

Mill Guide's Handbook retyped work copy

Pioneer settlers needed flour for bread. It was typically two years from the time a settler arrived on his land until he produced his first wheat crop. The earliest settlers in the county had to bring in flour by way of Lake Erie from Buffalo or Canada. Busti, however, was first settled in 1810 when surrounding areas in Sugar Grove and Carroll already had established settlers growing wheat.

At the time of the first settlement in Bust, mills were in operation in Pennsylvania, Kennedy, and Falconer. Work's mill in Falconer was an active one, although the stones were made from inferior local material. Sophisticated bolting (sifting) equipment was absent. Busti hamlet (then known as Fank's Settlement), like several other local communities, pushed one of its first roads in the direction of Work's mill. Homer Wellman, for example, who settled in March, 1811 south of Boomertown, carried his grain on his back to Frew's mill in Lander, eight miles distant. A mill opened up in Ashville after 1811, Prendergast's mill started grinding in Jamestown in 1814 as Busti increased in population.

Holland Land Company surveyors were instructed to make special note of good mill sites. The company encouraged early mills in an effort to promote settlement and land sales. The Kennedy and Work mills were aided by the company. However, the surveyors did not note the site of this mill as a good one when they passed near (about on the Busti-Sugar Grove Rd.) on June 28, 1798. Nor did they find any mill sites worth noting in all of what would later become Busti in their lot surveys of 1807-1808.

But the Busti and area population was growing and in need of a mill. Wheat could be carried to neighboring mills only with difficulty and hardship because of the rudimentary nature of early roads. Corn could be and was ground at home in hollowed log mortars with spring pole mounted wooden pestles but this was slow and required much time. Often it was a chore for the pioneer wife. Animal grist, later so important to mill business, was not a consideration in pioneer times because animals, when fed any grain at all, had to accept it unprocessed.

The early history of the mill site is not very clear. Heman Bush, from Litchfield, Herkimer County took out a land contract in 1810 for property now in Busti hamlet. In April 1811 he took a contract on the property where he later built his large house and tavern on Southwestern Drive south of Orr Street Extension. He arrived in Busti in June, 1812 (according to most sources) and in October "articled" (contracted for) the land on which the mill stands. Bush acquired full title to his house site on June 26, 1812, to the mill site (100 acres) on April 28, 1825, and to 175 additional upstream acres June 5, 1837.

Several establishments were present on the mill property at various times before 1840. French's 1860 New York Gazetteer states that Bush built a mill in Busti in 1815, but he does not specify grist or saw. Young's county history (1875) mentions a saw mill but gives no date. Young also mentions a clock factory "built at the same place about

1830" and that "after discontinuance, a grist mill was built on the same site by Heman Bush; another afterwards by Francis Soule (sic)." There is some information indicating the clock factory burned and was rebuilt in 1830. At least two of these clocks, made by Samuel Chappell and James Sartwell, are known to exist. One was displayed at the first Busti Pioneer Festival. Judge E. T. Foote mentioned a "cloth dressing shop at Bush's Mill on Stillwater Creek, operated by Jacob Lockwood... in 1817." County land records contain an agreement about tail race rights made December 12, 1832 which mentions both a saw mill and a three-run grist mill on the property at that time.

The cloth dressing shop processed home made wool by raising the nap with teasels then shearing it down. It may also have dyed and fulled the cloth. Both a grist and saw mill appear at this location on the 1830 map of the county by David Burr.

In his 1923 Busti Centennial Town Picnic speech Albert Jones mentions the clock factory "built about 1830 and continued for several years." He went on to say, "Heman Bush built the first grist mill. Francis Sowl built the present one on the same site," Further excerpts, with comments, from Jones, speech follow:

"Francis Sowl, a man who did much for Busti, was born in the state of Vermont. He moved from there to Northampton (Northampton, Fulton County, N. Y. in the Adirondacks) then to the town of Stockton, Chautauqua County. From there he moved to Busti in the 1830's. (On Feb. 14, 1839, Sowl described as a resident of the Town of Stockton, and Bush exchanged 50 acres west of Centralia for 50 acres on which the mill, the miller house, the big house farther southwest and the slag storage area now stand. This must mark Bush's exit from milling and suggests an 1839 construction date for the present mill. N. C.) A millwright by trade and practice he did almost anything that required mechanical ability, he helped to construct the first machine that made pointed screws. Screws before that time had the same size thread throughout. They had no point and would not draw themselves into wood without first having a hole bored for the screw to follow. (A similar claim is made for a Jamestown resident of the same era and Fenton Hall of Fame inductee for 1976, Thomas Harvey. This self tapping wood screw is called the gimlet point screw. The invention of screws and screw making machinery is a complex story. The inventions cover a span of years from about 1790 to 1850. N. C.)

"While living in Northampton he started out one spring to find work at his trade. When he got back in the fall he found his wife dead and buried. She had taken sick in the summer; no one knew where to find him, he had no way to let them know where he was. No mail, no telegraph, no telephone, no railroad. There was some trouble even in the good old times. (Sowl's first wife, Betsey Lyon, died August 19, 1829. His second wife was Lucy Gifford who died February 11, 1854. His third wife was Sarah Howard. She died April 16, 1885. Betsey was the one who died while Francis was out on jobs and could not be reached. The other two are buried with him in the Busti Cemetery. N. C.)

