# HISTORY OF IRON MAKING

## PRINCIPALLY IN EAST CANAAN, CONNECTICUT

**WALTER MICHAELS**

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# ACKNOWLEDGEMENTS

**This History of Iron Making is dedicated to my mother, Julia Perdrizet Michaels, who in her early years witnessed the end of iron making in the Northwest corner of Connecticut.**

**I also want to express my deepest appreciation for help in composing these pages to Phyllis R. Bailey, Marie Biello, Alta Crowley, Marie Lavendier, Michele Lepper, Janice A. Rimiller, Betty Sword and Fred Warner for their knowledge, help and direction. I would also like to thank Allison O'Brien for typing and editing and to Walter and Jean Congdon at Fox Laminating Company for their generous and endless printing and copying assistance. I am of course grateful for the aid of many others.**

**This book is the recording and result of information gleaned from my family, many very helpful and knowledgeable people in the field, and of over 20 years of tracking-down, observing and painting scenes of iron making.**

**Lastly, I would like to give a special thanks to John Mills for the endless editing and typing he did on this book.**

# PREFACE

**What started me on this book of iron making in East Canaan was visiting my 90 plus year old mother in the late 1980's, who told me of her life growing up on the lower road in East Canaan. Her father was a lifetime iron worker, employed at the two iron furnaces in East Canaan.**

**My ability to remember being naught, anytime I visited I would encourage her to talk of her thoughts and to write them down. Fatefully and diligently she put her stories of living in East Canaan in writing. I had them typed exactly as she wrote them, and here they are.**

**First, a short discourse as to how iron is made. In early East Canaan, iron ore was heated with a charcoal fire using an air blast to increase the heat. The chunk of ore, almost white hot, was taken from the fire, placed on an anvil and hammered, then heated again and re-hammered as many times as necessary to rid the iron of impurities. The end result would be a bar of almost pure wrought iron. It was an expensive process and labor intensive. A blacksmith would *then* buy a bar of iron, heat it and hammer our nails, hinges, latches etc.**

**Later, in my mother's time, two blast furnaces were in operation in East Canaan. A blast furnace is about forty feet tall, the inside is hollow, and is continually filled in what is called the burden. This consists of burning charcoal, iron ore, limestone, and a significant blast of air.**

**This process melts the iron from the ore. It then drops to a container (crucible) at the bottom of the furnace where it is drained off about every six hours to make pigs of cast iron. (Pigs are solid bars of cast iron weighing about seventy pounds.) The iron produced is brittle and is re-melted to be cast into useable iron products. The latest East Canaan furnace was making as much as 24 tons of iron in 24 hours.**

**In 1988, I used my mother's writings and some of my writings to put together a small booklet of East Canaan. Then, I took up oil painting and naturally I started painting pictures of the iron industry, using old photos for reference. This is the result.**

# IRON ORE

**If you travel almost two miles west of Lakeville, Connecticut on Route 44 and look to the right, you will see a large pond. This was once the largest iron ore mine in Connecticut and was called Ore Hill. Ore was taken from this bed from 1732 to April 1923. In 1837 the amount of ore raised during the previous forty years averaged about five thousand tons annually. Imagine, about 96 tons a week carted to the area furnaces without the benefit of the railroad. The ore was transported about 11 miles to East Canaan using saddle bags on horses. Later, it was transported by wagons, and then around 1871, by railroad. (D11)**

**In the earlier days there was an association of proprietors who owned the land and a mining company that took out the ore.**

**The average production per year for forty years previous to 1835 is stated to have been about 5000 tons of iron ore annually. $1.25 per ton was paid to the mine owners, $1.75 per ton to the concessionaires, and 15 to 20 cents per ton mile for carting from the mine to the furnace. This made the total cost at the Connecticut furnaces about $4.00 to $5.00 per ton. (D12)**

**Around 1890, iron ore was mined up to 200 feet below the surface. The surrounding area is honeycombed with underground tunnels to 865 feet below the surface. The ore was hauled to the surface up an incline at the west side of the pond. Then it was dumped into a second car which carried it to a washer, where it was screened and dumped (E24). At the washer the dark porous ore was broken up in a stone crusher in about 5 inch chunks, was passed down to the washer proper where it was cleansed of earth, and loaded on flat cars, about twelve tons per car. It was then shipped directly to the Barnum Richardson's furnaces at East Canaan. This mine employed about thirty men underground in the late 1800's. There were three or four mines in Ore Hill plus the Chatfield Mine. Ore Hill had Mammoth pit, Union Pit, Star Pit, etc. In 1898, Barnum Richardson was sending about eighty tons daily of processed Salisbury Ore to its two furnaces in East Canaan.**

**A second ore bed, known as the Davis Bed, lies about a half mile northeast of Ore Hill between Salisbury and Lakeville, (about 3/4 of a mile north on Route 44 from Lakeville). This mine was also owned (1885) by the Barnum Richardson Company. All its processed ore was sent to the two furnaces in East Canaan.**

**The Davis Ore was sometimes mixed with the ore from Ore Hill and also mixed with ore from Aremnia Mines at the furnaces to give a more satisfactory grade of pig iron.**

# LIME

**If one removed the earth's crust in the Canaan area, most of the rock under the earth would be Stockbridge marble which is a dobmitic metamorphosed lime. It was removed and used in iron making from many quarries in the Canaan area. One of the lime quarries, and still being used for lime products today, can be seen on the lower road in East Canaan. (See #1 on map)**

**In early iron making, limestone was drilled and broken or blasted from the sides to fall to the bottom of the quarry then broken-up into baseball sized pieces and taken to the furnace. After 1860, it was carted to the top and crushed into about four inch chunks in a steam engine operated stone crusher. It was then transported to the furnace and stored in sheds until ready for smelting. Kent Furnace made about fourteen tons of pig iron a day using about 250-350 pounds of limestone per hour (D56).**

**The limestone serves as the flux which combines with some of the non-ferrous materials to form slag. This is similar to glass and being much lighter than the iron, floats to the top of the iron in the crucible.**

**This resulting slag collects all the non-iron materials as it settles down the furnace to the top of the much heavier molten iron at the base of the furnace. When the slag level almost reaches the air blast nozzles (tuyeres) it is drawn off, allowed to cool to become hardened slag, and is thus hauled off to a cinder pile. If one crosses the iron bridge (see #22 on map) and walks a few feet up the hill, one will see these cinder piles (see #21 on map). On a personal note, after the closing of the furnaces in 1923, my grandfather, Alfred Perdrizet, worked in the limestone quarries and kilns until his retirement in 1935.**

**To be correct, Ed Kirby uses proper geological mineral and rock type terms which often differ from the commercial terms – hence the geological process. That process involved the pressurization of lime materials (i.e. shelled animals) in a shallow sea to become limestone, which in the Taconic Mountains building event (4.35 million years ago), heated and pressurized it to become calcitic and dolomitic marble. Hence, marble is made up of lime, but is no longer limestone. Yet, we can refer to it as limestone (a stone containing mostly lime).**

# CHARCOAL

**If one would cross the iron bridge (see #22 on map) next to the Beckley "Upper" Furnace on the road in East Canaan, walk up the mountain and into the forest, one will find circular leveled-off areas in the woods. These are some of many places charcoal was once burned. (see #27 on map)**

**Charcoal pits (not pits, but above-ground "bee-hive shaped" structures) require both skill in construction and constant attendance while burning. Thus quite a few colliers (men who watched the burning charcoal day and night) were in the forests, living in crude log cabins, on land they did not own, attending the bee-hive shaped structures in which the charcoal was burned.**

**In making the coal pit, the trees were cut and stumps removed. Then the ground was leveled off and raked smooth. A circle was drawn which formed the circumference of the pit. In the exact center of the circle, a stout straight pole called the vent pole was set. This vent pole was first encircled with four foot cordwood of chestnut, oak and maple, set on end on the dirt about the vent pole. Around the first circle of cordwood about the vent pole, other circles of cordwood standing on end were arranged until the circumference of the coal pit was reached. Piled on top of this tier of cordwood, other circles of cordwood were similarly arranged. Each higher tier smaller in circumference was set on end, until the top of the cone or bee-hive was completed. When finished, the whole pile was covered with leaves, and the leaves were covered with a layer of dirt. The leaves prevented the dirt from sifting down into the cordwood. The covering of earth sealed the pit tightly. Next the vent pole was withdrawn leaving a hole, and fire was dropped into this hole upon the kindling, which had been previously placed at the bottom of the pit. The fire started, the slow turning took fourteen or more days during which the coal pit had to be carefully watched to keep the right temperature for charring and not burning the wood. When the heat within got too high, the vent hole was partially closed. If more heat was needed, small holes were made at the bottom of the circle to give more draft. From a small cabin nearby, the collier gauged the temperature within the pit by the quality and quantity of smoke issuing from it. The average charcoal pit chars about thirty cords of wood to yield 900 to 1200 bushels of charcoal.**

**To cut and haul forty cords of wood required two men and oxen working about a month. This made about eight tons of pig iron, a little more than half a day's production of pig iron at the Canaan #3 furnace when it was first built.**

**Consider the work involved. Forty cords of hardwood had to be cut (without chain saws) and hauled to the coaling area. These four-foot logs had to be stacked, covered with leaves and dirt, fired for two weeks, uncovered of earth, loaded into wagons, and hauled to the large sheds at the furnace. The voracious appetite of the furnaces for charcoal used all the hardwood trees in the nearby forests and cast a haze of smoke over the countryside. In the late 1800's, charcoal was brought by railroad from states as far away as Maine, Vermont, Michigan, West Virginia, Pennsylvania and others. A later generation would complain that the forests were ruined by the critically needed charcoal.**

**Anyone handling the charcoal had to be very careful of sparks or fire. The smallest spark left smoldering after coaling might ignite days later, destroying a whole shed of charcoal.**

**Rufus Harte, in his book "The Early Iron Industry of Connecticut" related the following, "Always a menace because of the possibility that the charcoal was not completely extinguished and that there lingered a spark which only needed a little air to start a glorious fire, there occasionally were cases where trains were involved." (D69)**

**My next door neighbor Marlin Deloy, upon hearing I was interested in charcoal burning provided the following information on her grandfather's brother. From the (#43) Berkshire Courier, October 1870.**

> **"MAN BURNED TO DEATH IN MONTERREY, MASS. A Frenchman employed on a coal job in Monterrey was found near the coal pit. He had been tending on Friday the 14th (and was) badly burned from the effects of which he died the following day. The man was subject to the fits and is supposed to have fallen into the fire during a return of the malady."**
>
> **This was Jean Pierce Rosier who was born in 1849 in France.**

**My mother, Julia Perdrizet Michaels, told of watching four-wheeled charcoal wagons with their high slanted sides, their drivers with faces powdered as black as the charcoal, crossing the iron bridge to fuel the Canaan furnaces.**

**In my early teens I would walk with my father on Canaan Mountain looking for the remains of charcoal pits. I think back now that my father must have had numerous thoughts about his father's lonesome life working charcoal.**

**Note: I have described an average charcoal pit. Some pits charred up to 100 cords, and could be oval.**

**<u>The following is from Appleton's Dictionary of Machines (Y83 & 84) and Describes charcoal burning.</u>**

> **The circle, to be leveled and pounded down, for a kiln of this sort, will be from 40 to 50 feet in diameter; the driest ground must be selected for the purpose, and a place sheltered from winds. The best period for burning, in America, is from the middle of May until the middle of August; and then again in October and November, during the season known as the Indian summer. Wood which has been felled, and looped, and barked in December and January, will be sufficiently seasoned to char in the autumn following. After logs have been arranged, as in the figures, around the three long stakes of ten or twelve feet in length, (which are to serve as a chimney), and piled as evenly and compactly as possible, the whole pile must be covered to keep out the air, a sire for a coaling improves by use, for the charcoal and loam get trodden and mixed together, forming the best material for the covering. On entirely new ground use must be had of sod. When covered, fire is applied, either through the top and suffered to fall through to the centre, where provision has been made of some light wood to catch readily, or through a horizontal flute left along the ground, which is closed at its entrance as soon as the fire has taken. For the first twelve hours the kiln must be closely watched, and, therefore, it is usual to light at daybreak. At the end of that period, or a little longer, according to the kind of wood, its state of seasoning, and the skill of the collier, the fire will have taken sufficiently, and the top may be covered in with dust and loam. From that time, it is better that the operation should proceed as gradually and slowly as possible. In three or four days the cover begins to shrink and fall in, and fresh watchfulness is required to stop every opening thus made, and even new ones are made to effect an equable distribution of heat. These are points that cannot be taught by talking; they are lessons of experience and observation. When the cover sinks gradually, and the smoke grows less and less, regularly, the work is known to be going on well. Expert colliers find indications of the process in the color of the vapor and smoke, which varied at different stages. After all smoke has ceased, the kiln is entirely and thickly covered, and left for four or five days, less or more according to its size, *to cool*. The coal is begun to be drawn from the foot, but cautiously at first, until it is found to be too cool to re-ignite upon admission of air. If so, the drawing may be continued all round for coal that is wanted, peeling it off, as it were, like an onion; the whole contents may be hauled off to store, or it may be left (covered up again) to be resorted to when wanted. In proportion as the kiln is well piled, flues in various places are unnecessary. It sometimes happens that the fire takes in particular parts, or does not take at all. In this last event, the advantage of a horizontal firing flue is tested. A kiln of ordinary size, of this kind, holds about 30 cords; the largest contain 50 cords.**

**Charcoal Hearth Model**
**Steps in Building the Pile**
**Rockland "Open Charcoal Pits"**
**1700's-1930's**
by Walter Landgraf, Stone Museum

1. Hearth is cleared and leveled, 30 to 40 feet in diameter.
2. Wood is delivered and organized by girth
   a. Billets - 4 feet long and 4 to 7 inches in diameter
   b. Lap Wood - 4 feet long and 1 ½ to 4 inches in diameter.
3. Fagan pole, 18 feet high, is set in the center of the hearth to guide the formation of the pile.
4. Three-sided chimney of lap wood is built around the Fagan pole to the height of the pile.
5. Pile is constructed of billets and lap wood 20 – 30 feet in diameter at the foot and 14 feet high at the head. Lap wood is used to fill in gaps in the foot, waist, shoulder and head of the pile.
6. Pile is covered with leaves and ferns.
7. Pile is dusted with fine dirt to the depth of one foot on the head. This allows for the control of air entering the pile.
8. Chimney is filled with small wood and fired with coals from the campfire.
9. Firing requires 10 to 14 days to reach the foot or post, and drive all chemicals except carbon out of the wood yielding about 30 to 40 bushels of charcoal per cord of wood.
10. Cooling and opening the pile required up to one week.

**Late Fall through Early Spring**
**Step 1:** Clear 30–40 ft. round hearth. Bank soil at edge.


Photo Courtesy of the National Park Service

**Step 2:** Cut the wood in 4-foot lengths, sort by girth into billets and lap-wood and deliver.


Photo Courtesy of the National Park Service

Stack lap-wood on bank. Lean billets against it.


Photo Courtesy of the National Park Service


Photo Courtesy of the National Park Service

**Late Spring through Early Fall**
**Steps 3 & 4:** Build the pile around fagan pole and chimney by stacking billets.


Photo Courtesy of the National Park Service

**Step 5:** Fill in the cracks and cover the sides and top with lap-wood, 20 feet across 14 feet high.


25-30 cords of wood
The Connecticut Historical Society, Hartford, Photo CD 0543-29

**Step 6:** Cover the pile with leaves & ferns.


Photo Courtesy of the National Park Service

**Step 7:** Dust the pile.


Photo Courtesy of the National Park Service

**Step 8:** Fire the pile. Fill the chimney with small wood, brands and hot coals.


Photo Courtesy of the National Park Service

**Step 9:** Tend the pile. Read the signs of the smoke. Fill in low spots, tamp out high. Control the burn.


The Connecticut Historical Society, Hartford, Photo CD 0543-28

Jump the burning pile tamping out air pockets.


Photo Courtesy of the National Park Service

**Step 10:** Cool the pile. Rake out sections.


Photo Courtesy of the National Park Service

# WATER POWER (BLAST)

**Charcoal Blast furnaces required several principal requirements to make iron. The first a sufficient supply of iron ore. The second a large forest to make charcoal. Third, a supply of flux such as limestone, and fourth, a river of sufficient size and drop to operate a water wheel. (A few furnaces used a steam engine to power the bellows.) Additionally, plenty of workmen are needed to mine the ore and limestone, cut the wood to make charcoal, and to run the furnace. Lastly, horses and oxen were needed to transport all these items.**

**A dam was constructed about 1830 to furnish water power for the Forbes #1 furnace. The dam was about 500 feet down river from the iron bridge at the Beckley furnace. A raceway was dug between the river and lower road to the site of the blowing engine. In 1834, a grist mill was built at this location. When Forbes #1 shut down, this water powered blowing engine was used to blast the Canaan #3 furnace. The Canaan #3 furnace also used a Corliss steam engine turning a rotary blower which was modern for this time to furnish the blast.**

**The Malby Phoenix furnace used a steam engine to power the two vertical blowing tubs.**

**Mary Stetson Clark in "Pioneer Iron Works", tells us the Saugus Furnace used two hinge type bellows 18 feet long, blowing directly into the arch using two tuyers. They blew about 300 cubic feet a minute. (Z35)**

**The first blast furnace built in Lakeville, CT in 1862 by Samuel Forbes, John Hazeltine, and Ethan Allen used two hinge type bellows about 20 feet in length to force cold air into the bottom of the furnace through a single tuyer.**

**From "Katahdin Iron Works," "It was built in 1846, enlarged in 1847, burned in 1883, rebuilt in 1885, last operated in 1890, the furnace was dismantled with the machinery going to Glasgow, Nova Scotia, where it was used to build a similar structure. It had double acting cast iron blowing cylinders operated by a 12' breast water wheel. The pressurized air was piped to the top of the furnace over ½ of the tunnel head to heat the blast. The air was piped to the arch where two 6" diameter pipes blasted the air into the furnace.'' (AA15)**

**Richmond Mass Furnace 1833 – 1923**
**The blast was furnished by a blower actuated by a water wheel of the old-fashioned over shot type. In 1863 the furnace was partially rebuilt, and at the same time the water wheel was abandoned and a blowing engine installed. In 1912 the blast was furnished by two Sturevant No. 9 Positive Blowers, direct coupled to the engines. From Historic Furnaces in Berkshires by E.C. Kreutzberg. Reprinted from July 9 issue, The Iron Trade Review.**

**The furnace at Newcome, NY. near Tahawus, NY. in Blast One Year 1854/1855:**
**The furnace used four six-foot long cast iron cylinders four feet in diameter to make the blast. It was powered by two sixteen-foot diameter overshot water wheels, each eight feet across. A lot of the remains are still in place including the four cast iron blowing cylinders. For more information, see "A Tour of Tahawus" sponsored by Adirondack Architectural Heritage Aug 12, 1995.**

**To even the pulsations from the tubs or bellows, an equalizer wind box was used. This box had wood flap valves with leather hinges to act as a reservoir to even the flow of blast air. The air generally was low pressure, less than 1 pound per square inch. The Newcome furnace used a sheet steel equalizer about 6 feet in diameter and about 18 feet long, located on top of the blowing cylinders.**

