tier, "usable objects."

There are over 1,500 objects in the mill that will be cataloged this summer, many are original to the site. Last year, also with the help of a NYSCA grant, the museum cataloged the O.D. Greene collection, in which eighteen hundred objects were identified and documented.

The research and documentation of the collection is an important process. It allows the museum to produce valuable information that helps to develop and revise exhibitions, helps with interpretive planning, and helps to understand how the site was used and how the collections support the museum's mission. 

A Workshop for Everybody

This year we have put together a calendar of workshops for both adults and families. There is something for everybody's interests.

A new addition this year are family workshops which are designed so an adult and child can attend together. Make your own camera in **Pinhole Photography** on July 24. Families get an introduction to quilting in our August 7th **Quilting Workshop**. And on August 28th, visit with Carrie Hanford

from the 1880s as she takes you through doing the wash in the **Laundry Day** workshop.

Hanford Mills Museum has also expanded its adult offerings. The popular **Beginner's Blacksmithing** workshops will be offered four times this year - June 12-13, July 17-18, Aug. 14-15, and Sept. 18-19. Learn to **make a market basket** on August 21st. Try our **Historic Milling** workshop on September 4, which includes a tour of the Caverns Creek Gristmill, lunch, and a visit to Hanford Mills Museum. Learn how to tat in our **Lace Making** workshop on September 25th

or learn the **basics of appliqué** on October 2nd. If you want to know more about wood sign up for **"What Kind of Wood do I Have?"** on October 16. Learn about using a cookstove and make lunch in our **Cookstove** workshop on October 23. Or get an **introduction to woodcarving** on October 30 and 31.

All workshops require pre-registration and a fee. Some family workshops have an age limit. Space is limited, so call right away at 607-278-5744 or 1-800-295-4992 or email hanford2@hanformdills.org for a brochure with registration form. 

The Hanfords' First Brush with Handles: The Ober Lathe

by Caroline de Marrais

A railroad was coming to the little village of East Meredith. Businessmen were chomping at the bit. It was difficult getting supplies into the out-of-the-way village and even harder trying to get products out of the valley. A railroad would help East Meredith "put Oneonta in the shade" as the *Delaware County Dairyman* newspaper said on December 28, 1888.

All East Meredith wants is a chance to get in its fine work, and it seems as if that time has nearly come.

D.J. Hanford and his sons, Horace and Will, were among those businessmen. D.J. knew what the railroad could do for his mill. He had sold the Ulster and Delaware Railroad the land behind his mill for a right-of-way, ensuring the Mill would have ready access to the rail line. Unfortunately, D.J. never saw his dream fulfilled, he died the year before the railroad finally reached East Meredith in July 1900. But sons, Horace and Will Hanford, were ready to take over where their father left off. Even before the first train rolled by, they made plans to expand the Hanford Business in a new direction - HANDLES!

How did the Hanfords choose the handle business? We'll probably never know, but we can make some

guesses. The Hanfords subscribed to trade journals like *The Wood Worker*. In these journals they could read about the latest machinery and how to set up woodworking shops. The magazines were a great source for ideas, and the

Ohio, and on February 12, 1900 the company answered a request for information by writing about their No. 10 Lathe. The Hanfords had asked how best to make broom handles with the No. 10 Lathe. The company

answered that handles could be sanded or tumble finished and that Ober:

turn[s] our timber green then sand[s] it after we have dried it. We turn it ¼" larger than the article to be turned, this allows for shrinkage in drying and sanding.

