Making Furniture in Preindustrial America

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The Preindustrial Joiner in Western Connecticut, 1760–1820

In preindustrial America, wood was the dominant material for construction, as well as the main fuel for heating and cooking. Wood by-products included maple syrup to sweeten the diet and bark-based tannin to tan leather. Wood's ubiquity, low cost, and relative workability all contributed to its primacy. Therefore it is not surprising that woodworkers were the most numerous and active craftsmen, using the products of forests that had been cleared to permit cultivation and creating various parts of the built environment. Furniture was just one of the many items made from wood, so it is important to begin the study of furniture makers in late eighteenth-century western Connecticut by explaining their position among all the woodworking trades at the time.

During the late seventeenth and early eighteenth centuries, the various woodworking trades often overlapped. Distinctions among carpenters, housewrights, furnituremakers, coopers, and wheelwrights blurred, giving way to the “ambidextrous” woodworker throughout rural New England.¹ Toward the middle of the eighteenth century, such ambiguity among woodworkers in western Connecticut began to change. Although trades never reached guild-like exclusivity, certain lines of demarcation became firmer. Rather than try to isolate very specialized trades or to lump them together arbitrarily, it is more helpful and accurate to consider a range of woodworkers, based upon training, tools, and task difficulty.²

The Spectrum of Woodworkers

At one end of the spectrum were menial jobs that almost anyone could undertake, even villagers who were not woodworkers. Such tasks included
felling, scoring, sledding, splitting, and sawing timber. Ownership of the necessary tools—axes, saws, hammers—by a large number of inhabitants and the basic nature of these jobs permitted such widespread involvement. Another low-end, semiskilled type of work included framing outbuildings, laying floors, rending (splitting and dressing) shingles and clapboards, covering roofs and sides, splitting rails and making fences, and making and repairing wooden agricultural tools. This part of the spectrum was the domain of the general handyman carpenter. On rare occasions, nonwoodworkers or woodworkers from the upper end of the spectrum performed such tasks. Closer to the upper end of the spectrum were the coopers, wheelwrights, and house joiners, each of whom tended to specialize in a particular skill. Of these three groups, house joiners were more likely to cross task boundaries because the demand for new building or extensive renovations fluctuated. At the highest end of the spectrum were the shop joiners, or furniture builders, whose products required the greatest amount of fastidious work.

Over the last half of the eighteenth century, a group of general-purpose handymen carpenters was restricted to certain basic jobs at the lower end of the woodworking spectrum. Such yeomen-handymen as Daniel Bishop of Bethlehem and Joseph Curtiss of Southbury spent most of their time chopping and sawing wood, sledding wood, mending or making agricultural tools, splitting rails and making fences, or riving shingles. Only in a few cases did such woodworkers make a cart, lay a floor, or cut rafters. Handy­men carpenters were excluded from furniture production and house building even though they occasionally painted furniture or bottomed chairs.3

Coopers were another group of woodworkers to specialize in the last half of the eighteenth century. As farmers in western Connecticut started to pack their surplus meat and pork for the New York City and West Indies markets during the 1760s, a steady demand for barrels and hogsheads arose every year during the slaughtering months of November through February. Consequently a number of coopers could make a living in each town.4 The inventory of Stephen Sperry, a cooper in Bethlehem, Connecticut, whose estate was appraised in 1776, documents the emergence of cooperage as a distinct craft. He had a large, active shop devoted to making wooden containers: his shop was valued at £13, and his stock included 1,850 staves and 400 headings.5 The local cooperage business kept growing during the Revolution as Truman Hinman and Shadrach Osborn, prominent Southbury merchants, organized the region’s collection of supplies for the Continental army. Crucial to their meat and pork shipping were the thousands of bar-
rels supplied by local cooper in New Milford, Roxbury, Woodbury, and Bethlehem. In the early nineteenth century, many farmers in western Connecticut began to produce and export greater quantities of butter and cheese. This intensification of dairying further solidified the cooper as a separate group. Pails, tubs, churns, presses, and firkins were essential equipment for processing and storing dairy products, which took place during the summer months, between planting and harvesting. The dairy and meat trade ensured year-round activity for the leading cooper in rural western Connecticut. Cooper would build barrels for meat in the fall, sell the barrels during the winter slaughtering months, build firkins for dairy products in the spring, market the firkins in the summer months, and supply churns and pails as the demand arose. The only other service cooper provided was the riving and dressing of shingles and clapboards. Their tools and techniques suited them to this task—they were accustomed to riving or splitting oak or chestnut into roughly shaped staves and finishing them with shaves and drawknives. This process was considerably quicker than sawing and planing. The same woods and techniques were used for clapboards and shingles.

