THE FRANCESTOWN HERITAGE MUSEUM

Newsletter **November 2019**

MILLS #3

The third mill summary in our series deals with the Bixby Wheelwright Shop. This is item 3 on your Mills Map (Don't tell me you can't find your map! – alright another one is enclosed – don't lose this one). This mill was erected by Dean Bixby in 1831 on the mill pond in Mill Village on the New Boston Road. Dean operated his Millwright shop here until 1847 when he sold the property to a painter (Issac Prentis) who ran his paint shop from here until his death in 1864. The mill went through a number of owners until 1869 when it was purchased by Daniel Moody who reopened it as a wheelwright shop. It continued as such until 1890 when the mill was closed. So the property started and ended as a wheelwright mill and is what will be the focus of this newsletter.

2019: It's New England – you just hit a pothole and blew out your tire – you are not a happy person. Fortunately you are near a garage which calls the tire store, puts on your new tire and you are again on your way.

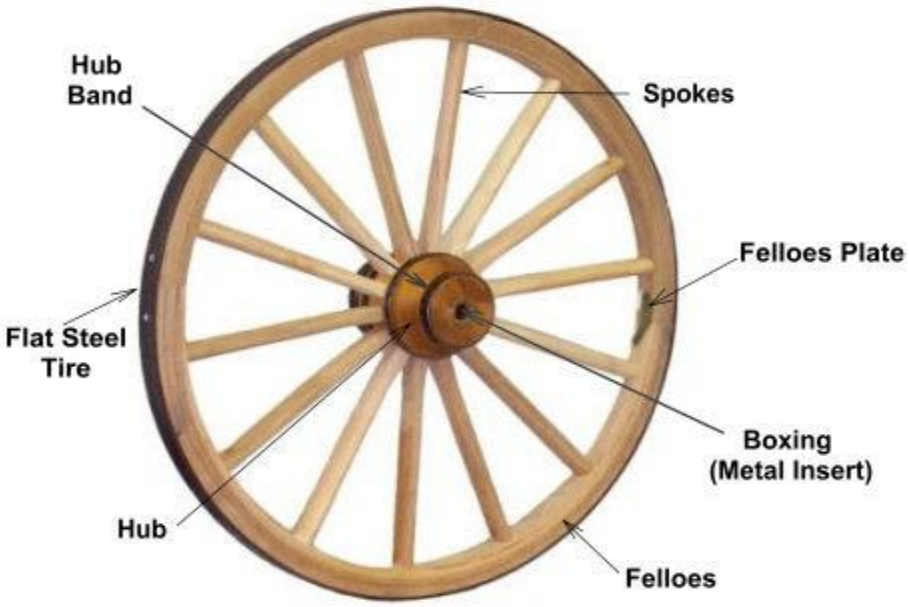
1819: It's New England – you just hit a pothole (probably the same one – they never seem to get fixed) and broke a wheel on your wagon – you are not a happy person. No garages or tire stores in those days but fortunately you are near a local "wheelwright". Which is where this analogy ends.

Unlike today's tire shop where it is quite easy to find a replacement tire, replacement wooden wheels were not readily available, and they needed to be individually made. So unhitch your horse and settle back because it is going to be a while before you get that replacement wheel.

There is a lot of material here and the goal is not to bore you all to death but to illustrate just how difficult life was for our ancestors. How a simple problem today was a major issue back then. Remember, you've broken the wheel on your wagon and you are going to have a long wait for a replacement – so read on and enjoy.

What is a wheelwright – "a person in the trade of constructing and repairing wheels for carts and wagons and other uses". Because of the multiple tasks involved in constructing the wheel the wheelwright became somewhat of a jack of all trades: a skilled carpenter and joiner, furniture maker, 'hedge' carpenter (servicing farming needs, such as wheelbarrows), a cooper and a millwright (constructing and repairing mill wheels and grinding mechanisms for the local mills). They often made children's toys and very often acted as the village undertaker; coffin-making an obvious related skill. They serviced the community literally from beginning to end!

