POWERING

EARLY

GREENSBORO

Greensboro Historical Society
Summer 2008 Exhibit

The surviving artifacts of an earlier material culture are a window through which we can view 19th and early 20th century everyday life in Greensboro. These tools and simple machines of this exhibit were made in the farm shop, village shop, and remote factory. Many were shipped by railroad from factories all over the northeastern US. Often a Vermonter could make a tool or machine in his own shop and save money. Americans of this period were very inventive; always seeking a better way to do what was often a time consuming or physically exhausting job. Vermonters were cautious but welcomed any real help in making a job easier. These exhibited tools and simple machines were reliable, easy to repair, and inexpensive to operate. Most were hand-operated, some were foot-operated, and most replaced a less efficient way of performing a task.

Powering Greensboro's Machinery

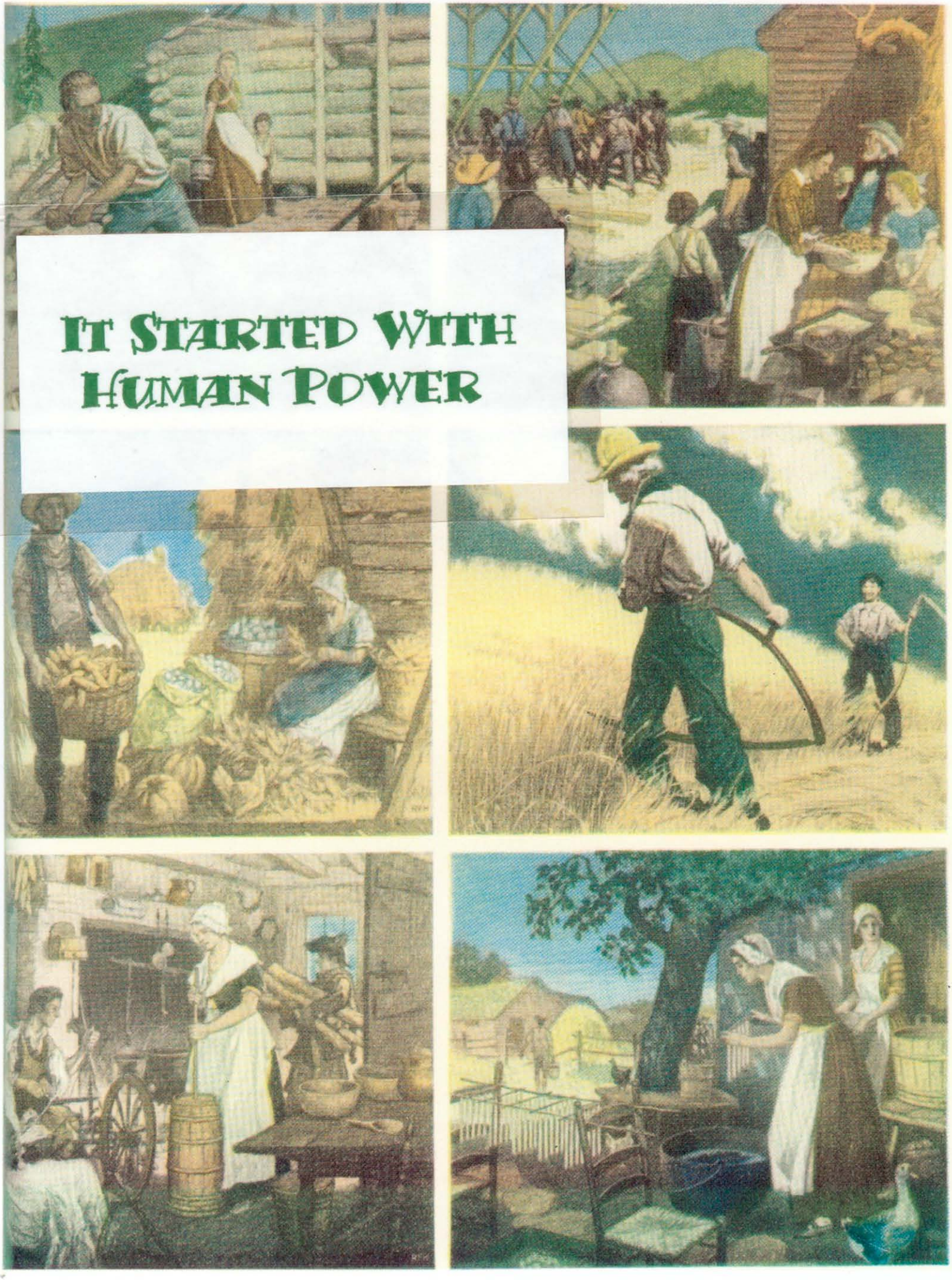
Greensboro's earliest power source was the human hand, supplemented for heavy work by the ox. Most early settlers arrived with an axe, hoe and sickle. Soon after settlement, saw and grist mills were built, powered first by water wheel and then by the more efficient water turbine. These were followed by shingle, carding and fulling mills; by starch, butter tub, wagon & sleigh, and blind, door & sash factories; and by a creamery, iron foundry, machine shop, and granite polishing shed – each with its own specialized powered machinery. The introduction of steam engines into large mills at Greensboro Bend freed mill operations from the uncertainties of stream flow. In the later part of the 19th century, a wide variety of horse-drawn farm equipment became available including mowing machines, tedders, hay rakes and manure spreaders. During the same period, the horsepower treadmill was introduced onto farms to power threshing machines and firewood saws. By the early part of the 20th century, stationary gas engines had replaced horsepowers and were powering vacuum pumps for milking machines and electric generators for lighting, milk coolers and water pumps. Electric lines came to Greensboro Village from Hardwick ca. 1915-16 and to rural farms in the 1930s and 1940s, leading to an explosion of electrical household appliances. Finally, the first gas-powered tractors were introduced just prior to World War II and, after the war, became the primary farm "workhorse".

Even after the introduction of horsepower treadmills, gas engines and electric motors, many small or infrequently-used machines in the farmhouse and barn continued to be powered by the human hand (and foot). Paul Wood will demonstrate hand and foot-operated machines from his collection that were used for a wide variety of 19th and early 20th century domestic and farming tasks. These tasks included milking cows, testing milk, separating cream, churning butter, broadcasting seed, shelling corn, clipping hair, making ice cream, pumping water, washing clothes, and winding yarn.

The Greensboro Historical Society
Gratefully acknowledges Paul Wood who provided most of the tools and implements for this year's exhibit.
Others who contributed artifacts for the exhibit: Cathie Wilkinson, Ercel Harvey, Martha Niemi, Jan Travers, Alice Perron, and the GHS Collection

EXHIBIT CURATORS

Ercel Harvey
Linda Johnston
Debbie Kasper
Martha Niemi
Willie Smith
Catherine Wilkinson



It Started With Human Power

From Manpower-→Horsepower-→Water/Mechanical Power-→Gasoline Power

DID YOU KNOW?

Work requires the expenditure or use of energy at a certain rate.
Power expresses the rate at which work is done and/or energy is expended.
Power is expressed as Watts; A Watt equals 1 joule/second, 14.3 kcal/minute, or 3.41 Btu/hour.

Another commonly used unit of power is the horsepower (HP); 1 HP equals 746 W or 2542 Btu/hour. **1 HP is the maximum work capacity or power level that a horse can sustain for a ten-hour working day.**

Manpower- the power level of a person is about 1/10 of 1 HP. Therefore, when chopping wood, pushing a hand plow, churning butter, or digging a well for a ten hour day, a person produces an energy equivalent of only 1 horse power hour. A horse or an ox can accomplish the same amount of work as ten people in one hour.

Horsepower and oxen power were some of the first substitutes for human power and contributed to improving the quality of human life. Certainly the early settlers of Greensboro were more productive when they used oxen and horses.

Water and Mechanical Power also contributed significantly to lessening the workload of early settlers. The abundance of water in streams and brooks could be harnessed to power sawmills and gristmills. Cogwheels from the large water wheel to the small grinding wheels powered the saws and grinders. Pulleys, block and tackles, and inclined planes all provided mechanical energy much more efficiently than could be accomplished by manpower or even horsepower alone.

Gasoline Power: The tremendous effect of technological development on human activities can be appreciated by comparing manpower to the mechanical power of a tractor fueled with gasoline. When one gallon of gasoline fuels a mechanical engine, which is about 20% efficient in converting heat energy into mechanical energy, an equivalent of 8.8 kWh of work can be achieved. Hence a single gallon of gasoline produces more power than a horse working at maximum capacity for 10 hours (7.5 kWh). Further, one gallon of gasoline produces the equivalent of almost three weeks of human work at a rate of 0.1 HP or 0.075 KW, for 40 hours a week. Is it any wonder that farmers welcomed tractors and everyone in Greensboro welcomed the first "horseless carriages," both cars and trucks!

And then came ELECTRICITY

WHAT ONE KILOWATT HOUR MEANS

TO THE FARM

GRINDS 100 LBS. OF GRAIN

COOLS 10 GALLONS OF MILK FOR ONE DAY

MILKS ONE COW FOR 20 DAYS

GRINDS 48 AXE HEADS OR 8 MOWER BLADES

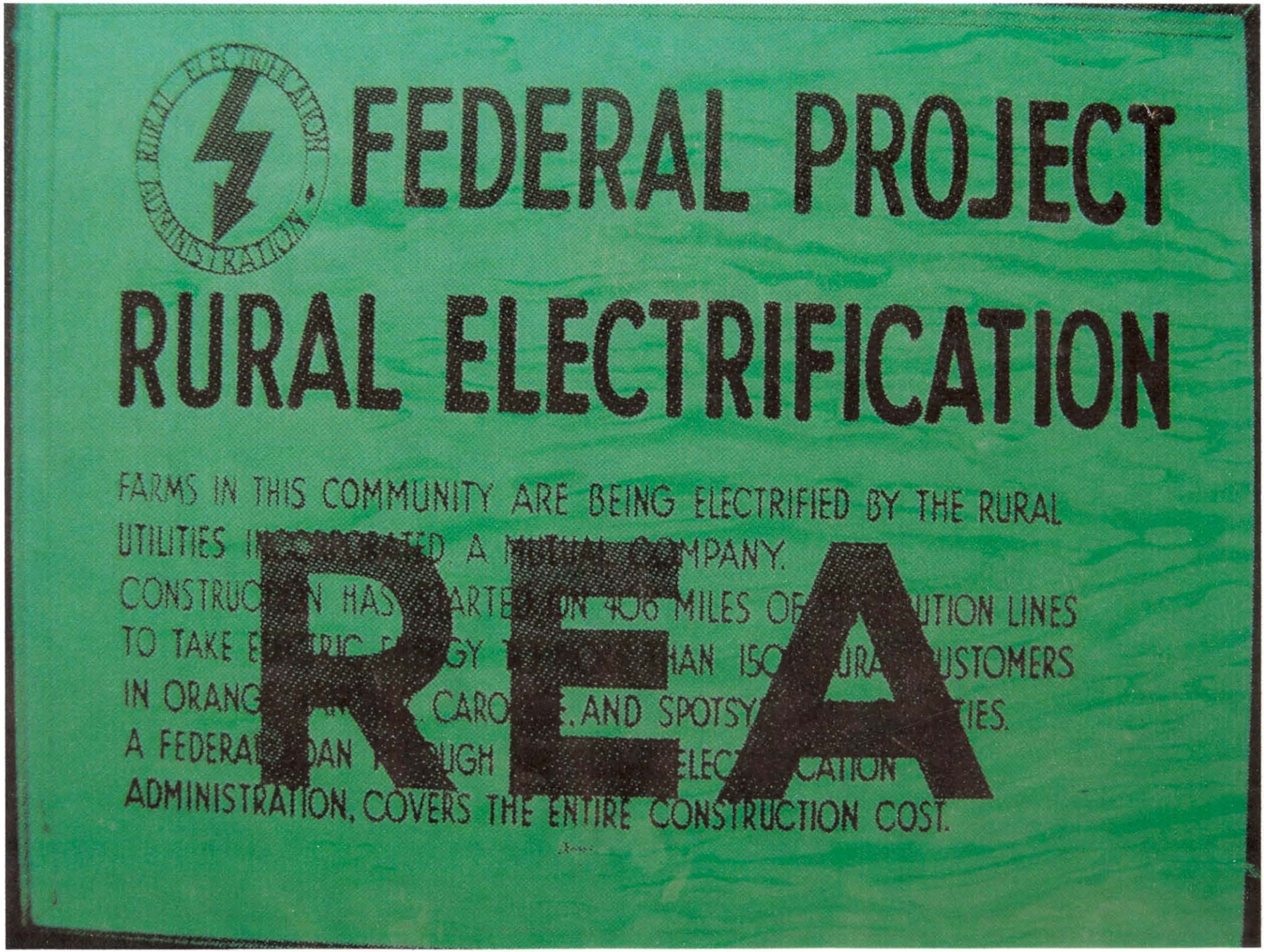
LIGHTS 100-BIRD POULTRY HOUSE FOR SIX DAYS