**Mark's Handbook 5th Edition, 1951 Page 527, and Leighou "Chemistry of Engineering Materials", 4th Edition, 1942 Page 265, both state that it takes about four tons of air to make one ton of pig iron in later day furnaces. In letters from Norman M. Wickstrand dated Nov. 24, 1985 and Oct. 15, 1989 to this author, he agrees with the above, and also calculates the blowing tubs at Beckley made 2 to 4 revolutions per minute.**

# SMELTING

**All three East Canaan furnaces were built in such a manner that the iron ore, limestone and charcoal storage area were located on the side of the furnace and level with the top of the stack, 32-40 feet above the casting house floor. A bridge allowed wheelbarrows to load at the storage sheds, move over the bridge and dump against a bump log to empty the contents into the stack. At the bottom of the furnace three arches were available to introduce the air blast into the furnace and a fourth arch was used to draw the iron and remove the slag. The outside of the three East Canaan furnaces were all made of large blocks of limestone (Stockbridge Marble). The center of the stack was small at the top and lined with firebrick. The space between the limestone blocks was filled with rubble and sand. Limestone could not stand the great heat next to a layer of firebrick. On the bottom in the hearth was located a firebrick crucible to collect the molten iron. At the bottom of the stack was a firebrick crucible to collect the molten iron. At the bottom of this container was a tapping hole plugged with fire clay. To drain the molten iron the fire clay would be punched out with a long iron bar to release the iron for molding into pigs. Near the top of the crucible would be located a cinder notch. This was located above the level of molten iron, and just below the blast nozzles.**

**The hot layers of impurities or slag floats on top of the molten iron, and as the slag accumulates it overflows the cinder notch on to the floor, where after cooling and broken up it was taken to a cinder pile. The Beckley and Canaan #3 furnaces blocked the cinder notch with a door or a clay plug, so that the slag could be removed at timed intervals. When the hot material floating on the iron is in a liquid state, it is called slag. After being cooled and broken up it was called cinders. To the left the iron could be directed through a narrow ditch to the casting floor where damp sand was formed to allow the hot flowing iron to form into pigs. The slag was run off twice an hour, and the iron every six to eight hours.**

**Starting a blast furnace when it was cold (blowing in) was quite a project. The furnace mass had to be heated slowly. The stack was first filled with charcoal, which was lit, and then only charcoal added until the fire burned to the tuyeres (air nozzles). With the furnace full of glowing charcoal, the air blast was started gently at first, gradually increasing to full strength, at the same time ore and limestone were added gradually, increasing the amount until normal operating conditions were reached. Then at stated intervals the charging crew opened the top of the the furnace, making the top open for admission of the charge. At the same time someone opened the "snort valve" in the blast pipe to relieve the pressure in the furnace and prevented burning gases from bursting out of the open top and scorching the charging crew. The charging crew then wheeled the wheelbarrows across a bridge from the storage sheds to the top house of the furnace, and dumped the specified quantity of the ore, limestone and charcoal into the furnace. The top was then closed, the blast again directed into the furnace, and the operation resumed. The furnace was kept nearly full up to the top. The greatest combustion was in the lower part of the furnace. Towards the top of the stack the hot exhaust fumes were piped down to a brick building which housed a heat exchanger to heat the cold incoming air blast. The hot exhaust gas fumes were ignited and burned for more heat as they entered the heat exchanger.**

**The iron master controlled the output by his choice of ores and suitable proportions of limestone and charcoal. The hearth temperature was also critical as to the grades of iron produced. This could be controlled by #1, reducing the proportion of ore and flux to charcoal, #2, making the slag richer in lime and #3, changing the blast temperature and pressure. Because of the slow downward travel of the mixture the quicker way to change the iron grade was by changing the blast temperature and pressure. The intense heat generated by the heated blast liquefied the iron ore.**

**The impurities in the iron ore combining in chemical reaction with the charcoal and limestone**

**are separated from the ore, and this slag, in a liquid state lighter than the molten iron, floats on top of the iron and is drawn out through the cinder notch. Sometimes furnaces used a hole plugged with soft clay to remove the slag.**

**At the top of the furnace the escaping gas had a high proportion of carbon monoxide and was a serious menace to the men loading new material. This smoke and gas was drawn off to a side flue or tunnel head and eventually down to a set of heat exchangers. The hot gas would surround a cast iron heat exchanger, turning it hot. The incoming air blast was piped through these heat exchangers and brought the cold air up to about 900 degrees Fahrenheit, after which it was piped into tuyeres. Canaan #2 started with a cold blast in 1847. It was refurbished in 1856 to a hot blast at 475 degrees F. After a fire in 1896, the blast was changed to 900 degrees and the hearth was water cooled. (BB)**

**Charcoal grade iron is graded in seven steps #1, 2, 3, 4, 4-1/2, 5 and 6. (D60) Number one iron is very soft, number six, hard. The Canaan #3 and Beckley furnaces made mostly #4 and #4 1/2 grade, used for railroad wheels.**

**The grade of iron produced depends largely upon the temperature of the furnace and by the grade of ore used and also, the state of the weather. When the furnace is cold it produces hard grades of iron (D59).**

**The experienced men could predict the grade of the next cast most accurately. Once any trouble interfering with the output had been cleared up, it was remarkable how little unsuitable iron was run before the stack was brought back to the grade it had been working on.**

**The rate of descent of the material as it was burning in the furnace was an important sign in furnace operation. Any irregularities indicated some sort of obstruction down in the stack. Sometimes material wedged itself to form a bridge, thus, slowing or stopping the downward descent. If the stoppage was not too bad, (jumping) starting and suddenly stopping the blast sometimes dislodged the obstruction. If the obstruction was near the top often it could be broken with a long iron bar which was driven down from the top.**

**If the blockage did not yield, other methods had to be used quickly because the steadily growing open space between the obstruction and the increasingly large gap below caused the blow ultimately, when it did release, to become increasingly dangerous. At the same time, if the stack temperature was not kept fairly high there was danger that the blockage might cool and freeze, which would mean destruction of the hearth. If use of the iron bar from above failed, drilling through the side wall and into the obstruction to make it fall sometimes worked. Sometimes through this hole (later date furnaces) an oil fired blow pipe was inserted to melt the obstruction away. When the obstruction yielded, frequently, this made an outburst of gas at the tunnel head. In a severe plunge the obstruction would fall to the hearth causing a sudden flow of molten iron and flux. This could result in injury or death to men about it.**

**All else failing, the furnace is allowed to cool, and the obstruction manually chiseled out. The obstructions were called salamanders or bears. If you look to the river bed from the right side of the iron bridge at the Beckley Furnace, you will see several salamanders or bears in the river and on the river bank. (see #20 on map)**

**My mother, Julia Perdrizet Michaels wrote in 1988, her recollection of watching the casting at the Beckley furnace in early 1900's.**

> ***"My father worked at the iron making in France before immigrating to Richmond, Massachusetts, to take a job at the Richmond Furnace. He was in his early twenties at the time. Barnum, Richardson and Company enticed him to move to East Canaan with the promise of a house and a better job in iron making, so we moved to East Canaan around 1900 when the iron furnaces were going strong."***

**At the Canaan #2 furnace (#23 on map) the casting floor was on the right side of the furnace arch, at ground level. The iron makers used the sand floor to make the molds for the iron to flow into. The iron was drained off every eight hours. It was a pretty sight to see this red hot liquid iron flowing like water into the molds, red sparks flying as it was coming from the hearth. The iron bars were probably four inches square by three feet long. After cooling, they were removed, loaded on oxen carts to be hauled to the Canaan #3 (lower) furnace (see #8 on map) and loaded on railroad cars. On cold winter nights, in my bed before going to sleep, I would hear the crunch, crunch, crunch of oxen feet on the cold snow. The oxen were hauling the pigs of iron from the Beckley (upper) furnace to the Canaan #3 (lower) furnace for loading on railroad cars for shipment to the Barnum and Richardson casting foundry in Lime Rock to be cast into railroad wheels.**

**The iron drained from the front arch, the slag flowed out the right side arch. This was a very pretty white gray, greenish or bluish color, all bubbly and running like water.**

**The slag was taken away when cool to the cinder banks. These cinder banks are still piled high near both the Canaan #2 and Canaan #3 furnace. My brother, George Alfred Perdrizet, spent many hours combing the cinder banks picking up small scrap pieces of iron to sell back to the furnace owners. My father worked at the East Canaan furnaces for many years. His paycheck was $9.98 a week for many months. When the furnaces shut down in 1923, he went to work at the lime kilns until he retired at age 73.**

**I will always remember the red hot iron, the flowing hot slag, and the crunch of the oxen feet in the snow."**

**The following was written by my mother's sister Alice Perdrizet Young. "I was born in East Canaan in 1902 in our house just about half way between the Beckley furnace and the Canaan #3 furnace. My father worked at the furnaces from 1900 until they closed. He knew the iron industry from A to Z. When anything went wrong, day or night, he was called. The most exciting thing that I remember was watching the red hot iron flow like water in the trenches made of sand. Also I enjoyed watching the oxen slowly going up the road returning to get a load of iron, as it all had to be transported from the Canaan #2 furnace to Canaan #3, then loaded on flat cars and taken to the foundry at Lime rock to be cast into railroad wheels".**

**It must have been a spectacular, thrilling sight to see.**

**It has been written, that the woosh, woosh, woosh of the older style (before 1830) blacksmith-type bellows could be heard up to five miles on a quiet evening.**

**The last two furnaces in existence were the Canaan #2 and Canaan #3. They were relatively quiet. The water wheels operating the blowing engine were also quiet.**

**The flame coming out of the top of the furnace furnishes among other things a sign to the founder of the state of the furnace. If it is small and weak it is presumed that the blast does not pass through sufficiently; and the materials, which from the moment of charging ought to be undergoing a preparation for fusion, are in fact descending more or less raw. The remedy for this is not always to increase the blast; on the contrary a discreet founder will first take into consideration the nature of the materials, their ability to fall apart and likely to become packed in the stack. Too little slope in the boshes is always more or less involved in the result, where the materials are constant. If the flame is, as sometimes, on one side it is a sign that the charges are not descending equally. If this is permanent, there is reason to suppose that the in-walls or boshes, or both have degraded out of shape. If occasionally, it is rather to be attributed to an accidental choking of the furnace caused either by a bad state of materials, or what was a more common, a bad filling. In a well-going furnace in a calm atmosphere, the flame should rise cylindrically, with life, and with a certain whistling cry the founder likes to hear. (Y98)**

**In conclusion, from these Connecticut furnaces, came the iron that was used in muskets, sabers, cannons, cannon balls, stoves, anchors, anchor chains for ships, cooking utensils,**

**and numerous other products that touched lives of so many people all over our nation.**

**May we all appreciate that a Sunday drive to these iron making areas, perhaps a picnic at the Beckley Furnace which is now a State Park, can take us back into the pages of the historic Story of Iron Making.**

**As New Englanders, we can be proud of our heritage. As Connecticut residents we are especially fortunate to be close to these points of interest.**

# SLAG

**The three East Canaan furnaces produced a huge amount of slag. About every half hour the cinder notch door would be opened to spill hot slag on the casting floor. This white hot liquid slag would cool and harden. William Wallace writes, "it was then moved away from the casting floor and cooled with water before being taken away to the slag pile." (BB11) Up to the early years it kept piling up. In 1917 (The New England Slag Co.) built a crushing plant near the Canaan #3 Furnace and started crushing and screening slag to be used in concrete products, railroad ballast and other uses. To see concrete made with slag, visit the Railroad Abutment on the lower road across from the Nod Winery, just above the foundations for the Canaan #1 and #3 blowing engines. The slag is visible in the cement. In 1922 the American Slag Co. built a railroad bridge to cross the Blackberry River and have tracks to bring the huge pile of slag from the Beckley to the crusher.**

# CANAAN BLAST FURNACE #2

**On the official Connecticut map, in the upper left hand corner, just off Route #44 in East Canaan is a red star. Below is written "Industrial Monument". This is the site of the Beckley #2 Furnace.**

**The Beckley's owned Iron Furnaces in Sussex, England before coming to America in 1635. Then they came first to New Haven, then to Hartford and then to Canaan, Connecticut. The name Beckley comes from Beach-Lea or field near the water. (U)**

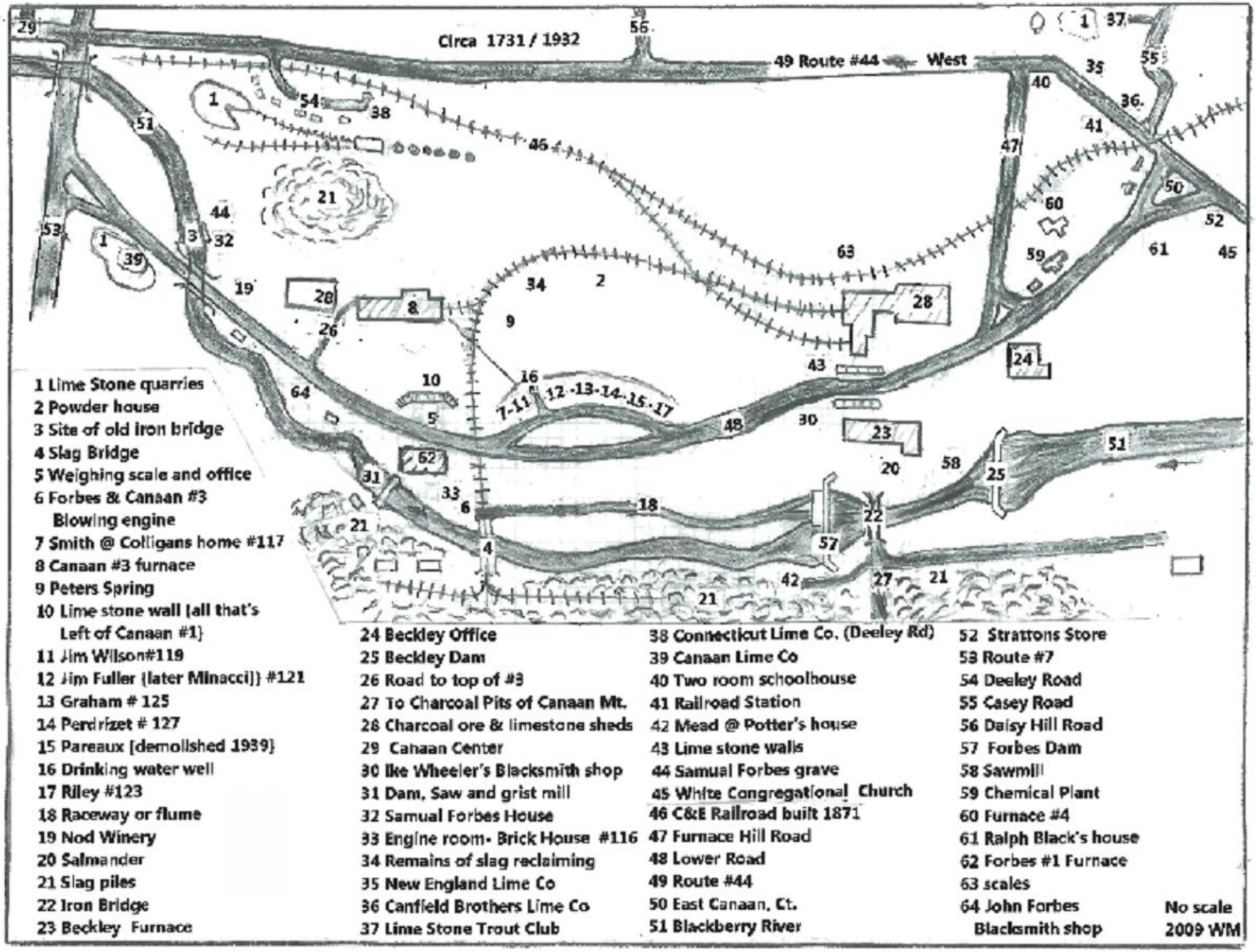
**A letter from the Connecticut State Forest and Park Association, March 18, 1964, to Miss Buckley of the Hotel Sheraton in Pittsfield, Massachusetts states that "you will be interested to know that our association has purchased the Furnace still standing in East Canaan with the plan of presenting it to the state as a road side park". In another letter to Miss Clara Beckley, September 26, 1949, it is stated, "we are happy to inform you that the following sign is to be placed at the furnace: Memorial Iron Furnace Built in 1837 by John Adam Beckley, presented to the State of Connecticut by the Connecticut Forest and Park Association June 1946".**

**A grant of $250,000 from the State of Connecticut in 1989 enabled a Committee for the Preservation of the Furnace to restore it to its present condition.**

**See Page 44 & 45 for more information. WM**

# CANAAN BLAST FURNACE
# FORBES #1

**While traveling west on the lower road about 1000 feet past the existing furnace stack of Canaan #2 is now a home at 116 Lower Road, East Canaan, Connecticut), and looking to the right, one can see a limestone wall, about 16 feet high and about 114 feet long. The #1 Forbes Furnace was on the opposite side of the road. In 1832 Samuel Forbes Adam, the grandson of Square Forbes, built a furnace here. Sometime about 1739 Richard Seymour, a good friend of Squire Forbes, had built a Catalan type forge to produce blooms and bar iron near this site. This was on the south side of the Blackberry River and approximately 1000 feet down river from the #1 Forbes site. Squire Forbes at age fourteen started his iron making at this Seymour forge. This forge was the beginning of iron making in East Canaan. Later the Squire and his brother Elisha built two forges in East Canaan and one in Norfolk. One forge was at the site of where the later #1 Forbes furnace was built; the second is thought to be at the site of the #2 Beckley furnaces. It was bought by the Barnum and Richardson Company in 1826, abandoned in 1885, and demolished in 1889. In 1835 the #1 Forbes site was a mere heap of stones. Today, only the Limestone (Stockbridge Marble) wall remains.**


Circa 1731 / 1932
49 Route #44 West
1 Lime Stone quarries
2 Powder house
3 Site of old iron bridge
4 Slag Bridge
5 Weighing scale and office
6 Forbes & Canaan #3 Blowing engine
7 Smith @ Colligans home #117
8 Canaan #3 furnace
9 Peters Spring
10 Lime stone wall (all that's Left of Canaan #1)
11 Jim Wilson#119
12 Jim Fuller (later Minacci)) #121
13 Graham # 125
14 Perdrizet # 127
15 Pareaux [demolished 1939]
16 Drinking water well
17 Riley #123
18 Raceway or flume
19 Nod Winery
20 Salmander
21 Slag piles
22 Iron Bridge
23 Beckley Furnace
24 Beckley Office
25 Beckley Dam
26 Road to top of #8
27 To Charcoal Pits of Canaan Mt.
28 Charcoal ore & limestone sheds
29 Canaan Center
30 Ike Wheeler's Blacksmith shop
31 Dam, Saw and grist mill
32 Samual Forbes House
33 Engine room- Brick House #116
34 Remains of slag reclaiming
35 New England Lime Co
36 Canfield Brothers Lime Co
37 Lime Stone Trout Club
38 Connecticut Lime Co. (Deeley Rd)
39 Canaan Lime Co
40 Two room schoolhouse
41 Railroad Station
42 Mead @ Potter's house
43 Lime stone walls
44 Samual Forbes grave
45 White Congregational Church
46 C&E Railroad built 1871
47 Furnace Hill Road
48 Lower Road
49 Route #44
50 East Canaan, Ct.
51 Blackberry River
52 Strattons Store
53 Route #7
54 Deeley Road
55 Casey Road
56 Daisy Hill Road
57 Forbes Dam
58 Sawmill
59 Chemical Plant
60 Furnace #4
61 Ralph Black's house
62 Forbes #1 Furnace
63 scales
64 John Forbes Blacksmith shop
No scale
2009 WM

