200 Years of Woodworking

The history of the wood industry is, to a large extent, the history of the United States. From the time of the landing of the first settlers in Virginia and Massachusetts (in wooden ships), lumber was a vital and profitable product.

The nation's first sawmill is variously reported at Jamestown, VA in 1625, or in Berwick, ME in 1631, both operated by a water wheel and single sash-saw producing only a few hundred board feet a day. Whichever was first, the early date shows the importance of wood to the colonists, for export as well as their own use.

Although the water wheel was used in making lumber, hand labor still turned out the lion's share of lumber. Using what we today would consider primitive tools, early-day Americans produced remarkably well-made objects. Bark spuds, chisels, or irons removed bark, and the adze, beveled on the inside, cut a smooth surface. Instead of sawing, pioneers often split a log in half with a froe and then squared off the halves into flat, four-surfaced boards. A variety of saws, of course, was used as well as many other ingenious tools.

Wooden conestogas and prairie schooners carried the settlers further westward. Their children went to school in wooden products, and they traveled in, sat on, ate from, and lived in wooden products.

The industrial revolution was ushered in by the introduction of steam power in the early 1800's, soon followed by electrically powered machines that could do the work of many men, boosting lumber production and providing a myriad of wood products for a bustling, expanding nation. Wood, indeed, was a partner in the development of the nation.

Wood still plays a major role in the life of the United States. In 1960's (the latest date for such a figure), 5% of the Gross National Product was related to timber. Now wood products manufacturing is a $28.4 billion industry, according to the latest available statistics from the U.S. Census of Manufactures.

What follows are glimpses from our past, photographs and sketches illustrating how jobs once were done and how backbreaking they must have been for both man and animal. Some early tools and machines are there, too. We don't pretend to present a complete history of the wood industry in 15 pages but we do hope our pictorial essay will show where we've been and how far we've come.
Important dates in woodworking

1776—James Watt invented the separate-condenser steam engine, which powered early overhead-belt woodworking plants.

1790—Sir Samuel Bentham, engineer, English naval architect, invented rotary cutting.

1799—Sir Marc Isambard Brunel, a royalist refugee from the French revolution, became chief engineer of New York and invented a method of making wooden pulleys for ships by mechanical means.

1800—Planing machine and circular veneer cutting saw patented in England.

1808—William Newberry patented the bandsaw, though it was not much used until Swedish steel became available in the 1870's. The bandsaw created a special era in American architecture known as “American Carpenter Renaissance.” The age of gingerbread was born.

1814—Large circular saws introduced in U.S.A.

1840—First lathe-type veneer cutting machine patented by John Dresser.

1846—First practical cylinder planing machine built.

1849—California gold rush stimulated development of special machines to build wagon wheels.

1860—Circular saw in general use.

1866—First double end tenoner patented by H. B. Smith Machine Co.

1869—Completion of first transcontinental railroad and expansion of rail system led to development of railroad cutoff saws, multiple-spindle borers, and hollow-chisel mortisers for car building.

1869—First practical large log band mill built.

1875—First veneer slicer operating in U.S.A.

1881—Double surface with endless-bed infeed and power-driven top and bottom outfeed rolls patented in U.S.A.

1885—Band mill with 9-ft. wheels put into service.

1890—Silicone carbide abrasives first produced experimentally.

1896—First band mill driven by electricity. It had a 14-in. saw, 9-ft. wheels, and a 100-h.p. electric motor.

1899—George Stetson developed the “Ready Sizer” to meet the demand for surfaced lumber to build flumes for the Alaska gold rush.

1900—Endless-bed, triple-drum sander patented.

1906—DC motors begin to replace belted drives.

1907—George Stetson and Harry Ross market their planer-matcher.

1908—Ball bearings used in woodworking machines.

1909—Thin high-speed steel knives in round heads replace thick knives in square cuttersheads.

1910—Heyday of wooden automobile frames, using special glue joints and specialized machinery.

1919—Alternating current motor comes into use. Mounted on the same arbor as a ball-bearing cutterhead, it gave machine designers great flexibility.

1924—William H. Mason forgets to turn off the press heat at lunch time—discovers hardboard.

1926—Strauss' patent rights on tungsten carbide cutting tools acquired by Krupp Works of Germany.

1930—V-belts begin replacing flat belts, permitting more compact designs.

1930—Laminating industry begins to develop wide market for board products.