HOISTS TWO TONS OF HAY

CUTS ½ CORD OF WOOD

CUTS ONE TON OF ENSILAGE

PICTORIAL STATISTICS, INC


RURAL ELECTRIFICATION ADMINISTRATION
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RURAL ELECTRIFICATION
FARMS IN THIS COMMUNITY ARE BEING ELECTRIFIED BY THE RURAL
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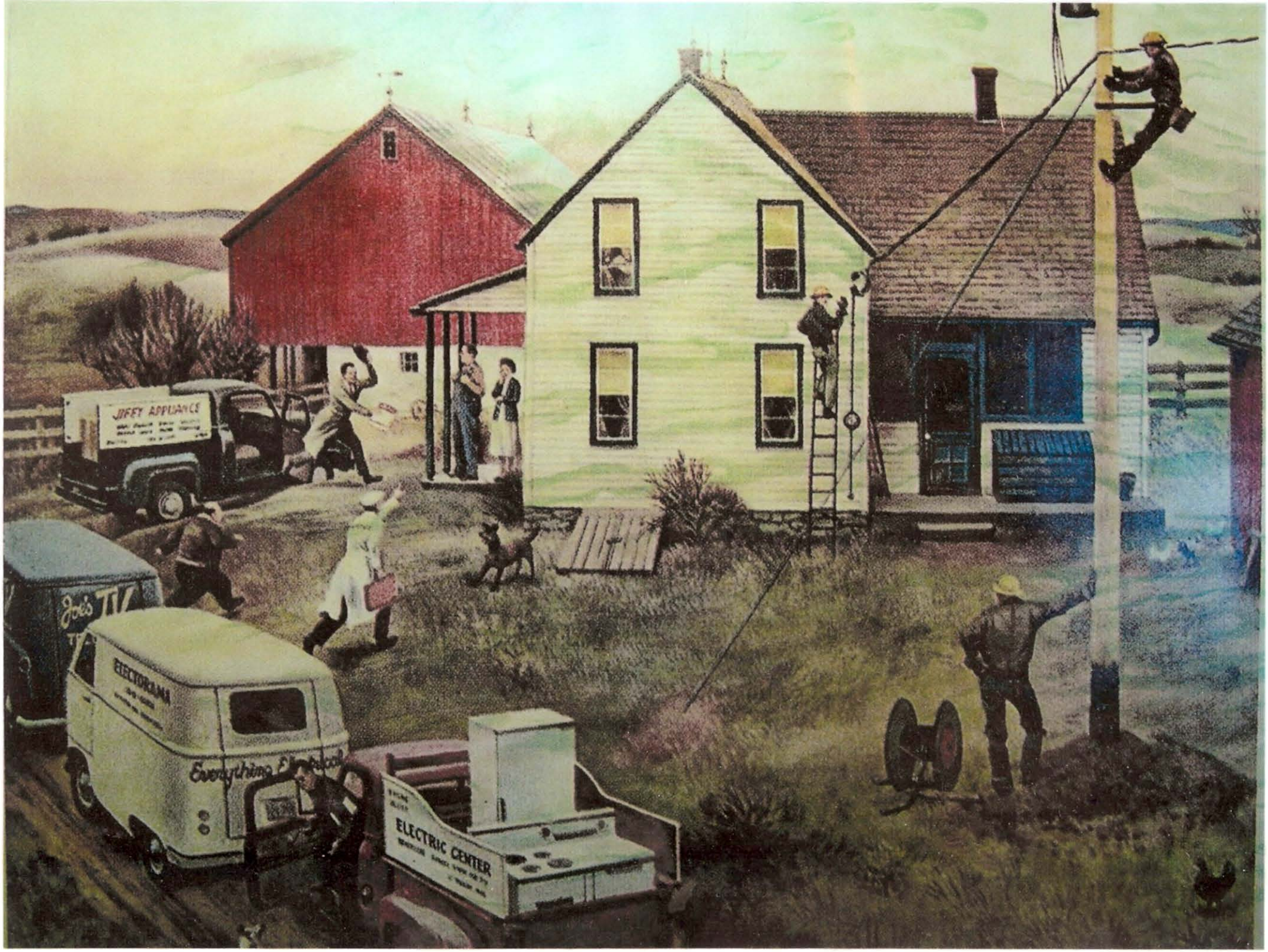

JIFFY APPLIANCE
ELECTRIC CENTER

Powering Greensboro

Late 1700s

Horses were used for transportation and work. Oxen were needed for heavy work: clearing land; moving rocks, stumps, and logs; foundation stones for buildings and making roads.

Manpower furnished much of the power; often many men were needed to build dams, buildings, mills, and roads.

To support the early settlers, mills were needed first. Sawmills were needed for lumber since settlers from "civilized" Southern New England did not care to live in log houses for long. Gristmills were needed to grind corn and wheat for food for people and animals. The settlers immediately spotted the fast moving streams where mills could be built.
First built were a sawmill and a gristmill on Greensboro Brook below the outlet of Caspian Lake. Later there were both saw and grist mills on Sawmill Brook in North Greensboro where settlement began in the 1790s.

Early 1800s

A sawmill was also built further down on Sawmill Brook near where it joins the Lamoille River.
In later years small sawmills were built along other streams like Porter Brook, most being used for only a few years such as one in the area below Donovans toward the Ling farm.

Horse and sheep powered rigs made it possible to saw wood, thresh, and do other chores on the farms, but in a limited way, as animals tired quickly. Sometimes two horses ran a treadmill for more power.

Mid to late 1800s

The coming of the steam engine, and later the railroad to Greensboro Bend, changed the area suddenly, as steam powered mills replaced the unreliable water powered ones. A large steam mill just above Greensboro Bend produced lumber and wooden boxes, which were shipped out on the railroad. An old locomotive engine powered another one further up the river below where the North Greensboro joins what is now Route 16. The mill in the Bend burned several times but was rebuilt. The one up further burned in the early 1900s and was not replaced. The big boiler was hauled away as scrap

machines and more efficient hand powered washing machines. One man in North Greensboro installed a tall windmill to pump water to his house and barn until the power line reached him.

Early to mid 1900s

As gasoline engines became smaller and more efficient, they were used for sawing wood, running threshing machines, and milking machines. Electric lines were being extended into the back country thanks to REA, and farmers were installing milk coolers, milkers, and electric water pumps and people were putting bathrooms and water heaters in their houses. Some people without power installed gasoline fired generators or wind powered generators to run lights and radios. One man attempted a water-powered generator on Esdon Brook, but abandoned it after a few months.

Mid 1900s on

Following World War II industry developed rapidly. Not only did chain saws, hay balers, bulk milk tanks, milk rooms, and piping make work easier, it made it possible for one farmer to run a large dairy operation almost by himself. One man said it didn't make life any easier, because he had to work twice as hard to pay for his labor saving machinery and electricity made it possible to work long after dark. Piping, oil-during World War II. Even though they didn't use waterpower, both had millponds where cutters could dump their logs where the sawyers could get them later.

Water powered other mills. Greensboro Brook had a water driven sash and blind factory, an oat mill, as well as the grist and saw mill near its headwater. Later the two Perrin brothers, both mechanical geniuses, built a machine shop below the stores in the village.

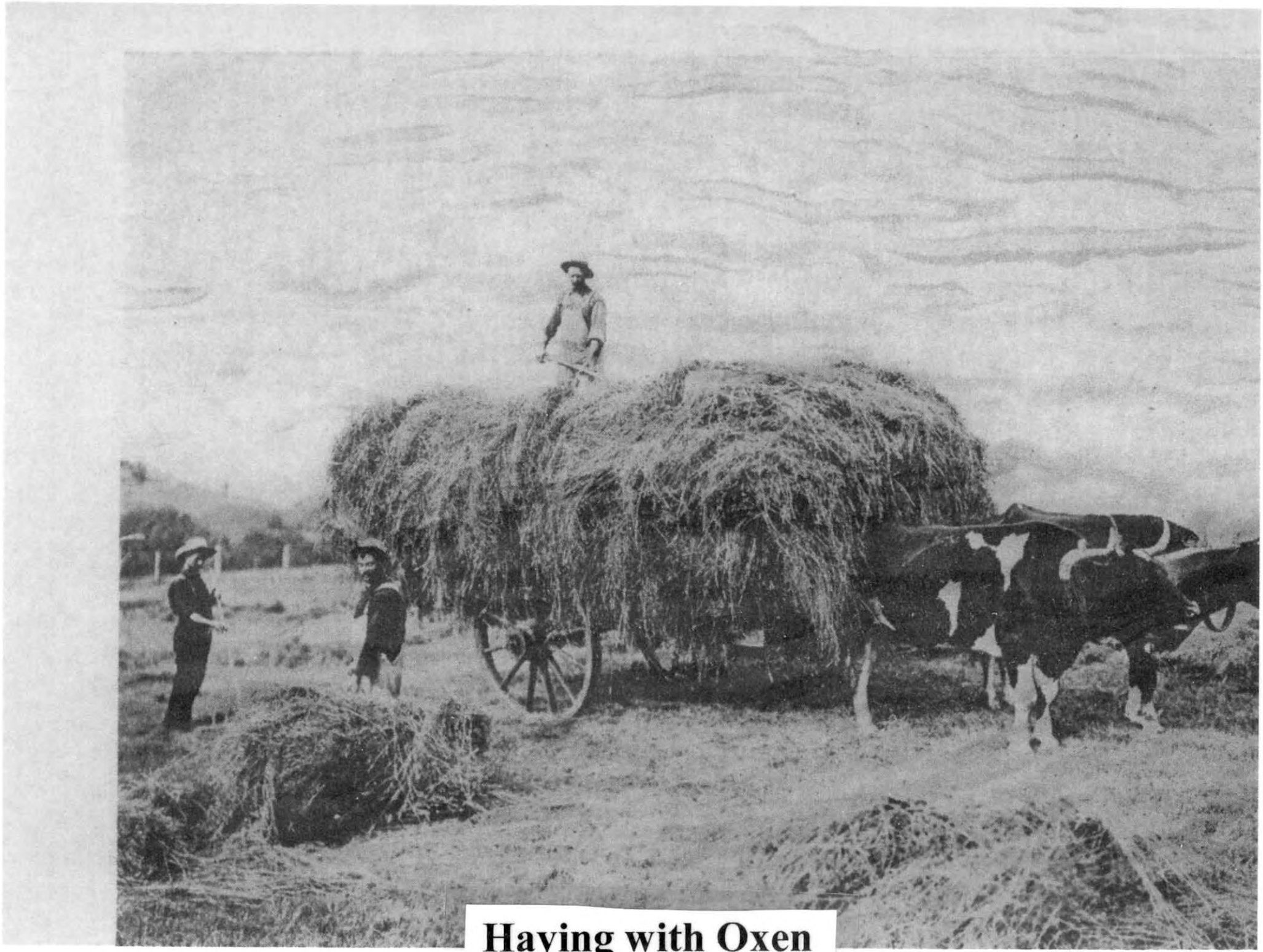
Water from a dam powered a variety of wood and metal shaping machines, and with a forge, the men produced sleighs, sleds, hearses, carriages, wagons, farm equipment, and machines for other mills. Some people used hydraulic rams to pump water from brooks and lakes to their houses and barns. These were water powered by an ingenious machine that used about two thirds of the running water to pump the remaining one third to where it was needed.