What does constructing a wheel involve and why did he need an entire mill to practice his trade? Let's see what goes into a wooden wagon wheel.



You can of course see some of these various parts at the Francestown Heritage Museum as well entire wheels on our various horse drawn coaches, buggies, hearses, et al.

A close look at our vehicles with wooden wheels will show that the wood part of the wheel between the metal rim and the spokes consists of a series of short wooden arcs known as the felloes. These were fitted to the spokes. The iron wheel rim was heated by a blacksmith to expand the metal and then it was fitted over the arcs. Cold water was poured on the metal rim to cool it and shrink it onto the wheel and arcs and hold them all onto the spokes and hub.

Oak was used by wheelwrights as it is extremely strong and could cope well under extreme compression, which was ideal for the spokes of a wheel. Ash is extremely flexible and shock absorbent, so makes the perfect wood for the felloes of the wheel. Elm is very strong and perfect for the hub of the wheel, as it is cross-grained, meaning its fibers are inter-woven, and flexible, and so was the wood of choice.

Wood would be chosen and felled during the winter months, ideally November through to February, when the sap is down, before it has started to move upwards. The timber would be marked by the wheelwright, with different patterns for different pieces. Sometimes holes would be bored in the logs to begin with to aid drying and relieve tension which could lead to splitting. Then it would be left until the wood would be cut and allowed to season. Wood would be stacked with spacers off the ground, covered and allowed to dry out, outside and then indoors. Wood cannot be rushed, the whole process takes around 4-5 years. A 3 inch thick piece of wood needs a year for every inch of thickness plus a year for good measure, literally. But for the sake of discussion here let's assume that the wheelwright already had the necessary seasoned wood on hand prior to your unfortunate run-in with the pothole.

Wheelmaking is precise work with no standard sizes. The type of wagon and even which wheel on the wagon is involved can determine how an individual wheel is made. To get an idea of how long you will have to wait for your wheel we'll look at the steps involved.

DAY #1 - Starting with the hub, the wheelwright will select a piece of seasoned elm wood and roughly hew it to size. He would have used a hand adze and a draw knife (which by the way you can see at the Francestown Heritage Museum).

The final trimming was done to get the correct circumference. This was done on a belt driven saw taking power from the water wheel (remember – it is 1819 and this is a water-powered mill). The finishing step was done using a lathe to turn the hub making it uniformly round and the proper circumference.

Once the hub has been turned, it is then marked where the angled mortises (or slots) are to be cut – drilling and chiseling by hand.

The mortises must be angled to allow the spokes to be "dished" so they slant outwards from the center. This strengthens the wheel and allows wider carriages to support more downward pressure.

DAY #2 - The next step is to make the spokes for the wheel. The spokes are made of ash or oak wood.

A DRAW KNIFE

A square piece of wood stock is clamped in a spoke-horse and the wheelwright uses a draw knife to roughly shape the stock into a spoke. It is then finished with a spoke shave.

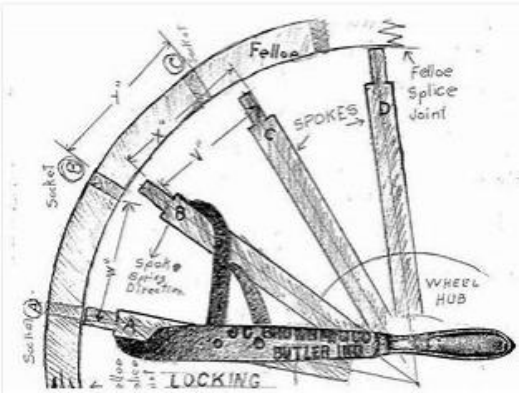
A SPOKESHAVE

A "foot" is then cut on one end of the spoke and driven into the previously made hub with a sledgehammer. The other end of the spoke is then finished with a tenon tool into a circular or oval shaped "Tange" or tongue which will fit into the felloe.