Jones took most of the above material, much of it word for word, from a 1926 book *A contribution to the history, biography and genealogy of the families named Sole, Solly, Soule, Sowle, Soulis.*

"After coming to this town he built several houses. The house now occupied by Dwight Way, owned by Rev. Palmeto, being the first one. He bought the grist mill and put up the present mill building about 1838. He also built a new saw mill and sold it to Hiram Bush. (July 14, 1841 including two acres with the old Jones house site. Hiram was Heman's son. N. C.) He had a wagon shop and a blacksmith shop. Father (Mark Jones, N. C.) began working for him in March, 1845. His wages were 50 cents a day when working in the shop; a little more when working in the mill, on the farm, or in the woods. A man could earn wages large enough in those days so he could lay some aside for posterity. I'm posterity in his case.

"They would take the timbers in the woods, have them sawed at the mill; they would turn out the hubs with a lathe that was in the basement of the mill, and split and shave the spokes, saw out the felloes, with a riddle saw, make the axle out of scantling (small lumber, N. C.), do their own iron work; making every brace and bolt. Certainly that was a handmade wagon, buggy, or cutter.

"Mr. Sowl was a man six feet six inches tall weighed 340 pounds, had a hand, a foot and a gait that reminded one of an elephant. He was an honest, upright man, trusted by everybody, and he in turn trusted in his God, the founder of Busti. Mr. Sowl after retiring from active business mended the lame clocks and sick watches for the people for many years. He is dead now and his remains lay in the village cemetery."

Francis Sowl was born June 10, 1779 in Massachusetts, not Vermont, the son of William and Mahitable Walton Sowl. He died November 9, 1885 and is buried in Busti Cemetery. Mahitable, who died August 12, 1846, is also buried in Busti Cemetery. With his first wife (Betsey Lyon), Francis had two sons, John, who with his son, Elbert Sowl, was a successful miller in Randolph, and Albert. Francis and Betsey also had a daughter, Laderna. Numerous descendants are scattered about the U. S. including some around Cleveland, Ohio and some in Michigan

Heman Bush was born January 17, 1777 in Westfield, Massachusetts. He died in Busti May 8, 1839. Like a number of early local settlers, he had lived in Herkimer County, N. Y. There he married Abbey Fross February 17, 1799. His parents were Moses and Lucretia Ensign Bush. Abbey Fross was born September 10, 1780 in Sheffield, Connecticut, daughter of John Fross. She died November 28, 1872. Her brother, Rufus, had come to Dewittville in 1811 which may partly explain why Heman and Abbey came to Chautauqua County.

Most published sources say Bush came to Busti in June, 1812, but Elizabeth Jennings in her 1899 versification of family history, says they came in a sleigh through Buffalo the day after it was burned which was December 30, 1813. So Bush may have arrived in January, 1814. Anyhow, he and Abbey had six children at the time. Five more were born later. They first built a log cabin east of Hatch Creek at an intersection that then existed where the present Orr Street Extension rather than bending on the hill came

straight down and crossed Southwestern Drive then continued on over the hill to intersect with the present Nutt Road at the bend on top of that hill and with a road that then ran on a northeast diagonal from Sugar Grove to Jamestown. The ancient Miles Road from Sugar Grove to Chautauqua Lake must also have been near that location. Bush planted an orchard with seed he had brought and cleared more crop land to the north. He soon built a new cabin there on land near the present Mead Road intersection.

He built his saw mill, then the grist mill and the miller's house. He built his famed tavern hotel in 1817 and moved in in October, 1817. The first Busti town meeting was held there March 2, 1824. Bush also built a store, an ashery, and a blacksmith shop.

Heman's trunk that he brought with him to Busti when he first settled is in our collection.

Here is an outline of mill ownership. Most of them played other interesting or important roles in Busti history. Bush ran his tavern, an ashery, held several public offices, and was an early Masonic leader. Mitchell, and Pickard were town supervisors. Pickard was County First District School commissioner and a prominent lawyer. James Wood served as an assessor and overseer of the poor.

On April 1, 1851 Francis Sowl sold the mill and 50 acres of land to his son, John and to Mark Jones, each half interest.

On Feb. 5, 1859 Jones sold his half interest to Ahaz F. Carpenter and on Aug, 28, 1865 John I. Sowl sold his half to Ephraim and Henry H. Wood.

The next year, Oct. 22, 1866, the Woods sold to Harmon G. Mitchell. On July 3, 1867 Carpenter sold his half to Mitchell returning the mill to single ownership.

On Nov. 6, 1873 Harmon G. Mitchell sold half interest in the mill and 25 acres (restricting the mill property to the east side of Lawson Rd.) to his son, John, and the other half interest in mill and land to Alonzo C. Pickard. On March 7 the following year John K. Mitchell sold his half to his partner, Pickard.

On January 9, 1875 Pickard sold half interest in the mill and land to Mark Jones and on July 20 of the next year he sold the other half to James H. Wood. James was the son of Ephraim Wood and brother to Henry. Jones regained full title by foreclosure in 1883.

On Jan. 9, 1890 Jones divided the title to the mill and the property, including once again lands west of Lawson Rd. (slag storage area, etc.) evenly between himself and his sons Edgar O. and Albert G. Edgar returned his third to his father and, brother on Oct. 22, 1897. Mark Jones died July 23, 1909 leaving the mill and property to Albert.

In later years Albert Jones was incapacitated by asthma and hired Johnny Palmer to run the mill. Clarence Andrews hauled a great deal of freight for the mill. Andrews'

brother-in-law, Arden K. Denn wanted to own a mill, so with encouragement from Jones, Andrews and Denn bought the mill May 1, 1925

On April 22 1946 Denn sold his interest to Andrews. The Town of Busti acquired it from Andrews May 22, 1964 and the Busti Historical Society was given the mill and 0.6 acre, not including the dam site Dec. 29, 1972.