Coopers' specialization also can be seen in the increasing quantity of tools they owned. For example, the 1782 inventory of Benjamin Dunning of Newtown listed a bung bill, cooper's adze, and a cooper's howel in addition to other, more general woodworking tools, whose total value was £4.2.0. In 1801 the estate of Henry Glover included a greater quantity of tools, many of which were more specialized: a heading jointer, stave jointer, cooper's croze, crooked shaves, and a stack shave in addition to many other tools, extra heading, and oak boards.

A second woodworking trade that became differentiated from the others was that of the wheelwright. By the end of the eighteenth century, craftsmen such as James Kasson of Bethlehem, Thomas Stedman of Newtown, and John Leavenworth of Woodbury specialized in making wagons and spinning wheels. Shaping and fitting wheel hubs, spokes, and rims necessitated great skill in turning and bending wood and in creating extremely strong joints. Wheelwrights often owned several lathes and cauls to accomplish these tasks. The growing external market for meat and dairy products was a catalyst for the wheelwright's specialization. Demand for wagons grew as local farmers shipped more meat and dairy products and as transportation improvements facilitated longer travel (table 1).

Developments in cloth production provided a greater need for compe-
### Table 1
Wagon and Spinning Wheel Ownership in Newtown and Woodbury, 1760–1824

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<td><strong>Newtown</strong></td>
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<tr>
<td>Number of estates</td>
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<td>18</td>
<td>17</td>
<td>29</td>
<td>26</td>
<td>48</td>
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<tr>
<td>Spinning wheels (%)</td>
<td>67</td>
<td>88</td>
<td>100</td>
<td>76</td>
<td>83</td>
<td>77</td>
<td>90</td>
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<tr>
<td>Wagons/ carts (%)</td>
<td>13</td>
<td>41</td>
<td>67</td>
<td>47</td>
<td>38</td>
<td>73</td>
<td>56</td>
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<tr>
<td><strong>Woodbury</strong></td>
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<tr>
<td>Number of estates</td>
<td>16</td>
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<td>20</td>
<td>17</td>
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<td>24</td>
<td>29</td>
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<tr>
<td>Spinning wheels (%)</td>
<td>62</td>
<td>77</td>
<td>70</td>
<td>76</td>
<td>85</td>
<td>83</td>
<td>86</td>
</tr>
<tr>
<td>Wagons/ carts (%)</td>
<td>50</td>
<td>38</td>
<td>45</td>
<td>59</td>
<td>55</td>
<td>63</td>
<td>59</td>
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**Sources:** Estate inventories for Woodbury, Danbury, and Newtown probate court districts (microfilm of the original record books is held by the Connecticut State Library, Hartford).

As a result of these economic changes, wheelwrights such as John Sturdevant of New Milford, who had made chairs earlier in his career, eventually shifted their output to concentrate on the wheelwright business. The inventory of Sturdevant’s estate in 1825 included three turning lathes, numerous turning chisels and augers, twenty-seven cranks and spindles, and eleven wheel forms. Nevertheless, a few wheelwrights and wagon-makers continued to devote a small portion of their time to producing inexpensive furniture, either because demand for wheels and wagons did not require full-time work or because demand for chairs had occasionally exceeded the technical and temporal limits of normal production. An 1828 mortgage by Charles Glover of Newtown lists the contents of his shop for the manufacture of wagons. In addition to partly finished wagons, sawed wagon tills, cart axletrees, wagon spokes and hubs, cart spokes, bending blocks, and other wheelwright tools, the deed listed field bedsteads (light,
portable bed frames) and high bedsteads (more elaborate fourposters with headboard and tester) and posts for kitchen chairs. Glover used his spare time and turning skills to provide parts for other furnituremaking craftsmen.\textsuperscript{12}

Although wheelwrights sometimes used their turning equipment and skills to produce inexpensive chair and bedstead parts, joiners performed most furnituremaking tasks in rural western Connecticut at the end of the eighteenth century. Such furniture craftsmen were often specified as either a house joiner or shop joiner.\textsuperscript{13} House joiners mainly framed houses, produced window sashes and doors, and finished interiors, but they also made furniture. For example, Charles Prindle, a Woodbury house joiner, made four inexpensive kitchen chairs for Reuben Mitchell in 1803 and a built-in cupboard for Luman Ovit in 1805. Nehemiah Pray of Huntington and Brookfield, Connecticut, devoted most of his time to framing, making sashes and window frames, and other house joiner's work, but occasionally made a chest, a chest of drawers, or a stand.\textsuperscript{14}