Some machinery was appearing on the farms, powered by horse drawn--mowing machines, rakes, manure spreaders and hay tedders. Human powered churns, cream separators, cider mills, and grinding stones, were common as milk became the leading farm product. The women were demanding sewing

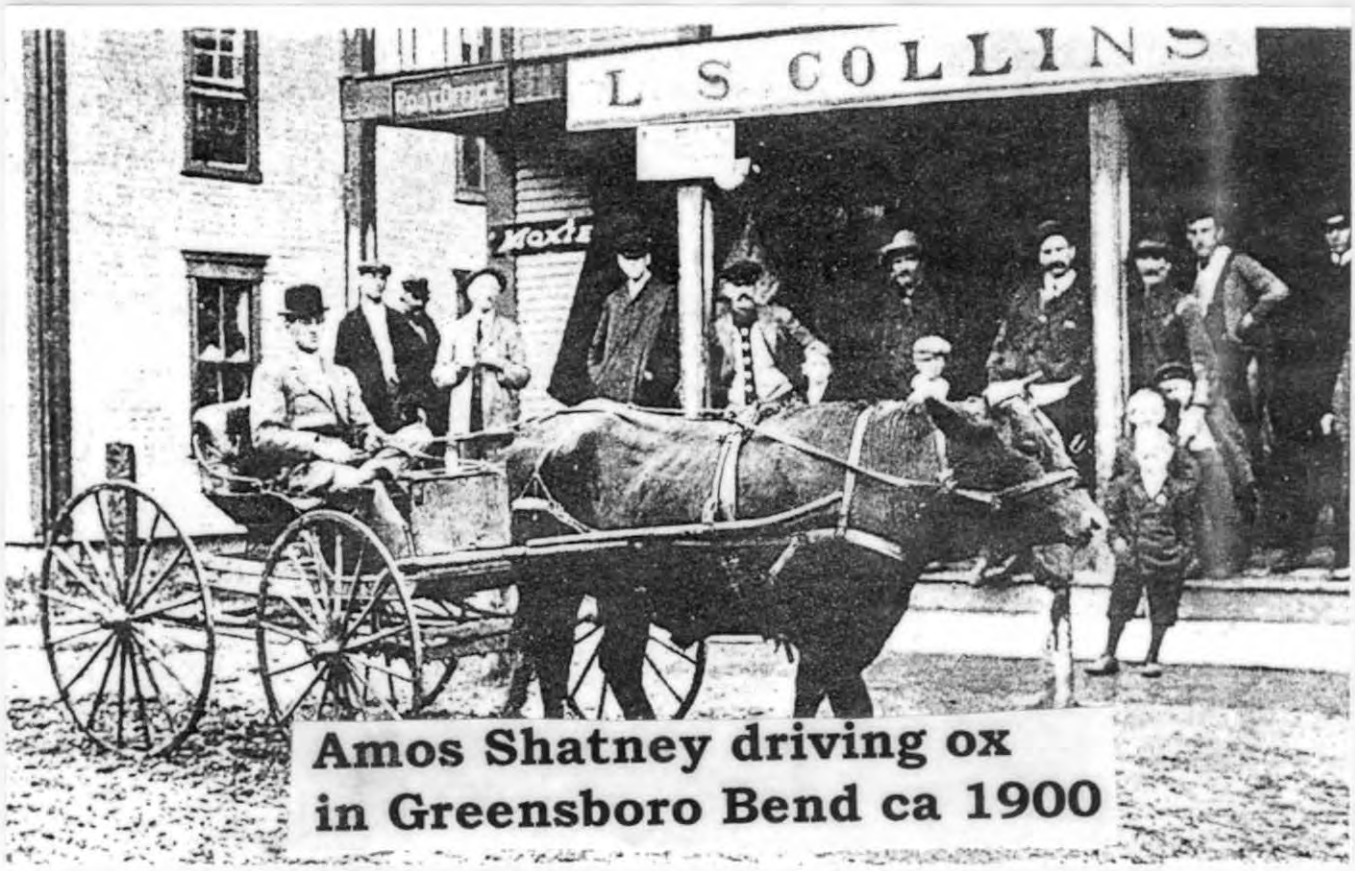
fired evaporators, and osmosis equipment made maple syrup making less labor intensive for some. The result is most of the small farms ceased operations, and farm help was not so much in demand. Most of the laboring jobs in nearby towns also disappeared as the railroad, sawmills, furniture and other factories closed, and the granite industry in Hardwick ceased operations.

In recent years some homes have installed solar water heaters, and solar electricity generating panels on their buildings.


Haying with Oxen
Horse Powered Potato Digger
Blacksmith at Work

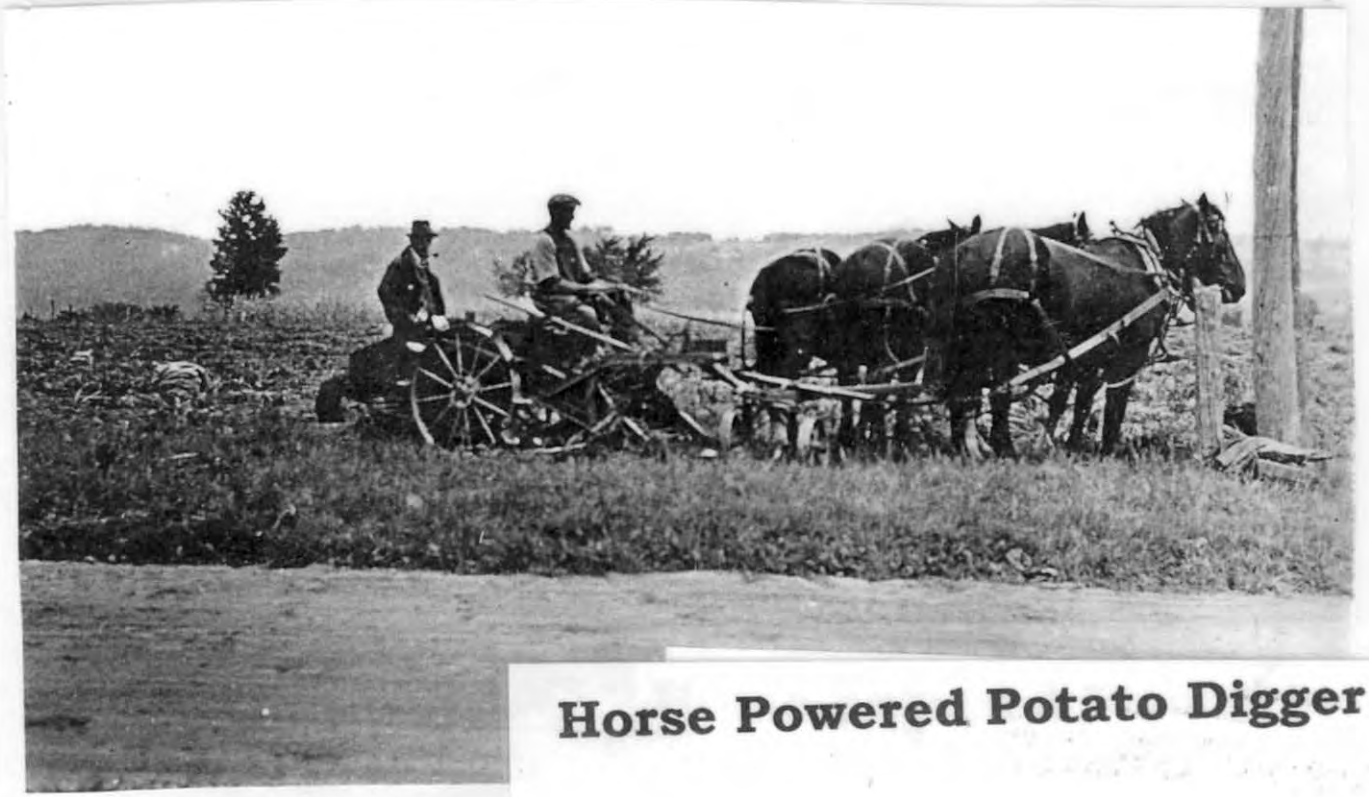


Haying with Oxen



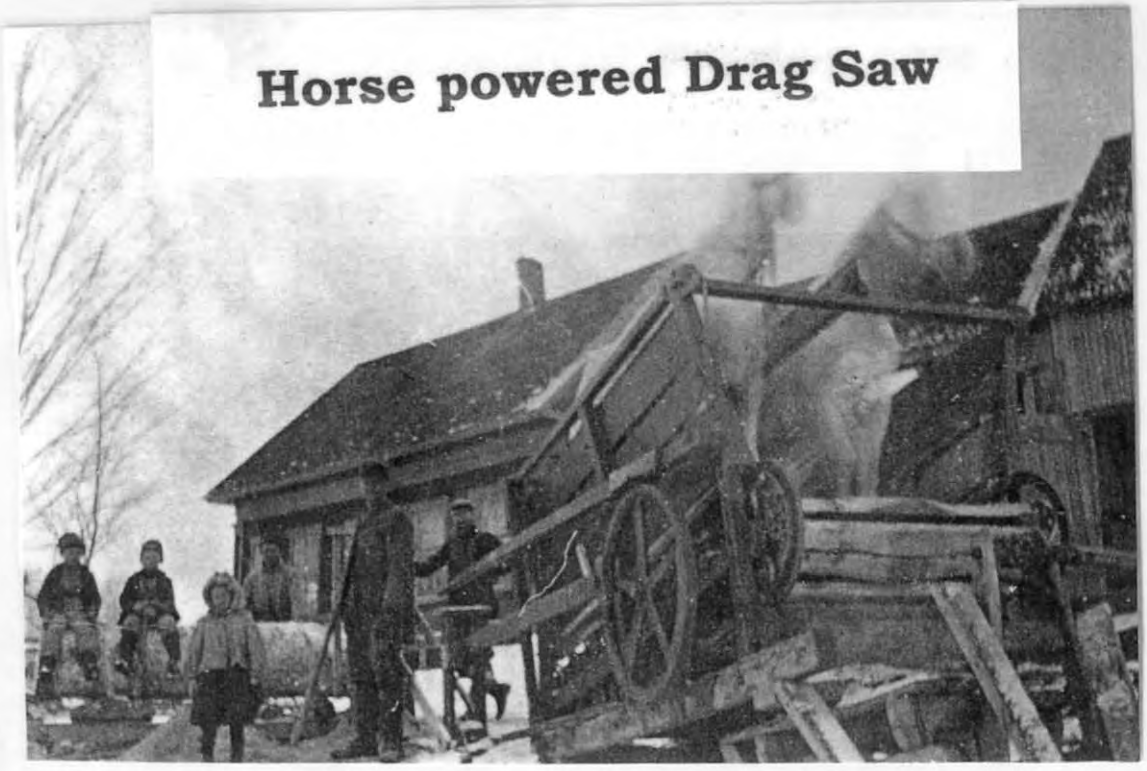
Amos Shatney driving ox in Greensboro Bend ca 1900