# BECKLEY IRON FURNACE – SPECIFICATIONS

## Preservation Study Report

**EAST CANAAN FURNACE # 2**
**THE JOHN ADAM BECKLEY BLAST FURNACE**
**[The information that follows is based on preliminary measurements, reports and reviews by Ed Kirby and Ed Kirby, Jr., November 1996.]**

**GENERAL INFORMATION OUTLINE**
**The Beckley Furnace was one of the three blast furnaces in operation along Lower Road and the Blackberry River during the period 1832-1923.**
**Beckley Furnace (East Canaan #2), was built in 1847 by John Adam Beckley, great grandson of Samuel Forbes. Construction was of fine ashlar, carbonate rock transported from a quarry a short distance west. The host formation of the carbonate rock is the Stockbridge marble (OCs). Though locally referred to as limestone, geologically the formation is a true, dolomitic marble.**

**Built: 1847**
**Stack base - 30' x 30'**
**Height - 32'**
**Bosh width - 9'**
**Hearth - 40"; of Dalton formation (CZd) schistose quartzite, lined with firebrick**
**Fuel - Charcoal**
**Blast – First Salisbury iron district to be built as hot blast**
**Tuyere arches - 3**
**Tuyers - 3 with 3.25" nozzles**
**Power - Water from dam with breast water wheel and 2 blowing tubs.**

**Refurbished in 1856**
**Stack base - 30' x 30'**
**Height - 32'**
**Bosh width - 9'**
**Hearth - 40"; of Dalton formation (CZd) schistose quartzite; from I. N. Bartram Quarry.**
**Mt. Easter**
**Fuel - Charcoal**
**Blast - Hot @ 475 degrees F**
**Tuyere arches - 3**
**Tuyers - 3 with 3.25" diameter**
**Power - Water from dam to east with two blowing tubs**
**[Purchased by Barnum and Richardson in 1858]**
**Refurbished after the 1896 fire:**
**Stack base 30' x 30'**
**Height - stack and shaft increased 8'; new height 40'.**
**Width at the bosh - 9'.**
**Hearth - 40" diameter; of Dalton formation (CZd) schistose quartzite; from I. N. Bartram Quarry, Mine Mt., Sharon.**
**Fuel - Charcoal.**
**Blast - Hot, water-cooled, @ 900 degrees F.**
**Blast heating oven - Ground level; 42 pipe coils in oven;**
**blast pipes outside furnace stack to tuyere arches.**
**Casting arch - Tapered French Gothic; approximately 16.3'. wide and l4' high at facing around opening; interior opening 10.4' wide.**
**Tuyere arches - 3; north and south tapered Gothic, at face 9.3' wide and 7.8' high; east arch brick**

**Gothic, no taper; possibly reconstructed in the rebuilding following the 1896, fire.**
**Tuyeres - 3, with 3.25" diameter? [or 5 with 3" diameter?]**
**Power - Water powered turbine [bevel gear and portion of the turbine remain].**
**Blowing tubs - Vertical; 2 with 72" diameter and 6' stroke.**
**Casting house - Brick with curved iron roof; still standing in 1930; later torn down for the sale of bricks. Portions of the foundation remain.**
**North retaining wall - Fine ashlar, Stockbridge marble (OCs).**
**Charging wall - Across road; fine ashlar, Stockbridge marble (OCs); charcoal shed back wall (OCs, fine ashlar) standing 113' north of charging wall**
**Paymaster's office - Stucco building, still standing, north of the dam; vault housing in place, but safe removed; building used as visitor center.**

**Closing of Beckley Furnace:**
**Lawrence Eddy (Eddy Paper, 1969) states "it continued in operation until the end of 1918, when it had to be shut down due to a salamander in the hearth.**
**Purchased by the State of Connecticut - 1946**
**Later designated as Connecticut's Industrial Monument.**
**National Register of Historic Places - 1978**

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# NOTES

**John Forbes, a blacksmith and father of Samuel Forbes, moved from Simsbury, Connecticut to East Canaan on October 6, 1746, on land purchased from Samuel Jones of Canaan.**

**Samuel Forbes "The Iron Prince", was born in Simsbury, November 10, 1729, and died on November 27, 1827. He married Lucy Peirce on August 5, 1754. He had one daughter Abigail, born on June 19, 1755, died on October 7, 1813 who married John Adam from Taunton, Massachusetts.**

**Samuel Forbes and John Adam became business partners, Forbes and Adam. Samuel Forbes, operating his forge, attempted to make nails more economically by rolling and slitting. He was called by Governor Trumbull, to resume as iron master at his former furnace at Lakeville (at the first Salisbury iron district built in 1762 by John Haseltine, Samuel Forbes and Ethan Allen) for the duration of the Revolutionary War (1775-1783). In 1783, he returned to East Canaan to resume his attempts to make inexpensive nails. He converted two of his forges to a rolling and slitting mill, and was successful in 1785. Previous to making nails, Samuel Forbes, in 1768, was making anchors for ships at his two forges in East Canaan.**

**Abigail and John Adam had twelve children; six died in infancy. One of these children was the mother of John Adam Beckley, the builder of the Beckley Upper Furnace.**

**The 44 furnaces in the iron producing area all used different amounts of iron ore, charcoal and limestone to make a ton of iron for the nine grades of iron. Earlier furnaces used more amounts than later furnaces. Harte, in his book "The Early Iron Industry in Connecticut" listed iron ore at 58%, charcoal as 28% and limestone as 14%. These percentages are for the Kent furnace, probably in the last year of making pig iron. (D56)**

**The date escapes me, but my friend Felix Minacci and I attended the dedication of the new 1838 Samuel Forbes Bridge.**

**Throughout the stages of the life of a furnace, different owners and processes and improvements to the technology caused the quantity of production, and the quantity of raw materials required to change. For the most part, as time went by, the furnace output was increased and efficiency improved due to these factors.**

# LIME KILNS

**Lime kilns originally produced lump lime, pure nuggets of calcium oxide. This material was called quick lime. When it was crushed it was a very perishable commodity. Inside a typical kiln are three imaginary compartments, one at the top, one in the middle and one at the bottom. They are not separated by any structure within the kiln itself, except that there must be a separation between the source of heat and the limestone above. The kiln was lined with refractory material throughout. The top compartment called the hopper is where the limestone is dumped; the middle compartment is the shaft where the limestone is burned. It is narrower than the hopper and the limestone easily falls into it from above. Below the shaft is the cooler where the burned limestone falls. Iron doors called sheers allow the burned lump lime to be removed.**

**Lump lime was crushed to a powder called quicklime but sometimes the shipment from the kiln to customer was in lumps. The problem with the material was that it was highly perishable, because upon exposure to humidity it would harden and lose its bonding ability.**

**Hydrated lime is a lime product having the benefits of quick lime, but it did not need to be protected from humidity to improve its perish-ability. The production of hydrated lime, lead to the closing of many kilns.**

**Most of the above information is from a book (Vermont Lands and Resources by Harold A Meeks 1986. Published by New England Publishing Co., Shelburne Vermont.)**

**Below is from Appleton's Dictionary:**

**"A layer of brushwood is first placed at the bottom of the kiln, upon this some coal, then a layer of limestone, which is again covered with coal, and then another layer of limestone, and so on until the kiln is filled. The last layer of stone is heaped up above the mouth of the kiln, and the progress of the firing is judged of by the manner in which it sinks down; the sinking in this case being due, not only to the diminution in bulk of the stones, but also to the consumption of the fuel. As soon as the uppermost layer has sunk down to the level of the top of the kiln, another charge of coal and limestone is thrown upon it. In the mean time, at intervals of one-half to one-quarter of an hour, the lime which has sunk to the bottom of the kiln is drawn out through the holes in the bottom on the kiln." (Y207)**

# MISCELLANEOUS

**<u>This is quoted from a story by Jack Mahoney titled "Growing up in Lime Rock Station"</u>.**

**This talk was given at the Falls Historical Society.**

**"Down from the iron furnaces in East Canaan came trains loaded with pigs fresh from the furnace moulds. Men struggled to unload these heavy objects (about 75 pounds each) of pure iron and stack them along the stone platform. Later, the train gone down the track, a wagon and team from the Barnum and Richerson Company in Lime Rock would arrive. Men would jump down and begin the task of loading the wagon with the East Canaan pigs. Then they were off, back to Lime Rock where the iron pigs would be transformed, in the forge and foundry, into wheels for trains all over the growing country. Soon, with the process complete, the wheels, some weighing as much as 500 pounds, stacked on the two hundred-yard long stone platform, waited for a train to take them to their destinations."**

**<u>From Iron Country 1720 to 1972 by Edward D. Fales, Jr. published by the Lakeville Journal Press, Lakeville, CT, Page 18:</u>**

> **In all the towns hammers rang, sparks flew from red hot iron and spat like fireworks, near the blast furnaces children stopped to listen to the bellows, which drew their power from waterwheels. One who remembers is Mr. Willard Palmer of Lakeville. He recalls the Hunts-Lyman ironworks at Lower City.**
>
> **"We kids used to love the sound," he says. "It was hypnotic." Today he still likes to imitate it: a wheezing-roaring-screaming each time the monster bellows spewed its breath to hotup the fires. The bellows that kept the fires going were sometimes 8 and 10 feet tall. They looked like large copies of the hand-bellows people kept at their firesides.**
>
> **During the Revolution, the Iron Country profited from the nation's first arms boom. In the forges and furnaces as many as 2,000 men worked day and night, pounding out shot and cannon, musket barrels, anchors.**
>
> **The Salisbury furnace, and possibly those is the other towns, also are said to have turned out guns for New York's harbor battery (Battery Park) and iron for chains to be hung across the Hudson and Long Island Sound. (The chains themselves were *not* made here.)**
>
> **Anchors were made at East Canaan and Huntsville, and surprisingly "Old Ironsides' " own monster anchor was forged on Mt. Riga, 1,500 feet above the sea. It was so big it had to be hauled down the back side of the mountain into Copake, NY., by a dozen oxen. Some pulled ahead and others, undoubtedly, pulled back to keep things under control. H. A. Brassert, an industry historian, calls the anchor "a prize achievement of the times." (DD18)**
>
> **Though no documentation has been located, it is claimed that the anchors for the Constitution (old iron sides) and the Constellation were made at the Rigi. (J24)**

**Making Anchors in the 1850's-- The anchor smith's forge consists of a hearth of brickwork, raised about 9 inches above the ground, and generally about 7 feet square. In the centre of this is a cavity containing the fire. A vertical brick wall is built on one side of the hearth, which supports the dome, and a low chimney to carry off the smoke. Behind this wall are placed the bellows, with which the fire is urged; the bellows being so placed that they blow to the centre of the fire. The anvil and the**

**crane by which the heavy masses of metal are moved from and to the fire are adjusted near the hearth. The Hercules, a kind of stamping machine, or the steam hammer need not be described in this place. To make the anchor, bars of good iron are brought together to be fagoted, a fagot is a bundle of iron rods held together with hoops if iron (C153), the number varying with the size of the anchor. The fagot is kept together by hoops of iron, and the whole is placed upon the properly arranged hearth, and covered up by small coals, which are thrown upon a kind of oven made of cinders. Great care and good management are required to keep this temporary oven sound during the combustion; a smith strictly attends to this. When all is arranged, the bellows are set to work, and a blast urged on the fire; this is continued for about an hour, when a good welding heat is obtained, two white hot pieces of iron become one solid piece when merged and hammered together. The mass is now brought from the fire to the anvil, and the iron welded by the hammers. One portion having been welded, the iron is returned to the fire, and the operation is repeated until the whole is welded in one mass. The different parts of the anchor being made, the arms are united to the end' of the shank. This must be done with great care, as the goodness of the anchor depends entirely upon this process being effectively performed. The arms being welded on, the ring has to be formed and welded. The ring consists of several bars welded together, drawn out into a round rod passed through a hole in the shank, bent into a circle, and the ends welded together. When all the parts are adjusted, the whole anchor is brought to a red heat, and hammered with lighter hammers than those used for welding, the object being to give a finish and evenness to the surface. The toughest iron that can be procured should be used in anchors. (CC480)**

**I quote from Connecticut Iron (about 1940) by William J. Garrigus:**

> **"Shears of Yankee metal (Salisbury Iron) clipped heavier cloth longer than scissors made in Germany. Connecticut scythes cut more hay than from any other part of the world, and the harrow teeth and mowing machines fingers cast up here outware the machines. Curry combs, stoves or cannons, Salisbury Iron stood every test, and asked for more."**

**<u>My Iron Experiences</u>**

**The Clayton brothers built a new factory on the site of the old Watrous Shop (about half a mile up from South Street on Wolcott Street, Bristol, CT in 1893). They manufactured cast iron shears, tinners snips and had a foundry for casting grey iron. (R418)**

**During the school year of 1942, a classmate and I secured a job in the foundry working four pm to eight pm week days at one dollar per hour.**

**The company employed about ten molders, they worked all day making clay molds (a block about 12" x 16" square and 16" tall). A sprue hole was made in the top to receive the liquid hot iron. By 3 pm, they were ready for pouring.**

**The molders lined up with their long handle ladles in front of the furnace spigot. The white hot iron would flow, and each molder, one right after another, would fill his ladle, carefully walk to his molds and pour the hot iron into the sprue hole in each mold.**

**After all his molds were filled and his ladle put away, he went to the wash room. He was done for the day.**

**The hot early summer day, the heat from the iron furnace, the heat from the poured iron and the hot sweating molders washing up, made the smell in the washroom of a very distinct odor, I can still smell it to this day.**

**Next after cooling, we used an iron bar with a handle on one end, and a hook on the other to**

**break the sand molds apart. Hook on the sprue of the casting and pull the casting from the mold, and make a pile of the castings. Then sitting on a short stool, we would pick a casting up and hold it by the sprue and with a small hammer tap each scissor half off to fall into a shop box. Then we would throw the casting into a pile to be re-melted for the next days pouring. When the shop box was filled, using our iron rod, we'd pull the filled shop box to the tumbling room.**

**By not wasting time, we could be done by six thirty. We took turns staying until eight o'clock to punch both of us out.**

**When it was my time to stay late, I would accompany the watchman on his rounds. It was a shop education in itself to observe all the plant's manufacturing operations the Clayton brothers did as we walked all though the shop.**

**My second iron experience happened after I was discharged from the Air Corps in 1946.**

**My mother had for many years a cast iron paper weight in the shape of a sitting dog, about one and one eighths inches tall. It was painted white with black eyes and nose and a red ribbon around its neck.**

**With the thought of making and selling this knick-knack paper weight, I took my sample paperweight to the Sessions Foundry in Bristol (now a strip mall on Route 6) and paid the cash upfront to cast 100 pounds of paper weights. In due time, I picked two fifty pounds boxes of cast iron paper weights.**

**Back home I belt sanded the parting line and cleaned them up. Then I painted a first white coat, and a second white coat. Then with a small brush, I painted the eyes and nose and a spot on one ear. I made a dinking die to make green felt to glue on the bottom. Mother finished them, tying on the red ribbon. Sawing quarter inch plywood to four by six inches and covering it with green felt, I made a base for an attractive display, holding eight finished paper weights.**

**Traveling to stores and gift shops, I would ask to put my display on consignment. It did not work out, it being too expensive to drive around collecting for one or two sold, and replace the stock. I found it more beneficial to join the 52/20 Club and attend school under the G.I. Bill.**

**Another experience with iron casting was when I was working as a tool and die designer at Plainville Special Tool. We received an order to build two machine (from furnished drawings) to make convoluted flexible metal tubing. If you were replacing muffler pipes on a vehicle, and not able to buy original pipes, you could use this flexible metal pipe and bend it to fit.**

**The drawings called for several cast iron arms. I was sent to a pattern shop to have wood models made. The pattern maker, using his skills, made the models slightly larger and different from the finished print to allow for shrinkage of the iron casting. Then, I took the wood patterns to the iron casting shop in Southington, CT to be cast. We machined them, painted them and assembled them on the machine. We also required several solid blocks of cast iron about 6"x 4" x 3" to machine. No problem for the casting shop, we could pick them up in a week.**

**<u>The Following are Quotes Taken from Various Publications:</u>**

**<u>From the Richmond Iron Furnace 1957, I quote:</u>**

**"The pouring was a popular and often public affair. Alice E. Peirson who taught at the school wrote of the excitement of the daily event: I remember the thrill we always felt**

**when we went to see the midnight "cast," when the red hot iron and cinders ran out from the furnace into the grooves made for it.**

**From the Lakeville Journal:**

**Thursday, September 30, 1999. The Buena Vista Furnace, lower city, by Cyril M. Wismar. "The furnace and trip shop did not really enhance the neighborhood. One source advises that the noise from the furnace and trip hammer shop plus the groaning of the tub blower was said to have disturbed the valley for miles.**

**The Sunday Republican, Waterbury, CT. February Thirteenth 1968 by John P. Conway:**

**"At night the bible black sky in the area was illuminated by leaping flames from the blast furnace which smelts ore into pig iron."**

**From the Lure of the Litchfield Hills 1956 Edition – "Mt. Riga. The Furnace and Village by Mrs. Julia Pettee:**

**"A vent pipe through which poisonous gases escaped rose high in the air from the furnace top. The gases burned with a rosy flame by day and lighted the sky by night, with a brilliant flame mingled with showers of glowing sparks.**

**Or from the same lure:**

**"When they dropped the bottom out (poured the pigs) flames and sparks leapt out of the sky in great flashes that illuminated the area for miles around."**

**Or from a talk given by Mrs. Eleanor Adam to the Falls Village Historical Society 9/27/65:**

**"At night the sky around Salisbury glowed as if it were reflecting an internal inferno, by day the sky was yellowed by the smudge from the furnaces and the enormous charcoal pits; day and night the whole area was haunted by the ominous grunts of the furnace bellows, and the unearthly screech of revolving water wheels. (Q9)**

**The following is a description of a very early blast furnace from about 1830:**

***"The stack gasses burned with a rosy translucent flame interspersed with glowing sparks. They rose and fell from the open tunnel head in harmony with pulsations of the blast. By day the rosy flame was suspended over the furnace top like a mystical flame. At night, serving as a beacon, it lighted up the countryside with leaping brilliant flames mingled with showers of glowing sparks. Weary, sweaty men with soot blackened faces, talking with heavy accents, pushed heavy wheelbarrows loaded with ore, limestone, and charcoal, through the dark smoke to the gaping white hot mouth of the blast furnace. At the bottom of the stack the white hot iron and slag poured forth at timed intervals". (Author unknown)***

**Or From Hart:**

**"A translucent flame interspersed with glowing sparks rose and fell from the open tunnel-head in harmony with the pulsations of the blast. By day it was suspended over the furnace top like a mystical oriflamme, and at night it served as a beacon, lighting up the country-side." (D38)**

**Or From Mary Clark (Saugus)**

**"When the blast furnace was in operation, sparks and smoke billowed out from is stack. At times flames spurted forth. In the dark New England countryside, where candles, betty lamps, and hearth fires provided only scattered pinpoints of light, the red glow of the furnace was like a colossal beacon, visible for miles around.**