Saw Mill

The first structures the pioneers of this area built were pole and brush lean-tos, soon followed by log buildings, the ubiquitous trademark of frontier America introduced by the Swedes in their 17th century colony in Delaware. Sawed boards and planks were far more convenient, tighter, and more versatile for all construction and construction was the keystone of frontier development. For this reason plus the fact that saw mills were simpler and could be built more quickly with less heavy imported iron equipment, they were usually the one industrial establishment erected earlier than grist mills. In southern Chautauqua County, saw mills even preceded settlement. Kennedy's commercial mill was exploiting the rich timber resources and water power and was floating lumber down the Ohio and Mississippi before any settlers were here to create a local market. Falconer and Jamestown were also first established as commercial lumber camps populated mainly at first by transient, unmarried laborers.

Most of the other early saw mills were smaller, often much smaller than grist mills. It was common for them to be set up in a shed on or near a grist mill making use of the same race. Here, however, the sawmill was about the same size as the grist mill and immediately below the dam between the headrace and the Stillwater.

As we have seen, the first saw mill on this property was said to have been built by Heman Bush in 1815. This would have been a simple up and down saw mill, a water powered version of the hand pit saws such as have been demonstrated at the early festivals. These would resemble common crosscut saws but, of course, would be rip saws. Lumber from up and down saws is easily identifiable by the saw marks which are in straight lines in contrast to the arcs observed on modern circular sawed lumber.

On Dec. 12, 1832 Bush secured a 999 year lease from William Smith for the mill tail race. Bush, for his part of the agreement, was to saw, at his saw mill on the spot all the hemlock cut on Smith's land and delivered to the mill. Smith was also to haul it away, but Bush was to keep half. This was to apply to no more than Smith wanted for his own use.

As mentioned above, Albert Jones said that Francis Sowl built a new saw mill and sold it to Hiram Bush. Records show the sale for July 14, 1841. Hiram Bush died Sept. 23, 1873. In 1874 Alonzo C. Pickard, owner of the grist mill, acquired the saw mill from Bush's heirs.

On Feb. 10, 1880 Pickard sold the saw mill to Martin L. Fenton. On May 24, 1893 Fenton conveyed the property to Helen S. Brown and Charles H. Brown who

conveyed it to the Joneses July 8, 1895. But it is probable that the saw mill no longer existed, or at least did not operate after 1892.

Sanborn insurance maps for 1886 and 1891 show the sawmill as ‘J Phillips sawmill’ and the 1896 maps show just a “frame of building.”

1892 was a year of severe floods. Eric Fosberg remembers a flood on May 11-13 that washed out the dam and the saw mill and raised water two feet over the main floor of the grist mill. There were two or three severe floods in 1892, but I can’t confirm one on that date. Town highway records show a severe flood of June 4. At that time Donelson Road came straight down what is now Anderson Road and continued across the creek and tail race there without a bend. Pine Ridge Road crossed the dam. In any event, the Town purchased three iron bridges the next year, one of which went in over the creek tight to and downstream from the mill. A wooden bridge spanned the tailrace. The iron bridge stood until 1954 when the county moved the highway slightly to the north. Another severe flood struck the area the night of Aug, 24 the same year, 1892.

One can only speculate to what extent lumber from the first saw mill may have gone into the present grist mill when it was constructed and lumber from the saw mill Soul built may have been used for repairs and remodeling (of which there was considerable over the span of years) of the grist mill. I have no indication the saw mill ever converted to a circular saw. I suspect not.

Some of the hardwood (beech) original timbers in the mill are sawed. These, like lumber, were produced from a saw mill, The softwood (pine) timbers are hewed. Apparently men of that day did not consider power saw mills to have a marked advantage over hand methods on easily worked woods for the large framing timbers.

General History of the Mill

We know no specifics of any of the pre-Sowl buildings on the mill site. We cannot even be sure that the dam and first grist mill were in the exact locations of the later ones. Land records do suggest the early mill, like the present one, had three runs of stones. It is possible at that early date it is even likely, that the first mill was powered by a water wheel.

The water turbine, such as those that powered the existing mill, is considered to have been invented in 1827 although tub wheels and other primitive precursors existed earlier.

The bins, chutes, elevators, machinery, and floor plan of the mill have apparently been altered time and again. There is no way to determine either the original condition or the layout at any other time prior to living memory. Even living memory has been very little help in actual practice.

It is possible that some of the timbers, lumber and machinery from the first mill were used in the current mill. In those times people tended not to be conservative of

timber and lumber, but machinery that was not worn out or obsolete probably would have been used.

The mill is about 62 feet by 36½ feet. The main floor is nine feet three inches high. The top floor is 16 feet, four inches to the peak. The large dormer rises two feet, eight inches above the peak for a total height of 28 feet, four inches. The basement is nine feet, seven inches high and the space below the basement floor down to the run out level for the water exiting the turbines is another eight feet for a total of 46 feet. Another four to six inches in floor and roof thickness and error could be added.

The center turbine shaft, if not from the old mill, is almost certainly original equipment in this mill. The upper portion of the shaft is wood and the main gear wheel is wood with an iron gear ring. The wooden portion of the shaft is lathe turned 17" diameter by 6' 3" long.

The present turbines were bought from John T. Wilson's foundry on Winsor Street, Jamestown near the bridge in 1871 as part of a major overhaul. The one closest to the creek is rated at 10 horse power, the other two each at 15. Although written up in the Jamestown Journal at the time as up to date and efficient, they actually seem to be quite basic.

The front turbine has been raised and removed. It is located as an exhibit in the basement. The other two turbines have been exposed by removal of the housings. One can be turned by belting from an electric motor.