Several characteristics distinguish house joiners from shop joiners: tools, approach to work, and mobility, among others. Owing to the scale of work and the necessary technology, house joiners needed a different chest of tools. Preparing and dressing large beams for sills and posts called for broadaxes and adzes. To assemble these large-dimensioned frames, the house joiner had to use large augers, socket chisels, and slicks to cut appropriately sized mortises and tenons. The joiner erecting a house constantly used large squares and chalk lines to create accurate right-angle joints and plumb lines. Such tools restricted the range of the house joiner's tasks. Many house joiners rent, sawed, or dressed shingles and clapboards but lacked the smaller precision tools to produce furniture other than plain chairs, built-in architectural furniture, or simple case furniture such as board chests, which consisted of five boards nailed together.\textsuperscript{15}

Contemporary writers made similar observations about house joiners. In 1703 in \textit{Mechanick exercises}, the Englishman Joseph Moxon pointed out the differences between joinery and house carpentry. Although noting that the trades employed similar tools and technology, Moxon wrote that carpenter's tools were "somewhat stronger for Carpenter's Use than they need be for Joiner's." Moxon also drew a distinction between the trades on the basis of the practitioners' respective attitudes toward work: "Joiners work more curiously, and observe the Rules more exactly than Carpenters need do." To demonstrate this point, Moxon compared a joiner's table and a carpenter's floor, both of which are flat and true. To him, the floor is "not so exactly flat
and smooth as a Table.” Furthermore, joiners found it easier to “work slightly,” unlike carpenters who, taught to work “more roughly, do with greater difficulty perform the curious and nice work.”

Another distinguishing feature of the house joiner was the need to move from town to town according to demand. During periods of extensive new building or rebuilding, these woodworkers could remain in their hometown, but if demand were sporadic they would have to work in adjacent areas. Charles Prindle worked in Poughkeepsie, New York, during the spring, summer, and fall of 1799, in Bethlehem in 1801, and in Southbury in the fall of 1801. David Fabrique, a house joiner born in Newtown, lived and worked during the last quarter of the eighteenth century first in Newtown, Derby, Southbury, Roxbury, and then in Newtown again. New building contracts precipitated each move. Equally peripatetic was Nehemiah Pray, who worked in Huntington from 1810 until 1815, undertook work in Weston and Trumbull between 1814 and 1816, and then moved to Brookfield in 1817. The accounts and mobility of these house joiners demonstrate the early existence in rural Connecticut of tramping artisans, who worked in regional teams in response to the growing need for dwelling houses, meetinghouses, and mills in the early national period.

Technical Aspects of Joiner’s Work

In sixteenth-century England and early seventeenth-century New England, a joiner was a craftsman who exclusively used paneled construction to assemble furniture. In eighteenth-century western Connecticut, the term took on a more general meaning, representative of broader responsibility. It described a craftsman who made, finished, and repaired furniture. The occupational label of “cabinetmaker” was not used in western Connecticut until the end of the eighteenth century. At that time, shop joiners produced most of the furniture, regardless of its value.

As a descendent of the seventeenth-century joiner and the ambidextrous woodworker of the late seventeenth and early eighteenth centuries, the rural joiner of the late eighteenth century could draw on a number of different techniques to conceive and construct furniture. In one technique, as implied by the term joiner, entire storage forms, tables, or chairs were treated as framed structures. The seventeenth-century joiner would make panels and fit them into grooved horizontal rails and vertical stiles.
with pinned mortise and tenon joints. To this basic structure the joiner could attach a hinged chest top, nail a tabletop or chair seat, or nail a bottom board for a chest.