**The sight was dramatic enough by day, but in the darkness it was awesome, and terrifying. One writer in 1652, telling of the flame arising from a blast furnace at night, said that it 'maketh a terrible shew to travellers who do not know what it is.' The great furnace must have exerted a mystical fascination over both red men and white." (Z22-23)**

**Or from Empire Over the Dam:**

**"The water powered leather bellows on beam frames violated the echoes twenty four hours a day with animal-like growls and groans audible up to 5 miles." (B42)**

**From Berkshire Sampler; Sunday, February 24, 1980.**
**A publication of the Berkshire Eagle, by Bernard A. Drew and William F. Edwards, page 2.**

**With picks and shovels, miners worked in pairs following veins or drifts of ore as they wove away from the central shaft, some with gravel, and others so solid they were drilled then blasted.**

**Those guys put some awful times down there; they worked together, one holding the drill, the other swinging a hammer. The hammer man never missed. Tall guys worked the drill, where there was room to stand. Short guys held and turned the drill.**

**Candles on holders lighted the passageways. A sharp end was jabbed into the near wooden beam to hold the wax candle, and moved as necessary for light.**

**Chunk ore was loaded onto carts and wheeled along a small gauge railway to a central shaft, where it was dumped in a skip hoist. The skip was then hoisted along a track up and out of the shaft, to the above-ground washer where the ore was sifted through grates and the larger pieces crushed. It was then hauled to the top of the furnace in wagons.**

**The tunnels were supported and roofed with timber, usually chestnut, which was sawed on the premises.**

**From the Poughkeepsie Journal, April 19, 1964 by Helen Myers, given to me by Charles Benton, great grandson of Ezra Benton:**

**All Hand Labor**

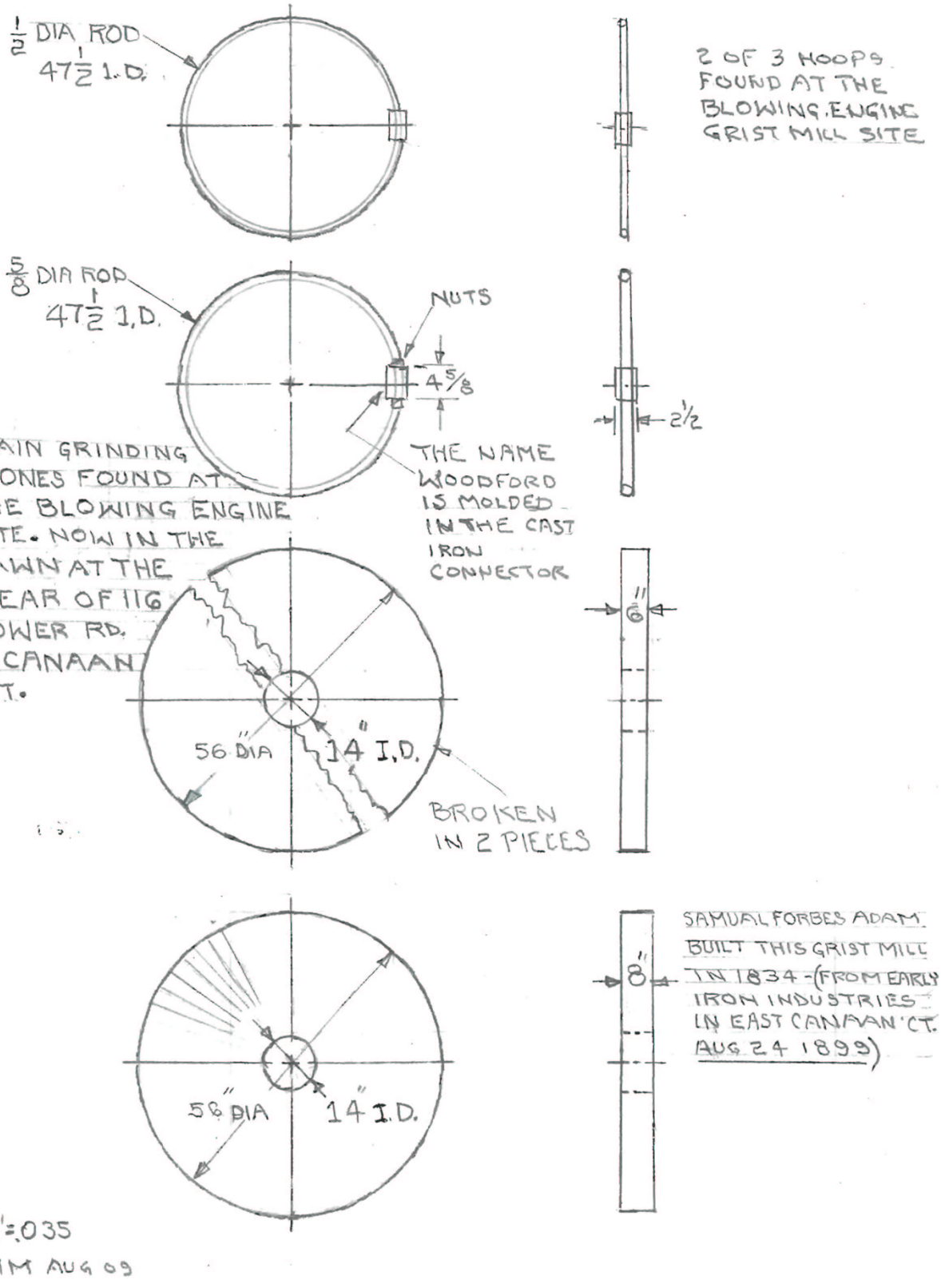
**Taking out the ore was all hand labor. A great deal of the ore was in stones which were simply shoveled out. When drilling and blasting were necessary, that, too, was done by hand. There was no such thing as a jack hammer in those days.**

**"They drilled with one man holding the drill and three men striking," Mr. Benton said. "One man sat with a drill, a bar of sharpened and tempered steel. He held that in the hole and turned it between each stroke."**

**"Three men around him would take turns in striking with a big sledge hammer with an eight-pound head. The strikes were about one a second from the three men. The men seemed casual. They didn't seem to pay much attention, but they never missed."**

**"After they'd gone down a little way they had to stop and spoon out the chips with an iron spoon. Most of the holes weren't more than two or three feet deep, but I have a seven-foot drill in the barn, so they must have gone in five or six feet that way sometimes."**

**"Then they put black blasting powder and a fuse in the hole. They tamped the top with easily packed material, such as powdered brick. Then they lit the fuse, and got the blast."**


1/2 DIA ROD
47 1/2 I.D.
2 OF 3 HOOPS FOUND AT THE BLOWING ENGINE GRIST MILL SITE
5/8 DIA ROD
47 1/2 I.D.
NUTS
4 5/8
2 1/2
GRAIN GRINDING STONES FOUND AT THE BLOWING ENGINE SITE. NOW IN THE LAWN AT THE REAR OF 116 LOWER RD. E. CANAAN CT.
THE NAME WOODFORD IS MOLDED IN THE CAST IRON CONNECTOR
11/16
56" DIA
14" I.D.
BROKEN IN 2 PIECES
56" DIA
14" I.D.
8"
SAMUAL FORBES ADAM BUILT THIS GRIST MILL IN 1834 - (FROM EARLY IRON INDUSTRIES IN EAST CANAAN CT. AUG 24 1899)
1"=.035
WM AUG 09

# THE GOOD OLD DAYS ON THE LOWER ROAD IN EAST CANNON

BY JULIA MICHAELS

**In 1898 the little town of East Canaan, Connecticut which is situated under Canaan Mountain was a very busy place. The iron industry was going strong, with two furnaces in full operation and about four Lime Kilns also in the area. Barnum and Richardson were in charge of the furnaces. There was an upper and a lower furnace situated next to the Blackberry River where they got their water power. There was also a headrace to supply power for the blowers.**

**There were huge buildings. They consisted of large sheds where the charcoal ore and limestone were stored. The ore came from ore hill in Lakeville and the lime came from quarries nearby. From there, the charcoal, etc. was transported to the upper part of the furnace where it was dumped into a large opening where it would burn until it was ready to make the iron. The fire burned continually. In the lower part of the furnace one side was made ready for the hot iron to flow in. It was a sand bed with trenches about *5* or 6 feet long and about 2x4 wide. When it was ready an iron door would open up and the red hot iron would fill all the trenches (like running water). The slag or cinder as we called it came out through another opening in another trench. This was all waste material and was drawn away to the cinder bank. This was repeated several times a day and night. When cool, the iron bars were taken out of the sand beds and piled outside where a freight train would pick it up. They must have been very heavy. They called it pig iron. I don't know why. The upper furnace was operated the same way, but the iron had to be transported to the lower furnace to be loaded onto the freight cars. For this the company had about 3 or 4 pair of oxen and carts with big iron wheels. This was a slow process as the oxen are very slow moving animals. Of course the roads were never plowed. In the winter time, many times below zero we could hear the oxen and carts going back and forth, crunching thru the snow. There was a Blacksmith Shop between the two furnaces in full operation also. They also had charcoal pits up on the mountain just across the river.**

**I believe it was in the 1920's that the Iron Industry went out. A party bought all the land surrounding the lower furnace and demolished everything so there is no trace of the furnace sheds or anything. The only thing left are the cinder banks. There was also a boiler room on the banks of the Blackberry River which was connected with the lower furnace. It still stands in the same place. A party from New York bought it and with a lot of hard work they made an apartment out of it and are living there at present. There is also an old foundation on the property of an old furnace which must have been in operation perhaps years before the other two.**

**As for the upper furnaces all that is left is the main foundation surrounded by a fence. It is supposed to be a State Park but not well cared for, but it's a rather pretty spot situated next to the Blackberry River from where you can see a very pretty waterfall. Also across the river are acres of slag or cinders. So at the present time, the little town of East Canaan is a very quiet little town.**

**Looking thru my mother's notes I found this and I quote: "We forgot to mention a man by the name of Jim Fuller who was an important person during the time the furnaces were running. He was boss for several years, and always a good neighbor. He always came to my father (Alfred Predrizet) for advice when things went wrong. He walked to the office daily for several years until he finally got a car. It was one of the first cars in our little town. He would give us youngsters a short ride now and then, which I still remember was a great thrill."**

**Julia Perdrizet Michaels – June 1998 W.M.**

# THE "GOOD OLE DAYS" IN EAST CANAAN, CONN.

## Written October 1984 by Julia Perdrizet Michaels

**In the "good ole days" we could not run to nearby stores or supermarkets. We had to rely on available growing things for some or much of our food.**

**As the long winter waned and spring arrived, the first thing we found to eat in the garden was chicory. This was wild and had dark green leaves. It was bitter but made a good salad. It grew to be a foot high. When it had blue blossoms it was no longer edible. We would watch for dandelions. When the plants were young they were eaten raw in salads. As they got older they had to be cooked. The blossoms could be picked and made into wine. We also gathered cowslips. They grew in swamps or small brooks; these had to be cooked also.**

**Some time in April we got watercress. We had to walk four or five miles into the woods to get the watercress. It grew in spring water. When the watercress was young it was very tender and made a good salad. We would try to get a good supply, enough to last a couple of weeks because as it grew older it would become bitter and tough. We also gathered edible weeds such as mustard, pigweed, nettles and others which had to be cooked.**

**Another source of food was mushrooms. We picked only one kind. These were called Morel. They were brown and quite ugly looking. We never picked the white ones. We looked for milkweed that was only two or three inches high. It was delicious when cooked, similar to asparagus. By now we could use lettuce and radishes from the garden.**

**Next we would have berries to look forward to. First we picked wild strawberries, then raspberries, blackberries and blueberries.**

**Blueberry picking was quite a project. We had to go about eight or ten miles to get the berries. Our only transportation at that time was by train. We had to walk about half a mile to the railroad station. We took our lunches and pails, got on the Central New England train and rode to Norfolk. We then got off the train and walked another two miles to a big berry lot. We picked berries all day. Then we took the train back over the same route. As soon as I got home, I delivered two heaping full quarts of berries to a family down the road. They gave me ten cents a quart for the beautiful wild blueberries. Later in the summer we would get up a hay load drawn by a team of horses. About ten or twelve of us would take pails and lunches to the berry lot. We picked as much as a bushel of the wild berries, staying all day. Blueberry picking for me was never a chore. I loved it. My mother took me to pick berries when I was very young. She had me stay by and pick from one bush while she moved around to pick from others.**

**Every year I looked forward to picking watercress and berries. Even now I go berrying every year. I picked berries last summer. I've been doing this for at least eighty years and still like to recall the "good ole days".**

**Julia Michaels**

**Written Oct. 1984 by my mother**

**Walter L. Michaels**

# JULIA PERDRIZET MICHAELS

**Written January 16, 1989**

## MY FIRST AUTOMOBILE RIDE

**Dr. Lee our family physician was making a call in our neighborhood one day. My girlfriend and I were in the yard playing and we were probably 8 years old (about 1903). Along comes this new automobile and stops. We just stood there and stared at it. It was loaded with brass and so shiny. Dr. Lee finally came out and asked us if we would like to take a ride. We were thrilled. It was a hot summer day so we got in and he took us down the read about 1/4 of a mile. There he dropped us off and we had to walk back. I will never forget that day.**

## MY FIRST AUTOMOBILE

**It was in 1918. I had just gotten out of nurses training, came home and there was a terrible flu epidemic at the time. Shortage of nurses etc. So I was very busy for a while in East Canaan. Then I had a call to go to Sharon Mountain. I had to go by train to Cornwall then this party picked me up with a horse and buggy and up the mountain we went. There I met Dr. Chaffee. After the case was over he begged me to go to Sharon Hospital to work. I had no transportation so I bought a new Ford Touring Car. It was black and I paid $600.00 cash. This was in late summer. When the salesman brought it down it was a rainy day, so I told him to put it in a shed which was down the road a ways. I didn't know much about driving it. The next day I had to go to the dentist which was about *3* miles down the road. My sister-in-law, Etta Gallagher Perdrizet, happened to be visiting so I asked her to come with me. It was a hot day so I thought I would take a chance and drive my new car. We got down to the shed and we got in the car. Had no trouble starting it but no matter what I did, I couldn't back it out. So I just about gave up the idea when my neighbor (Sam Graham) came along. He wanted to know what the trouble was so I told him the story. He got in and backed it out onto the road for me. Then Etta and I got in and away we went. I drove very slowly. This was on a narrow country dirt road. About halfway, there was a road scraper ahead of us, so I was stuck. I knew I couldn't squeeze through. He finally saw us and drove on a little way and turned out as far as he could and beckoned for me to come along. I hesitated but finally started to go by. I was a little nervous as I didn't think I could make it without scratching my new car, but I did and we went on our way. I parked about a mile from our destination and walked the rest of the way. Came back and made a big circle so I wouldn't have to back up and got home O.K. Next day I went to Canaan and got my license and have had one ever since.**

**It was getting late fall and I thought I would take my mother and a couple of the neighbors for a little ride. It was rather chilly but sunny when we started. I headed for Great Barrington and started for Monument Mountain just outside of Great Barrington, Massachusetts. We got to the top when it started to snow. We had to stop and snap the side curtains on. We couldn't see out of the windshield. The snow came down pretty fast so we started for home. Had nothing to scrape the snow off so my mother took her petticoat off and took care of the windshield. Had to stop several times to clean off the snow. Finally got home safe.**

**I also took a few trips into Hartford. My sister and her girlfriend got a job at Travelers Insurance Company and were living at the YWCA on Church Street. This was in 1920. So I had had a little experience driving. When I wasn't busy I would go into Hartford and pick them up and bring them home for the weekend, then on Sunday afternoon I would take them back. It was much better for them than going by train. It took about *3* hours on the C.N.N. where I could make it in about 2. I**

**went in one day to pick them up and was a little low on gas. I had another passenger who wanted a ride to Canaan also. He was a boyfriend. So we got to Avon Mountain and the car was cutting out. So we got about halfway up and the boyfriend (Harold Barber) took over. He turned the car around and backed it up to the top. Something about the gas which worked better going up hill backward. The gas tank was under the front seat. At the top, I took over and drove home O.K. I have been driving ever since. Never had an accident or been stopped or arrested, but I still can't back up straight.**

**NOTE: The cars of yesteryear were noisy, rough riding and dirty to ride in. Just think though, almost seventy years ago a 25 year old woman would set out alone in her Ford Touring Car over the Albany Turnpike from East Canaan to Hartford to bring her sister home for the weekend. Chugging up the hill in Norfork, coasting down into Winsted up and down Avon Mountain. To go to an Antique Car Show today and see a 1919 Ford, its almost impossible to visualize people seventy years ago traveling around as they did.**

# NURSING 1920

BY JULIA MICHAELS
JANUARY 1984

**As I was cleaning out a desk drawer I found this story in Reader's Digest about Father Sill the first Headmaster at Kent School for Boys which was very interesting to me as I worked in the Infirmary.**

**I was the only Registered Nurse at the time. This was in the 1920's. Dr. Turrill was the only physician around so therefore when anything came up I would call him. Sometimes the boys might have a minor cut which would require a couple stitches, but the Dr. would say go ahead you can sew better than I can.**

**One time one of the professors came in with a laceration under his chin. It was superficial but needed stitches. He insisted I do it, so with the Dr's permission I did. Took about 10 stitches and I will say I really did a good job. In fact the boys didn't have much faith in these Doctor's.**

**I knew Father Sill very well. His only interest was his boys and they just adored him. He was very strict.**

**I'm 88 years old and often think of my experiences at Kent School, *63* years ago. I had a model T Ford at the time. I graduated from the Hartford Hospital School of Nursing in 1918 and started work at the school around 1921.**

# THE GOOD OLD DAYS ON THE LOWER ROAD IN EAST CANAAN
## BY JULIA MICHAELS

**I was born in Richmond, Massachusetts in 1895, a small town this side of Pittsfield. My father worked in a furnace where pig iron was made. When I was about 3 years old we moved to another small town in Connecticut, East Canaan. There were two furnaces there and were going full blast. My dad had no trouble getting a job as he was well experienced along that line. We moved into one of the company's houses that had *5* rooms, a large yard and garden space. As I recall it we paid $4.00 a month rent, but of course my dad's weekly pay was less than $10.00 for a 6 day week. We had no electricity, plumbing or running water. We had an out house about 50 ft. in back of the house. It was a *3*-holer. Didn't know what toilet paper was as we had to use old Sears Roebuck Catalogue's. We had to use kerosene lamps and lanterns. Saturday was the day to wash all the chimneys and refill the lamps with oil. As I got a little older that was my job which I hated. As for water we had a pump in the kitchen. The water came from a cistern just outside the kitchen. That water was used for washing clothes, baths etc., for drinking and cooking we had to go to a spring about mile away. Sometimes making two trips a day. Bath night was every Saturday night. We had a large metal tub placed it in front of the stove and filled it with hot water from the reservoir at the end of the stove and a couple of extra pails from the cistern. In the summer time we would take a cake of soap and towel and go down to the river which was just across the road from our house. We always had plenty to eat, A nice big garden, chickens and 2 pigs. My mother didn't waste a thing. Always had extra vegetables for canning and plenty of potatoes. The butcher came by twice a week and the grocer came and took orders one day and delivered the next. So we had nothing to worry about as far as food was concerned. We had no car, no TV or radio so we had to do a lot of walking if we wanted to get anywhere. The milkman came around every A.M. with a big can of milk and a dipper and would fill whatever container we had outside. Of course it was all raw milk. Our cellar was cool so thats where our milk was kept also anything else that needed to be kept cool. But later in years we got electricity, running water, a furnace, bathroom and an artisan well. But when I was sixteen I graduated from High School than went to work.**