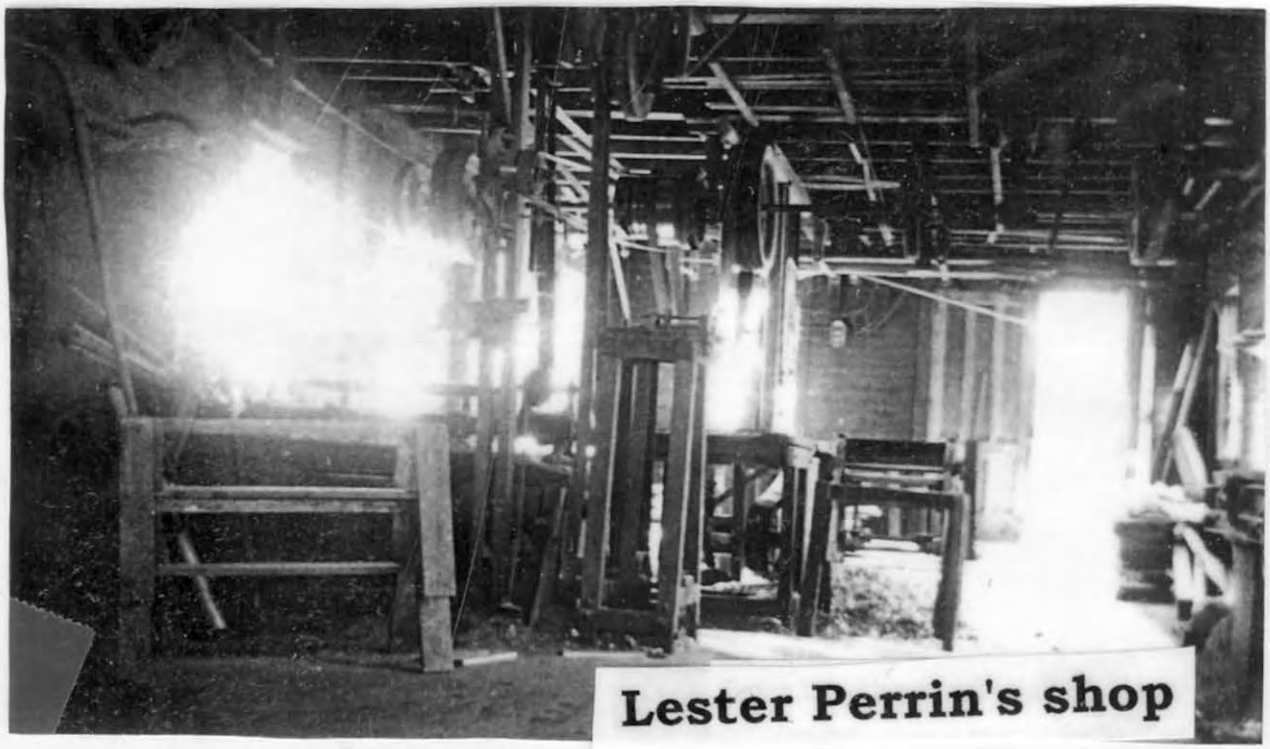
Grain Mill and Cheese Factory Now Miller's Thumb



Horse Powered Potato Digger

Horse powered Drag Saw





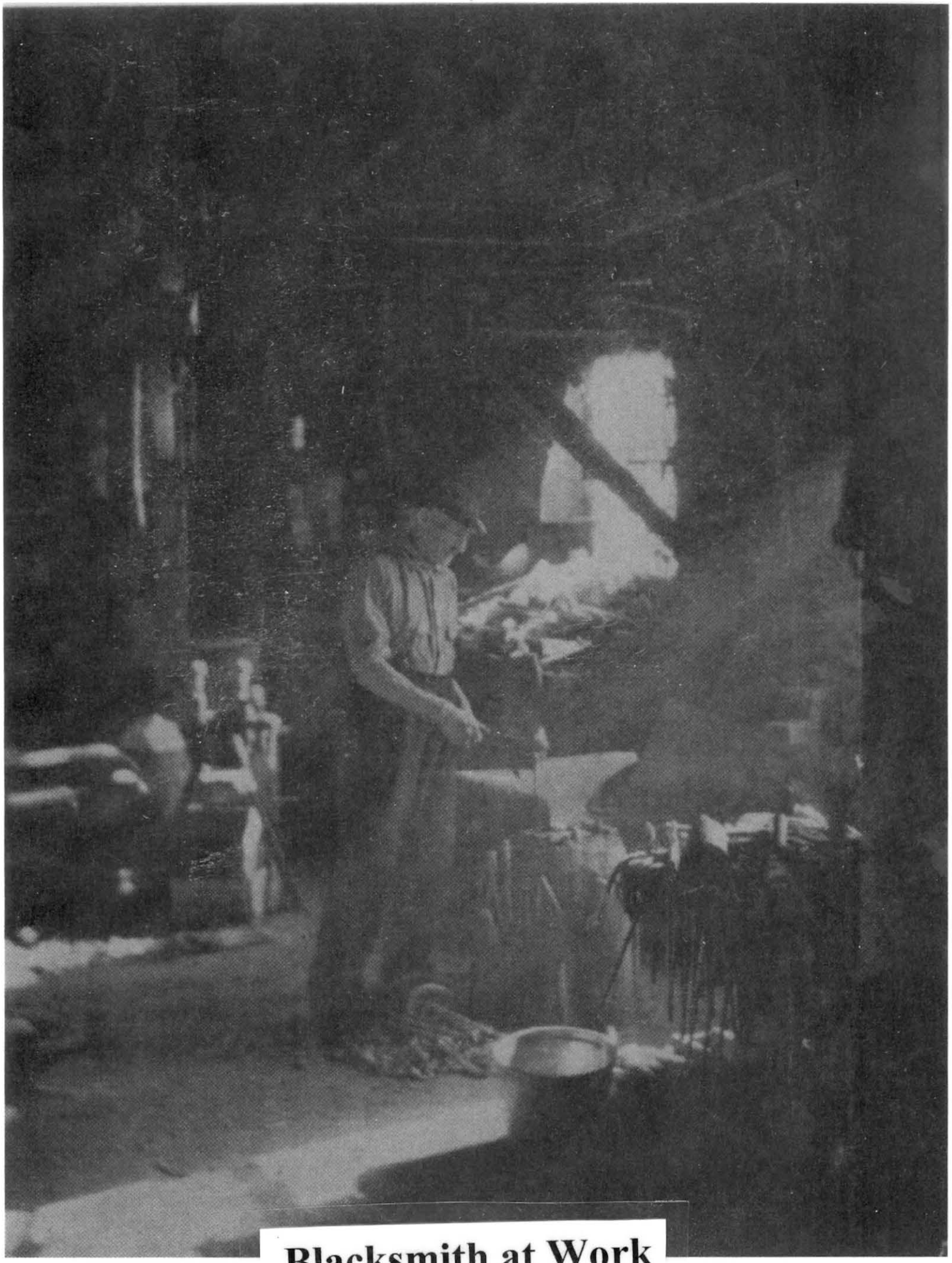
Lester Perrin's shop

Farm family and horses

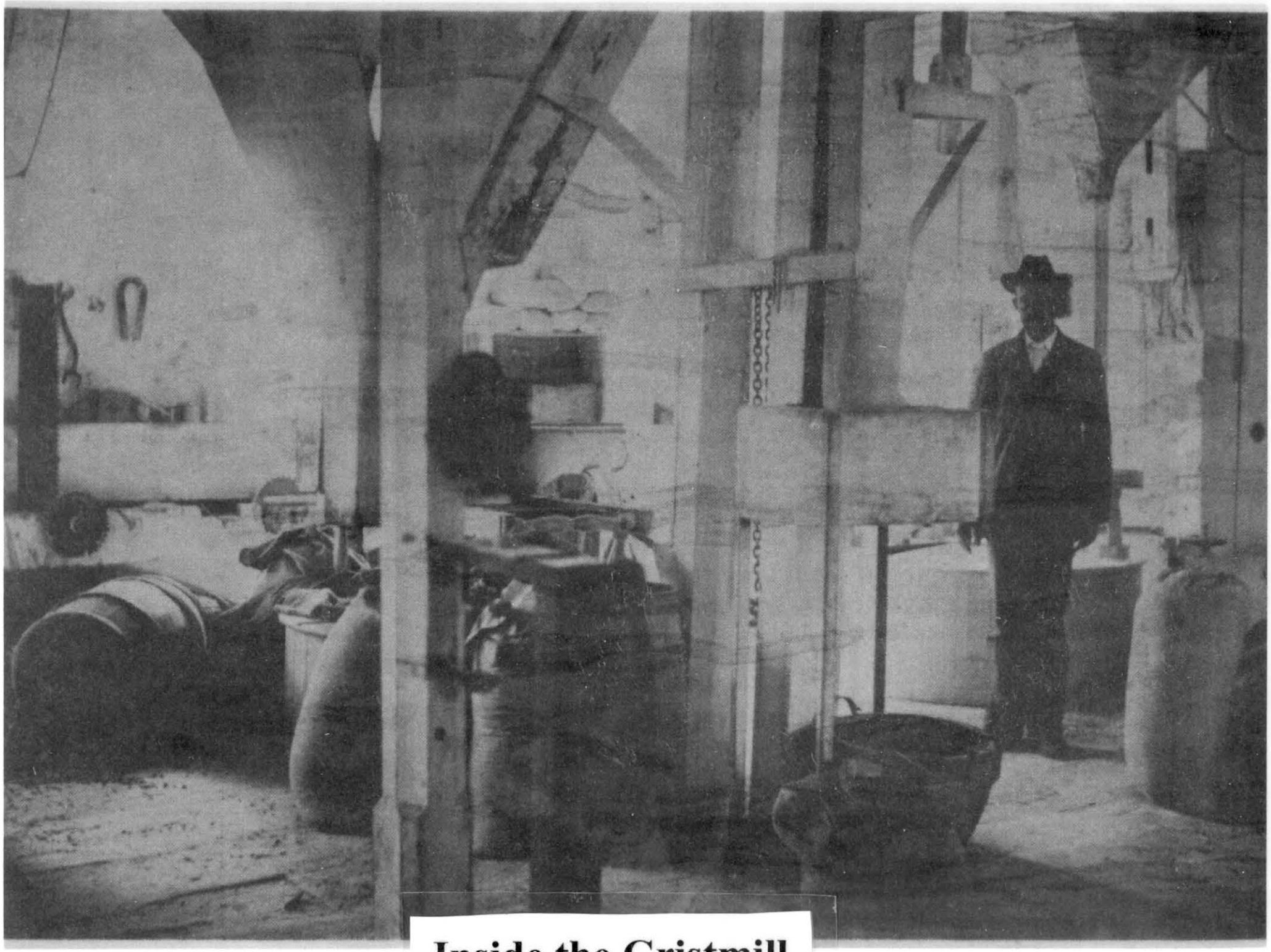
Spinning at Home

George Marshall's grain wagon

"It's your move."
Winter home entertainment



Blacksmith at Work



Inside the Gristmill

Water Power Built Early Greensboro

Two fast-running streams got the Town of Greensborough started and kept it running for its first century: Greensboro Brook and Sawmill Brook. The Greensboro Brook, flowing from Caspian Lake through what is now Greensboro Village, was spotted early as a source to provide power enough to operate a sawmill and turn the virgin forest into boards and timbers. The setters had no intention of living in log cabins or cellars for long and wanted buildings like those they had been accustomed to further south. Sawmill Brook in North Greensboro served the same purpose for the inhabitants in that area.

The first sawmill was located near the present Miller's Thumb shop, but it was soon moved downstream, below the village, near the present antique shop. A gristmill built by Mr. Stanley replaced the sawmill and used the same dam. It was remodeled several times. In 1804, Eli Austin, built the first carding machine in Orleans County on the brook. Though the exact locations of many later enterprises are no longer known, over the years several other mills were started and abandoned or replaced with other mills, both above and below the gristmill site, and some used the same dams. At various times during the 1800s several mills were operating, including a starch factory that produced the potato starch used in laundry, an oat mill, a cloth dressing mill, trip hammer shop, carding machine shop, a wheelwright shop, a tannery, an iron foundry that made stoves among other things, and a sash and blind factory. In the late 1800s The two talented Perrin Brothers, Alden and Lester, built a large machine shop and foundry powered by water, below the present Willey's Store. They made carriages, farm equipment, hearses, sleds, and much more. Lester worked with wood and Alden with metal. That enterprise operated well into the early 1900s.

The power industries encouraged local growth, as blacksmiths, coopers, shoemakers, harness makers, tinsmiths, and other tradesmen set up shops in Greensboro, and stores and boarding houses flourished.

In North Greensboro, on Sawmill Brook, another swift moving stream, Deacon Aaron Farnham built a sawmill and a grist mill near the home where Nancy and Lewis Hill now live. Later Aaron Hill and his sons operated both of them for many years. One son, Aaron R Hill, built sawmill and shingle mill further down the stream in Skeeterville, near where it crosses Route 16. He operated this with his son, Henry.