There are several unusual aspects of construction evident in the mill. Most striking is the plastered walls. We don't find this in other mills. It was probably intended to discourage accumulation of dust. Dust is everywhere in any operating mill. It is always a severe fire and explosion hazard.

Both split and sawed lath can be seen in the mill. Split lath, the oldest style, was made from thin hemlock boards attached by nails at the top and progressively split with a splitting adz working from first one end to the other and then back the next few inches down. Modern lath is a metal net but that has largely been superceded by drywall sheets.

This mill is three stories high whereas mills were typically four. The turbines and race were below the bottom story, but this would be true in a four story mill also. After the mill was converted to electricity the large front dormer was added and housed some elevating and cleaning equipment thus serving as a fractional story. The mill has no ridge pole. The roof is supported by two angled mid-beams over an H shaped framing.

The units of framing were undoubtedly assembled on the ground and raised as units. They were probably pried up for a start and then lifted by ropes, possibly by gangs

of men, possibly by horses; possibly over pulleys suspended from high tripods, possibly with the help of capstans.

The smutters left in the mill downstairs and the one obtained from Randolph on the main floor were manufactured by Howes Babcock & Co. of Silver Creek which undoubtedly supplied most of the mill's machinery throughout its history. It was a major national supplier and still exists today as S. Howes & Co.

The mill had a small out-building on the corner of the property toward Busti. In Jan., 1875 the land records first mention "the mill hog pen." Hogs could be fed from the waste of the mill. Later, Jones kept chickens in the building. Andrews and Denn used it as a garage and storage building.

Few specifics about the internal changes and business of the mill are known for the 19th century.

Harmon Mitchell gave the 1870 census taker some important information. He listed the capital value of his establishment as \$8,000 and stated he employed the equivalent of two full time hands the equivalent of 6 months. (Water power at Busti was very uneven and unreliable.) His figures were as follows

Materials			Production		
wheat	5,000bu.	\$6,000	flour	10,000 lb.	\$6,000
corn	5,000bu.	8,000	meal	1,500 lb	6,000
rye	100bu	100	flour	20 barrels	80
buckwheat	300bu.	300	flour	30 barrels	150
oats	6,000bu.	1,650	feeds	90,000 lb.	18,000

The materials costs total \$16,550 and the production income totals \$30,230, both reasonable, but the production listed amounts to around 110,000 lb. leaving most of the 792,000 lb. of materials unaccounted for.

Two mill account books have been located covering the years 1877-1884.

At the turn of the century the mill was undoubtedly producing the same general line of products we observe above: wheat flour, mixed ground animal feeds, corn meal, and minor flours. Wheat flour was the most difficult to produce of these because it required the most meticulous cleaning the most critical adjustments and tolerances of the stones, and special complex and costly bolting (sifting) equipment. As transportation improved, large commercial mills were able to make and ship finer, whiter, more uniform flour at cheaper prices. The mid-west was looming ever larger as a grain growing behemoth and roller mills in larger New York cities were revolutionizing the industry with previously unimagined speed and volume. Nearly all rural water powered, stone mills dropped wheat flour production.

A 1906 bill found in the mill indicated an order for five grades of silk. This proves wheat flour was still in production at the mill at that time. About or before 1910 flour production seems to have stopped. The bolting reel was then covered with a single

grade of silk for sifting buckwheat flour.

The back room of the mill was added about 1910. It was intended for additional storage of grain and as a place to house a gasoline engine that would serve as auxiliary power. The concrete base for the engine is still present as is the circular hole in the wall for the exhaust pipe.

The engine was one cylinder and 50 horse power. It had two flywheels about nine feet by four inches. Albert Jones used to start the engine at times by walking the spokes, The usual way to start it was by feeding it compressed air to get it turning over at a speed where the flywheels would carry it through a normal compression cycle or two.

The air was drawn from a 75 or 100 gallon tank in the basement which was charged by a large compressor which is still in the mill. It was water powered off the front turbine.

At some point, there had been a small “pony” engine installed to start the big engine.

When the engine fired, it could be heard all over Busti. It drove equipment in the mill through a large clutch wheel that is still present. However, it was never used to run the stones, at least not to Pike Andrews’ knowledge. By that time the mill made most of its money on animal feeds. These could be ground on modern metal attrition mills. Jones had one such steel grinder on the main floor, back room, powered by the gasoline engine and another in the front run off the water power.

The attrition mills were much faster and higher capacity than the stones. They could grind two tons per hour compared to about 300 lb. for the stones. The rear stones (small run closest to the creek) and turbine were used in a limited way for buckwheat flour through about the first year of Andrews and Denn's ownership.

Jones had a cornsheller in operation off the front turbine (closest to the road) at the front of the basement. Andrews and Denn kept it in use under electric power and it is still in place. The office stove burned some of the corn cobs.

The standing seam metal roof that remained until the 4-H and Historical Society began work was probably put on about 1910 or soon after.

One or more of the turbine housings was rebuilt early in the century as remembered by Andrews.

Coarse whole wheat flour could be made on the steel mills and to a limited extent that was done.

The concrete for the pit of the head race bears the date May, 1910. Prior to that, the pit wall was probably plank and timber.

The only washout dates we know for the mill dam are February 28, 1902 and June 23, 1928 (plus 1934 for the recreational dam), but it is likely the dam had to be rebuilt several times. Joseph Meredith remembered building the concrete ends that are still present and the dam with them in June of 1911 or 1912. John P. Johnson was the foreman. Leon, his son hauled gravel from the creek bed with horses and wagon. Meredith and Guy Boswell mixed the cement in 4 ft wide wooden pans each batch mixed twice dry and three times wet. Blaine White wheeled the cement. Forty five bags of cement a day or more were used. The work days were 10 hours and the pay \$2 per day.