**We always looked forward to Christmas. Went up on the mountain and cut down a small Christmas tree and strung popcorn for several feet and decorated the tree with the corn. We had only 1 gift each with an orange, but I think we appreciated that one gift more than the children do now a days with several gifts.**

**In the spring we were out picking dandelion's and several other edible greens, watercress, cow slips and milkweed etc. Then it was berries. We never had anything but wild strawberries and blueberries. My mother and I would sometimes pick 25-30 quarts of blueberries at a time, then when we got home I would have to take 2 quarts down to a family about mile down the road. Got 10 cents a quart.**

**We had much more snow in those days and it started from Thanksgiving right thru until April and seemed much colder than the winters we have now. Some days it was pretty tough going to school. Had to walk about 3 miles one way to High School, but I very seldom missed a day. I worked in a paper mill for about a year then went into nurses training in 1917. In the winter time we used to go skating in back of the Blacksmith Shop on what was the upper dam. We also had sleds and had a beautiful hill in back of the house. It was called the Powder House Hill named after a little building on top of the hill which held dynamite. We also tried skiing. We made our own ski's out of barrel staves. They weren't fancy but we had a lot of fun. My husband, as a boy worked part time after school making barrels at the lime kilns, so we had no problems in getting a barrel stave once in a while. The boys that made the barrels were called Coopers. Most people don't know what a Cooper is.**

**We had a two room school house. Four grades downstairs and four grades up. They each had a big potbelly stove up in front which heated the place. It still stands on the corner of Route 44 and the furnace hill, but now is a big package store.**

## NOTE

**To me it is interesting to note that in the early 1900's, my Grandfather was paid $9.98 weekly; his rent was $4.00 monthly. When I married in 1949 my weekly pay was $40.00; our large three room apartment cost us $30.00 monthly rent. Now, in 1988, a friend's single daughter with a six year old son is trying to find a place to live. She is making less than $300 weekly and cannot find a place to rent for less than $600 a month.**

**Walter L. Michaels, 1988**

**Work Days for Month's Rent**
**1900 = 2½ Days**
**1949 = 4 Days**
**1988 = 10 Days**

# THE GOOD OLD DAYS ON THE LOWER ROAD IN EAST CANAAN
# BY JULIA MICHAELS
# OCTOBER 1985

**My thoughts go back to the early 1900's. We were waiting for a good frost so that we could go after chestnuts and hickory nuts. That's when they would be ripe and fall off the trees. At the foot of Canaan Mountain about 2 miles from where I lived, was a group of huge chestnut trees which would always be loaded with delicious chestnuts. My brother and I would start out with our white cloth bags and a stick to poke the leaves over and hunt for the nice brown chestnuts. They were so fresh and crispy. Once in a while you might bite into one with a nice fat juicy worm. A few years later, a blight came and killed all the chestnut trees, and much to our disappointment they never came back.**

**Then there were the hickory nuts that came about the same time. My brother and I knew about every nut tree for miles. We would get up early in the A.M. before school and gather nuts. They also were delicious, had a flavor all their own. They were very good in cakes etc. but rather hard to crack and pick out the meats. We also got butternuts and black walnuts so we were well supplied for the winter. Once in a while we would make fudge and put butternuts in it which was very good. We just didn't go to the store and buy candy and nuts like today but had to work for everything we had. The hickory nuts we find today are not as good as they used to be. They seem to be dry and not much flavor. So I think they are on the way out too.**

**We also used to pick wild grapes for jelly. They were very small but you never tasted grape jelly like we used to make out of those grapes. We called them fox grapes.**

# FATHER

**My father was born in Norfork, CT in 1893. His mother, Madora Ball Michaels, died of complications after his birth. His father, James Michaels, not able to cope, deserted the nine children and went up on Canaan Mountain to be a charcoal worker. The children were placed with friends and relatives. It has been passed down that James Michaels, crippled with rheumatism and knowing his days were numbered walked to the South Canaan cemetery on the Under Mountain Road with a friend and indicated his grave site. I have looked for his grave marker and have not found any, so I presume that he is buried next to his mother, Sarah Michaels (1799-1841). Her grave does have a stone marker.**

**My father went to live with his uncle, Lyman Howard Ball and his wife Maryann. They lived near the community building across from Stratton's Store in East Canaan, CT.**

**In his early teen years, his foster father and some friends would load a wagon with a tent, camping supplies, provisions and a keg of beer and travel to the top of Canaan Mountain to Lake Wangum. After finding a suitable camping site and with their keg of beer cooling in the lake, they would spend a week or so camping and fishing. Sometimes they would camp at Rigi Lake in Salisbury. I remember riding with my father (me in my teens) as he pointed out the location of their camping site on the lake.**

**After High School he worked making barrels on Rt. 44 until going into the Army in 1917. After he returned from France where he was wounded and gassed, he returned to live with his sister, in Bristol. He, and with a partner, opened a wet wash laundry business. Business was good. He married, built a house, and bought a new 1927 Ajax 6 Nash. The crash of 1929 took his laundry business and house. I remember the banker sitting at our table having my father sign the foreclosure papers, taking our house. I remember my mother crying as the banker left. My father often said the bankers had all kinds of money to lend before the crash; after the crash if you met them on the street they would look away. Anyway, my father went to live with his sister in Bristol to look for work.**

**My mother took my two sisters and me to live with Grandma in East Canaan. This was in April, so I was sent to the two room school on Furnace Hill. We lived in Canaan about six months when my father got a job working at the laundry at the Fairfield State Hospital in Newtown, CT. at $28.00 a month. We lived in an old farm house on the hospital grounds. The hospital held mentally deranged men and women and was commonly called the insane asylum. I remember one of the first things my father did was to tear down a partition in one of the barns and using the boards he made a box about two feet by three feet. He then made a smaller box to fit inside. He filled the gap with crumbled newspapers to make our ice box. It wasn't long afterwards that we acquired an inside ice box with a water pan to drain daily. About 1936 the soldiers were given the promise bonus (remember the 1932 march on Washington). It was substantial, because mother got much needed dental work, and I got a brand new triple X bicycle. Living with a young family on the grounds of the insane asylum was not conducive to raising a family, so the bonus gave us money to move to Bristol and buy a house, for a fresh start. He worked as a carpenter for a while. War clouds in 1939 made factories tool up for the coming war so he got a job at New Departure in Bristol, CT.**

# MY GENEALOGY

G-G-G-G
BALL JAMES

BORN 1716 IN ENGLAND, SETTLED IN SALISBURY CT. WITH HIS WIFE — THEY HAD A SON DANIEL MAYBE OTHER CHILDREN

MY GREAT GREAT GREAT GRANDFATHER
BALL DANIEL
1744
1825 (81Y)

BORN IN SALISBURY BURIED AT MT. RIGI MARRIED HANNAH — HAD A SON SYLYESTER AND 3 OTHER CHILDREN

MY GREAT GREAT GRANDFATHER
BALL SYLVESTER
1783
1825 (41Y)

BORN IN SALISBURY BURIED AT MT. RIGI — HE HAD 3 CHILDREN BY HIS FIRST WIFE SALLY MUFFIN. AFTER HER DEATH HE MARRIED LYDIA SURDAMM — THEY HAD HARVEY LYMAN AND 6 OTHER CHILDREN

MY GREAT GRANDFATHER
BALL HARVEY LYMAN
1816
1878 (62Y)

BORN IN SALISBURY BURIED IN SALISBURY — MARRIED HANNAH JANE AYERS HAD MORDRA AND 6 OTHER CHILDREN

MADGRA MARRIED JAMES THEY HAD LYMAN HARVEY AND 8 OTHER CHILDREN

MY GRANDMOTHER-
MICHAEL MADORA JANE
1852
1895 (43Y)

BORN IN LAKEVILLE
BURRIED IN SALISBURY

LYMAN MARRIED JULIA PERDRIZET — THEY HAD A SON WALTER LYMAN AND 2 GIRLS JEANETTE & ARLENE

MY FATHER
MICHAELS LYMAN HARVEY
1893
1976 (83Y)

BORN IN NORFOLK
BURRIED - EAST CANAAN

ME MICHAELS, WALTER LYMAN - ALIVE AT THIS DATE 6-30-2010 AND AUTHOR OF THIS BOOK

THIS DATA IS FROM SALISBURY TOWN RECORDS, CENSUS AND L.D.S. CHURCH RECORDS

CONTINUED ON NEXT PAGE

**This data is from the Salisbury, CT town records, the Internet, L.D.S. Church Records, and the US Census Bureau.**

# MY GENEALOGY (cont'd.)

**Throughout the course of writing this work, previously unknown aspects of my own genealogy began to surface. A chart on the preceding page summarizes most of these discoveries. Thank you in advance for your latitude and patience as I digress just a bit from the main topic of Iron Making…**

**James Ball, born in 1716, came from England with his wife to settle in Salisbury, Connecticut. They had a son, Daniel. A bloomer forge was constructed at the outlet of South pond on Mt. Rigi in 1781 by Abner and Peter Wooden. Daniel Ball acquired the forge when he was forty one years old in 1785 and took the name Ball's Forge. He operated the forge for fifteen years. (E279) (J 24) (S161) Daniel Ball would be my father's mother's great grandfather.**

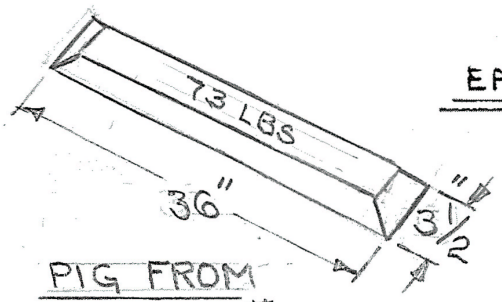
**Julia Pettee wrote "The Settlement on Mt. Rigi" in The Lure of The Litchfield Hills. Volume XX111 #7-49 Summer issue. She writes, "Daniel Ball is credited with building the early dam and erecting the first forge on the Mountain. This is probably true. But, whether the forge was Owen's Levi Allen or Lemul Wheeler's idea, it seems probable that Daniel Ball was involved. Daniel was a promising and capable young man who knew how to construct a primitive forge, had the skill to work it, was employed to construct the crude dam and build the forge, and hammer out much needed household utensils and farm tools. These tools found a ready market in Salisbury, CT as well as just over the border in New York State." She continues, "Daniel Ball must have been a man of considerable means. He was busy buying up large tracts of mountain land. Among many conveyances to him is Balls Peak which stills bears his name. For some years his family owned much land on the Mountain selling off large tracts. In 1801 the forge rights were purchased by Seth King and John Kelsey who began construction of the Mt. Rigi blast furnace. Financial problems held up construction until 1810 when Joseph Pettee and William Dexter put it into blast. Two finery forges were built below the furnace (one with 5 fires) to make anchors, gun iron, bar iron, plows caldrons and other large welded iron items. Some of the other iron was transferred to the Springfield Armory, Harpers Ferry and the Collins Company in Connecticut."**

**The following is a quote from an interview of Charles Henry Ball (1848/1932). It was told to his daughter, Maude Caroline Ball. She wrote: "My Grandfather Ball's name was Sylvester Ball (1783/1825). He worked in the Mt. Rigi forge. His job was to stand on a platform and take the iron and drop it down where it could be broken up. One day a man got in his way, so Sylvester jumped with the piece of iron. He broke his leg, and gangrene developed. He died at age 41 leaving ten children." Charles Henry Ball is my father's mother's grandfather.**

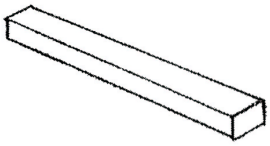
**Charles Henry Ball [1848-1932] joined the Civil War at age 16 (see A Goodly Heritage by Maude Montrose from The Lure of The Litchfield Hills.) Winter (1973/1974).**

**My Father, Lyman Harvey Michaels (1891-1976) played catcher on the East Canaan baseball team and tells how his uncle, Charles Henry Ball, would play baseball with my father. He would throw the ball just short of Charles to make the old man bend down to just aggravate him. (Author's note: Kids will be kids.) W.M.**

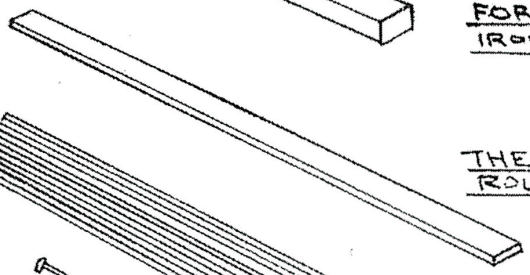
# EARLY NAIL MAKING




PIG FROM CANAAN # 3



FORGED WROUGHT IRON BAR

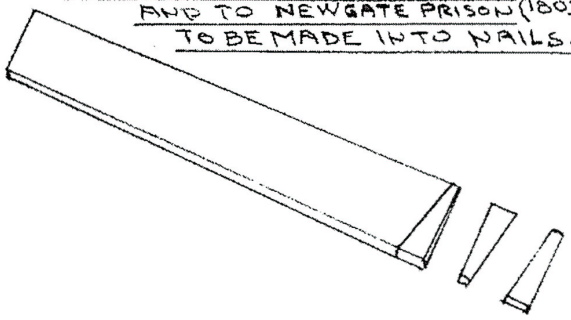


THE IRON BAR WAS ROLLED TO ABOUT 1/8 THICK AT THE FORGE



THE RODS WERE HEATED, A TAPER FORGED, CUTOFF THEN HEADED

AFTER ROLLING THE BAR WAS SLIT INTO STRIPS ABOUT 1/8 WIDE SAMUEL FORBES SOLD BUNDLES OF THESE NAIL RODS TO FARMERS AND TO NEWGATE PRISON (1803/1812) TO BE MADE INTO NAILS.



CUT NAILS USED THE WIDTH OF THE IRON BAR FOR THE LENGTH OF NAIL

WM-OCT-88 #10

# GRANDMOTHER

**Grandma ran the house and finances. Her husband worked his 12 hours a day, 6 days a week; ate, slept home and turned all his pay over to Grandmother. He never had a horse or buggy or a car. All his life, he walked. He started at Beckley around 1902, worked at Canaan #3 until 1923, then worked in the hot lime industry until his death in 1936.**

**Grandma was able to buy the company house they lived in, and also buy a second company house (129 Lower Road), which she rented out. She always had a big garden. She always had a big garden, canned everything possible. Apples, carrots and potatoes were kept in the cool cellar with homemade root beer and homemade beer. There was not an edible berry or anything wild that was not pickled or canned.**

**Weekly, Mr. Stratton drove his Model "A" Ford around the neighborhood to take grocery orders to be delivered the next day. A card would be put in the window to alert the ice man as to the size of the ice to be put in the ice box. Periodically, a butcher would come to sell meat. Until about 1910, the drinking and cooking water was obtained from Peter's Spring (now a mud hole), located close to the slag grinding building, (I think) just east of the #3 furnace. My mother often told of taking two water pails to fetch the drinking water. Later on, water for the row of B&R houses was obtained from a dug well located between Manacci's house (#12 on the map) and Graham's house (#13 on the map).**

**Look up the double driveways to see a large tree, and at its base, the pump was on a 6 foot square cement block. This was a self drain pump enabling pumping water in zero weather. Caution was in order not to let wet body parts touch the ice cold iron pump. The water pail, at least up to 1935, was placed left of the sink. A tin dipper floated on top of the water. Everyone drank from the dipper. To drink from the dipper, we were instructed to fill the dipper, place the lip of the dipper on your lower chin, and let the water flow into your mouth. Any left over water was not to be returned to the pail, but thrown away.**

**On the right was the cistern pump. The cistern was an in-ground tank that collected rain water from the roof. About 1944/1946, a driven well, water pump and inside toilet was installed. Prior to that, the outhouse was located at the extreme right and rear of the house lot. Around 1935, it was moved to directly behind the existing garage.**

**Grandmother would give her husband 15 cents on a Sunday to cross the river on the iron bridge to get a haircut, and a few glasses of hard cider. Saturday nights they would visit the Turners, another French family that lived just above where the railroad tracks crossed Furnace Hill Road (the spur to Beckley), to play cards. Occasionally, a rough dressed man 40-50 years old would come walking up the lower road, always going east. We called him Peska, I don't know why. He walked slowly, and would stop every so often to have a one-sided conversation with a tree. I don't think he was drunk, but had mental problems. As young teens we would follow him, (at a safe distance) and verbally taunt him. Sometimes he would turn around, and we would run for our lives in the opposite direction.**

**I remember two occasions where a raggedy dressed hobo would stop at the back door and ask for something to eat. Grandma would make him a sandwich and a cup of tea, which he would sit on the step, consume, and leave. There again, as kids we kept our distance.**

**I quote from William Wallace's notebook:**
**The company houses at East Canaan, some 24 in all, were rented including garden space, quarters for horse, cow, pig & chickens at from $1.50 to $1.75 per week. The amount was deducted weekly while men were working, but no charge then or later if sick, injured or temporarily laid-off. With this the tenant (received) all fire wood for winter free and all charcoal needed for cooking free in summer. Electric lights were also installed in 1915.**

# ALFRED PERDRIZET

1861-1936

**Alfred was born in Chagey, France where he worked in the iron industry until about 1886. At that time he migrated to Richmond Massachusetts where he worked as a miner in the iron industry. In Richmond, around 1895 he married a French woman from Belvern France and had 4 children. They lived in a company owned house on Rt. 41 which is still standing.**