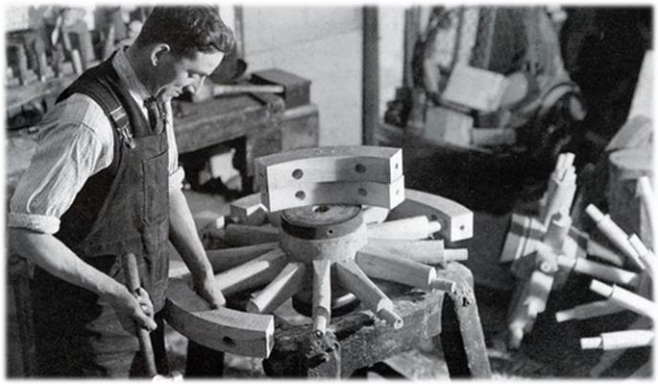
TENON TOOL

DAY #3 - So your wheel is taking shape – the hub and spokes are in place so the next step is to make the arc shaped blocks that make up the rim of the wheel. These blocks, known as "felloes", each hold two spokes and are made according to a template depending on the size of the wheel.

The wood used in the felloes was often green and cut with an adze into the arc shape. The felloe was then drilled to make the holes that would accommodate the spoke tenons. The ends of the felloes had to be cut at exactly the right angle in order to make a perfectly round wheel. Once the felloe was complete it was fitted onto the spokes using a "spoke dog".



A SPOKE DOG



FITTING FELLOES TO SPOKES

So your wheel is taking shape but one more step is required. A wooden wheel would not last long if used with the wooden felloe in direct contact with the ground. So a protective steel rim needs to be fitted around the circumference of the wheel.

DAY #4 - Up until now the wheelwright has demonstrated his skill as a wood worker but for this last step he has to assume the role of a blacksmith (although it was not unusual to ask the local blacksmith to take on this step). The wheel circumference is measured using a "traveler" which is a circular measuring device. Once the circumference is determined the iron that will form the outer tire is cut to length and bent with a roller.

"TRAVELER"

METAL ROLLER BENDER

The iron hoop is then heated in a forge or fire until white hot at which time it is immediately placed onto the wooden wheel and hammered into place. Then quickly cooled with water it will contract or shrink, pulling the wheel and all the component parts together.

HEATING METAL RIM

HAMMERING HOT RIM ONTO WHEEL

COOLING THE RIM ONTO THE WHEEL

So your wheel is fixed and you are back on your way. The preceding got a little involved but hopefully it drove home the point that, what today seems like a minor inconvenience, was back in our ancestor's time, a major problem.

In your travels do not forget to stop by the Francestown Heritage Museum (there are no potholes in our drive) and see a variety of these old wagons, wheels and the tools used to make them.

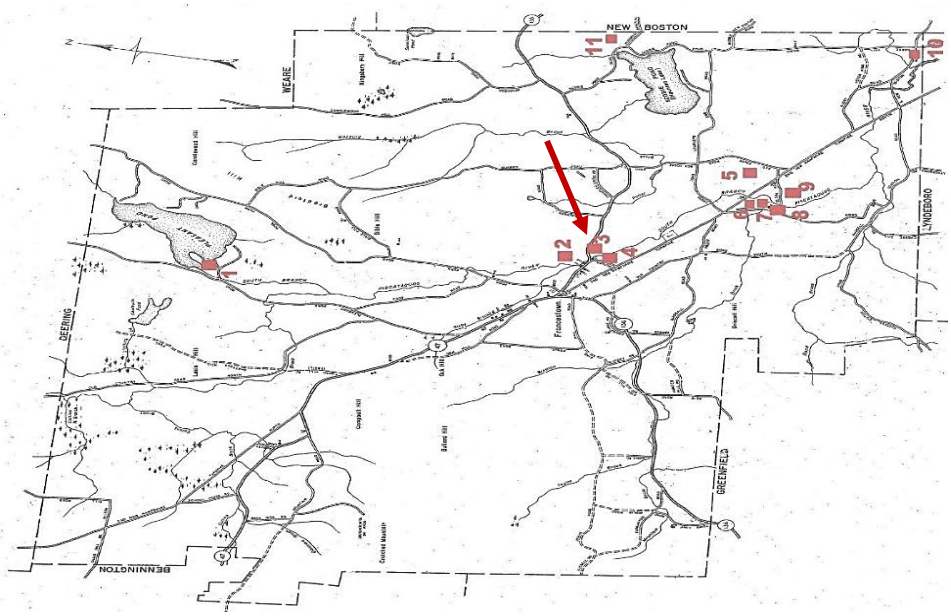
What's that? You say the museum wasn't open. Well pick up your cell phone and call 547-8320 (and if I am home, it will be opened). Or call for an appointment and private viewing.