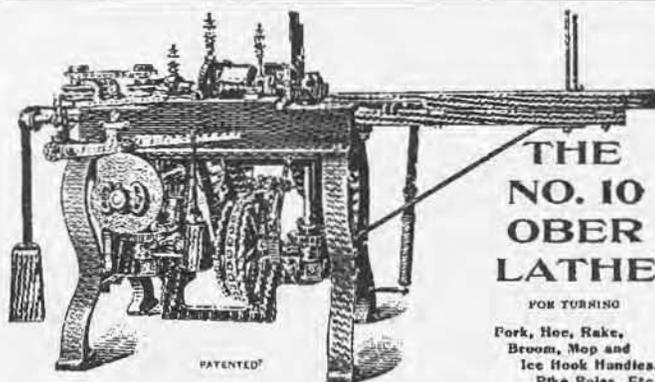
Then Ober invited the Hanfords to come see their machine in operation and they would pay

for the railroad ticket. So Horace Hanford went.

Horace must have been impressed with his trip. On April 7, 1900, the Hanfords ordered an Ober No. 10 lathe with everything needed to make a broom handle. Horace must have talked the price down to \$285 because the company added that as part of the payment agreement Horace would "stand all of the expense of your trip to see the lathe."

A week later, the Hanfords ordered a Nash sander from J.M. Nash of Milwaukee, Wisconsin. It is likely that this was the type of sander that Ober was using. Horace

Con't. on page 6



THE
NO. 10
OBER
LATHE

FOR TURNING

Fork, Hoe, Rake,
Broom, Mop and
Ice Hook Handles,
Pike Poles, Etc.

We also manufacture a new Automatic Sander for all kinds of straight work. Also other lathes and sanders for all kinds of spoke, handle and variety work. Write for catalogue, mentioning brooms, brushes & handles.

Shapers, Saw Tables, Special Machinery.

OBER MANUFACTURING CO., Chagrin Falls, O.

This ad comes from *Brooms, Brushes and Handles*, a trade journal in the Hanford Mills Collection.

Hanfords wanted ideas.

We can guess at Horace and Will's thought process: The mill was already producing specialty wood products with their butter tub covers and milk crates. It made sense to add another wooden product. There were machines specifically designed to produce broom and tool handles so it would be easy to make handles. And the railroad would be in East Meredith any day with boxcars that could carry large loads to customers throughout the United States. Why not try it?

The Hanfords contacted the Ober Manufacturing Company of Chagrin Falls,

Ober - con't. from page 5
also talked down the price of the sander. J.M. Nash wrote on April 14, 1900:

The price you offer for this machine is much less than it is worth and less than I had intended to accept for it. But I have decided to accept your offer.

In late May 1900, the Ober lathe arrived on skids. Hanford teamsters picked it up in Davenport Center, since the U & D Railroad still was not open to East Meredith. As the Hanford Brothers and their men set up the lathe, they waited for the sander. It did not arrive until late June. It had been damaged in transit and returned to Nash by the railroad for repairs.

It did not take long for disillusionment to set in. The Hanfords cut their broom handles green, just as Ober did, then dried and sanded them. It didn't work and the Hanfords complained. Ober Manufacturing wrote back on July 14, 1900:

We beg to differ from you in regard to your saying that a good guage lathe will beat our No. 10 Lathe in a days running, for we know from our own experience and from others that the Lathe will turn a great many more handles in a day than can possibly be turned on a guage Lathe ... We feel very certain that any trouble which you may have with the Lathe has been caused by inexperience or bad management, but we will make you the following proposition, viz: We will send a man there to examine the Lathe and give instructions for running the Lathe, and if he makes it run all right and finds that the trouble

was in the management you are to pay us \$15.00 toward the expense of sending a man, but if he finds that the machine itself is at fault we will charge you nothing for sending the man.

Ober also sent the names of four businesses that were satisfied with their Ober No. 10 lathe. On the same day that the Ober letter arrived, the Hanfords received a note

believing it would solve their problems. Ober wrote that ". . . if we furnish these new heads at one-half price we are doing all that could be expected."

Through the summer of 1900, despite their lathe problems, the Hanfords began to produce and sell broom handles. They had customers in Ohio and New York. Customers ordered broom handles in boxcar loads.