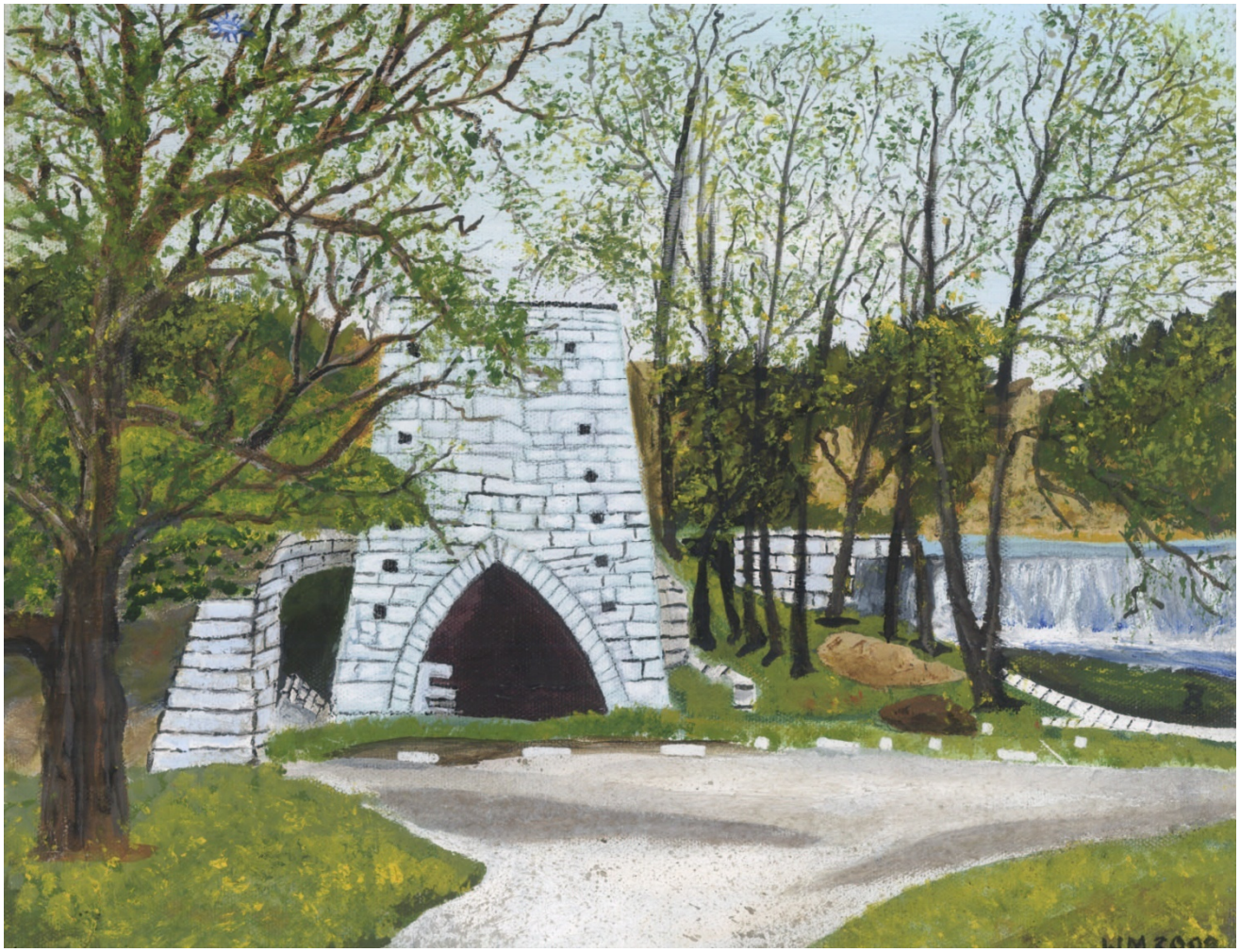
**At about 1900 he moved to East Canaan to work for Barnum Richardson Co in the Beckley Furnace and the lower Canaan #3 Furnace. He lived in a company owned house, which he later bought. The company provided both wood and charcoal for heating.**

**After the closing of the Lower Furnace he worked in the Lime Industry making hot lime until his death. He never owned a horse or car.**

**Every morning he would sit in a kitchen chair and place a wash basin on the stand. His wife would fill the basin with hot water from the stove cistern and he would wash his face and then dry it with a roller towel on the kitchen door. He then placed more water in a shaving mug in order to make lather to shave. Then with a few strokes of a leather strap he would sharpen the straight razor and shave. After drying and removing the shaving mirror his wife would give him a few round soda crackers and a chunk of limburger cheese along with a cup of strong black coffee.**

**After having his breakfast he would be off to start his 12 hour work shift. William Wallace listed him as a fireman. His duties would have included controlling the quality and quantity of the iron.**
**Rufus Hart's "The Iron Industry in Connecticut" refers to him, and also has a picture of him standing in the Richmond Furnace casting arch. Lawrence Eddy on page 16 of "Random Notes" wrote "Gone are the old timers, Ralph Black and Charlie Wickwire at the throttle of the switch engine; Charles Boujon as the general foreman; Joe Riley foreman; and Fred Perdizet as the Iron Master of the Furnaces. (M16)**

**I must note, Ed Kirby's great grandfather John Lawton had also emigrated, but from Ireland, to work at the Richmond Furnace. He came a short time before Fred Perdrizet arrived. W.M.**



# Canaan Blast Furnace #2

**Traveling west on the Lower Road from East Canaan the first blast furnace remains that can be seen will be #2 Beckley, known locally as the upper furnace. This was built in 1847 by John Adam Beckley (great grandson of Samuel Forbes and William Peirce). The Furnace was bought by Barnum Richardson Company in 1858. It was completely destroyed by fire in 1896. It was rebuilt and back in blast in 1898, and closed in the winter of 1918. A huge salamander [a huge chunk of hardened iron] plugged the stack, and with business slowing down it was decided to close the furnace. It was updated in 1856 and 1880. Water power was used for the blast until 1880 when it was changed to steam. In the beginning it used two tubs for the blast, each measuring 72 inches in diameter and six feet long. Its base is 30 foot square and stands 40 feet tall. In later years it utilized a water cooled hearth and 5 water cooled tuyeres, measuring 3 inches in diameter.**

**The information on the sign at the Beckley site tells us it used 110 bushels of charcoal, 3 tons of iron ore and 2 tons of limestone to produce 1 ton of pig iron. To make its 80 tons of pig iron weekly it would require 8,800 bushels of charcoal, or to put it another way 250 cords of wood or about 20 acres of forest. It required 240 tons of iron ore and 160 tons of limestone. Just think of the work required to harvest the forests, mine and process the ore, quarry the limestone and then, transport it all to the furnaces to be measured and at timed intervals dumped into the furnace. In its later years, production was increased to 24 tons of pig a day. All this work was done mostly by man power, oxen, and horses to make a weeks production of pig iron. The Beckley yearly production around the end of its life was worth about 5 million dollars. The State of Connecticut bought the furnace around 1946 for a state park. N-42- 00-667 W-073-17-547 WM.**


# Canaan Blast Furnace #3

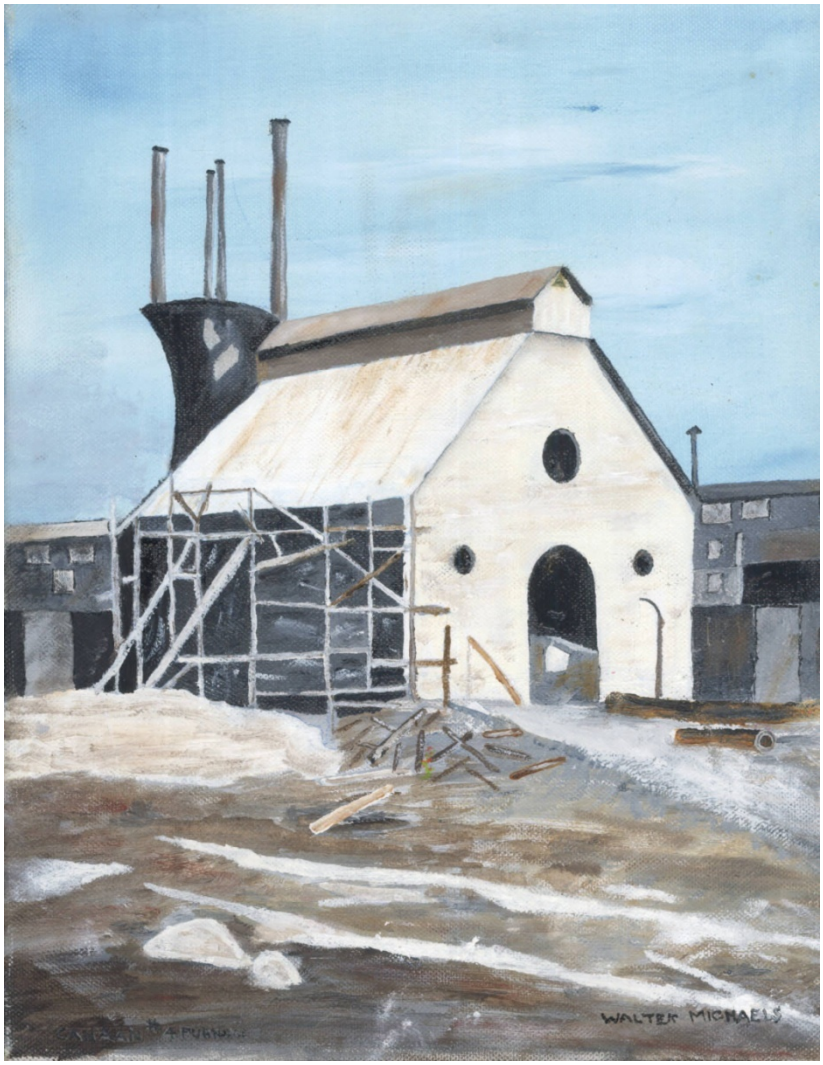
**Traveling west on the Lower Road about six tenths of a mile from a Beckley Furnace one can see the remains of the last furnace to blast in northwest, Connecticut. It was generally referred to as Canaan #3, or the lower furnace or the furnace out in the field.**

**I quote from Men of Iron (C124): "The new furnace at East Canaan at its last blast ran 105 consecutive weeks, being the longest and best blast on record that has been made in a blast furnace." It was built in 1872 by Barnum Richardson Company, and blown out and closed down in 1923. It used two tubs for the blast, each measured 72 inches in diameter and six feet long, powered by a water wheel and also a Corliss steam engine located in the engine room. The steam engine was connected to the most modern turbo blowers. The blast pressures and temperature are from "Harte's Book" "The Iron Industry of Connecticut. I would surmise the figures are from the start date of 1872. Other references report a blast temperature at 900 degrees Fahrenheit. The blast oven was on top of the stack. It used a pressure of six tenths of a pound per square inch at 475 degrees Fahrenheit. The furnace stood thirty six feet tall and used four tuyeres three and one quarter inches in diameter. The tuyeres and hearth were water cooled. All that is left as of 1984 is an open field on the right of what are now vineyards. This is where the furnace stood, and on the left across Lower Road the foundation remains of the blowing engine. The raceway is visible from the roadway in some places. The remains of the Forbes power dam can be seen by walking up the river. This dam was blasted away in 1957 by the army engineers for flood control. In 1936, as a boy of 12, I can remember the hearth with its casting arch, the metal roof over the casting floor, the stack and the cinder piles. N-42-00-674 W-073-17-972 WM.**


# Canaan Blast Furnace #1

**This was one of the few furnaces where the oven was on the ground instead of on top of the stack. Before converting to steam power, it used the power from the Forbes dam to operate the blowing engine. This blowing engine was later used in addition to a steam engine to make the blast for Canaan #3 Furnace. In the beginning, the blast was powered by two seventy-two inch diameter tubs six feet long and was built on, or near one of the two Forbes forges. It used a hot blast 475 degrees Fahrenheit with four tuyeres, three and one quarter inches in diameter.**

**Data from Hartes book "The Iron Industry of Connecticut" N-42-00-605 W-073-17-832 WM.**




# Canaan Blast Furnace #4

**The man who designed #4 Furnace started it, but never finished it. It was designed to produce 100 tons a day (V61). It was located about 300 feet north west of the chemical plant and started in 1918. The man who designed number four took the designs of the two other furnaces, the Iron Co. of Newbery Michigan and Canadian Car and Foundry Company, and came up with his new design to call his own. He was sued for infringement of patent. That was the beginning of the end. Barnum and Richardson (in 1922) auctioned piecemeal by bankruptcy auction and sold for junk. The above is from William Wallace notebooks, prepared by Richard Paddock (N).**

**The following is from a talk by Lawrence Eddy at the Falls Village Historical society meeting in May 1969.**

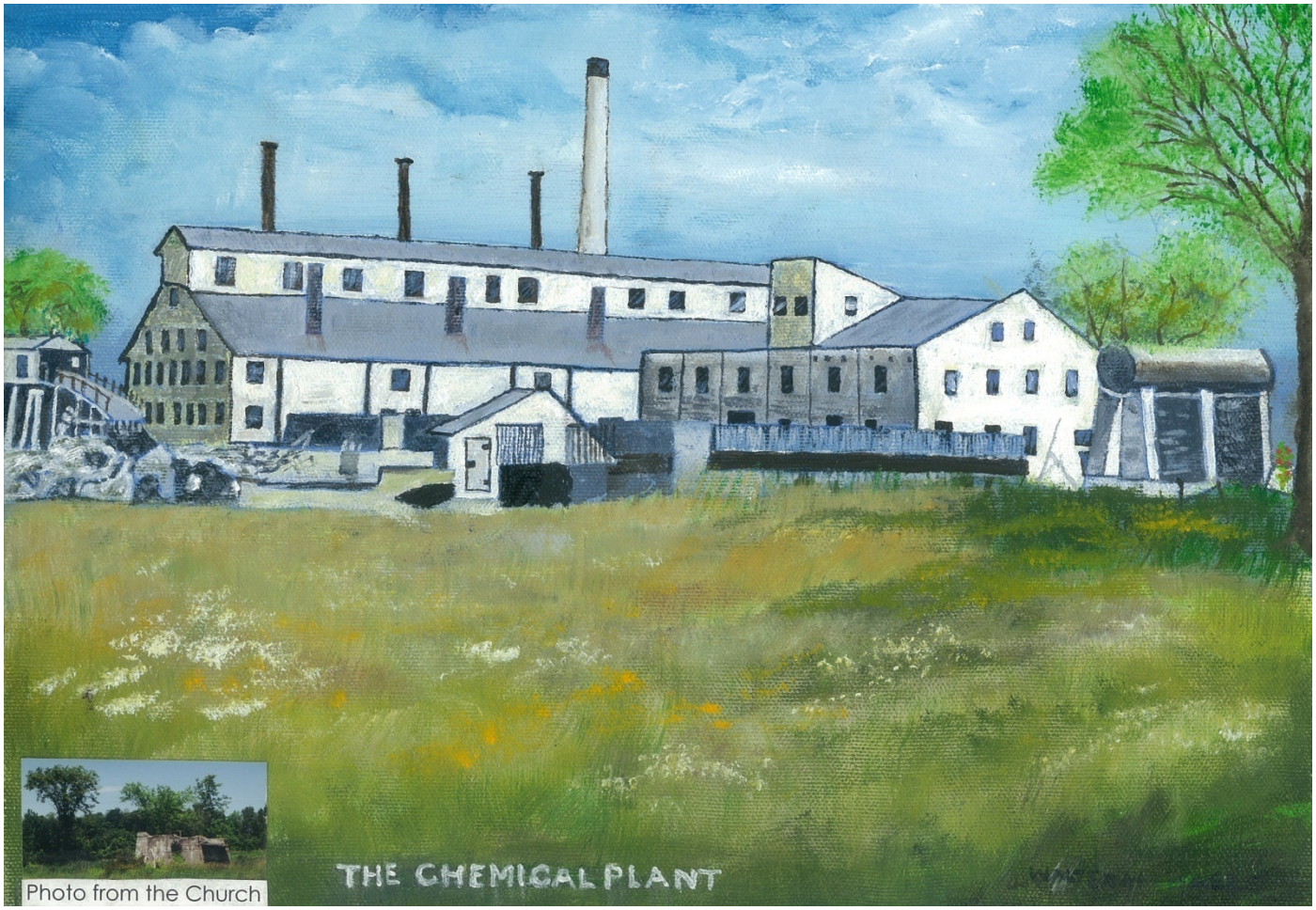
**The Barnum also engaged a well known consulting engineer J. E. Johnson, to prepare plans for a new blast furnace, to operate on charcoal but to larger capacity than any previously built in this area. They would incorporate many of the improvements that had been developed and were in common use by the big blast furnace fueled with coke (coke is made from coal). They let contracts and started to build this furnace in 1918, but when financial difficulties overtook them and Barnum Richardson Company went into bankruptcy. The new furnace project came to a halt, and was abandoned. WM**

# Charcoal Making

**This painting was copied from a photograph given to me by Walt Landgraf from a collection in the Stone Museum. The picture was taken in August Nineteen Sixty Nine by Curt Barie in the town of Sand Lake, Rensselaer County, New York. The Collier is "Gene" Eugene Dobert. Curt Says Genes father and grandfather were colliers. Gene made this last burn and asked his nephew Curt to record the event, so the younger generation could learn the art of making charcoal of long ago.**

**As most of the blast furnaces were located in the section of the country where winter interfered with outdoor work, and as their construction was such that the interior was rapidly destroyed, the practice of making one "blast" every year was as followed. Wood would be cut during the winter, and as soon as the weather permitted of doing so, hearths would be leveled among the cut timber, covered with loam and earth fired. After about two weeks of carbonization the charcoal would be drawn, and hauled by wagons to the furnace. When a sufficient quantity of charcoal had accumulated to insure regular supply, the furnace was blown in, and except for some accident, low stage water, or other disturbing cause, it would be continued in blast until all the charcoal which had been made in the coaling season was consumed. This generally permitted the furnace to be active 8 or 9 months in each year. (D68)**

**Eventually the housing-in of the stacks, and the construction of great charcoal sheds made all year-round operation possible. Toward the end of the period of smelting iron in district, with the local fuel sources largely exhausted, charcoal was brought in from the south by train. Always a menace because of the possibility that the meiler or kiln had not been completely quenched, and that there lingered spark which only needed a little air to start a glorious fire, there occasionally were cases where trains were involved. Alfred Perdrizet of East Canaan, for many years with the Barnum-Richardson Company, told of seeing such a string of burning charcoal cars which came down the grade from the East Canaan railroad station to furnace No. 3 like a great comet. Luckily going clear to the end of the side-track and off it into the fields, where it burned out with no further damage. (D69) WM**




# The Chemical Plant

**The chemical plant was started by Barnum and Richardson Co in 1915, located south of Rt.44 and close to Furnace Hill Road. The following is a talk from Lawrence Eddy to the Falls Village Historical Society in 1969. "The chemical plant started to produce charcoal in closed retorts, which recovered valuable by products of wood alcohol, [600 gallons per day] acetate of lime [10 tons per day], wood tars and creosote. This plant had the capacity to process 21,000 cords of wood per year". (M)**

**The following is from the notebooks of William Wallace prepared by R. Paddock (N) in December 2007. The idea of building the acid plant was put into being in 1915 by forming the Connecticut Chemical Plant, controlled by Barnum & Richardson Co. They did not follow the advice of Ben Bussman, who was the originator of this industry, to build 5 separate 20 cord plants in 5 locations. They adopted a man absolutely unfitted to make recommendations, having no knowledge of either the iron business or acid plants. The plant used 25,000 cords of wood per year, and the wood had to be seasoned 8 to 12 months. With the starting of the chemical plant someone canceled all the charcoal contracts with manufacturers of charcoal. This brought on most of the troubles. The chemical plant produced only half of the necessary charcoal, so the people were forced to buy charcoal at 25 cents per bushel instead of 5 cents. It was clearly evident that this sort of mismanagement could only end in bankruptcy. The plant was shut down in early 1919. It was sold at auction in 1922 and shipped to West Virginia.**

**A projected 100 ton blast furnace was constructed 300 hundred feet west of the chemical plant. Construction was started, but it was never finished. It was sold at auction with the chemical plant. N-42-00-804 W-73-17-215 [at the tank] WM.**


# Charcoal Hauling

**This painting of hauling charcoal was made from a black and white photograph given to me by Fred Hall.**

**When loading from the charcoal pit, it was important that all the fire was out; a small spark could cause the whole wagon to go up in flames.**

**The information on the sign at the Beckley Furnace tell us it used approximately one hundred and ten bushels of charcoal, approximately three tons of iron ore ands two tons of limestone to make one ton of pig iron. To make about eighty tons of pig iron a week could use up about twenty acres of woodland. W.M.**