1949—Lee Sherrill and Raymond Pendergast, who founded Timesavers, develop the widebelt sander.

1950—Nicholson of Seattle and Soderhamn of Sweden invent the ring debarker separately and almost simultaneously.

1962—Slicing and rotary cutting of thick (1/4 in. and thicker) veneer developed by John Lutz of the Forest Products Laboratory.

1963—Demonstrations that lasers and water jets can cut wood.

1963—Feasibility of chipping headrig demonstrated by Peter Koch of the Southern Forest Experiment Station. First commercial model in use a year later.

1963—Shaping lathe headrig developed by Peter Koch.


1976—First commercial use of Peter Koch’s shaping lathe headrig on hardwoods.
Log handling

Left: For many farmers living in wooded areas in the 1700's and 1800's, crops were raised for home use and timber was sold for cash. Logs were fastened together into rafts and floated downstream—usually in winter when there was high water. Steering was done with long oars. Largest recorded raft measured 215 ft. long, with 120,000 ft. of wood.

Middle left: Logging railroads were prime movers of men, machinery, and logs in early-day America. In this logging scene from the Northwest, a woods crew and steam donkey are being hauled by flatcar from one logging site to the next.

Below: Hand chopped undercuts were needed to direct the fall of the tree in the old days. In this photo, the axeman is standing on a pole driven into the tree.

Left: Animals helped transport timber, too. This load of logs on a sled is being pulled by two faithful workhorses in a photo identified only as A. Mason's Camp, March 23, 1903.
**Sawmilling**

Top right: Most early plank sawing was done with pit saws in a pit or on a trestle. The open pit saw, which was built in a factory, remained in use until the late 1800's. One of the characteristics of the pit saw was fine, diagonal marks rather than coarse up and down marks.

Middle right: Waste utilization isn't new. Early Americans ground up bark and poured cold water over it to make tannin for tanning hides. The bark on the log was split and ringed with a barking axe, then removed with a peeling chisel, bark spud or similar tool. Oak bark was the most common source of tannin.

Left: This steam tractor for transporting wagon loads of lumber was built by the Best Manufacturing Co., San Leandro, CA.

Bottom left: An early straddle lift is shown off by an operator in a lumber yard.

Right: A mammoth log goes through an early-day Northwest sawmill, which was quite an improvement over the water-powered sawmills of the 1600's.
Grading

Astoria Box Co's Lumber Price List.

* MARCH 1, 1907. *

AT THE MILL:

<table>
<thead>
<tr>
<th>Size Range</th>
<th>Per 1000 Feet</th>
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<tbody>
<tr>
<td>Common, 3'-5' in. 60 ft</td>
<td>$7.75</td>
</tr>
<tr>
<td>62 to 65 ft</td>
<td>8.50</td>
</tr>
<tr>
<td>56 to 58 ft</td>
<td>9.50</td>
</tr>
<tr>
<td>60 to 64 ft</td>
<td>11.50</td>
</tr>
</tbody>
</table>

For every additional 60 feet, add 25 cent per 1000 ft.

Lengths up to 60 ft. at special rates.

Clear Boards, to 24 ft., not over 14 inches wide. 10.00
Plank 1, 2, 3 or 4 sides, everywhere, up to 24 in. 1.50
Plank 1, 2, 3 or 4 sides, over 24 in. 2.00
No. 1. Kiln-dry, Grade, Rough. 15.00
No. 2. Kiln-dry, Rough. 10.00
No. 3. Kiln-dry, Rough. 5.00

For Carpenters, Door and Window Jams. 20.00
Clear Spruce, Basswood, Tremont, up to 14 in. 15.00
Clear Spruce, Basswood, Tremont, 15 in. and over. 20.00

No. 2 Spruce, Basswood, Tremont. 20.00
Good Milled, Slightly Seasoned. 1.2, 3 or 4 sides. 15.00

Common Rough square and Cedar. 10.00

Lath

Lath, Untreated. Per Tierce. .65
Latticework Pipe, Plain Sides, per board yard. .95

Grades, and 3 1/2 Furring, per board yard. .75

Shingles.

Illustration: Oregon State University

Many a buyer today wishes he could purchase lumber at the prices shown in this price list from 1897.

Veneers

Illustration: The Bettmann Archive

Use of veneers goes back in history as far as the Egyptians, whose thin layers of face wood glued onto cores have endured hundreds of years of time. In early America, Chippendale, Georgian and other styles of furniture were reproduced with materials turned out by veneer factories such as this one.