Horace Hanford even traveled to drum up business, visiting places like E.B. Estes & Sons in New York City. Unfortunately, complaints rolled in:

... they were not thoroughly seasoned and have had a great deal complaint of brooms coming loose on handles ...

and

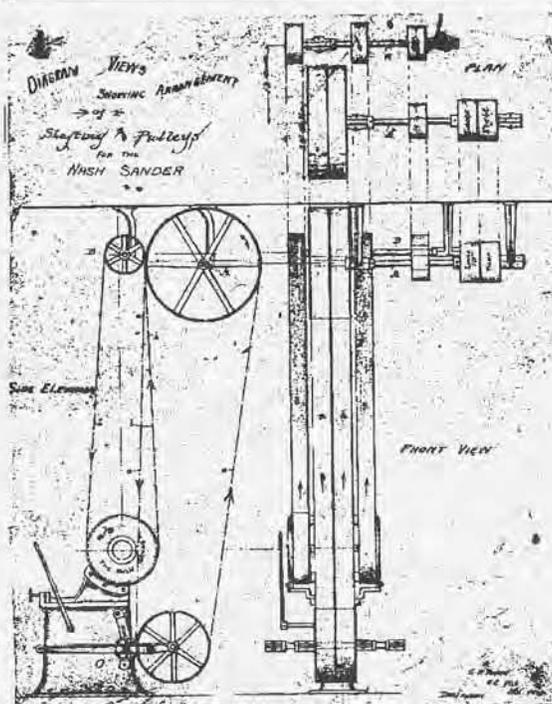
... are inclined to crook. He tells me quite a percentage of them are practically of no value.

These companies were understanding of the fact that the Hanfords had just started their business. They gave suggestions for improvement and continued to do business with

Hanford Mills.

It was obvious to the Hanford Brothers, though, that the Ober was not going to work for their business. Sometime between April and June of 1901 they put it and the Nash sander up for sale. By the end of August 1901, the Hanfords had received inquiries from companies in Indiana, Pennsylvania, Georgia, Alabama, and North Carolina. To each of these

Con't. on page 7



The Hanfords received this drawing to help them set up their Nash Sander. The center belt in the right hand drawing is the belt used for sanding.

from one of these companies stating that the "machine is entirely satisfactory to us."

It is difficult to tell if the Hanfords took Ober's offer. A December 5th letter from Ober suggests that Horace Hanford did admit that the problem was with the operators and not the machine. Still, the problem was not completely cleared up. In December, the Hanfords asked for Ober's newly designed cutter head for free,

Ober - con't. from page 6
companies the Hanfords wrote that they wanted \$235 and that the Ober

... will make the swell and taper on broom and other handles of this class. The Machine is in perfect order having been used to turn about four carloads of broom handles only since it was purchased new by us last year.

No one was interested once they heard the price.

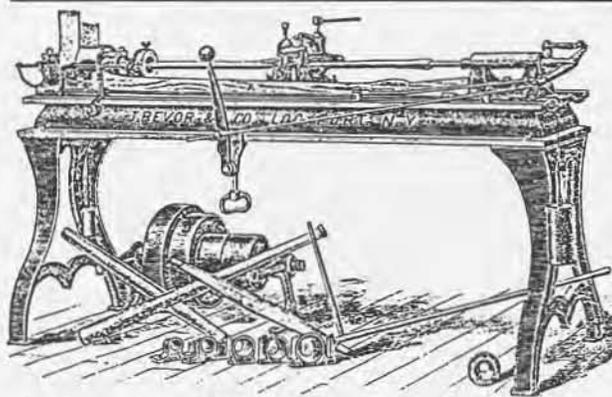
Throughout 1901, the Hanfords continued to sell broom handles saying "We are making a much nicer handle now than we made last year on account of turning them from seasoned stock." Since it appears the Hanfords did not have another machine to cut long handles, it looks as if they were stretching the truth about the Ober only cutting four carloads.