About that time, according to Will Sanbury, two millwrights, a father and son, from Kennedy, worked all summer overhauling the mill.

The gasoline engine was unsatisfactory. Even though the water power usually failed in the winter and summer, the engine was seldom used. Andrews and Denn tried to make use of it. They heated the head with a blowtorch and got it to fire three times. Andrews concluded there was too great a fire risk and sold it to junk dealers who cut it up.

Andrews and Denn electrified the mill and under their ownership it was known as the Busti Electric Mill. Despite an attempt as early as 1910, electricity, as best as can be determined, came to Busti hamlet around November, 1921. Andrews and Denn had eagerly prepared ahead for the changeover. Soon after they installed electricity the highway crew modified the bridge over the tail race eliminating the necessary drainage and drop for water power to function. The dam washed out in 1928 despite a bungled effort to save it.

In 1933 or 1934, the Village Improvement Society instigated a community project through a New Deal program to build a new dam for the sake of the pond rather than the power. Poles donated and sold by Fred Anderson and others were used along with clay. Problems of weakness developed before the dam was even finished and it lasted only briefly before washing out in a storm.

In January, 1936, the town took an interest and in September decided to build a new cement headrace. But at the end of the year, they decided the remnant of the dam was causing damage to Lawson Road, apparently causing the creek to undermine and encroach on the road. On February 17, 1938 the town board moved to furnish Andrews and Denn with dynamite to blow out what was left of the dam.

Andrews and Denn first put in 25 cycle electricity. They hired Gust Lindstrom of Buffalo to convert and remodel the mill. Somewhat later he built on the large front dormer. Later, regular 60 cycle, three phase power was provided and the power company (Niagara-Lockport) rewired the motors.

The mill blossomed anew into a flourishing and prosperous business. The little single bag hand trucks Albert Jones had used were replaced by rubber tired 5 bag hand

trucks and maple runways were put in over the original cucumber flooring. Andrews and Denn put in the first mechanical mixer for animal feed. Previously mixing had been done by shovels on the floor 18th century style. The mixer was purchased from Sprout-Waldron. The mill was grossing \$200,000 per year.

The old chimney was at the back of the office. In the 1930's it was leaky and in poor condition so Andrews and Denn hired Harry Beck to build the present one.

Andrews and Denn shortened the porch roof which had originally extended over horses and wagons as they drove up. (It has now been replaced again with a similar roof.) They also built on to the upstream end of the porch and enclosed the new section to make a place protected from the weather where people could pick up finished grists after working hours. This was not rebuilt on the present restored porch.

Andrews was a busy man well known to farmers throughout the area as "Pike." He owned Pearl City Mills and Jamestown Electric Mills in Jamestown and he carried several farm machinery dealerships. The profits and demands on time of these enterprises were much greater than the mill in Busti particularly after World War II when improved roads and trucks encouraged town-to-farm deliveries from larger mills at greater distances. Denn had left the partnership at the end of the war also.

Thus the Busti Mill did less and less grinding, was open fewer hours, and in the 1950's was rented out to other millers. Neighbor Harry Anderson, next door, was the first of these about 1951. Walter Wahlgren of Wahlgren's Seed Store in Jamestown and Harold Bloomgren were renters. To a large extent they sold feeds and minor supplies out of the office. The last grinding was done by Warren Wilcox working for Bloomgren about 1956. Wahlgren had tried to drive a well and put in a toilet to comply with State regulations, but he was unsuccessful. This contributed to the closing of the mill which finally happened about 1959.

In the early 60's Andrews moved much of the mill machinery to his commercial property in Jamestown. Some of the pine wainscoting and many of the 18 foot joists for the back addition he took to his home in Lakewood. Webber-Knapp approached Andrews about his Jamestown mill and he sold it "as is". The building with the Busti equipment was later demolished by Scalise Construction Company which has denied knowledge of the contents when asked by Andrews and the Society.

There have been three fires in the mill. The first one November 7, 1951 7 p.m., was started by the stove, or Andrews speculated, by a cigarette. It was spotted after working hours, by Bill Stowell, an employee, and put out by the Busti Fire Department. The second fire, December 6, 1966, 9:30 a.m. was started by local boys who were playing cards in the mill by candle light. They abandoned the candle when they were frightened by the police. It burned a large hole in the floor of the main level on the southeast corner of the old section. The last fire was set on the porch on Halloween 1970 (November 1, 3:50 a.m.) by a gang of teenage delinquents from Sugar Grove under a reciprocal arrangement with Busti delinquents that they would from time to time set fire

to unguarded buildings in each other's area.

This mill was not, strictly speaking, the only grist mill in the Town of Busti. According to Floyd Darrow in an article in the September 21, 1957 Post-Journal and according to a map prepared in 1977 by Margaret (Mrs. Sven) Holmstrom, there was a mill in Boomertown on Goose Creek at the corner of the current Maple Street and the former Atlantic and Great Western Railroad tracks, parallel and directly south of Gleason Road. This was owned by John Alexander and later operated by Ira Holdridge. "Not long after the early 1900's when the railroad was moved southward to its present trackage, Mr. Alexander discontinued the grist mill, and Art Lloyd bought it, tearing it down and moving the lumber to Ashville," says Darrow. The track relocation and doubling Darrow speaks about was accomplished January 10, 1908. The "Alexander or Wellman Feed Mill" is shown but not located on several Sanborn Insurance maps. It apparently existed in the late 19th and very early 20th centuries.