Seems like a good time to do a crossword with a

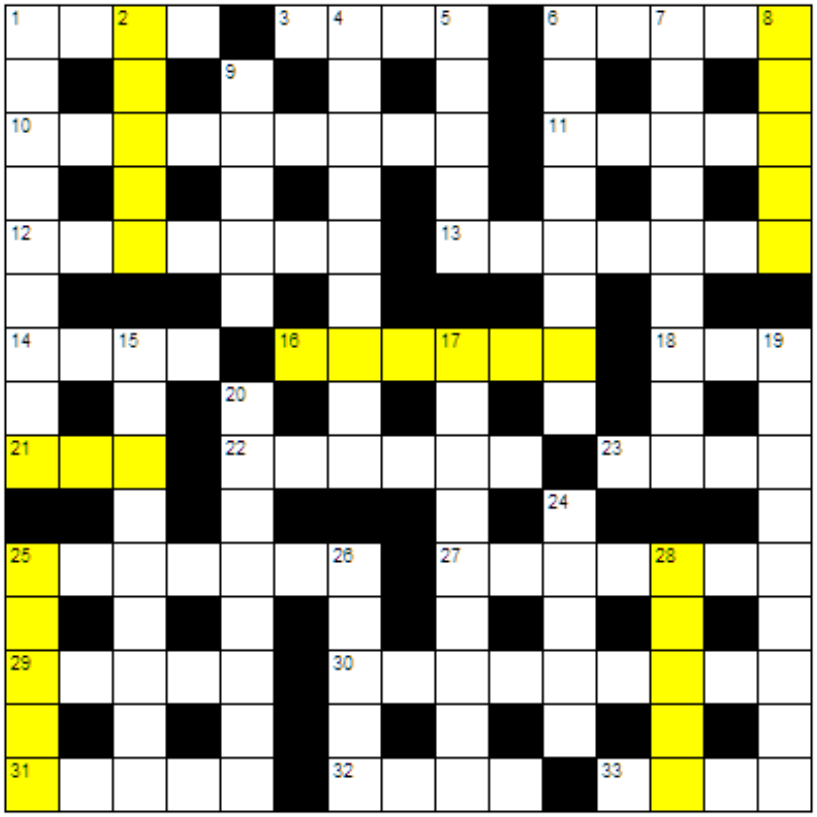
WHEELWRIGHT THEME

SEE PAGE #6

For those who have mislaid the map of the mills – this newsletter deals with mill #3 (Arrow)



As always – the theme letters are in yellow and all appear in the text of this newsletter. ENJOY



Across

1 Intense dislike
3 What insect bites do
6 Part of an ox yoke
10 Oahu National Cemetary
11 Departing
12 Splits
13 Trampled on
14 British nonsense
16 Outer rim of a wheel
18 Mature female cells
21 Central part of a wheel
22 Pulls your wagon
23 Advantage
25 Slumlike
27 Imbecile
29 In abeyance
30 Orange flavored liqueur
31 Force out
32 Proclaim
33 Strong criticism

Down

1 Skip from place to place
2 British for tongue
4 Collection of clothes
5 Class of serfs
6 Inherited wealth
7 Cover someone's eyes
8 Pulled by 22 across
9 Culinary herb
15 Under judicial consideration
17 Middle of the day
19 Lost for words
20 Neat as a pin
24 Polish monetary unit
25 Between 16 and 21 across
26 Russian country house
28 Important invention

Do not even think about looking below first!