Finally in October of 1902, the Hanfords saw an ad in *The Barrel and Box* journal. The Campbell Handle Company of Campbell, Missouri wanted to purchase an Ober lathe. The Hanfords wrote immediately to offer their machine. They offered the lathe for \$185 (\$50 less than their first listing) and also tried to sell their Nash sander. Campbell wrote back saying they could take the lathe for \$150 if it was "in good condition" (the underlining was Campbell's). The Hanfords answered:

While we do not care to sacrifice so much on the machine, we are willing to take less than we gave for it as we have no use for it, and will split with you on the prices and will accept \$165.00 cash for the machine.

The check for the Ober arrived on November 12, 1902.

It took longer to sell the Nash Sander. R.G. Burleigh & Sons of Jackson, Mississippi inquired about the sander on April 18, 1901, but nothing was done for nearly two years. The Museum's archive records do not show us what the first offer was, but on January 16, 1903, the Hanfords wrote and offered \$225. Burleigh and Sons



In the end, the Hanfords purchased a gauge lathe like this one. It used a metal pattern as a guide for cutting the handle.

counter offered \$200 and the sander was finally sold. The Hanfords boxed up the sander and shipped it by railroad to Austin Baldwin & Co. in New York City. Baldwin & Co. was a customs agent and forwarding merchant. They wrote back to the Hanfords that the sander would "... sail on the steamer 'Umbria' on March 14th."

This first brush with handles did not turn the Hanfords off the business. Even as they were trying to sell the Ober lathe, Horace purchased a second-hand Waymoth duplicating lathe. When it came in June of 1901, he complained that it could not cut a length of 5½ feet as he had been led to believe. It

could only do 3 feet, so he could not use it to make broom handles, only smaller tool handles.

Then in October of 1901, the Hanfords purchased a tumbling machine. They used this in place of the sander to finish handles. Rather than sanding each piece by hand, a load of handles could be tumbled together. Instead of sand or some other abrasive agent, the action of the handles bumping against each other smoothed each piece.

Then, finally, at the end of November in 1902 (the same month the Ober was shipped out), the Hanfords purchased a Trevor Gauge Lathe from Lockport, New York. Horace Hanford had said early on that he felt a gauge lathe would do better than the Ober, and he must have felt this was true.

Despite these changes and additions, the Hanfords only ran their tool handle business for another two years - until 1905. Again we can only guess why they stopped production.

The first, and most obvious, reason was machinery problems. Nearly every machine the Hanfords purchased for the broom and tool handle business had a problem - either it did not run properly or it was not made to do what the Hanfords wanted. Orders were made in boxcar loads. That was a lot for a few machines to make. And finally, it is likely the variety of different handle designs ordered was overwhelming.

Ober - con't. from page 7

Nearly every order the Hanfords received was for a different style of handle. This usually required obtaining another knife or pattern for cutting the new design.

Also, though it was probably not obvious to the Hanfords, local resources were at their lowest supply. In the early 1900s, there was little local timber available. For years, loggers had been clearing the hillsides of useful trees. Hanford letters often mention that they couldn't get a certain type of timber for a customer or that they didn't have enough dry stock, although they always offered an alternative.

While the Hanfords were searching for timber resources, they had increased their staff to fill handle orders. In the months before they began their handle business, an average of eight men worked in the mill. In the peak year of tool and broom handle production, the Hanfords had eighteen men working. Their workforce more than doubled for an object that retailed for approximately a penny a piece.

Finally, the same railroad that made it possible for the Hanfords to ship their vast number of handles, also made it possible for others to do the same. The letters the Hanfords received from

prospective buyers tell us handles were being produced in Michigan, Ohio, Indiana, Pennsylvania, Georgia, Alabama, Missouri, New York and likely elsewhere. Many of these factories specialized in handles. It is possible that if the Hanfords had converted their entire mill to handle production, they may have survived as a handle manufacturer - for a while.