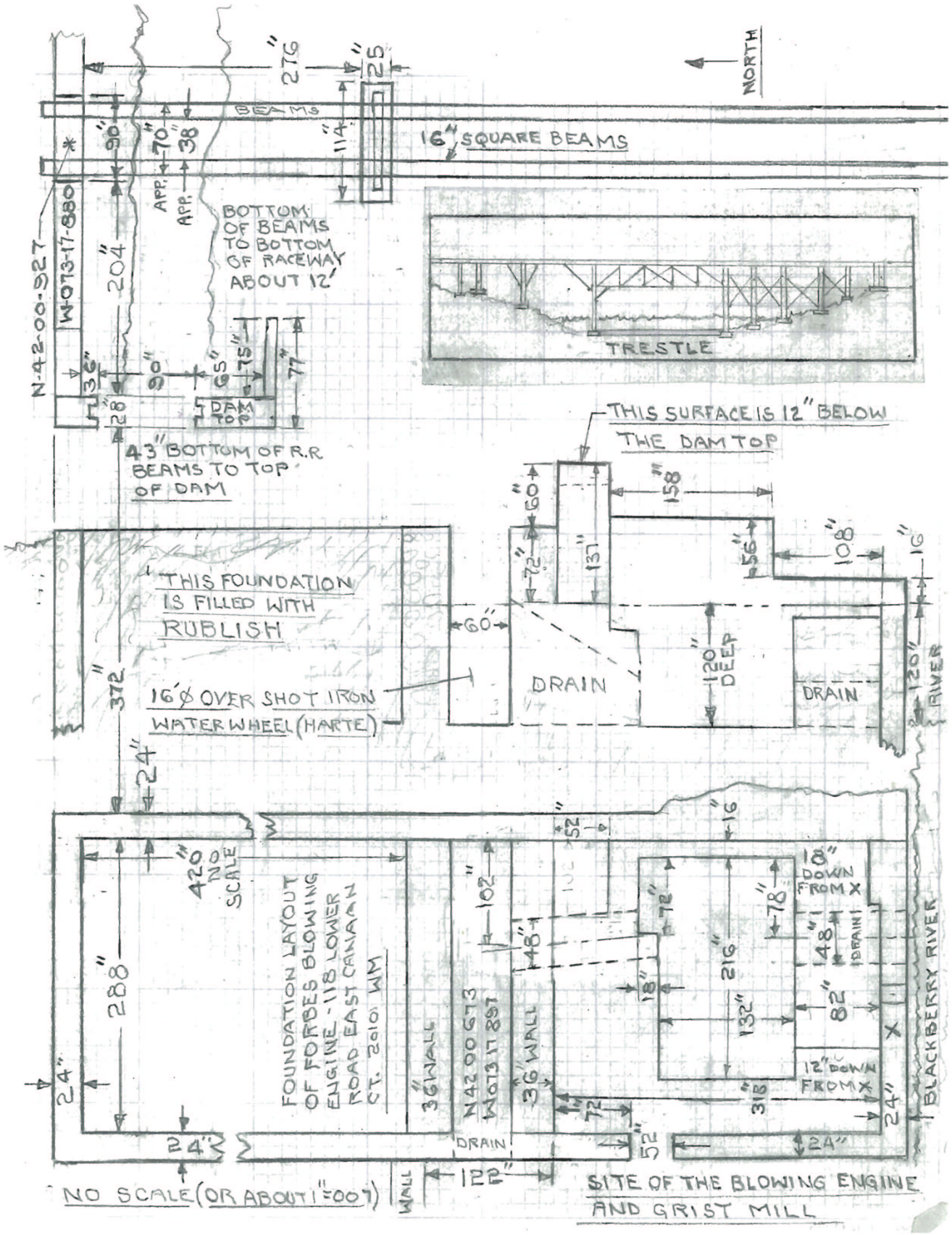
# Blowing Engine

**Most blast furnaces were located near a stream or river. This was necessary to turn a water wheel or, in later furnaces, a turbine. The Canaan # 3 furnace, and the Forbes #1 furnace utilized a dam up - stream and a raceway to bring the controlled water to the blowing engine. On each side of the water wheel was located a cylindrical tub seventy two inches in diameter and six feet high. A crank on the water wheel operated a connecting rod to give reciprocating motion to leather covered wooden pistons in the cylinders. Valves operated to give constant air flow to the furnace. The blowing tubs were located near the river about 200 yards from the furnace. They were connected to the furnace with a pipe located about twelve feet from ground level. The pressure at the blowing tubs was six tenths of a pound per square inch (D Fly Leaf) and this air was piped to the top of the stack. Above and slightly to the front of the stack was the oven where the blast was heated. It was a brick room filled with large "U" shaped pipes through which the blast passed. The hot smoke and gasses from the stack were exited through a tunnel head to this room and this heated the "U" pipes. The heated flue smoke and gas escaped through a chimney to the outside. The heated and pressurized blast air was piped to the nozzles (tuyeres), and blown into the furnace. The arches on the side accommodates two tuyeres each and the arch at the back one, three and one quarter inches in diameter. The hot blast improved iron production approximately 40% and was first used around 1837. "The Early Iron Industry of Connecticut" by Keith and Harte reports that it takes five tons of air, 150,000 cubic feet, to produce one ton of iron from the ore. In addition to water power for the blowing engine Canaan #3 also used a Corliss steam engine with rotary turbo blowers to make the air blast. (E237-8)**

**Keith and Harte in their book, "The Iron Industry of Connecticut" records the temperature of the air blast from cold in the early days up to 900 degrees in the final years. They record blast pressures from one-half a pound per square inch, up to six pounds per square inch. N-42-00-611 W-073-17- 895 WM.**

**At this blowing engine site there was also a grist mill. It was built by Samuel Forbes Adam (Grandson of the Squire) in 1834. Mrs. Clayton, now deceased, related to me that her husband found two grinding mill stones in the river. He moved them to the rear of his house at 116 Lower Road, East Canaan, CT. He put them into the ground, the top surface to be flush with his lawn. One is just at the up-river corner of his house, and the other is about 30 feet down-river.**

**Both stones are fifty-six inches in diameter with a fourteen inch hole in the center. The down-river stone is 6 inches thick, the other is 8 inches. The 6 inch stone is broken in two pieces.**


NORTH
16" SQUARE BEAMS
BEAMS
BOTTOM OF BEAMS TO BOTTOM OF RACEWAY ABOUT 12"
N-42-00-927
W-073-17-880
TRESTLE
DAM TOP
43" BOTTOM OF R.R BEAMS TO TOP OF DAM
THIS SURFACE IS 12" BELOW THE DAM TOP
THIS FOUNDATION IS FILLED WITH RUBLISH
16' Ø OVER SHOT IRON WATER WHEEL (HARTE)
DRAIN
DRAIN
120" DEEP
120" RIVER
FOUNDATION LAYOUT OF FORBES BLOWING ENGINE - 118 LOWER ROAD EAST CANAAN CT. 2010 WM
36" WALL
N42 00 673 W073 17 897
36" WALL
DRAIN
18" DOWN FROM X
12" DOWN FROM X
DRAIN
BLACKBERRY RIVER
NO SCALE (OR ABOUT 1"=00')
SITE OF THE BLOWING ENGINE AND GRIST MILL

# Blowing Engine (Hopewell)

**This painting is made from a photograph taken from the working blowing engine at the Hopewell Furnace in Birdsboro, Pennsylvania.**

**The first American installation of the 2 tub blowing machine was at Hopewell about 1771. It was used until the furnace closed down in 1883. The complete blowing gear in working order has been set up at the Franklin Institute Museum in Philadelphia. (D42) On July 23, 1990 I visited Hopewell Furnace and talked with two full time teachers who worked the past 13 summers demonstrating iron making. They both related that the remains of the blowing gear in the early 1930's were crated and stored at the Franklin Institute, but not set up there as Harte writes.**

**In 1990 I visited the Franklin Institute and talked with the officials; both related they had no knowledge of a blowing engine ever having been set up there.**
**At a later date the blowing engine was retrieved from Franklin, refurbished, put into working order at Hopewell where it is now pumping air.**

**Harte writes that the blowing machine at Hopewell is very similar to the blowing machines in the Salisbury district. (D42) WM.**


# Forbes Dam

**If you stand in the center of the iron bridge at the Beckley Furnace and look about five hundred feet downstream, you can make out the remains of this once beautiful dam. After the flood of 1955 the Army Engineers called it a river hazard and blasted the center to improve the water flow. My mother Julia Perdrizet Michaels condemned to her dying day the blowing up of this beautiful limestone dam. In the distant background is Canaan Mountain, and just across the river is a huge slag pile from the Beckley Furnace. The raceway channeled water to the blowing engine used to make the blast for the Forbes #1 furnace, built about 1832. Later it provided the air blast for Canaan #3 furnace. If you walk to the dam you can still see the exit pipes that furnished water to the raceway. It was comforting in bed at night (at 125 Lower Road) listening to the river flowing over the dam. N-42-00-611 W-073-17-646 WM.**


# Birch Quarry

**This Quarry is located on the present Limestone Trout Club land at #29 Allendalle Road, north of Route 44 and west of Casey Hill Road in East Canaan, Ct. It is now filled with water and used as a trout pond [Birch Pond] for the club's use. From the New England Lime Co. kilns on Route 44, there was a tramway to the quarry on which cars were run to load the limestone into the kilns for burning into hot lime. The Canfield Brothers Lime Co. located on Route 44 and Casey Hill Road must have used limestone from this quarry and other quarries. Canfield Brothers advertised that a high grade wood burned lime has all the cement qualities of old Canaan lime, with the whiteness of Massachusetts lime. "It is quick slaking, it will lay three thousand bricks per barrel, it is all right for plastering, and it is free from impurities and excels in keeping qualities." They advertised to guarantee our lime as represented, and have never lost a customer.**

**Ed Ustico relates the lime quarries in this area also had a narrow gage track thru the farm of Stanley Marschot to the kiln location north of the Stop & Shop on Rte 44, Canaan CT. WM.**


# Canaan Lime Company

**D. L. Peirce and W. B. Hinman built the first perpetual lime kiln in 1853 on property afterwards operated by Charles Barnes, and later, by the firm of Charles Barnes and Son. In 1902 the Pierce and Freeman Co., with several other lime companies in this section and southwestern Massachusetts, were merged as the New England Lime Company. These lime kilns in the past were wood burning, creating a secondary business of securing enough firewood for the kilns. Out of the lime industry in the past came another occupation; the manufacturing of barrels. The staves, heads, and hoops were made locally at first, but as wood became scarce the buyers secured them from other parts of the country, namely Ulster County, New York.**

**Besides burning, grinding , and preparing the lime at the local kilns the actual quarrying played a great part in the industrial life of the community. The first stone was hand drilled and blasted out, later the steam drills took over, and finally came the compressed air drills. "This quotation is from The Lakeville Journal - 50th Anniversary Edition, titled "Canaan- Industrial City."**

**Ownership over the years has changed, and now the quarry is a large supplier of lime for many uses. It is located at 50 Lower Road in Canaan Connecticut. N-42-00-826 W073-1 8-838 WM.**


# Slag pile

**This painting is from a photo taken from Lower Road in East Canaan, Ct., about halfway between the Beckley Blast Furnace and the site of the Forbes #1 Blast Furnace, looking across the Blackberry River at Canaan Mountain. If you stand on Lower Road and look down to the river to see the remains of the Forbes #1 Dam you will be about where this photo was taken. This picture shows a roadway between the river and slag pile. The New England Slag Co. built a railroad bridge across the river at the site of the Forbes #1 blowing engine [across from the vineyards] after 1920 to lay tracks up river almost to the Beckley Blast Furnace and down river to another slag pile. This was to bring slag to a crusher, located in the now vineyards. The raw slag was crushed to be used as sand slag, concrete slag, roofing slag and some road slag. This information is from a booklet 'Slag' published in 1920 by the New England Slag Co. In William Wallace's notebook he states in 1913 we succeeded in finding a buyer for 150 years of accumulation of slag, formed a company and started shipping 15 to 25 carloads of slag a day. N-42-00-625 W-073-17-586 WM.**


# Slag Bridge

**My mother tells of crossing the bridge to visit the Pateux Family and their two girls Minnie and Mary. They lived in a house next to the cinder bank. Mother and her brother George would cross the bridge in the fall to get chestnuts and in the spring to get Slippery Elm. My sister and myself around about 1937 also crossed to get Slippery Elm. Chewing the inner bark was said to be a good spring tonic. In mothers time the railroad tracks and ties were in place. In later years when I crossed the ties were gone. I remember a pile of railroad tracks piled about 12 feet high just across the lower road from this bridge. This was in the early 1940's; shortly after they were gone, no doubt scrap for the war effort. In 1937 there were two 16 inch square beams about 6 feet apart across the river. When I went with my father to cross he was brave and walked up right on the beams. I, being afraid of falling the 30 to 40 feet into the river, had to cross on all fours. Shortly after World War II, someone removed the beams on the east side preventing crossing. Soon after all was gone. Felix Manissi tells of the time his brother Junior was climbing on the bridge all by himself and fell to the river bed ,breaking his shoulder. After a time, a fisherman heard his cries and went across the road to bring Doctor Adam to his rescue. N-42-00-688 W-073-17-910 WM.**

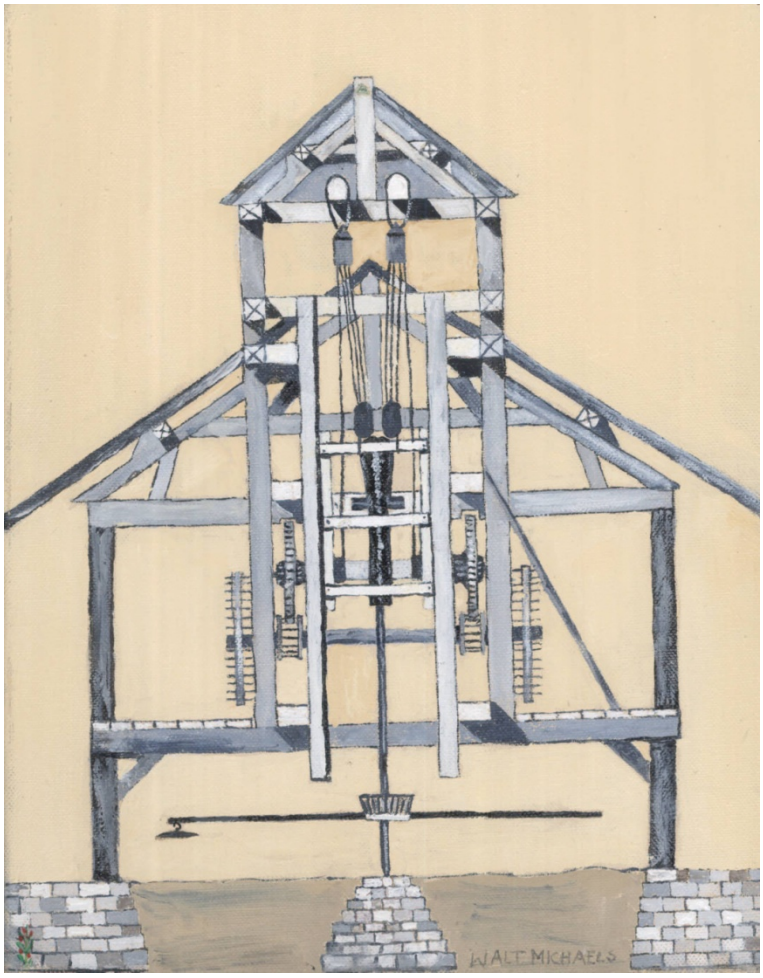

# Washing Ore

**If you travel two miles west of Lakeville, Connecticut on Route 44 and look to the right, there is a large pond. Prior to filling with water, this was the largest iron ore mine in Connecticut and was called Ore Hill. It was discovered in 1731 by John Pell and Ezekiel Ashly and was a most important find, as the ore was of high grade, free from impurities and suitable for making cannons.**

**Ore Hill mine was of such superior quality and quantity that this bed was used from 1731 until 1923. In 1837, a Doctor Shepard reported to the geological survey of Connecticut that the amount of ore raised during the previous forty years averaged about give thousand tons annually. Imagine, about ninety six tons a week carted to the area furnaces without the benefit of a railroad.**

**In 1850, $1.50 per ton was paid to the mine owners, $1.75 per ton to the mining company, and from 10 cents to 30 cents per ton to cart the processed ore to the area furnaces. Processed ore at the furnace cost in the range of $3.50 per ton.**

**In 1890, ore was mined down to one hundred feet. The surrounding land is honeycombed with underground tunnels. The ore was hauled up the incline that is still visible on the west side of the present pond. It was dumped into a second wagon and carried to a washer where it was screened and dumped. Here the porous ore was broken in a stone crusher into about 4" chunks. Then passed to the washer proper where it was cleansed of earth and loaded on flat cars holding twelve tons each. The ore was then pulled to the Barnum Richardson furnaces at East Canaan. Canaan #3 used about forty-five tons of iron ore per day. From N 41 57 350 W 073 28 254. This GPS was taken from Route 44, not at the Washing Ore site.**

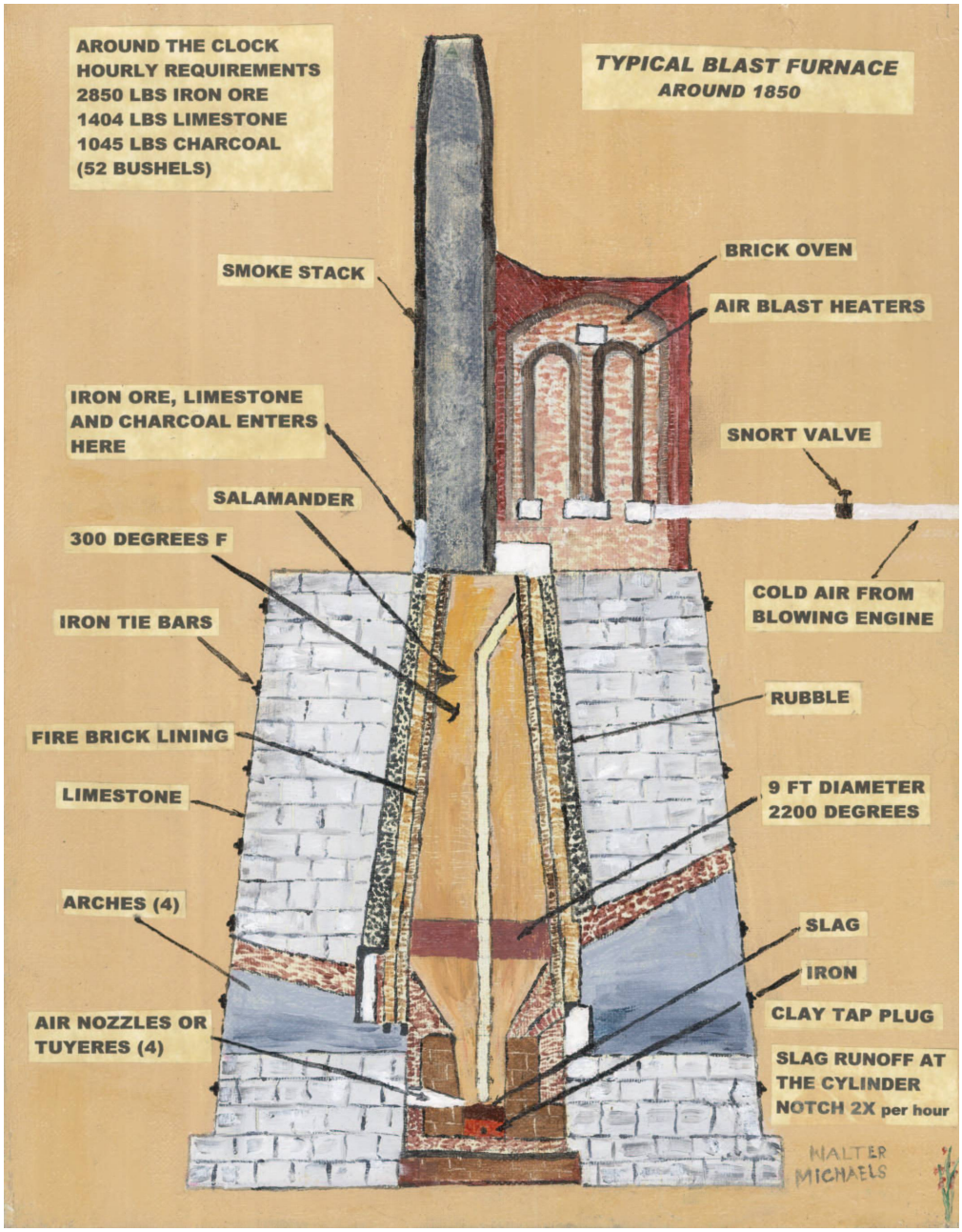



# Cannon Drilling

**At the start of cannon making in Salisbury, Connecticut, a hole was dug in to the ground in front of the furnace to accept a female mold with the gun muzzle upward. Actually the mold was made longer than the finished cannons. This allowed scum and impurities to float to the top. The muzzle end was sawed off to allow pure iron for drilling.**
**The cannons were cast solid, then when cooled taken to the boring mill to be drilled. The cannons were clamped to a vertical sled, with the muzzle pointed down, guided by greased vertical boards. The sled could be made to move up or down by pulleys and weights. Sort of like a block and tackle. Under the muzzle was a drill mounted to a guided wheel. The weight of the cannon on the rotating drill produced the bore. The wheel had a wooden cross bar attached. This beam was roped to a horse which turned the drill by walking in circles. Eventually, however, a hollow bore was created in the gun-though often at the cost of at least one dizzy horse! Later a water wheel replaced the horse.**