With the coming of the railroad in the 1870s, steam power arrived, and the mills no longer needed the fast streams for power. They did, however, need a mill pond for washing and storing logs until they were needed, so the Lamoille River, with its dependable source of water, became a choice location for later mills. The power provided by steam also made it

possible to use circular saws, which were faster and more efficient, than the old up-and-down blades. Henry Tolman, J. W. Simpson, and Joseph Delano, built a large steam mill in Greensboro Bend that employed 40 men and produced lumber, shingles and wooden boxes. In later years, until the late 1900s, the plant made novelty fencing.

North of the Bend, in the late 1800s, Robert Richie built a steam sawmill just below the Four Corners where Route 16 and the roads to North Greensboro and West Wheelock meet. An old locomotive furnished the power for this mill, and manpower was partially supplied by a group of Portuguese men Richie had imported. This mill burned in the early 1900s, and was never replaced. The huge boiler was sold for scrap during World War II.

Some men set up a lumber camp and a temporary steam-operated sawmill in North Greensboro in the early 1940s, on a stream coming from Mud Pond. A fire destroyed that mill one night, and it was reported that a half million-board feet of lumber were lost. The furnaces that heated the boilers of steam powered mills were a constant fire hazard and over the years many mills burned, and not all were replaced.

Citizens made use of wind power in a limited way during the early 1900s. Abner Hill installed a tall windmill on his farm to pump water for his animals and dwelling. A bit later propeller operated generators called windchargers appeared on houses and barns, as enterprising homeowners bought mail-order generators, or made them out of old automobile parts. These were able to generate enough 6-volt power to operate a radio and sometimes an automobile light bulb.

As the power lines gradually reached further into the backcountry, electricity from Hardwick gradually, in the early to-mid-1900s, became the power source for farm and town

6/08
Lewis Hill

Map Key

1 - 13. Early Greensboro mills: Sawmill, gristmill, carding machine, starch factory, oat mill, a cloth dressing mill, trip hammer shop, carding machine shop, a wheelwright shop, tannery, iron foundry, a sash and blind factory, and a machine shop and foundry.

14. Grist mill North Greensboro
15. Sawmill and shingle mill North Greensboro
16. Sawmill and shingle mill Skeeterville
17. Sawmill and box factory Greensboro Bend
18. Sawmill north of Greensboro Bend
19. Temporary sawmill near Mud Pond

Early Greensboro Mills:
Sawmill, Gristmill, Carding Machine
Starch Factory, Oat Mill
Cloth Dressing Mill
Trip Hammer Shop
Carding Machine Shop
Wheelwright Shop, Tannery
Iron Foundry, Sash and Blind Factory
Machine Shop, Foundry

Grist Mill
North Greensboro

Sawmill and Box Factory
Greensboro Bend

Sawmill and Shingle Mill
Skeeterville

Temporary Sawmill
Near Mud Pond

Sawmill and Shingle Mill
North Greensboro

Sawmill
North of Greensboro Bend

Power and Mills in Greensboro Vermont

Timothy Stanley erected the first mills in Greensboro on Greensboro Brook near the outlet of Caspian Lake – a saw mill in 1791 and a grist mill in 1792. These mills, powered by waterwheels, served the early needs of settlers for building materials and flour. A few years later in the late 1790s, a saw and grist mill was also erected on Sawmill Brook. By the early 1800s, Greensboro had a fulling and carding mill in support of the home woolen industry, an oat mill primarily for horse feed, and a shingle mill.

By the mid 1800s, as roads improved, a wagon and sleigh factory was established as well as a blind, door and sash factory to supply the active enterprise of home building. Also, a starch factory was built to process locally-grown potatoes that were not eaten or used for seed. An iron foundry was erected to satisfy the local needs for stoves and other ironware.

By the late 1800s and early 1900s, a creamery had been established to process milk from Greensboro's burgeoning dairy farms and an ice business was started to harvest Caspian Lake's pure ice both for the dairy and for the home icebox. The coming of the railroad to Greensboro Bend stimulated the construction of a steam saw mill, a granite polishing mill and a butter tub factory.

Greensboro's primary sources of power evolved as new technologies became available. At the time of settlement, the ox, the horse and the waterwheel were the primary power sources. By the 1850s-60s, the water turbine had replaced the waterwheel in most of Greensboro's mills. By the 1860s-70s, mass-produced horse-drawn field equipment and horse-powered treadmills were transforming Greensboro's farms. A decade later, the steam engine became broadly available and was used, for example, in the sawmill at Greensboro Bend.

By the 1910s, the "one-lunger" gas engine appeared on local farms as a convenient portable power source – powering, for example, cordwood saws and threshing machines. A decade later, the gas engine was used to power an electric generator which in turn powered milking machine vacuum pumps, milk refrigerators and electric lights for the barn. In 1915, electric service reached Greensboro Village but did not reach the more remote farms until the 1930s-40s. Finally, the gas-powered tractor entered the farming scene in the late 1930s and, with its myriad of powered accessories, transformed the farming operation.

TOWN OF
GREENSBORO, VERMONT
ORLEANS COUNTY

FARMS AND COUNTRY HOMES

SCALE – 1" = 2000' March 1980

0' 1000' 2000' 4000' 6000' 8000' 10000' (FEET)

0 500 1000 2000 3000 (METERS)

Map originated and drawn by William P. Kelly - 1945
Revised - 1972, 1980 & 1984
Revised-February 1988 by Wilhelmina Smith as a public service for
The Greensboro Association
Redrawn by M. Ann Bartel - Anniegraphics, Greensboro, VT - February 1988

◂LEGEND▸

- TOWN LINE
- UNIMPROVED DIRT ROAD
- BROOK
- □ FARM or COUNTRY HOME
- [2] STATE AID HIGHWAY
- (8) TOWN HIGHWAY
- △ U.S.G.S. BENCH MARK

This map is based on photoenlargements of appropriate U.S.G.S. Quadrangle Maps

GREENSBORO, VT

Busy day at the Mill and Store

Woodworking factory between Caspian Lake and Village

Ox Yoke (479)

Hand-Cranked Equipment on the Farm
(Paul Wood 6/30/2004)

Before the advent of horse powers, steam engines, gas engines and electric motors, many pieces of farm equipment were human powered via a crank. Even after the introduction of these other power sources, much equipment that was small or infrequently used continued to be powered by a hand crank. As late as the 1930s, most rural farms were still without electricity. There was a great variation in the frequency of use (seasonal, monthly, weekly, daily), the continuity of cranking (many interruptions, some interruptions, continuous), the total duration of cranking (short, medium, long), the cranking speed (slow, medium, fast), and the cranking effort (small, medium, large).

In most cases, a rotary motion was produced in the equipment's moving part(s). In a few cases, such as the shaker screen of a fanning mill or the oscillating gate of a broadcast seeder, the rotary motion of the crank was also translated into a linear motion. In a few cases, the rotary motion of the crank was translated only into a linear motion – for example, the potato sorter and the hair clipping machine. A few pieces of equipment had two cranks – for example, the boring machine was operated by both arms of one person and a large barrel churn was often operated by two people with a crank on each side. Power is typically transmitted from the crank by a direct connection or through gears (wood or metal), belts (leather or rope), chains, cams or rods (wood or metal). For a direct connection, there would be a single rotating part. Gears, belts and chains were used to power multiple moving parts in the same or opposite directions and at faster or slower speeds depending on the relative pulley or gear sizes. Linear motion was usually produced via a rod driven off a cam or arm on the crankshaft. Some types of human powered equipment had both hand crank versions as well as others that utilized levers, rods, bows, foot pedals, etc. for the application of human power. For example, butter churns have been made with dasher rods, foot pedals and rocker handles as well as crank handles.

Many a young farm boy or girl has clear although not necessarily pleasant memories of countless hours cranking one or another piece of farm equipment. Some equipment, such as centrifugal milk testers, cream

separators and broadcast seeders, required a minimum cranking speed in order for the equipment to function properly. A notoriously difficult job was cranking the grindstone while father sharpened axes, cyclebar mower blades, etc. Probably the most pleasant memories are of cranking the ice cream freezer with its promise of a future treat.

The high rotational speed of the cream separator required a sophisticated design and required regular lubrication. Its many parts had to be cleaned (without soap) and scalded after every use. Each piece of hand cranked equipment made its own distinctive noise – the loud clanking of the corn sheller, the high pitched whine of the cream separator, the splashing/sloshing of the butter churn, and the rushing air of the fanning mill.

Hand-cranked equipment was used for: dairy operations (D), animal care and food preparation (A), crop growing and processing (C), farm shop activities (blacksmithing, woodworking, sharpening) (S), kitchen and food preparation (K), and clothes making and washing (Cl). Some of the most common types of hand-cranked farm equipment are listed below:

Apple Peeler (K)
Automobile Starter Crank
Bone Mill (A)
Boring Machine (S)
Broadcast Seeder (C)
Butter Churn (D)
Butter Worker (D)
Clothes Wringer (Cl)
Corn Grinder (K)
Corn Sheller (C)
Cream Separator (D)
Curd Breaker (D)
Cyclebar Mower Grinder (C)
Fanning Mill (C)
Flour Sifter (K)
Forge Blower (S)
Fruit Grinder (C)
Grindstone (S)
Hair Clipping Machine (A)
Ice Cream Freezer (K)
Ice Crusher (K)

Insecticide Duster (C)
Lard/Sausage Press (K)
Lathe (S)
Meat Grinder (K)
Milk Tester (D)
Post Drill (S)
Potato Sorter (C)
Root Cutter (A)
Rye Straw Press (S)
Seed Cleaner (C)
Straw Cutter (A)
Telephone Generator Crank
Washing Machine (Cl)
Water Pump (K)
Well Windlass (K)
Yarn Winder (Cl)

Milk Setting Pan (2200)

In the earliest form of cream separation, milk was poured into a shallow dish or pan and allowed to sit for about 24 hours. A scoop was used to remove the cream that had risen to the top. A farmer needed enough pans to handle two milkings – typically dozens of pans. This form of separation was not only long in duration but left some butterfat in the skim milk.

"Shotgun" Can (933)

The shotgun can had two advantages over the milk setting pan. Separation could be accelerated by immersing the can in cold water. Once separation had occurred by gravity, the skim milk could be drawn off from the bottom spigot. The cream-skim milk boundary could be seen through the window and the spigot closed just before the cream was reached. With the advent of centrifugal separation, separation could be

Milk Stool (1226)

This innovative and ergonomically-correct milk stool, made in Holland, straps onto the backside of the milker and is always at the ready as he or she moves from cow to cow. The seat is contoured for comfort and the single iron leg terminates in a shock absorbing spring.

Rat Trap (2185)

The farmer and his domestic animals were in competition with the rat for food. The corn crib, grain bin, hen house, and pantry were magnets for the rats. This trap was one means the farmer and his wife used to control the rat population. This two-compartment metal wire cage trap has a counterweighted trap door leading to the second compartment with the bait. Once through the door, the rat can't go back and is eventually removed through a door at the end of the trap.

Curd Mill (1410)

This ca. 1800 curd mill (or "curd breaker") has ash teeth and a pine body fastened with rose head nails. Whereas as fruit and vegetable grinders had iron teeth, curd grinders had wooden teeth. The curd mill breaks up the curd prior to pressing and produces a much more uniform granule than the curd chopper which it replaced.

Curd Chopper (797)

Before the introduction of the curd mill, this hand chopper was used to break the curd into small pieces before salting and pressing. The curd mill was not only faster but produced a more uniform granule. A similar tool was also used to chop root vegetables.

Austrian Scythe (999)

The straight snath (handle) Austrian scythe was commonly used in Europe and usually had a wide, strongly tapered hand-forged blade. Although much less common than the curved-snath American scythe, this scythe had its strong advocates among American farmers. As contrasted with the mass produced stamped blades of the American scythe, the blacksmith wrought mild steel blades of the Austrian scythe could be sharpened an excellent cutting edge. Many farmers thought the straight snath was more efficient and less tiring.