The eighteenth-century joiner retained only parts of this technology rather than the whole system. In certain situations he continued to favor the mortise and tenon joint. The most common use of this joint was in fastening carcass boards to the legs of dressing tables and cases of drawers (fig. 2; see also figs. 17–21, 23–24) and fastening seat rails and stretchers to the legs of

Fig. 2. Case furniture nomenclature. Drawing by Larkin/Tenney.
Fig. 3. Joiner's chair nomenclature. Drawing by Larkin/Tenney.

joiner’s chairs (fig. 3; see also fig. 37). A mortise and tenon joint also secured chair banisters (a vertical back support, or splat) to the crest rails and shoes (fig. 4; see also figs. 8–15) and secured chair slats (horizontal back supports used in groups of two, three, or four) to the rear posts (see fig. 7). Vestiges of joined-panel construction can be found in the preferred method of drawer construction. The drawer bottom, slightly beveled under its front and side edges, was fitted into a groove cut along the inside of the drawer front and sides. However, the drawer bottom did not float within this groove like a true panel because the bottom was nailed along its rear edge to the bottom of the drawer back (see fig. 5).²⁰

Although both house and shop joiners used mortise and tenon joinery, differences in scale between the final products necessitated the shop joiner’s use of finer tools. To dress wood, the shop joiner used a series of bench planes—fore, jointer, and trying planes—to produce a very square and even board or stick. He then cut a protruding tenon with a ripsaw and crosscut handsaw and cleaned up this projecting tab with a straight-edge chisel. Unlike the house joiner, who used augers and socket chisels to make mortise holes, the shop joiner worked with a brace and bits and smaller chisels to achieve a smaller, more precise hole for the tenon.

The second construction technique in the eighteenth-century joiner’s repertoire was turning. After shaping wood parts on a lathe, the artisan assembled them using round mortise and tenon joints. This method, also
known as post-and-rung construction, was applied most often in building chairs. Entire chairs or specific parts of chairs and tables such as posts or rounds featured turned construction (see figs. 4, 7–15). The joiner also used the lathe and turning tools to shape the round feet on case furniture (see figs. 2, 16–19). That the lathe became part of the joiner's realm rather than being used exclusively by a specialized turner is explicitly revealed in the 1778 inventory of Hezekiah Porter, which listed "a joiners lathe."
Fig. 5. Drawer construction. Drawing by Larkin/Tenney.
The third method of furniture assembly was dovetailing. The joiner cut interlocking, wedge-shaped fingers at the ends of butted boards, applied glue to the touching surfaces of the fingers, and fit the two boards together (see fig. 5). The lock of the fingers and the larger long-grain surface for gluing gave this joint great strength, which resulted in its widespread use in a variety of circumstances. In making chests and the upper sections of cases of drawers, the joiner dovetailed the bottom and top boards to the sides. Similarly the long boards in the frame of a fall leaf table were dovetailed to the end boards at the corners where the swing legs retract (see fig. 41). The joiner also used dovetail joints to attach drawer sides to their fronts and backs, to secure drawer blades, to fasten battens to the underside of tea table tops (see fig. 40, left), and to secure medial stretchers in joiner’s chairs. Among the tools necessary to cut dovetails were marking and bevel gauges to lay out the desired joint; a fine handsaw, often referred to as a dovetail saw, to cut the fingers; a range of straight-edge chisels to clean up the fit; and a gluepot and glue to bond the joint.

A final construction technique, nailing, found greater favor among house joiners, although seventeenth-century shop joiners had used it. Carpenters relied on nails to lay floors, cover roofs and sides, and sheathe interior walls. For shop joiners, inexpensive board chests represented the most extensive use of nailing techniques. The joiner fit the sides into small rabbets cut along the inside corners of the front boards and backboards and then nailed these joints from the front and back. With the perimeter established, he dropped a bottom within these sides and nailed it in place. Finally, he attached a top with hinges. On other pieces of furniture, the joiner used nails only in areas that were not visible. For the backs of case furniture, the joiner devised a fast and easy technique not unlike flooring. Using a series of horizontal or vertical boards, he butted or shiplapped these boards against one another, set the outer edges into rabbets cut along the back of the sides, and then nailed the backboards to the sides, bottom, and top. Another common use of nails was to fasten the rear edge of a drawer bottom to the drawer back. Some shop joiners also used nails to secure drawer supports or to fasten moldings to carcasses.

Other skills related to furniture production involved decorating, finishing, and chair bottoming. Sawn profiles, moldings, turned ornament, carving, and inlay were the available options for surface ornamentation in order of complexity and required time, and therefore of expense. The joiner effectively used sawn decoration on the skirts of dressing tables and cases of drawers and on the backs of chairs. Simply by the way the joiner sawed out
the front boards and sideboards of case furniture or the crest rail and banister of a chair, he could alter the design.