**I quote from a Booklet published by The Salisbury Cannon Museum. "The first Salisbury cannon were made at half past three in the afternoon of May 27 1776. Richard Smith in 1768 was a part owner in the Salisbury Furnace and also owned the Colebrook Refining plant where he converted iron into steel, one of the first enterprises in the colonies". The steel could be made into a drill bit and then hardened to drill into the cast iron. Richard Smith was an entrepreneur and in 1776 disappeared and later turned up in England. Most people thought him a Tory, he returned into Connecticut in 1782.**

**Some of this information is from "Connecticut Cannons: The Salisbury furnace in the Revolution (T) by Adam Ward Rome". N-41-57-828 W-073-26-423 [Approximate] WM.**




# Cross Section of a Blast Furnace

**Iron ore, charcoal and limestone were weighed and dumped into the top of the blast furnace. A hot blast of air was introduced in the bottom to burn the charcoal thus creating a temperature of about 2,500 degrees Fahrenheit to melt the iron from the ore. The iron dripped to a fire brick crucible at the bottom. The liquid iron was drawn off about every six hours to cool into pigs of iron. Hot liquid slag floated on top of the melting iron and was drawn off about every hour to make the huge slag piles in East Canaan. The cold compressed air from the blowing engine was piped to a brick building containing heat exchanges. After exiting the heat exchangers it was blown through air jets "tuyeres" (just above the melted iron) to burn the charcoal. The hot smoke exited up the stack to come out of a pipe at the furnace top rear and be directed downward to heat the heat exchangers in the brick building. This smoky gas was ignited at the heat exchangers to increase the temperature and then exited up a high chimney at the end of the brick building. WM**


# East Canaan Railroad Station

**This Railroad station was built about 1872 and was located half way between the Lower Road and Furnace Hill Road, on the south side of Route 44 in East Canaan Ct. It was moved towards Furnace Hill Road where it now stands. N-42-00-877 W-073-17-257 WM.**


# Buena Vista

**Travelling North on route #63 one and a half miles past Route #43 look to the West, where a sportsman club now owns the land, and you'll see only bushes and trees. This area on the river in the early 1700's was the start of Huntsville, which was first a gristmill, then a sawmill, two forges, a woolen factory, a satinette mill making durable fabric, a blacksmith shop, a trip mill, school, stagecoach tavern, and homes. It also included the Blast Furnace Buena Vista, built in 1847 by hunt Lyman and Co. and sold to Barnum Richardson co. in 1882 and closed in 1892. In the "Historical Souvenir of Falls Village" (1894) F.E. Eggleston wrote "Huntsville had two forges and a furnace and, besides the usual pig iron industry, made steamboat shafts and large anchors. The largest anchor weighed 12 tons and required nine yoke of oxen to haul it to Hudson, New York". J.P. Lesley, writing in 1856, reported that in 44 weeks of 1856, 2,015 tons of high grade, grey, car wheel iron were made for the Jersey City Car Works and other places. I quote from the Lakeville Journal, Lawrence Pool's book (L), and The Lure of the Litchfield Hills. WM**


# Richmond Iron Furnace

**If you travel 12.1 miles north from the traffic light at the bridge (Route 7 & 41) in great Barrington MA, you will come to the Richmond library on your right. At the library turn around and go .4 miles south on route 41, and go left on Furnace Road then .3 miles to the intersection of Furnace Lane turn left and park. Just opposite the brick house at this intersection is a walking path to the furnace remains.**

**The furnace was built in 1830 abandoned in 1923. It was 31 feet tall with a cold water powered air blast. The furnace was rebuilt in 1864 adding a steam engine and a warm blast (250 @ 4 p.s.i). It had a water cooled hearth. Other improvements were also made.**

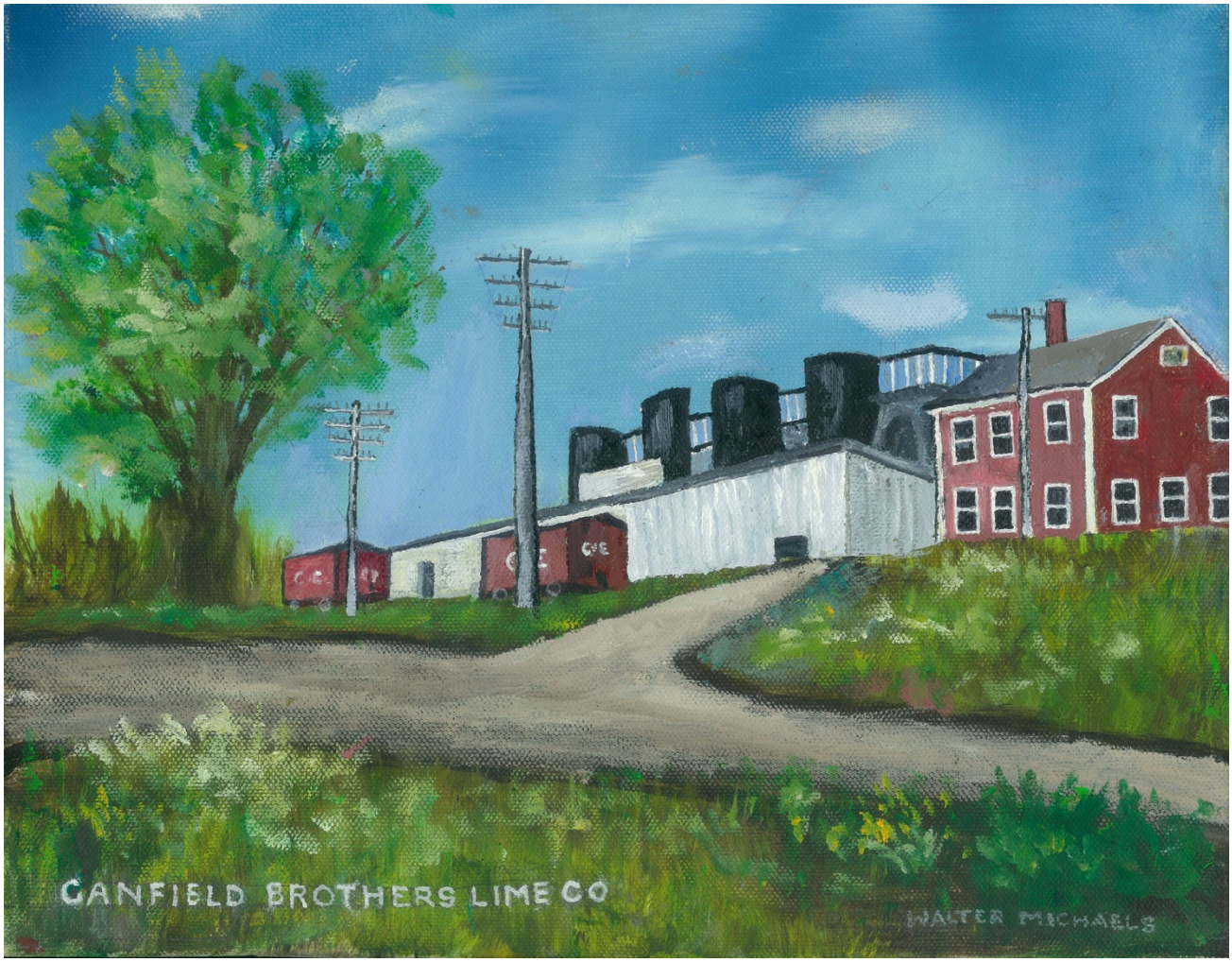
**This data is from a book "The Early Iron Industry in Connecticut" by Keith and Harte. Ed Kirby author of "Echoes of Iron" and other books, relates that his great grandfather John Lawton came to Richmond at age 14 to the furnace and worked there from about 1856 to 1880.**

**Alfred Perdrizet came from Chagey France and worked at the furnace around 1876. He married in about 1895 then around 1901 moved to East Canaan to work at the Beckley and Canaan number 3 Furnace until it closed in 1923. He then worked at making hot lime until he died in 1936. His picture is in Harte's book standing in the casting arch. Just north of the Richmond library on the right are 9 Company Houses. In 1895 my mother was born in the fourth house. [ #2801] N-41-21-473 W-073-22-750 WM.**


# Maltby [Phoenix]

**If you travel west from Lakeville Ct. on Route 44, take a right at the first traffic light just coming in to Millerton N Y. Then go right, the first cross road will be Spencer's Corners. Continue on and take the next right, then right again a few hundred feet and park in the area provided. A short walk up the hill to visit the ore pit [now a pond].**

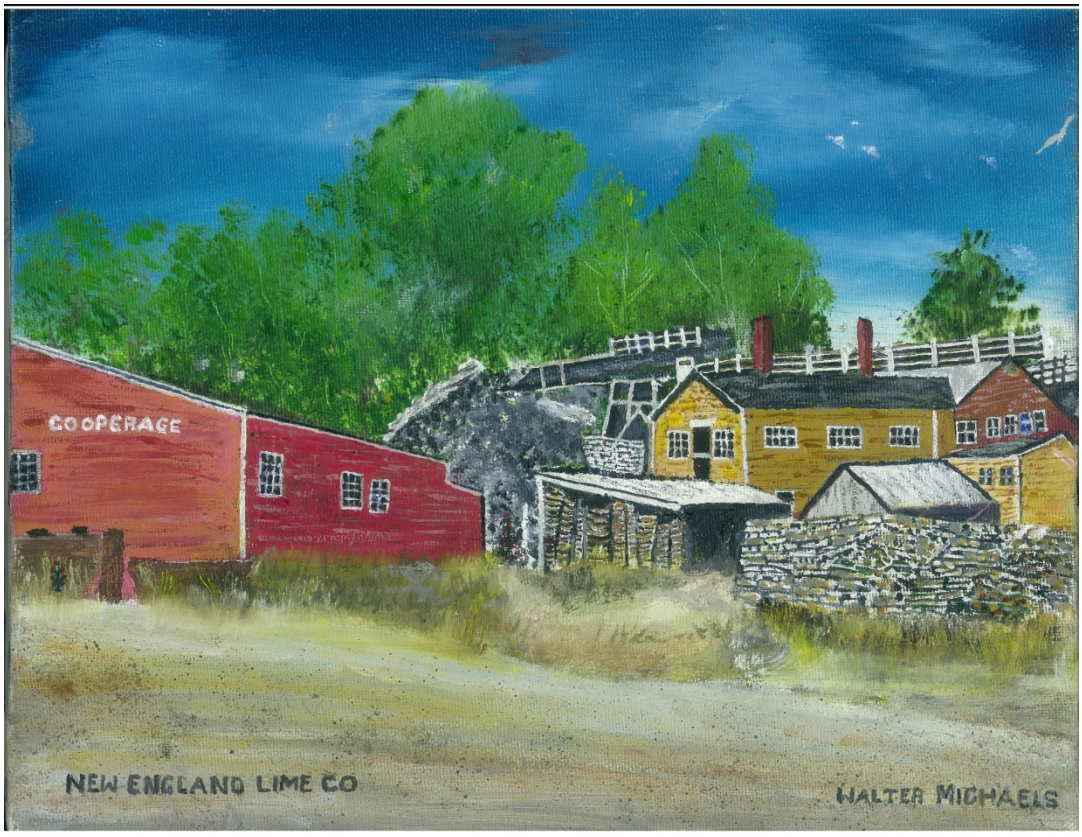
**The Furnace was built in 1840 with a cold blast. It was rebuilt in 1847 and 1863 with a hot blast. The furnace was charcoal fired, and used a steam engine for the blast. It was 31 x31 feet square at the base and 32 feet tall. The ore was obtained and washed about 1/3 of a mile west of the furnace. This data is from a book 'The early Iron Industry in Connecticut' by Keith and Harte. The Maltby remains are east of the parking area and are not seen from the road in the summer. N- 41-58-121 W-073-29-810 The dam at the ore pond is N-41-58-152 W-073-28-860 WM.**




# Canfield Brothers Lime Co.

**This hot lime kiln was located on the corner of Route 44 and Casey Hill Road in East Canaan, CT. If you stand on the corner of Rt 44 and Casey Hill Road and look north you will see four stone foundations. It would appear these were to support the loading bridges for the four furnaces. Fred Hall tells me the red house was used for an office, and later moved east on Route 44 to across from Toby's Antiques (Stratton Store). This plant made hot lime by burning limestone and cord wood. This plant was built about 1902 by William Canfield and his brother Wallace Canfield and closed in the early 1930's. The New England Lime Co next door and this plant obtained their limestone from what is now known as the Limestone Trout Club which includes Pine Pond, Birch Pond, Cedar Pond, and Beaver Pond. These were all limestone quarries owned by Howard F. Lawrence, and sold to Dr Ellis who founded the Limestone Trout Club in 1967. Several of these quarries were actively worked until 1942.**

**An advertisement in the Scrap Book of North Canaan in the local library shows a picture of the state capitol in Hartford built of East Canaan limestone which cost at that time $3,342,550. N-42-00-859 W-073-17-091 (P) WM.**




# The New England Lime Company

**This plant was located on the north side of Route 44 in East Canaan CT, about halfway between the Lower Road and Furnace Hill Road. Fred Hall tells me the plant was fired with cord wood, and then loaded with limestone. The limestone was taken from several of the quarries just north of the kilns, now owned by the Limestone Trout Club. The white hot limestone was raked out of the furnace and somehow ended up in a flourlike powder. It was then put in water proof barrels loaded into railroad cars on the nearby siding and shipped to the customer. One use of the hot lime was to put a hard, white thin coating over the rough coating of plaster in buildings. The day before being used, the barrel would be opened and water added. This would cause the lime to boil. Next morning it was stirred to turn it into a white creamy paste and could be trawled over the rough plaster to result in a few days into a hard white finish.**

**Ed Basset of Unionville tells of his use of hot lime as a teenager living near the Farmington River, next to Lawton's Feed Store (Perry Street and Rte 179). They would take a mason jar with a screw on top, steal into the feed store and from a broken bag of hot lime put a cup full into the jar. Then they the would go to the river with bread crumbs to attract a school of minnows, scoop some water into the jar and quickly screw on the top. The jar was thrown into the water to sink to the bottom. More bread crumbs then boom. Netting the stunned minnows provided bait for larger fish.**

**The plant was built by Peirce and Freeman around 1870 and later Edmund D. Lawrence became a partner. It was sold to the New England Lime Co in 1902 and closed in the late 1920's.**

**It was interesting to note that Howard F. Lawrence sold the quarries to Dr. Ellis in 1957 to make the Limestone Trout Club.**

**My father worked making barrels to ship the limestone until it closed.**
**N-42-00-922 W-073-1 7-279 WM.**


# Connecticut Lime Co

**This hot lime kiln was located in Canaan, CT about .7 of a Mile east on Route 44 on Deely Road. It was called the Conn Lime Co. and it closed in 1929. To the right of the shed, the narrow gauge tracks ran to the limestone quarry and 3 tenths of a mile to the west. An engine pulled the cars from the quarry to the kilns. The garage that housed the two engines is still standing, just north of the kilns remains. Cars from the quarry filled with chunk limestone (about football size) were stored at the bottom of the incline. When limestone was needed to fill the kilns, the worker in the building pulled a cable down the incline and hooked it to the limestone loaded car. An electric motor in the building on a winch pulled the car to the top, to enable the worker to fill each kiln requiring loading. The full size railroad tracks were used to bring soft coal to fire the kilns.**

**On the opposite and lower side, workers raked the white hot chunks of limestone from the kilns onto a cement floor. After cooling the chunks were broken into baseball size, and put into wooden barrels and sealed. A railroad car about 30 feet away took the barrels to be shipped to the customer.**

**This information is from Edward Ustico who remembers when the kilns were working. N-42-00-925 W-073-18-421 WM.**


# The Connecticut Lime Company
# Air Compressor Building

**This building was located off Deely Road in Canaan, CT at the very top of the main limestone quarry next to the hoisting crane. It contained the air compressors used to furnish compressed air for the jack hammers. This painting is from a photo taken before 1929 given to me by Ed Ustico of Deely Road. Ed tells me the photo was taken by William Wallace when he worked at the Connecticut Lime Co. Ed Ustico identifies the fourth man from the left as Calvbio Veronesi and the last man on the right as Tom Mullins, the Forman of the group. Ed tells me the foundation of this building is intact as of 2009. The first on the left in the photo looks very much like my grandfather Alfred Perdrizet, it could be because he worked in the lime industry after Canaan # 3 furnace closed in 1923. N-42-01-064W-073-18-749 WM**

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***Note: In the text where I have a letter followed by a number, the letter refers to the Source Consulted, and the number is the page reference.***

# ABOUT THE AUTHOR

**At the age of 18 I graduated from High School. I then joined the Army Air Corps and was discharged 3 years later in 1946. I then graduated (using the GI Bill) from Porter School of Tool and Machine Design and I worked at this trade until I retired at age 65. During this time I passed the test to become a registered professional engineer. After I retired at age 65, I started working part-time for two companies, and at the present, I still do.**

**I was always interested in the Iron Industry as my grandfather worked all his life in the Canaan iron industry.**

**In 2000, I started painting oil on canvas at the Farmington River School of Art and at this time began my series on "The Historic Iron Industry".**