In the end, though, the Hanfords probably made the right decision by getting out of the handle business and sticking with the general production of a number of different items. How many wooden handles are on *your* modern tools? 

News - con't. from page 1

Strasburg Railroad of Strasburg, Pennsylvania. We hope to have this front in place by July.

The second off-site project is the restoration of the Museum's vertical steam engine and steam pump (which pumps water to the boiler). These historic artifacts (acquired from Maine and Kingston, NY), are being restored by Jim Mackessy and friends, the steam engine project group of the Camillus Canal Society. They have a lot of experience in steam engine and equipment restoration, and when they are finished Hanford Mills Museum will have two great restored pieces to use with our new boiler.

Hanford Mills Museum is still looking for

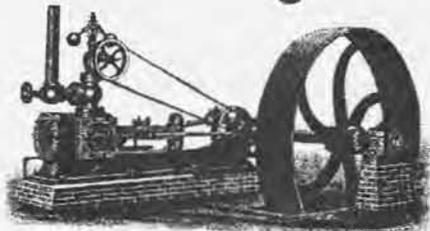
a horizontal steam engine to replace the original engine which was removed from the mill approximately 50 years ago. We are finding it diffi-

cult to locate the proper size and configuration of engine. At present the Museum can operate with its smaller vertical engine, but we will

eventually need the larger machine. We have included our "Want Ad" with information on the type we need. Please let us know if you know of an available engine.

Large engine or no, Hanford Mills Museum still plans on running steam this year. As long as all related projects remain on track, the Museum plans to begin operating the steam boiler and vertical steam engine during the Antique Engine Jamboree on Saturday and Sunday, September 11 and 12. 

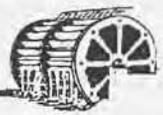
WANTED:
**40 Horse Power Horizontal
Steam Engine**



Hanford Mills had a stationary, right-hand, side crank horizontal steam engine which was manufactured in the early to mid-1890s, probably by Oneida Iron Works, Oneida, NY.

Hanford Mills Museum is searching for an Oneida steam engine (or an engine of a similar size, power and configuration) to be installed into the Museum's re-creation of the Mill's 1895 steam power plant. *The engine must be operational, OR in a condition fit for restoration to working order.*

Contact: Liz Callahan, Director or Robert Grassi, Mill Foreman
Hanford Mills Museum
PO Box 99,
East Meredith, NY 13757
1-800-295-4992 or 607-278-5744
or hanford1@hanfordmills.org