American Scythe (2537)

This most popular scythe in Vermont had a mass-produced stamped steel blade and a steam-bent curved (and supposedly more ergonomically correct) snath (handle). However, a vocal minority were dedicated users of the Austrian scythe which they felt could cut faster, better and with less effort. This curved scythe snath was manufactured by Derby & Ball of Waterbury VT.

Shoulder Yoke (2556)

The shoulder yoke was commonly used to carry maple sap in pails from the tree to the gathering tank or, if water was not piped to the house, used to carry water from the well or spring to the house in pails as many as six times a day. Each full pail could weigh fifty pounds or more and the neck yoke helped to spread the load to the shoulders. One farmwife, who had to carry water from a spring 60 yards to the house, walked an estimated total of 6,000 miles in the forty years she lived on her farm! This yoke has two canvas straps that rest on the shoulders. The red paint with black line designs is unusual for a shoulder yoke.

Shoulder Yoke (1997.005.06)

A typical bucket carrier. Hand-made to fit over the shoulders.

Donated by Gordon Richardson

Wooden Bucket (1997.014.02)

Used to bring milk from barn, collect sap, bring water to house or barn. Two buckets could be carried by yoke hung over shoulders.

Donated by Robert Wilson Family

Sap Gathering Pails (1165, 2045.1)

These pails, usually suspended from the ends of a shoulder yoke, were used to gather maple sap from tree-mounted sap buckets. The inwardly slanted sides prevented sloshing of the sap over the edges of the pail as the farmer walked from tree to tree.

Swing Dingle (n142)

The swing dingle was an early form of the Peavy used by lumbermen to roll logs. It was also called the "swinging bitch" because of its loosely attached cant hook.

Ox Muzzle (2244, 1294.1)

As contrasted with horses, oxen are prone to grazing and not working if the nearby grass looks attractive. Hence, farmers muzzled their oxen. The earliest were made of woven splint – followed later by a wire mesh design. The splint is loose woven to allow easy breathing.

Ox Yoke (479)

Most oxen were used in pairs – typically trained together from a young age and destined to work their entire adult life together. Ox yokes are simple in design (as contrasted with work horse harnesses) and were often made by the farmer during slack times. The draw chain was attached to the central ring. Oxen were slow but had great pulling power and were not fussy eaters. In the 1850s, oxen began to be replaced by work horses as farm machinery requiring greater speed was introduced.

Barn Lantern (1855)

The kerosene barn lantern was the only source of nighttime light in the barn before the availability of electricity. This was especially needed for early morning and late afternoon chores during the wintertime. The clear glass chimney is held on by spring-loaded cap and could be removed for cleaning. As Mrs. O'Leary and all of Chicago found out, the barn lantern had serious potential for starting fires.

Calf Weaner (e1, 1488, 1480)

Farm implement inventors have taken three approaches to weaning a calf from its mother. In the first and most primitive approach, spikes of the farmer-made calf weaner (1488) prick the mother's udder when the calf tries to nurse, causing the mother to back off or worse to kick the calf. This doesn't do much for the mother-calf relationship! In a second approach, the sharp points of the weaner (e1, "NU-WAY") prick the calf's own nose when its pushes against the udder, causing it to stop nursing. The most humane approach is represented by the weaner (1480, "Kant-Suk") in which a hinged plate blocks access to the mother's teats but allows grazing. This weaner fastens onto the calf's nose with nose balls.

over →

CALF Weaners

Boring Machine (71)

This adjustable-boring-angle "beam auger", manufactured by Snell Mfg Co. of Fiskdale MA, was primarily used to drill holes for the wooden pegs that secured mortise and tenon joints in houses, barns, and bridges. The boring machine was placed on a beam with the operator seated on one end. The two crank handles allowed two-arm drilling at a much faster rate than the bit and brace which it replaced.

Auger for Drilling Holes

Corn Knife (n39)

The corn knife was placed near the bottom of the corn stalk and with a quick upward pull severed the stalk near the ground. This primitive corn knife with a reused scythe blade was clearly homemade in the farmer's shop.

Millstone Pick (584)

The millstone pick is used to sharpen the edges of the grooves in millstones of gristmills. This is essential for efficient grinding. This pick was found, during building renovation, on a beam at the Miller's Thumb. The pick is marked "S.D. Dow" for Samuel D. Dow who owned and operated a sash and blind factory which occupied the old fulling mill ca. 1870s. Likely, he also owned the grist mill. The bolted-in blades can be removed for sharpening.

Log Marking Hammer (957)

The log marking hammer was used by a lumberman to mark the ends of his harvested logs with a unique symbol. This identified his logs at the sawmill among those of all the other lumbermen.

Bit Brace (206)

This wooden brace of ancient design used a center bit for boring holes. It was a slower and less accurate means of hole boring used before the introduction of the boring machine.

Scythe Anvil (1033) and Hammer (e253)

The scythe anvil (or "dengelstock") and scythe hammer were used to sharpen the hand-forged blades of Austrian scythes. The anvil was driven into firm ground or a stump and the scythe blade edge was placed on the anvil. The hammer peened along the blade, drawing out a sharp serrated cutting edge.

Dibble (655)

This primitive hand planting device was used to make holes in a plowed field into which seeds were dropped. It was slow and backbreaking work and was gratefully abandoned in favor of hand-pushed or horse-drawn planters (seeders) that opened a furrow, metered and dropped the seed, and closed the furrow over the seed.

Apple Picker (2491)

This interesting apple picker has two unusual features – a leather-covered horsehair cushion at the bottom of the cage to prevent bruising and a stem cutting blade attached to top of the cage. This is probably Shaker designed and manufactured.

Apple Basket (1491)

The traditional split wood apple basket had split wood handles and a wooden disc bottom. These baskets were made in large numbers at local shops.

Davis Swing Churn (1192)

To make butter, separated cream is poured into a butter churn and agitated for about thirty minutes until butter forms. There were many different butter churn designs. In the Davis Swing Churn, the chamber is free of any internal structures so the cream moves in a smooth continuous overturning course. The claim is made that a better grade of butter results from the lack of violent turbulence during churning. The Davis Swing Churn was patented by Oliver W. Davis of Waterbury VT on May 1, 1877. Davis is the grandfather of Allen F. Davis of Greensboro. The Davis churn, manufactured by the Vermont Farm Machinery Co. of Bellows Falls VT, was one of the most successful churns in the market. This was a great improvement over the primitive up-and-down (or "dash") churn.

O. W. DAVIS.

CHURN.

No. 190,199. Patented May 1, 1877

Fig. 1.

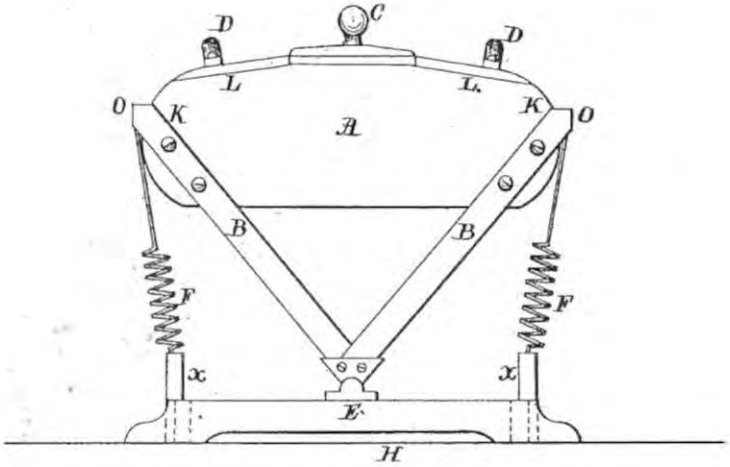
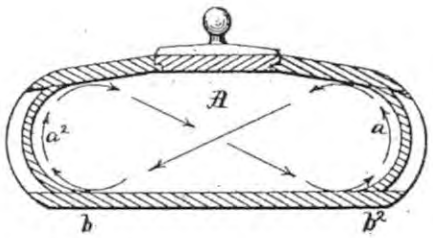


Fig. 2.



Witnesses:

Curtis Weller
Geo. W. Kennedy

Inventor:

Oliver W. Davis.

UNITED STATES PATENT OFFICE.

OLIVER W. DAVIS, OF WATERBURY, VERMONT.

IMPROVEMENT IN CHURNS.

Specification forming part of Letters Patent No. **190,199**, dated May 1, 1877; application filed October 30, 1876.

To all whom it may concern:

Be it known that I, OLIVER W. DAVIS, of Waterbury, in the county of Washington and State of Vermont, have invented a new and useful Improvement in Churns, which improvement is set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is to churn the cream evenly and without breaking the grain of the butter, and without excessive labor; and by agitating all of the cream, a greater quantity of butter is produced.

In the annexed diagram, A represents the box-churn, with the curved ends K K.

The churn is made of wood, with curved ends, produced by staves fitted into grooves in the sides of the box. The box is about three feet long and fifteen inches wide, and eighteen inches high at the cover, which is two or three inches higher than at the ends. Thick cream is apt to lodge in the corners of a square box, and to obviate this the box is made with a curved end; or it may be made with three boards, so that the cream will slide up an inclined plane instead of coming against a right angle.

In rocking the churn on the pivot E the cream rushes to one end, and, sliding along the curve, is thrown over, and strikes near the opposite end of the box, as shown by the arrows in Fig. 2. The cream passes around the curved end at *a*, and strikes the bottom of the box at *b*, then to a^2, and thence to b^2, and back to *a*. The joint *b* being beyond the center of motion, the force of the cream aids the reverse motion of the churn; and the curved ends and the top being higher at the cover C than at the handles D D, facilitates the motion of the cream without so much friction as to break the grain and injure the quality of the butter. The beveled top L L also allows a better access to the churn in examining and taking care of the cream and butter.

F F represent spiral springs, made of steel, and attached to posts of wood *x x* about one foot high, and the other end connected by a string or cord to a cleat, *s*, across the end of the churn at *o o*. The braces B B are firmly screwed to the box, and fastened with screws to a metallic joint, which turns at the point E.

The churn is operated by taking hold of one of the handles D, and moving it back and forth.

H is a frame, on which the pivot E rests.

It will be observed that the bottom of the churn being flat and its ends curved, and the top being formed with the two upward bevels or inclines L L, connecting with the upper ends of these curves *k k*, the cream, when the churn is oscillated, will slide across on a flat bottom, and then on the curved end; and in passing beyond such curved end the continuous upward incline or bevel L assists the gravitating tendency of the cream quickly to leave such bevel, and in season to take its proper course to the bottom of the opposite curve *k*, and not to ride along the under side of the top of the churn so far as to be deflected, in its fall, abruptly against the center or hollow of the curved end.

The effect of this construction and action is to cause the cream, during the oscillations of the churn, to pursue a continuous regular course, and turn entirely over, or bottom side upward, and vice versa, its route being, in fact, in lines resembling a figure eight, (**8**,) the resultant effect upon the cream being that it is all churned alike, and a better and more uniform butter is produced, as also a larger quantity from a given amount of cream. The bottom of the churn, being flat, gives it a greater force when it reaches the curved ends than it would if the bottom were round or concave, and thus insures a better action.

The springs F are made of the best steel; and they not only perform the duty of assisting very materially in the oscillations of the churn, and so relieve the attendant of much labor, but their strength is such as to serve as supports for the churn, whether the same is at rest or in action. They also greatly relieve the strain and wear of the pivot or axis at the center of oscillation, while the arms or braces B B not only, in turn, relieve the springs, but they also firmly sustain the box or churn, and insure a uniform and steady support for it.