Molding planes provided another relatively easy way to embellish a piece of furniture. Joiners often owned extensive sets of these tools, whose soles and blades allowed a regular result with minimal effort. Used individually, molding planes provided a decorative edge on drawer fronts or on the straight legs of joiner’s chairs and fall leaf tables. The joiner also used combinations of molding planes to execute intricate base molding, mid-molding, and cornice molding that could be applied to case furniture.

The lathe, owned by nearly all joiners in late eighteenth-century Connecticut, provided an easy but riskier decorative option. While turning chair posts and rounds, the joiner worked with turning chisels and gouges to form ball-, ring-, urn-, and baluster-shaped elements (see figs. 4, 7–15). He also could use the lathe to fashion finials and drops for cases of drawers and dressing tables.

For carving, the joiner employed many of the same tools that he worked with in furniture construction. With a compass, he laid out a fan, shell, or rosette, which he then carved using a series of gouges and chisels. Gouges were also used to execute relief carving and scrolls on the knees of the crooked legs that supported case furniture (see figs. 20–21). A third carving technique can be found in rope-twist quarter-columns (see fig. 44) and flame finials (see fig. 24). To achieve this spiraled, or rope, effect, the joiner laid out the line of the spiral while the wood was set in the lathe. Then he took a fine handsaw and sawed a kerf along the marked line. Finally he used a file to smooth the ridges left by the kerf.

The least common form of decoration was inlay. Although inventories of joiners did not list strips of inlay or veneering tools such as veneering saws or weights, surviving artifacts document limited use of stringing, patterned inlays, and pictorial inlay (see figs. 49–50). The time and precision necessary to cut an inset, compose an inlay from several pieces of wood, and set it snugly in place may have made such decoration prohibitively expensive for most customers.

Finishes for furniture depended on the type of wood used. Maple, pine, or yellow poplar furniture was often painted red using Spanish brown or black using lampblack. These two colors retained their popularity into the early nineteenth century, even though green Windsor chairs began to be made in the 1780s, and blue or yellow chairs in the first decade of the nineteenth century. For cherry or mahogany, western Connecticut joiners did not stain the wood to resemble mahogany or walnut but rather used
linseed oil or varnish for a finish. James Briscoe Jr. of Newtown listed jugs of oil, jugs of varnish, Spanish brown, red ochre, and lampblack among his shop contents in 1765. According to a recipe recorded by the Woodbury house joiner Charles Prindle, varnish consisted of “Rosum red led and oil,” which had been boiled together. Most chair bottoms were constructed of flag or rush. The maker quickly rounded seat lists with a drawknife and fit the lists into holes drilled into the vertical posts. He or a bottomer then wove the flag seat over the lists. The Housatonic River area apparently was renowned for the quality of its rushes for chair bottoms. This material’s availability made it appropriate for all chair types, as Ezra Slason, a chairmaker in Stamford, Connecticut, informed the public in 1792: “Flags of the best kind and quality—Likewise Rushes of various Kinds . . . are transported from Derby, or the Ferry a little below, and are supposed to be some of the best in the State or County for handsome genteel gentlemen’s parlor chairs—also, a course kind for kitchen chairs may be had.” Chair bottoming, however, was not the exclusive domain of the joiner. Handymen carpenters, older joiners who had passed along control of their shop, and even nonwoodworking villagers occasionally rebottomed chairs.

The 1759 inventory of Jacob Leavitt, a shop joiner from Fairfield, provides a clear picture of the joiner’s chest of tools for furniture production in the late eighteenth century (fig. 6). To prepare boards for assembly, Leavitt used two fore planes, two long planes, and a smoothing plane. A fourth bench plane, the glue jointer, was specifically the tool of the shop joiner, who used it to “shoot” the edge on long boards to ensure a tight fit when glued together edge to edge. The shop joiner’s careful gluing of boards contrasted with the house joiner’s tendency to butt boards edge to edge or to use a shiplap joint. After planing the wood, Leavitt laid out mortises and tenons or dovetails using scribing gauges and squares. He cut tenons with steelplate and crosscut saws, mortises with a stock and bits and chisels, and dovetails with a dovetail saw and chisels. Or, if making a turned chair, Leavitt shaped the individual parts on the lathe with seven turning tools and then used a stock and bits to drill holes. After fitting the members together and gluing them, he used a scraper to achieve the smoothest surface possible. Like the glue jointer, the scraper, with its implicit concern with surface, was distinctive among the shop joiner’s tools. To provide decoration, Leavitt relied upon nineteen molding planes and six chisels and gouges.