The Hanford's Sawmill Operation - Part II

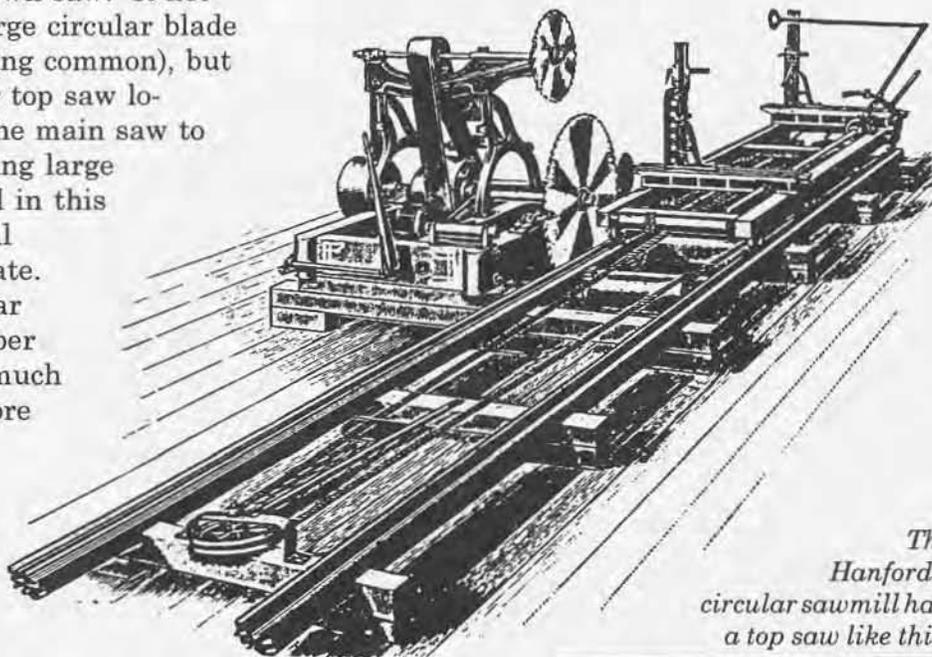
by Robert Grassi

By 1881, D.J. Hanford had replaced his up and down sawmill with a circular sawmill purchased from the Chase Turbine Manufacturing Company, Orange, Massachusetts. This mill, complete with carriage, was installed in nearly the same location as the up and down saw. It not only had a large circular blade (54 inches being common), but had a smaller top saw located above the main saw to assist in cutting large logs, essential in this part of central New York State. With a circular sawmill, lumber could be cut much faster and more efficiently than with the up and down sash saw. The present circular sawmill at

Hanford Mills, installed by the Pizza brothers, is capable of cutting 125 feet per minute, compared to the 14 feet per minute of the up and down saw. This is nearly nine times faster. The operation of a circular mill requires more horsepower than the up and down mill to run them effectively. By 1881, the Hanford's had steam power available to use and had replaced the waterwheel with a more powerful water turbine.

In 1909, the Hanford's reported in the *Directory of Lumber Manufacturers*, published by the American

Lumberman, that they were capable of sawing 10,000 feet of lumber a day. Among the species and amounts sawn in 1908 they reported 150,000 board feet of white pine sawn with 15,000 in stock as of January 1, 1909; 15,000 feet of hemlock sawn with 10,000 in



The Hanford's circular sawmill had a top saw like this.

stock; 20,000 feet of basswood sawn with 5,000 in stock; 5,000 feet of birch with none in stock; 10,000 feet of beech with none in stock; and 20,000 feet of mixed hardwoods sawn (including maple) with 10,000 feet in stock. No oak, spruce, poplar or chestnut was reported sawn for that year.

Circular mills were built as a complete unit with saw blade, saw mandrel (the steel shaft the saw blade, drive, and feed pulleys are attached) and associated bearings, and feed works for the carriage, all mounted onto a wooden or cast iron husk frame. They

were built for hard service, but with their many manufactured parts required replacements that had to be purchased from the manufacturer directly. All of these mills were powered by belts and belting (another manufactured product) that also

needed replacement from time to time. On September 30, 1889 the Hanfords purchased a #3 standard set-works from the Chase Company. The set-works are very critical to the proper function of all circular mills. In-

stalled on the carriage they control the movement of the knees (vertical iron blocks on the carriage the log rides up against) and are used to set the dimension of the finished product. It is conceivable that the Hanfords' original setworks wore out and needed replacement after eight years use.

Bearings on these mills used babbitted bearing material set in cast iron boxes. Because of babbitt's low melting point it is easily worked and bearings could be renewed easily on site by

Con't. on page 10

Sawmills - con't. from page 9
 unskilled hands. There are a number of different formulas of babbitt but a common one is as follows: 50 parts tin = 89.3%; 2 parts copper = 3.6%; 4 parts antimony = 7.1%. Lead was added instead of copper for faster operating line-shafting 400 RPM or better. Lubrication of these bearings was with petroleum based oils/grease.

As often as the sash saws required sharpening the circular saw also needed work. Filing required a skilled filer to maintain these saws. Great care had to be taken to maintain the proper cutting edge. Filing, gumming (maintaining proper gullet shape) and setting, all required time and a skilled hand. Saw blades could be removed for filing and replaced with another blade with little to no down time, but this required several extra blades. Many mills filed saws right in place.