All floats or irons within the churn are avoided, as also all dashers and everything which could tend to mash the butter-globules. There are no sharp or other corners into which

Corn Planter (2215)

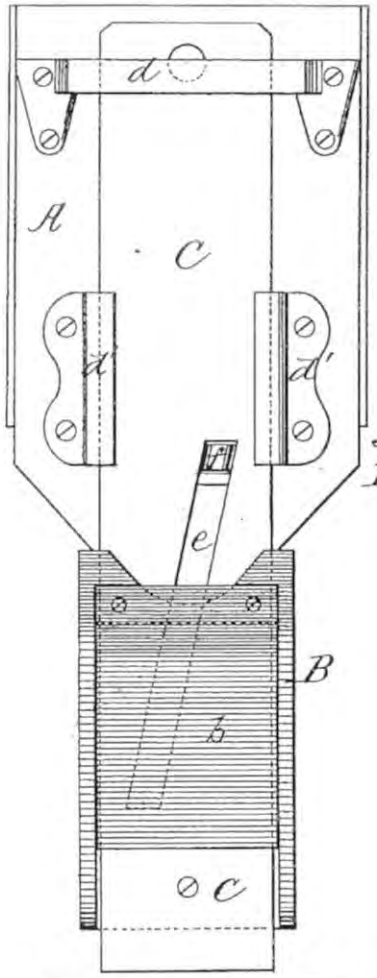
The Hoag hand corn planter has a tin seed hopper and a D-handle that operates a slide mechanism to open the seed gate. This hand corn, bean and beet planter was manufactured by The Queen of the Harvest Manufacturing Co. of West Chazy NY and invented and patented by Albert Hoag of Grand Isle VT. The "stabbing" planter was a great improvement over the back-breaking use of the dibble.

A. HOAG.

Hand Corn and Bean Planter.

No. 204,574. Patented June 4, 1878.

Fig 1



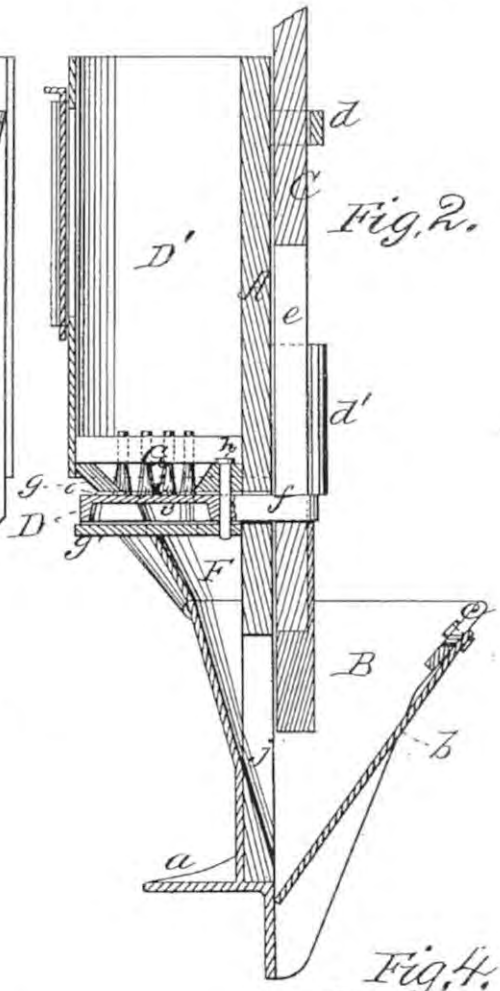


Fig. 2.

Fig. 4.

Fig. 3.

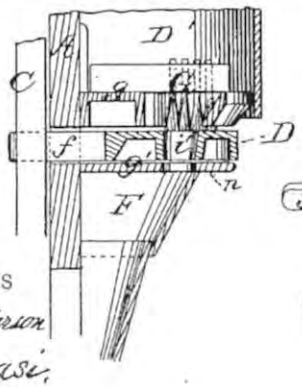
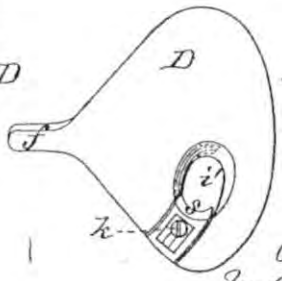


Fig. 5.



WITNESSES

Villette Anderson

F. J. Masi.

INVENTOR

Albert Hoag,

by E. W. Anderson.

ATTORNEY

UNITED STATES PATENT OFFICE.

ALBERT HOAG, OF GRAND ISLE, VERMONT.

IMPROVEMENT IN HAND CORN AND BEAN PLANTER.

Specification forming part of Letters Patent No. **204,574**, dated June 4, 1878; application filed May 4, 1878.

To all whom it may concern:

Be it known that I, ALBERT HOAG, of Grand Isle, in the county of Grand Isle and State of Vermont, have invented a new and valuable Improvement in Hand Corn and Bean Planter; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side view of my improved hand-planter. Fig. 2 is a longitudinal vertical section thereof; and Figs. 3, 4, and 5 are details.

This invention has relation to improvements in hand corn and bean planters; and the nature of the invention consists in the combination of parts, as will be hereinafter more fully set forth.

In the annexed drawings, the letter A designates the back board of my improved hand-planter, having at its lower end a chamber, B, of triangular form. This chamber is open at top, and has near its lower end a horizontal stop-flange, *a*. One of its sides is formed by a metallic plate, *b*, rigidly secured at its upper end to a brace, *c*, connecting the end walls of the said chamber, its lower end being free and in contact with the back plate of the same.

D′ indicates the seed-hopper, the bottom of which is formed by a dished plate, *g*. The front wall of this hopper terminates at the said plate.

C indicates a metal-shod plunger working in guides *d d′* upon the back board, and provided at its upper end with a suitable handle. Plunger C is provided with an oblique slot, *e*, in which is engaged the stem *f* of a valve, D, projecting through a transverse slot in the back board A. This valve D is arranged between two metallic plates, *g g′*, and it oscillates on a pin, *h*, extending through registering perforations in the said plate and valve. The space between these two plates *g g′* is not inclosed by a lateral wall, so that the valve D may be inserted therein and removed therefrom without passing it through the seed-hopper, and said valve is readily accessible for the purpose of adjusting the slide *s*.

The upper plate *g* is dished, as before stated, upon its upper face, and has an opening, *i*, in its middle portion, through which the grain flows to a seed-cup, *i′*, in the valve D. The plate *g′* has no opening corresponding to the seed-cup *i* of the upper plate *g*, but is broken away at one end, *n*, above a funnel, F, secured to the back board, so that when the cup *i′* is brought over this funnel, by actuating the plunger C, its contents are discharged into the said funnel, and, passing down it, are discharged from the hopper D′, through an opening, *j*, in the back board, into the chamber B below the plunger, which is required to be raised to throw the seed-cup *i′* in line with the funnel aforesaid.

The valve has an adjusting-slide, *s*, and screw *k*, by means of which the capacity of the seed-cup *i′* is increased or diminished. As the valve is operated by raising the plunger, any superfluous grains therein are swept out by means of a brush, G, secured to plate *g* in line with the funnel F, and the said valve is thereby prevented from becoming jammed between the plates *g g′* aforesaid.

It will be observed that plate *g′* serves as a bottom to the seed-cup *i′*, and also as a bearing for the valve.

In order to diminish the friction of the valve D upon plate *g′*, it is hollowed out upon its under side, a few ribs being retained to keep it level.

The grain, having fallen through the funnel F into the chamber B, is expelled therefrom into the ground by thrusting the plunger down, thus flexing the plate *b* and causing the heel thereof to be buried in the ground.

The top of the chamber is open in order that the operator may see that the grain has fallen through the funnel into the chamber.

What I claim as new, and desire to secure by Letters Patent, is—

The combination, with the seed-chamber D′, provided with the dished bottom plate *g*, having an opening, *i*, therein, of the valve-supporting plate *g′*, arranged below the said plate *g*, the oscillating valve D, fitting snugly between said plates, and having a stem, *f*, and the plunger C, having the oblique slot *e*, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

ALBERT HOAG.

Witnesses:
A. H. W. JACKSON,
M. B. CONEY.

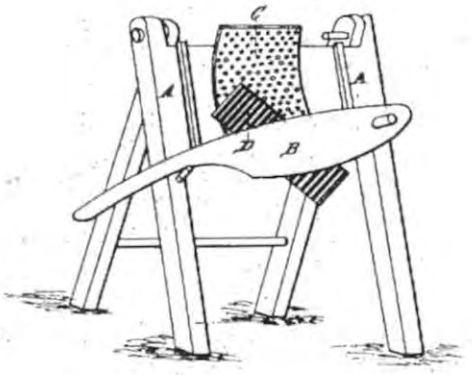
Corn Sheller (10)

Corn shellers are used to remove the dried kernels of corn from the cob. There have been many designs for corn shellers but this is one of the simplest. Except for the two cast iron knobbed plates that could be purchased at the local general store, a farmer or local woodworking shop could easily make or repair this sheller. The corn is shelled between the two knobbed plates – one plate being movable with a handle. There is space below the grain chute for a box or basket to catch the shelled kernels. This sheller was farmer-made and was probably inspired by the earlier design of James S. Harris of Poultney VT who was issued a patent on Sept. 18, 1835. This sheller was a great improvement over a box with an iron shelling strip.

9102X

J. S. Harris.
Corn Sheller.

Patented Sept. 18, 1835.



Potato Fork (e54)

This D-handled wood-tined fork was used to lift potatoes out of relatively loose ground. The blunt wooden tines caused a minimum of bruising damage to the potatoes.

Man's Boot (1994.005.02)

Note wooden nails to attach sole. Handy boot straps were made as part of the boot itself. Boots before 1860 were often made to fit either foot.

Donated by Gordon Richardson

Seed Potato Cutter (2717)

The foot pedal moves a wooden block that pushes the potato into the cutter blades. The potato is cut into up to eight pieces which fall onto six sloped iron fingers and thence into a box or basket. A slide adjustment positions the potato with respect to the blades for two sizes of potato. The pieces had to be checked to see if there was at least one eye. This device replaced the much slower cutting by hand with a knife. This seed potato cutter came from the Wilson Farm in Greensboro which was a large potato producer.

Seeder (2510)

This hand-pushed seeder would be suitable for the kitchen garden or a small field. Below the wooden seed hopper is an agitator driven by a rod resting on an eccentric mounted on the wood-spoked wheel. There are ten seed gates of graduated size, numbered 4 to 13, for different size seeds. A tin furrow opener is located below the hopper with a cast iron closing/tamping wheel behind. This seeder was made by O.V. Whitman & Son of Turner Bridge ME.

Apple Corer (200.078)

Butter Mold

Meat Grinder (1273)

The wood-body meat grinder has a wood cylinder studded with iron teeth that pass between a row of fixed iron knives. It has a lid that opens for cleaning the interior and is mounted on a board which at one time had four legs. A primary use of the meat grinder was in the preparation of sausage stuffing and was much more efficient than chopping with a knife.

Weaving Shuttle (1995.010)

Flax (Tow) Wheel (2368)

This wheel was used to spin tow (coarse flax or hemp), probably for cordage. The flyer is driven by a treadle via a cast iron crank. Shaft end opposite the flywheel is held in place by a removable leather strap.

Mowing Machine Grinder (101)

During mowing season, the five to eight-foot-long sickle bar blade of the mower was typically sharpened twice a day. A sharp blade cut the grass more easily and reduced the pulling effort for the horses. Initially, farmers used a standard platform grindstone often hand or foot-powered by the farmer's son. Not long after the ground-powered mowing machine came into common use (ca. 1860s and 1870s), specialized grinders were introduced whose grindstones fit between the triangular "sections" of the sickle bar. The blade was removed from the mower, placed in the grinder jig and sharpened more rapidly and accurately than before.

Dash Churn (1241)

The dash or "up-and-down" churn was one of the earliest and simplest forms of butter churns. The up-and-down motion produced butter in about a half hour. The churning process was much improved with the cylinder churn and the swing churn which produced better quality butter in less time and with less effort.