Photo: Coe Manufacturing Co.

The rotary type lathe allowed successful cutting of thin stock, as shown in this early western plant. One use of veneer in the late 1800's was for wooden splints impregnated with chemicals to ignite street lamps.

Lumber inspection is relatively recent. The first recorded classification of lumber was published in Sweden in 1764, but early mills used their own grading systems. In 1830, a Maine law established four official grades of white pine and authorized inspection and enforcement. In 1890, manufacturer associations were formed chiefly to agree on uniform grading.

June 1976
Drying

Right: The smoke kiln, a crude sort of smokehouse, was used until the late 1800's to dry lumber. Burning slabs underneath the lumber created heat and smoke which dried the wood—if it didn't burn first.

Below: Steam later took over the job of seasoning wood. The first steam dry kilns used tall stacks as high as 60 ft. to remove moisture and promote circulation but they caused excessive checking. The need for stacks disappeared with the development of automatic ventilating valves, and inside fans.

Bottom left: The early 1900's saw the improvement of circulation, graduation of heat and humidity, and longitudinal circulation, which permitted the drying of many hardwood species green from the saw.

Below: As veneer became more important in the manufacture of boxes, crates, battery separators and other items, low-temperature high-humidity kilns were developed. This photo shows furniture veneer drying at Timber Products Co., Buchanan, WV.
Planing

Right: The plane is the symbol of craftsmanship in woodworking. It not only offered limitless opportunities to create useful objects of beauty, but was itself an object of beauty. The steel stocks of modern planes can hardly compete with beech, hornbeam, lignum vitae, and rosewood.

Below: Young Baxter D. Whitney wanted to build a planer that would not tear out the ends of the lumber. Some planers were already on the market—the year was 1837—and Whitney had a wide range of imperfections to overcome. He overcame. His machines won medals at the 1867 Paris Exposition, in 1873 in Vienna, and in Philadelphia in 1876. This planer was built in 1846. The hand planers went on strike against employers buying the machines, but didn’t make a noticeable dent in the rate of change.

Below: Planing machines improved rapidly. This J. A. Fay & Co. double cylinder planer-matcher—first patent, 1862—planned on both sides 24 in. wide and 6 in. thick, and made tongues and grooves in stock 16 in. wide. The manufacturer said “the countershaft has tight and loose pulleys, 12 x 8 in., and should make 900 revolutions.”
Moulding

Aristocrat of all the dozen or different kinds of planes was the crown moulding plane. It made the ceiling mouldings of large ornate rooms at one sweep. It was a heavy, expensive tool, and few workmen owned one. Most workmen made repeated sweeps with smaller planes to cut mouldings. The crown moulding plane sometimes had bars so an apprentice could pull it by a rope, or could loop the rope around a mill-powered shaft, and pull the plane by tightening the loop.

Jointing

Coopers used the long jointer—nearly 6 ft. long—"upside down." They moved the work over the blade and got a precise enough surface so with a little help from the moisture-swelled staves, they produced a watertight barrel.

Shaping

Above: Worker uses a belt-driven shaper to machine a table leg at Coogan's Furniture Manufactory, Canton, Ohio, 1879.

Left: C. O. and A. D. Porter called this a spherical top coat hanger shaper.
Turning

Left: This 1852 wood engraving shows a young worker turning polygonal forms.

Below: The lathe, oldest of woodworking machines, has taken many forms. Craftsmen have turned wood workpieces with a bow similar to an archer’s bow, a foot pedal using a springy pole overhead to return the pedal to the up position, hand cranks, foot treadles with flywheels, and that culmination of medieval efficiency, the great wheel lathe. This required an apprentice to crank a massive flywheel.

Boring

During the early 1800’s this boring machine made heavy drilling relatively easy. The operator sat on the base and turned the geared spindle with two hand cranks. For mortising, the operator started with two holes, and finished by chiseling. Some of the bits used during this period look exactly like those introduced recently for electric drills.

Operator sat here and turned the machine with both hands.

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Carving

Above: A hundred or so years before this early carving machine, it was mallet and gouge that scooped out chair seats and wooden bowls. Some of these early edge tools resist rust remarkably in side-by-side tests with modern chisels. Many such handmade tools were forged by the users from ore found in their own fields. One explanation of the rust-resisting quality is that this bog iron held a lot of manganese but few impurities. The charcoal smelting gave it a high carbon content, too, making for a superior iron.