With the product in final form, Leavitt then would have turned to its

Moxon used these labels in the text:

A. Work-bench: a. Holes for pins;
   b. Hook; b. Holes for Hold-fast; c. Bench-Screw; d. Holdfast; e. Mallet; f. Table;
   g. Bench-Screw [or vise]

B. [Planes]: 1. Fore Plane; 2. Joynter;
   3. Strike-Block; 4. Smoothing-Plane;
   b-a-b. Sole)


D. Square: a. Handle; b. Tongue;
   c. Outer-Square; d. Inner Square

E. Compass Saw

F. Bevil

G. Gage: a. Tooth; b. Oval; c. Staff

H. Piercer: a. Head; b. Pad; c. Stock;
   d. Bitt

I. Gimlet

K. Augre: a-a. Handle

L. Hatchet

M. Pir-Saw

N. Whip-Saw

O. Bow-Saw

P. Whetting Block or Rub Stone

Q. Saw Wrelt

R. Mitre Square

[S]. Tennant Saw [above lower table]
finish. Unlike the estates of many other joiners in the area, Leavitt's inventory does not list flags, Spanish brown, lampblack, varnish, or oil. Although he owned a small bit of beeswax, an alternative finish to oil, it is impossible to determine his favored finish. As a final step, Leavitt attached brass escutcheons, handles, knobs, and hinges, which he had in stock.

The shop joiner's woodworking tools and skills did not restrict him to furniture production. Gouges, carving skills, and a working knowledge of steel acquired through repeated sharpening and honing of edge tools enabled Lewis Prindle and Ebenezer Booth to stock guns. Familiarity with precision joinery allowed Joel Booth and Cyrus Prindle to make and repair the wood parts of such musical instruments as spinets, violins, and flutes. In slack times or when expediency was required, shop joiners applied their skills to other woodworking tasks. William H. Peabody repaired farm tools and turned a roll for a map; Harvey J. Linsley turned two rolling pins; Cyrus Prindle made sashes and doors and helved axes; and Lewis Prindle mended a table, fixed a saw, made a lathe, and turned bobbins. However, house joiners and handymen carpenters performed most of these tasks. The woodworking spectrum was more flexible at the top. Most shop joiner's work involved furniture production and maintenance even though they also performed other jobs. On the other hand, handymen carpenters made no furniture and were confined to work associated with agricultural equipment and agricultural buildings.

Organization of the Joiner's Work

With this knowledge of the shop joiner's basic skills and tools, one can examine his shop operations without the misperceptions that have arisen in the past century and a half. Specifically, the early twentieth-century Arts and Crafts ideal of the solitary craftsman using simple tools to create individual products must be dismissed. One also has to look beyond the large-scale, mechanized, and specialized furniture industry of the last half of the nineteenth century. It is very important to understand the scale of the rural joiner's work, his mode of production, and his materials. The largest joiner's shops in rural western Connecticut contained two benches; most shops probably operated with only one. A joiner relied on the bench, with its vise and holdfasts, to hold the boards or assembled parts on which he worked. The use of only one or two benches, therefore, greatly influenced the pace of work. Brewster Dayton's Stratford shop, which contained two benches,
was engaged in work on twelve chairs, one case of drawers, two stands, and one bedstead when he died in the late spring of 1796. Fewer pieces of furniture in progress appeared in those shop inventories that listed only a single bench.\textsuperscript{27}

Although no shops in western Connecticut are known to have survived, they probably were similar in size and layout to the shop of the Dominy family, formerly located in East Hampton, Long Island. Measuring between 300 and 400 square feet, shops of this type were attached to the home or located in a separate small building. Extra boards and timber were stored in the garret or chamber above the shop, while some tools hung on the walls or from the joists in the ceiling. Other tools lay on the bench or benches, which were placed in front of a window (most joinery, especially cutting dovetails and carving, required good natural light).\textsuperscript{28}

Not only was the physical size of the rural joiner's shop small but so was the workforce. Even as late as 1820, the Ridgefield shop of Samuel Hawley was considered large, and it operated with only two men and four boys.\textsuperscript{29} This scale fostered easy interaction among the workers and allowed, even encouraged, apprentices to learn most aspects of the trade. The size of the shop and workforce, relatively low cost of tools and basic materials, and variety of techniques permitted the preindustrial joiner a great deal of technical flexibility. He could respond quickly to a client's demands or to new fashion without drastic retooling.