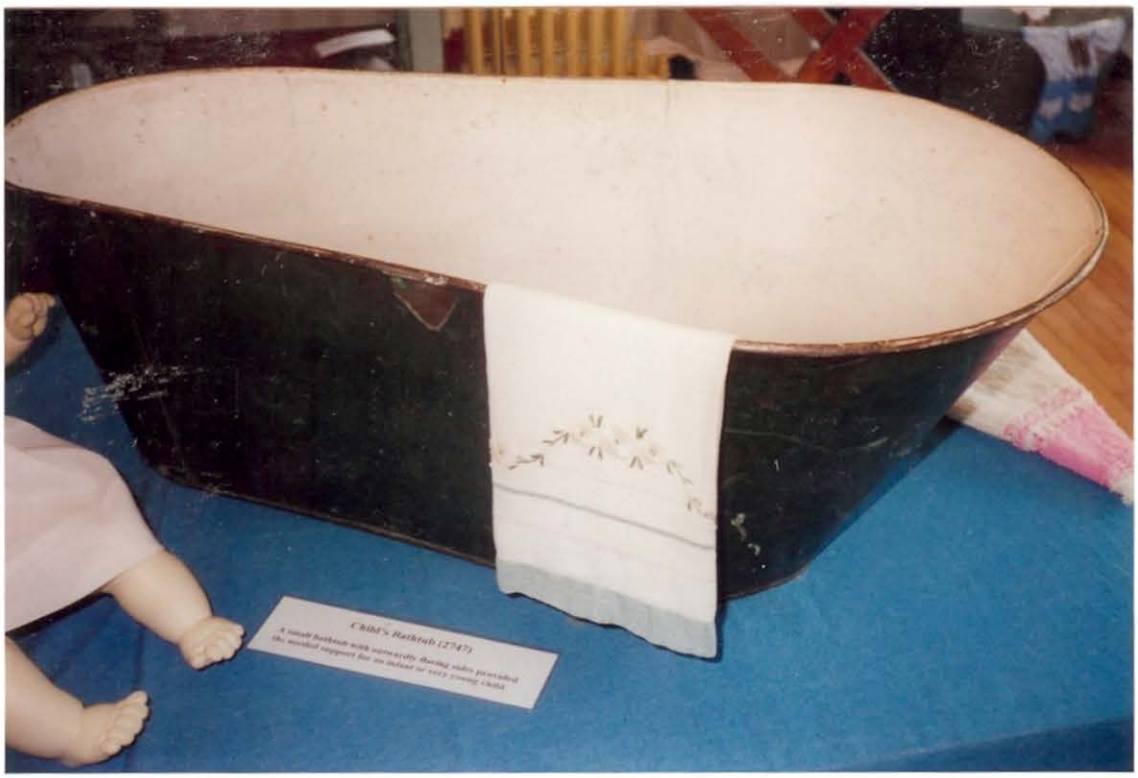
Child's Shoe (2006.043.03)

Found in the walls of Sam Ladd's House

Donated by Anne Harbison

Child's Bathtub (2747)

A small bathtub with outwardly flaring sides provided the needed support for an infant or very young child.



Cylinder Churn (522)

The cylinder churn is a coopered churn with a set of paddles rotated by a crank handle. This popular churn was called the "New Style White Cedar Cylinder Churn". Note that the paddles of this churn, as with most churns, could be removed to ease scooping out the butter and to simplify washing and scalding the churn.

Cheese Press (708)

After the curd has been broken into small pieces and salt has been added, it is loaded into a cheesecloth-lined cheese form and placed into a cheese press. There are a vast number of cheese press designs but all have the same objective of exerting a continuous pressure on the curd for about 24 hours. This press uses ropes and pulleys (three on each side) to exert pressure by raising the lower bar/platform. The capstan tension is multiplied through the mechanical advantage of the multiple pulleys. As the cheese is compressed, the expelled whey is caught by the drain board and is conveyed through the spout to a pail underneath.

Cheese Press Form (44)

This bentwood cylindrical form was used to retain and shape the curd during pressing. The disk-shaped follower transmitted pressure from the press to the top of the curd.

Cheese Press Drain Board (2147)

The drain board was positioned below the cheese press form and served to catch the whey as it was expelled from the pressed curd. A circular moat directed the whey to a spout and thence into a tub or can on the floor below.

"Shotgun" Can (933)

The shotgun can had two advantages over the milk setting pan. Separation could be accelerated by immersing the can in cold water. Once separation had occurred by gravity, the skim milk could be drawn off from the bottom spigot. The cream-skim milk boundary could be seen through the window and the spigot closed just before the cream was reached. With the advent of centrifugal separation, separation could be accomplished in minutes rather than hours needed for gravity separation.

Bathtub (2497)

This soldered tin bathtub has flared sides and a pouring spout for emptying the dirty water. Before the advent of bathrooms and indoor plumbing, the family took its baths in tin bath tubs in the kitchen. Baths were not a frequent occurrence – in fact, at one time doctors condemned bathing as unhealthy. During the winter, the tub was positioned for warmth in front of the cook stove. The bath tub was filled with hot water from a teakettle or stove hot water reservoir if it had one. To conserve water usually several family members bathed one after the other in the same water, starting with the youngest female and ending with the oldest male.

Washing Machine (2046.1)

One of hundreds of washing machine designs, this all wood machine has two perforated wooden discs. The lower disc sits in the bottom of a wash tub and the upper disc is raised, lowered and rotated on a wooden guide post by a T-handle to agitate the wash. Although very simple in design, this washing machine was still an improvement over the washboard.

Ironing Board (1112)

The main feature of this wooden ironing board is the adjustable height mechanism which consists of a notched wooden rod with a spring-loaded steel pawl (or detent) that fits into the notches.

Tulip Quilt

Appliqued with button-hole stitch
Made by Mrs. Sam Ladd

Donated by Marion Stegner

Iron (698, 710.2)

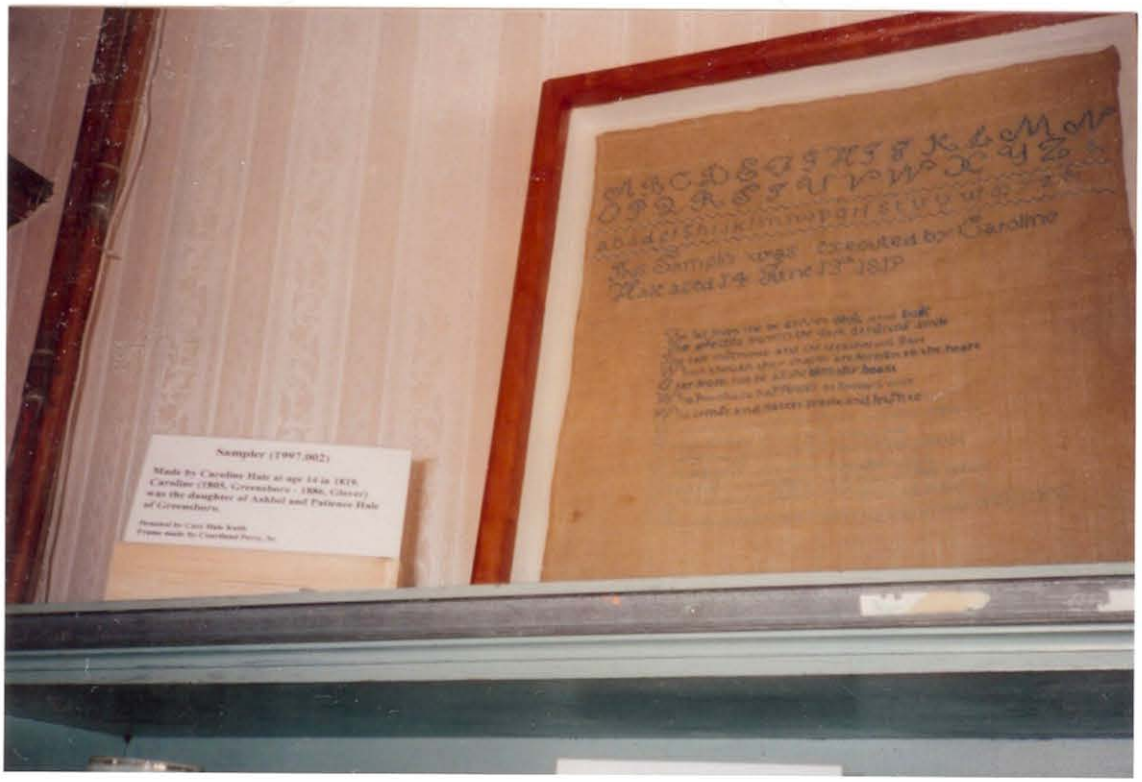
Iron 698 has a hollow interior to hold a heated wedge-shaped piece of cast iron. When the iron cooled, the sliding door in the rear of the iron was raised, the cool piece of iron was removed, and a new hot piece from the stove was inserted. The inside surface has ridges to increase the surface area and thus the transfer of heat.

With an ordinary iron-handled sad iron, the handle got hot along with the bottom of the iron. Often the laundress wrapped a towel or apron around the handle to protect her hand. Mary Potts of Ottumwa Iowa solved this problem by designing a detachable wooden handle that could be used interchangeably on many iron bottoms. Iron 710.2 has this detachable wood handle so that when the iron cooled off it could be returned to the stove, the handle detached, and reattached to a hot iron on the stove. The wooden handle stayed comfortably cool. She patented the idea in 1871. This very popular iron was manufactured by the Enterprise Manufacturing of Philadelphia.

Sampler (1997.002)

Made by Caroline Hale at age 14 in 1819. Caroline (1805, Greensboro - 1886, Glover) was the daughter of Ashbel and Patience Hale of Greensboro.

Donated by Cary Hale Keith
Frame made by Courtland Perry, Sr.



This sampler was worked by Caroline Hale of Greensboro, Vt. It has been said that she raised the flax at the family farm, wove the linen and dyed the embroidery thread. Caroline was the daughter of Ashbel and Patience (Munn) Hale, formerly of Glastonbury, Ct. and mother of Caroline Sophia (Clark) Bemis, great-grandmother of Laura Rosette (Bemis) Keith and great-great-grandmother of Cary Hale Keith and David Bemis Keith. Given to Cary in 1981 by Mildred Fairfield, cousin of Laura Keith.

"Far far from me be driven deceit and guile;
The affected frown, the dark designing smile,
The tale ingenious and the treacherous part
Which, though they charm, are foreign to the heart.

O far from me be all the bliss they boast
Who purchase happiness at Honor's cost;
Who cringe and flatter, praise, and feign to love
With empty words that Truth will ne'er approve,

Rather be mine whate'er I hope or fear,
The soul's true language, acts and words sincere;
The guileless thought, the motive upright, pure,
Which Heaven may bless and Virtue's smile secure.

Though humble here BELOW my lot should prove,
My conscience is unstained, my hopes may soar ABOVE.

Cream Separator (627)

This table-mounted cream separator has horizontal gearing and a small one-gallon receiving bowl. The "American Wonder" separator was manufactured by the American Separator Co. of Bainbridge NY and patented in 1906. Centrifugal separators have a complex mechanism that needs to be constantly lubricated. (Note the glass-sided oil cup.) This separator was designed for farm use and the cream was taken to the creamery in a few small cream cans instead of many large heavy milk cans. Gustav DeLaval invented the centrifugal separator ca. 1894 which allowed rapid and more complete separation, replacing gravity separation in a dish or "shotgun" can.

Wooden Balls (2006.043.01,02)

Found in the walls of Sam Ladd's House

Donated by Anne Harbison

Mop Wringer (2144)

An early help for the farm wife – this cast iron, foot and hand crank-operated mop wringer was manufactured by the White Mop Wringer Co. of Fultonville NY. It has a pair of fluted rollers and clamps onto the side of a tub. It was patented in 1880 by Henry B. Adams of New York City.

Knife Sharpener

Galvanized Wash Tub (26, 2046.2)

In the late 19th Century, the galvanized metal wash tub replaced the coopered wooden tub. It was less expensive, lighter and more durable.

Laundry Scrubber (1912)

This scrubbing machine attaches to a washboard and clamps onto the side of a wash tub. The crank handle-operated crankshaft moves a weighted grooved scrubber bar up and down the washboard to simulate hand rubbing. Although apparently a patent was applied for, this design seems to be of dubious merit.

Clothes Wringer (281)

This simple fluted wood cylinder clothes wringer with crank handle was a simple design but probably did the job. Although unmarked, it appears to be "Hall's Little Wringer" ca 1870.

Jug (1996.061)

From the Richie Farm in North Greensboro
Used for liquids such as cider, vinegar, syrup.

Donated by Charles and Rosanna Jaffin