Routing

The first router was the C. O. and A. D. Porter No. 1 Rounder, "a shaper turned upside down." The name came from the machine's ability to round corners. Another name was "Yankee Whittler." It was built in 1880, and sold for $200. This company, now known as C. O. Porter Machinery Co., and still located in Grand Rapids, MI, was founded by T. J. W. Porter, a bicycle manufacturer in the mid-1800s. A large mail order customer wanted T. J. W. to give up making his own brand of bicycles and make theirs exclusively. Well, they could just go jump in the Grand River. They drove T. J. W. out of business, though, and he turned to woodworking machinery manufacture, using water power sluiced from the adjoining river. The fifth generation now operates the company, still privately held.
Mortising

The craftsman seated on his workpiece appears to the uninitiated to be doing a crude task with a primitive tool. However, he has chosen a mallet of the exact weight and design to give him control for the species he's mortising, and for the size and shape of tool he's using.

Tenoning

The original double end tenoner, patented in 1866 by the H. B. Smith Co. and exhibited at the 1876 Centennial Exhibition. The company is still in business, building sanding machines.
Nothing crude about the bow saw!

Above: A frame saw like this was a work of art in itself. The gracefully curved arms were made of hickory, the brace of oak, and the winding stock assembly of yew and walnut.

The early open saw had a handle like a knife. This one was made for two-handed use.

This nicked farm saw was salvaged from a worn-down scythe blade.

Tang mounted tenon saw from about 1790.

A root formed the handle of this saw of the 1700’s. The blade and handle were riveted together.

Early factory-made saw had hand-fabricated and ornamented handle. The ornament on the blade tip was also useful for pushing work across the bench.
Sanding

Top left: Model A double belt sander and polisher, built by The Oakley Co. The very first such machine, bearing Serial No. 1, was shipped by The Oakley Co. to Stanley Furniture Co., Stanleytown, VA in 1934 and is still in daily use there.

Top right: A moulding sander from the early 1900's.

Left: This open-end hand block sander was offered in the mid-1930's. The manufacturer's literature described it as ideal for finishing "large, built-up work such as refrigerators."

Finishing

Until the last decade of the 19th century, manual brushing was the only way to apply finishing materials. The air spray method was introduced in the 1890's, but it proved to be a wasteful process, and industry continued to search for a better idea. The first major innovation was hot spraying, which involved heating the finishing material to lower its viscosity so air pressure could be reduced. A steam process for spraying was patented by the DuPont Co. in 1950, and the airless spray system was developed in 1955 by the Nordson Corp.

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Assembly

Right: Wooden pegs, or trunnels, were commonly used fastening devices prior to 1840. Large trunnels were used in the frames of houses, mills, and bridges; builders used a mallet to drive the square pegs into round peg holes through the mortise and tenon. Some cabinetmakers used smaller trunnels in chairs, beds, chests of drawers, and tables.

Lower right: Most cabinetmakers preferred to bond their mortise and tenon joints with hot animal glue dispensed from a heavy cast iron pot. The cabinetmaker’s apprentice kept the glue hot by periodically burning a small pile of shavings under the pot.

Lower left: Some old-time bar clamps were of metal, but wooden ones were more popular because they could be made in the shop as needed and were less likely to mar the wood being glued.

Bottom: During the winter months, farmers made hand-wrought nails by the thousands around the forge or fireplace. Rose-headed nails were the most common, but a wide variety of other types were available as well for special purposes.
Board products

Top left: Fir plywood was born here at the old Portland Mfg. Co. in Oregon. The firm glued up a few panels of plywood in 1905 for display at the Lewis & Clark Exposition. A short time later, door plants began making plywood for doors, the forerunner of an industry.

Middle left: At Portland Mfg., all plywood was cut and ripped on this saw.

Below: William H. Mason's fiber-making gun, patented in 1927, required high heat and pressure to break down wood into fiber for hardboard production. It was eventually replaced by the Asplund Defibrator.

A relatively new product, particleboard was developed in Europe at the end of World War II. Battle-scarred countries had to rebuild, but their forests had been destroyed. Particleboard filled the need because it provided a way to turn pieces of trees into building material.

Early hardboard was compressed on a 19th century letter press.