Albert Jones in his 1923 speech mentions a one run grist mill on the property later owned by Fred, then Elton Green, corner of Sanbury and Lawson Roads. The mill appears on the 1854 county wall map but not the 1840 Burr map or in the 1867 cadastral atlas. There is a three foot stone, seven inches thick, one piece granite, probably with a square eight inch center hole on the Green property cemented into a doorstep. This may have been the bottom stone.

Colonial American mills, like European mills of the Middle Ages involved much hand work even though water usually turned the stones. Men lifted bags of grain with ropes and pulleys. They carried grain in baskets. They bagged grain and flour with shovels and baskets. About 1790 Oliver Evans, a brilliant engineer, inventor, and millwright in Philadelphia, devised a system of milling in which machine power handled most of the formerly hand tasks and could be directed by levers and other simple control devices. It was the prototype of automation in American industry. Former hands here say this mill's level of automation was below the ideal. Nevertheless, Evans' ideas influenced this and all mills.

Grain brought to the mill was dumped through the opening in the front left of the foundation into a basement bin which is still in place. This was suspended, the whole bin and its contents, by an iron rod which hung from a large iron beam bolted to the top floor and now on display elsewhere in the building. The other end of the beam, much shorter, was also attached to an iron rod which extended through the floor into the office and operated the scale still present here. Thus the grist was automatically weighed. It did have to be leveled manually. It was emptied by an elevator run first off the front turbine and later by a 5 horsepower electric motor.

For the manufacture of flour, clean wheat was essential. Even the dirt in the natural seam of the grain could cause abrasion, heating, and reduced quality flour. The smutters were used to clean the wheat by high speed centrifugal action and wire brushes forcing the grain against metal screens.

The damsel causes the hopper to shake wheat into the center opening of the top stone. Two stones, top and bottom constitute a run or pair. The top stone turns, the bottom stone is stationary.

Apparently three sets of stones were worn out and replaced over the years in the mill. One history (Young's) mentions a run of stones in an Ashville mill lasting about 60 years. These were local material, probably granite, so the Busti stones should have been more durable.

Clarence Andrews remembers early discarded stones on the property. Their fate is unknown. Four of the last six used were purchased by the Shamrocks from Benny Anderson. The fate of the remaining two is unknown. Another pair was found built into the foundation during repairs. All the retrieved Busti stones were of 4 ft. diameter. Most people closely associated with the mill remember one run being of different size. The stones now in use are four that were purchased from Floyd Brown of Hamilton, Madison County in 1974. These are 4½ ft. in diameter. They were from a mill known as the Bingley Mill on the Chenango River.

The bottom stones weigh 950 pounds each and the top with additional plaster and iron, about 1,200. The weight of our smaller originals was around 750 and 900.

People are usually surprised to find the stones are composites of smaller pieces. Many people have seen solid or one piece stones. Such stones are either 1. local material (granite) and inferior to the composite stones; or 2. really composites but people failed to notice the fact. Composites tend to come apart when left exposed to the elements. These composites are a material called French burr, an imported stone that occurs only in small chunks. Our portable mill with two foot stones is French burr each stone one piece, but large burr millstones are always composites. They are put together with plaster. Concrete or mortar would be unsuitable.

The stone is very hard. It is a chert material. What people commonly call flint is a form of chert. This is silica (SiO_2) or silicon dioxide, (sand and glass being other forms of the same chemical) deposited from water solution in other rocks. In this case, calcium carbonate (limestone) crystals were dissolved away and replaced molecule by molecule in the same crystal pattern by the silica.

The patterns are cut into the stones in a precise way to maximize the efficiency of the grinding and cooling. The rotating of these grooved stones reduces the grain by a shearing, scissors-like action rather than crushing or grinding. It also helps work the grain and flour toward the perimeter of the stones as it is reduced. The stones are slightly closer together at the edges than at the center but must never be allowed to touch while in motion. Different groove patterns were used depending on the size of the stones, the speed of rotation, the material being ground, and the preference of the miller. Diagrams on display illustrate several patterns.

The top stone, called the runner stone, hung on the rotating central shaft. It had to

be balanced both statically and dynamically, just like your car wheels, in order to run smoothly so excessive closeness would not cause heating or contact and excessive distance would not cause coarse, inefficiently ground flour. The bottom stone is called the bed stone.

Will Sanbury remembers the front run was the feed run, the second corn meal, the rear buckwheat. It is not known which one ground wheat flour when that was in production.

Every so often, two or three months according to Sanbury, the stones had to be sharpened. To do this the top stone had to be lifted by the screw jack, called a tree. Here also our Busti original is gone and this was purchased with the stones from Mr. Brown. Pins were put in the stones, the iron straps of the tree placed over them and the stones lifted and swung, if necessary.

For a total overhaul the stone face would be made perfectly smooth and checked with a laminated wood or steel wand dipped in paint or ink to show high spots. Usually, however, this was not necessary and the grooves only had to be resharpened as they were. It was best to use a pillow under your knees. It took 10 hours to dress each four foot stone. Jones and some of his men did the sharpening or dressing here, but many places itinerants did the job. The condition of the picks was very important and a challenge to blacksmiths to harden them so they could hold an edge against such hard rock for a reasonable period yet not chip or break.

In Busti Earl Hamilton and Will Sanbury were among those who sharpened the stones for Albert Jones.

The dam backed up water into the head race. A bank, now gone, between the present bank and the creek formed one side of the race which terminated in the pit at the side of the mill, probably at about the level of the top of the pit. The height or head of water from the outlet level in the tail race to the surface in the pit provided the actual force and power for the operation of the mill by its weight. This was a maximum of eight feet.