Probate inventories and account books provide glimpses into the seasonal rhythms of furniture production. Inventories that listed partially assembled furniture were usually appraised between November and March, a pattern that suggests that the bulk of production took place during the winter months when agricultural duties slacked off. With the arrival of spring, the joiner may have been engaged more often in agricultural endeavors, in assembling work begun in the winter, and in making occasional pieces of furniture as demand occurred.\textsuperscript{30} Unlike John Dunlap, a New Hampshire joiner in the late eighteenth century, Connecticut joiners do not appear to have alternated between shop joinery and house joinery according to the seasons. Connecticut's denser population allowed joiners to focus on one craft in addition to their agricultural demands. Yet, like Dunlap, they tended to work within the warmth of their shop in the winter months.\textsuperscript{31}

Contrary to popular belief, not all joiner's work was custom work, which represented individual designs and solutions to every demand. Concern with efficient production and the desirability of predictable, polished products did not begin only with industrialization, or even just in urban areas
During the preindustrial period. Rather, it already was a major part of the rural joiner's values during the preindustrial period. The joiner recognized the waste of redrawing the profile of a chair crest rail, crooked leg, chair banister, or bracket foot every time one was needed, so he used patterns to save time, ensure compatibility of products made en suite, and ease his work. Templates, probably made from thin wood, appeared in the inventories of Ezekiel Hawley of Norwalk, Ebenezer and Joel Booth of Newtown, Thomas Kimberly of Southbury, and Hezekiah Porter of Waterbury. Hawley must have used many templates, for his “number of patterns” were valued at twelve shillings, the same as four molding planes. Ebenezer Booth’s estate listed “a set of patterns” valued at thirty shillings, the equivalent of three new round fall leaf tables or two calves. 32

Rural joiners applied their knowledge of the properties of wood to organize efficient production and to ensure predictable results. During the slow winter months the craftsman would turn large quantities of “chair stuff.” Wood was easily cut and sledded in December and January, after which the joiner would turn posts and rounds, shave seat lists, and rive and bend slats while the wood was still relatively moist and easy to work and turn. Using one set of tools at a time to fabricate and stockpile parts always in demand was much more efficient than constantly juggling different sets of tools to produce individual parts as needed. Many inventories document the custom of stockpiling seasoned chair rounds. Such examples range from Hezekiah Porter’s five dozen chair rounds in 1778 to Joseph Foot’s forty-three dozen chair rounds of various sorts in 1801 and William Adee’s seventy dozen in 1765. The listing of rounds, posts, and partially assembled chairs in inventories appraised in the summer and fall demonstrates that joiners assembled these parts only as time permitted or demand necessitated. 33

The power source for the woodworking process was another important aspect of joiners’ labor in eighteenth-century rural Connecticut. Throughout the process, nonhuman power was applied only to the basic preparation of wood. Water-powered sawmills, which had been established early in seventeenth-century New England, provided great quantities of sawn lumber. Nevertheless, water-powered machinery had many drawbacks: high capital investment in machinery and power drive, inefficient operation, dependence on variable water level and velocity, and vulnerability to flood damage. 34 Whereas some felt that the widespread demand for boards and the hard and time-consuming labor of pit sawing outweighed these shortcomings, similar reasoning was not applied to tasks other than basic sawing.

Most rural Connecticut joiners took advantage of the moderate popula-
Craftsmen relied on young apprentice labor to turn great lathes, foot power to turn smaller pole lathes, mallets to drive chisels, and plenty of muscle. Even when their shops had a prime location for using water power, joiners consistently rejected this option for driving their lathes or other equipment. The Newtown shop of Ebenezer and Joel Booth, for example, was located right on the Pootatuck Brook, where a gristmill operated and a satinet factory, rubber hose factory, and other water-powered businesses prospered in the 1820s and 1830s. Yet the Booths chose not to harness that power.

Apparently the town's social economy, in which a truly mixed agricultural system accommodated the population and balanced production and consumption, made human power more appropriate than the costly, erratic harnessing of water power for furniture production. Not until the market demanded increased production in the late 1810s did rural Connecticut joiners feel that the market possibilities outweighed continued use of their traditional power source. They turned to the abundant natural advantage of their hilly upland environment and began to use water power to drive lathes.