Circular sawmill blades also required periodic straightening (hammering) to maintain them. The hammering process tensioned the saw blade appropriately to compensate in advance for the expansion from centrifugal forces encountered during its operation. This enabled it to operate efficiently sawing dimensionally true (straight) lumber. Saw blade hammering required great skill and few practiced it under the

employ of even the largest mills. Many factors particular to each individual application dictated the proper



Set-works similar to the type the Hanfords ordered for their sawmill.

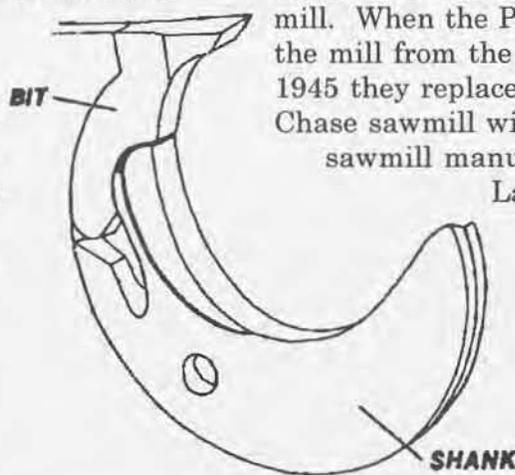
tensioning of each saw. Saw diameter, thickness (gauge), working speed (RPM), temper and tension, number of teeth, shape/depth of teeth, and right or left hand. Most saws were sent out to saw manufacturers where they were tensioned at their own facilities and returned.

For circular saws the loss of diameter due to filing, the skill required to file them properly, and the expense of replacement all led to the development of the inserted tooth saw blade. The first United States patents for inserted tooth saw blades dates back to the

early 1840's. Saw bits (teeth) were inserted into the saw(disc) and held in position with steel shanks. You could

get several filings before the bits would need replacement. This worked out to around 10 to 12,000 board feet of lumber cut. Any competent workman could easily learn the basic filing and upkeep of these saws and the bits could be changed in a matter of minutes. Other than filing, an occasional swaging (spread setting) was all that was required to keep these saws in working order.

Circular saws had their limitations as well. As with the up and down mill, one of the largest drawbacks in their use was the amount of waste generated by the kerf of the saw blade. Upwards of 1/4 inch of material was lost on every board sawn. This added up to a significant amount of loss over a time. With the advent of the bandsaw mills, the kerf was reduced to 1/8th of an inch, a substantial savings of material. The Hanfords never upgraded and purchased a bandsaw mill, but instead choose to keep their circular mill. When the Pizza's bought the mill from the Hanford's in 1945 they replaced the aging Chase sawmill with a used sawmill manufactured by



This simple drawing shows a saw-blade bit and shank.

Lane out of Montpelier, Vermont. This mill has parts from different manufacturers including Chase and Ireland. It served

them well, mainly custom sawing, until the mill closed its doors for business in 1965.



Up-Coming Events & Workshops

Sat., July 10 - 1 to 2:30 pm
Ice Cream Making Workshop [F12]
 A workshop designed for parent & child to enjoy together - make old-fashioned ice cream. Fee for an adult & child together: \$5 for non-members & \$3 for Museum members. **Preregistration required.**

Mon. to Thurs., July 12-15 - 9 am to 3 pm
Summer Apprentice Workshop - daycamp
 Call the Museum (607) 278-5744 to see if there is still space for kids in this history day camp. Open to kids between the ages of 8 and 13. **Preregistration required.**

Sat. & Sun., July 17-18 - 9 am to 5 pm each day
Blacksmithing Basics Workshop [A122]
 Learn the basics of blacksmithing. You will make various hooks and blacksmithing tools. Fee for one adult is \$90 for non-members & \$81 for Museum members. **Pre-registration required - offered also Aug. 14-15 & Sept. 18-19.**

Sunday, July 18 - 1 to 2 pm
Roxbury Brass
 Enjoy music at the Mill with the Roxbury Brass Quintet. The mill is a great place to enjoy great music!