This mill was powered by three water turbines, all still here not by a water wheel. Turbines are paddle wheel-like devices, cast iron in this case, set horizontally. One observable here has been raised and set out as an exhibit. Turbines were not only smaller and required less maintenance; they extracted as much as 95% of the power available from the water compared to a 75% efficiency for the best of overshot water wheels (30% for undershot and 65% for breastst.). However, the simple turbines used here were probably closer to 70% efficiency.

Water gates of planking with iron faces, two of which we found still in or near the pit in dilapidated condition, closed off the three holes in the bottom of the pit. These had handle-like extensions reaching up into the main story of the mill just inside the upstream wall where it hung over the pit. The upper ends had iron gear toothed racks which meshed with a gear on the shaft of the control wheels. Hence the flow of water to the

turbines could be controlled by the miller from a point near the stones. The parts of this apparatus on the ground floor have been rebuilt.

Water admitted through the gates passed into the wooden housings around each of the turbines. In order to escape, it had to pass through the turbines, entering from the sides. The housings have a slight spiral form around the turbines to give the flow a smooth rotary motion and encourage entry from all sides. The water entered the turbines from the sides, coming in contact with the angled vanes, thus forcing the turbine to rotate. The water then flowed out through the open bottom and out an opening into the lower level of the housing. The cup in the bottom center of the turbine is set over the bearing made of a special wood, *lignum vitae*, far harder than hickory or any other local wood. These bearings were imported from Germany although the tree source, *Guaiacum officinale*, from which its wood is taken this tropical American.

The water passed out the tail race under the middle of the Mill, under a bridge and down across the pasture to re-enter the Stillwater below the bend of Anderson Road.

The front and middle turbines are four feet. The rear is smaller, three or three and a half feet (Which is it?). The power of the Mill given by Mitchell on the 1870 census, just before the present turbines were installed, was 40 horsepower, probably 15 for each large turbine and 10 for the small one assuming the earlier turbines also consisted of two sizes.

The small or back turbine appears to have powered auxiliary equipment rather than a run of stones.. A cast-iron (front turbine) or in the middle case, wooden) shaft led up from each turbine and was geared or belted to the shaft upon which hung the top stone. The middle turbine powered two runs of stones. The front turbine powered one run of stones. Books give 125 r.p.m. as the speed for four foot stones.

As the flour was ground and worked toward the perimeter, It finally dropped out all sides of the stone onto the floor. It and the stones were enclosed by the shroud. At one point in the floor there is a covered opening that can be opened by pulling a slide device allowing the flour to drop into a chute. An iron wiper attached to the rotating parts sweeps around and pushes the accumulating flour into the hole.

Elevators consisted of belts of leather or canvas with tin cups or little buckets attached. Our elevators contain food grade plastic parts. These loop around pulley wheels, one on a lower floor, the other on a higher floor, and are enclosed in shafts. Bottom and top both open into bins so the traveling cups pick up any material in the lower bin and dump it in upper bin. Elevators could be fed from and could feed chutes as well as bins.

The flour was elevated to the top floor where it entered the bolting reel. This is driven, like all the elevating and cleaning equipment in the mill, by belts and shafts from the turbines. The bolting reel is the sifting device. It was covered with 60 yards of silk of five different grades or meshes. The central shaft is 21 ft. 2 in. long by 7 in. thick. The reel was mounted on a slant and rotated. Flour fed in at the high which was covered with the

finest meshed silk. As the reel turned, the flour tumbled and the finest flour was sifted out. This was termed “superfine”. Flour which could not sift through the finest mesh worked down to the next portion of the bolter, covered with a less fine mesh of silk. Here a coarser grade of flour was sifted out, and so on down the line to the middlings, etc. which were used primarily in animal feeds. What came out at the end that wouldn’t pass through any silk was called “tailings.” Each grade fell into a separate hopper with its own chute and thus through the floor into a separate bag, each with its own price - automatically. Some of these chutes were left in the floor and can still be seen in the ceiling from the main floor.

The milling operation in reality could be more complex. It could include storage and cooling phases and regrinding on the same of different stones that were differently fitted or had different speed or separation.

After wheat flour was no longer produced here the bolting reel was covered with a single grade of silk for bolting buckwheat flour.

The adjustment wheels can be shown. These are attached to a threaded rod and adjusted the separation of the stones when grinding. Different grains and different products required different separations.

Some mills had governor mechanisms built into the machinery whereby the speed of the stones themselves would change the volume of water admitted to the turbines. This mill did not have such refinements.

In the last years when the electric grinder was used and the mill was making animal grists only, Andrews had the grinder set up by the post on the right as you come in. He had two bins upstairs arranged so the grinder would be drawing and grinding from one while the other held another farmer’s grist. One order could be finished and the other begun with no stopping of the grinder and each farmer’s grain still kept separate. One of these bins is still intact.

The last grinder was used little and is still in apparently near working shape.. It is still in the mill but now downstairs. It was bought used from Harry Francis after his mill in Hartfield burned. Francis, in turn, had purchased the grinder, rebuilt, only a short time earlier. It has two three phase 440 volt 15 horse power Westinghouse motors driving counter rotating metal burrs.

ORIGINAL CUCUMBER FLOORING

Flooring and other matched lumber today is typically tongue and grooved. A cruder system, ship lap, is sometimes found. In the original mill floors however, we found several systems. Unfortunately, no note was taken of where each system was located and what sense could be made from their spatial relationships.