In Newtown during the 1820s, Abijah and George Bradley began to purchase land with water rights to ensure a reliable power source for their machinery. The inventory of Nehemiah Gray of Huntington, appraised in 1827, contained the first explicit reference to such a shift. In addition to a large stock of table, chair, and bedstead parts, he owned a “shop & machinery & pond” valued at $125. In the following year, a Woodbury deed included a water-powered saw, lathe, and boring machine among the equipment in William Hurlbut’s shop. By the 1830s, water-powered manufacturing provided the Housatonic Valley with its distinctive industrial identity, ranging from papermaking and iron furnaces near the Connecticut-Massachusetts border, to clockmaking and brass buttons around Waterbury, to textiles around Derby. 35

The joiner acquired wood and materials from a wide variety of sources, which meant involvement in both local economic exchange and commercial relations with external economies. If the joiner owned woodland, he would cut timber and sled it during the colder months. He then faced a number of options. If it was oak or chestnut to be used for shingles, clapboards, rails, slats, or rounds, he or another woodworker would split it. He might saw some timber himself if he owned a whipsaw or frame saw. More likely he would take the logs to a nearby sawmill. Although David Miles of Woodbury and Elijah Sherman of Newtown owned sawmills, most joiners
did not. Of the twenty-eight owners or part-owners of sawmills in Newtown in 1820, only three were woodworkers. Elijah Booth sledded his timber, or contracted a handyman to sled it, to the sawmill owned by his neighbor David Stiles. At the mill, Stiles or Booth himself sawed the logs into boards and, sometimes, into bedstead posts.\(^{36}\)

For the most part the joiner purchased the bulk of his boards directly from the sawmill or from a lumber merchant. Charles Prindle relied on a local sawmill in Bethlehem, but he often traveled as far as Norfolk or Derby to acquire boards from sawmills or from traders who dealt in timber. The reliance on mills and lumber merchants indicates that local wood lots no longer provided sufficient material. Lumbering in the region had become more intensive, and craftsmen relied on whatever might be available locally or sought good-quality primary woods elsewhere. Surviving objects from western Connecticut reveal inconsistent uses of different types of woods for interior structural elements (e.g., some Woodbury case furniture features drawer linings—the sides and back of a drawer—of oak and yellow poplar in the same object) or use of poor-quality knotty or slab-cut boards for interior elements (case furniture from Canaan, where the iron industry also used great quantities of wood, often has low-grade white pine as drawer linings and backboards).\(^{37}\)

A third source of wood was the joiner's clientele. Customers could supply the craftsman directly with boards intended for a specific piece of furniture or indirectly with boards as a medium of exchange. While the latter occurrence is recorded throughout surviving account books, the former appears to have been less common. Thomas Tousey, a minister-turned-doctor in Newtown, supplied Alexander Bryan with boards for a two-drawer chest and two tables in 1747. In 1803 Dennis Bradley of Woodbury made a chest for Matthew Minor with poplar boards provided by the customer. These two examples are the only clear-cut cases in which the client provided specific boards to be used in the construction of his furniture.\(^{38}\)

For tools and hardware, the joiner relied on local and urban sources. Although a joiner was skilled with both wood and metal, he usually did not make his own tools. Even when creating a tool for a specific purpose, he merely altered existing tools.\(^{39}\) Local blacksmiths usually provided nails, iron hinges, snipebill hinges, and such basic tools as axes and large chisels. John Hubbell, a Newtown blacksmith, provided Joel Booth with nails, bench hooks, hammers, and chisels. In Woodbury, blacksmiths such as Samuel Moody and Hezekiah Cole used their nail molds and nailing tools to provide local shop and house joiners with plentiful supplies of nails. For the
most precise edge tools (planes, gouges, and chisels), saws, and brass hardware, the joiners depended on those local storekeepers who imported goods from hardware merchants in New York City. Shadrach Osborn bought tools from Ustick & Hartshorn and brass hinges, locks, escutcheons, and knobs from John Broome and Rogers & Murray. Merchants such as Osborn and John Botsford of Newtown sold these tools and fixtures to local craftsmen.40

In the late eighteenth century, joiners in western Connecticut ranked at the upper end of the woodworking spectrum. During this period of “low technology” craft production, reliance on human skill rather than on sophisticated specialized equipment permitted considerable flexibility.41 Drawing upon a broad technical repertoire and a shop tradition that stressed economy, the joiner worked skillfully and efficiently to create a wide range of furniture, from simple to intricate. The local economic context provided the broad parameters of shop rhythms, and the interaction between makers’ traditions and patrons’ needs established the acceptable standards of performance and degree of elaboration.