Sat., July 24 - 10 am to 12 pm
Pinhole Photography Workshop [F15]
 Bring your child and learn a little about cameras, then build your own pinhole camera to take home and use. Fee for an adult & child together is \$10 for non-members & \$9 for Museum members. **Preregistration required.**

Hanford Mills Museum Presents: **The Indian River Olde Time Lumberjack Show**

Saturday, July 31, 2004
 10 am to 5 pm

Featuring award winning & champion Lumberjacks at their best.

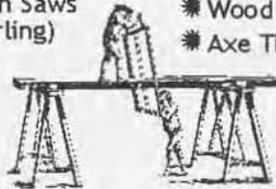


Demonstrations:

- * Cross-cut Sawing
- * Souped up Chain Saws
- * Log Rolling (Burling)
- * Plus MORE!

Amateur Events:

- * Cross-cut Sawing
- * Wood Splitting
- * Axe Throwing



Plus: Sawyer's Holiday

Experience History at work:

- * Pre-Industrial Pit Sawing
- * 1900 Style Circular Sawmill
- * Modern Portable Band Sawmill



Saturday, July 31
Lumberjack Festival & Sawyer's Holiday

↑ - NOTE CORRECT DATE!
 See above.

For more event & workshop information call (607) 278-5744 or email hanford2@hanfordmills.org for brochures & calendars.

Sat., August 7 - 1 to 3 pm

Quilting: Hotpads Workshop [F16]

A workshop designed for a parent & child together - learn quilting as you make hotpads. Fee for an adult & child together: \$15 for non-members & \$13 for Museum members (subtract \$8 if you bring your own materials). **Preregistration required.**

2004 Workshop Registration		Workshop Number	Fee
Name	_____	_____	_____
Address	_____	_____	_____
City	_____ State _____ Zip _____	_____	_____
Phone	_____	_____	_____
E-Mail	_____	_____	_____
TOTAL FEE*			_____

Turbine - con't. from page 3
 are not damaged. Other parts that will be replaced can be cut out to save stressing the more important components. All the bolts were considered expendable and cut when they would not unscrew easily. Bolts broken or cut off inside castings were bored out undersize and the remaining shell removed by collapsing it into the hole. Couplings were removed by using a combination of heat and pressure from a hydraulic press. The gate control shaft bearing castings were badly rusted and broken so we elected to cut them off to avoid damaging the shaft. Once disassembly was complete another assessment of the components was made to look for damage that was not evident earlier.

After the disassembly we

began the repair and replication process. Since the spider and top and bottom plate castings were badly cracked and broken, a large propane fired oven was built to pre-heat and postheat these parts during the welding process. The plates were then carefully positioned in the oven, loosely clamped to allow for expansion, gas welded, and bored out to accommodate the shaft once again. All the journal surfaces on the shafts will be polished with fine emery to remove rust and minor pitting. The next step is sandblasting and painting, this being done while the turbine is still disassembled to facilitate getting into all the nooks and crannies.

Finally we are ready to put all the parts back together. The turbine will be reas-

sembled using stainless steel nuts and bolts, this is a marked deviation from the original materials used in the 19th century, but is deemed acceptable since it can make disassembly in the future much easier and potentially less harmful to the historic parts. The original lignum vitae step bearing is still in good condition but the neck bearings are long gone. They will be replaced with a phenolic material to hopefully ensure a long and trouble free life.

While the newly rebuilt turbine is not original to the mill, it is of a similar size and type to that which was used. It will provide an excellent opportunity to interpret one of the many technologies used to power industry in the 19th century.



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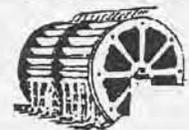
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