Our display shows, besides the conventional tongue and groove, two other systems: double tongue alternating with double groove, and double groove with splines.

The original flooring was cucumber wood. The cucumber tree is a native northeastern tree of the magnolia family. The scientific name is *Magnolia acuminata*. It is a soft, easily worked wood, light in weight and color. The fruits resemble small cucumbers. The wood is unusually decay resistant. The species was so much sought by lumbermen that it is now rare. Some small and medium specimens are growing locally.

Gunnard Wallen painted two views of the mill and framed them with some of the cucumber flooring when it was being torn out. These are in our museum. There is a 23 inch cucumber plank in the wall marked upstairs.

The floors have all been replaced. The top floor is western fir obtained at cost from Nelson Brothers Lumber in Jamestown. The main floor, except in the bay where the stones are, is _____ oak obtained below cost from Green Brothers Lumber in Blockville. The floor in the stone bay, replaced much later, is _____. The basement floor was replaced twice, first with _____ from Cornish Lumber in Bear Lake, Pa. and then, covering a larger area over toward the machinery, with _____.

SILLS AND CORNER TIMBERS

This display item is a corner of several of the timbers we replaced. Only the cut-off tenon remains of the upright. Notice the three timbers were tenoned and mortised and pegged together in such a way that none interfered with another. This exemplifies the workmanship that went into construction of the mill. Notice the original timbers 11 in. X 11 ½ inch by 36 inch, the full width of the mill.

It is impossible to find timbers of that size locally today. Also, we could not have replaced such timbers in full as one piece if they were available. Originally these units were assembled on the ground and raised. It wouldn't be possible to spring the units a foot to insert the tenons in place. We replaced in sections with laps over the posts and bolted the laps together.

The original timbers, many of them, are hewed then smoothed with an adz in the fashion demonstrated at the festivals. Some of them are further smoothed with a plane, possibly a large horse-drawn plane. Others of the original timbers are sawed, for example those in the H structures on the top floor.

Our replacements were sawed for the basement. On the main floor they were bought sawed standard 12 inch by 12 inch then reduced to 11 inch by 11 ½ inch with a broadax and smoothed with than an adz.

The sill over the head race pit required a minimum 31 foot timber. A beech sufficiently large for a 31 footer was taken from Paul Carlson's woods. Most modern sawmills are not equipped to cut timbers longer than 18 feet. The timber was roughed out

with a chainsaw, removing a cord of 14 inch stove wood in the process. Attempts to trim the timber down with broadaxes, adzes, and a mechanical sander were unsuccessful. The timber was delivered to the mill on a two wheeled farm cart. The 17 foot beam across the upstream side of the pit was hewed by Norman Carlson.

THE SMALL MILLS

The two small mills, weighing several hundred pounds each, are termed portable mills and have been used to demonstrate grinding at the Apple Harvest Festivals for many years.

The larger one was donated to the Society in 1973 by John E. Brightman, grandson of the original owner. It was restored by Bob Schultz in 1974. The stones are 24 inch, one piece French burr. In contrast to full size in-place milling set-ups, the bottom stone turns and the top one is stationary. The frame is ash. It was manufactured by A. W. Stevens, Auburn, N. Y. in the late 19th century. Stevens was a large manufacturer of farm machinery and traction engines.

The mill was originally purchased by John Y. Brightman and installed in a building on the Town of Chautauqua farm he had bought in 1885. In the same building was a log saw. Both implements were powered by a nine horse power steam engine.

The mill is now turned by a _____ horse power 220 volt electric motor at _____ r.p.m. It can grind at the rate of _____.

The smaller mill was restored by Kenneth Fisk of Lakewood in 1995 and 1996.

BROADSIDES

Broadside is an old word for anything printed on one side of a cheap piece of paper.

The mill has the remains of two interesting old broadsides. One on the stairway between the main and upper floors is apparently the advertisement for some New York City wholesale grocery. It is dated July 15, 1867.

Inside the front door another broadside announces:

Uncle Tom's Cabin !

A Drama in Six Acts

by the

U. L. A.

of Kiantone, N. Y.

Will Exhibit at (if the dotted line was ever filled in, it is faded away now)

Admittance 25 cts.
Children under 12 years 15 cts.

Doors open at 7 o'clock p. m. Curtains rise precisely at 7:30 o'clock p.m.

The cast of characters is given along with the parts they play. Unfortunately, some of the names have partly flaked away. They include: Will Abraham, Miss Esther Fenton, Riley Heaton, Gertie Colf, Will Brown, Ella Castle, Ralph Davis, Rose Fenton, Will Abram, G. B. Fenton, Rose Fenton, Lyman _____, Lyman _____, Rob't Ca _____, Riley H _____, Ralph L _____, Geo. Jaco _____, Nettie Fe _____, Mary C _____, Jimmy Slo _____, Chas. Elli _____, John Swans _____, John Neybu _____.

NOTES ON THE WALL

There are pencil notes on the timber of what was the office wall, also the front wall of the mill. I have been told that Glen Hassen wrote them. Hassen was employed by Andrews and Denn for many years.

They read as follows:

March 17, 1936 snow bound

Feb. 8, 1934 28 below 0

Feb. 9, 1934 36 below 0

Feb. 6, 1937 Jast. Mill burned

Winter 1943 & 44 snow bound all winter.

The mill thermometer hung on the porch post toward Busti. People still did a lot of walking in the 1930's. Those going by the mill often came up to look at the thermometer in winter and went in to the office to warm themselves.

Clarence Andrews said the 1937 date for the fire in the Jamestown mill is incorrect. It should be 1936. In fact the Pearl City Mill on Taylor Street burned February 1, 1937.