Medieval Furniture

A class offered at Pennsic XXX
by
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Medieval Furniture

Part I - Furniture Use and Design
Introduction
The Medieval House and Furnishings
Documentary Evidence of Furnishings
Furniture Construction Techniques
Introduction
Armoires
Buffets and Dressoirs
Beds
Chests
Seating
Tables

Part III - Furniture Examples

Part IV - Construction of Medieval Furniture
Introduction
Properties and Types of Wood
Purchasing Lumber for Furniture
Medieval Woodworking Tools and Modern Equivalents
Modern Equivalents of Medieval Tools
Sources of good hand tools
A Modern List of Carpenter's Tools
The Cost of a Minimal Set of Tools
Sharpening Wood Working Tools
How to sharpen tools
The 'Scary-Sharp™ Sharpening System
Angle of the Bevel
Wood Working Joints

Part V - Medieval Wood Finishes
Introduction
Shellac
Tung Oil
Linseed Oil (Boiled)
Medieval Furniture

Part I - Furniture Use and Design

Introduction

This lecture will consider the design, construction, and decoration of furniture in Western Europe from about the 11th through the 16th century. During this period there were four main groups of people: royalty, nobility, clergy, and peasants. Each group had different abilities to acquire furniture. The royalty had essentially unlimited wealth that allowed them to furnish their palaces on a grand, unparalleled scale. The nobility, before the 14th century, while wealthy, led a peripatetic life and supported groups of soldiers that consumed most of their disposable income. What money was left was insufficient to furnish the several manor houses in which they rotated residence. In the 14th century the standing armies and the peripatetic lifestyle were no longer necessary. Consequently, holdings were consolidated, the nobility settled down, and, since money was available, they were able to furnish a preferred manor house very comfortably. The establishment of the monasteries had a similar effect for the clergy as consolidation of holdings did for the nobility although it happened about 100 years earlier. The simple existence and dawn to dusk labor of the peasants did not change much throughout this period; neither did their housing and furnishings which were of a very simple nature.

Due mainly to the small number of remaining examples of medieval furniture, this rather long period of time can be considered as a whole since there is insufficient evidence to base a more detailed discussion of period variations in furniture styles. Similarly, little can be said about regional or nationalistic variations. There is, however, one general temporal division that can be made between the furniture from the early period, before about 1300, and the later period, after about 1300. This division is one of quantity and only later, towards, the end of the 15th century, one of quality. By the 14th century, coincident with the consolidation of manorial holdings, the private room, or solar, was gaining popularity and with it there was an increase in the amount of furniture in a house. In particular, there was an increase in the number of tables, chairs, cupboards, etc.

The scanty remains of early medieval furniture are partially demonstrated by the rarity of surviving examples. There are very few pieces which can be dated before 1200 with certainty and not many more which can be dated prior to 1300. This may be due to destruction of earlier pieces as old-fashioned or worn out. While partially true, implying that the surviving pieces are a minute fraction of the pieces that once existed, there are numerous surviving examples of woodwork in churches from these periods. The number of surviving examples suddenly increases as the end of the 14th century coincident with the consolidation of manorial holdings, reductions in feudal responsibilities, a less peripatetic life, and increase in the size (more rooms) and importance of houses.

Specifically furnishings made of wood, items made of iron, e.g. candelabra, will not discussed.

Furniture in England, France and the Netherlands from the Twelfth to the Fifteenth Century, by Penelope Eames, Furniture History Society, Vol. XIII, 1977, is perhaps the most scholarly work on Medieval furniture and the principal reference cited herein.
The Medieval House and Furnishings

Furniture exists only in conjunction with the house. A detailed discussion of the design, construction, and evolution of the Medieval House is beyond the scope of this class. Several books are listed in the bibliography for further study. A brief examination of the medieval house, primarily in England and France, will provide the necessary foundation for the discussion of furniture.

The medieval house, up through the 14th century, consisted mainly of one large room, the hall, which was used as living room, parlor, dinning room, bed room, workshop, etc. Indoor life in the 13th century was a poor substitute for outdoor activity. This was certainly true of peasant houses as well as the larger houses of the nobility, which even with their large fireplaces and screens blocking the drafts, the hall was dark, damp, and cheerless during the winter months. The great hall of a manor house, figure 1, or castle served a wide variety of uses: reception hall, living room, dining room, work room, dormitory, etc. The furniture in the great hall was restricted to a minimum in order to keep the floor as clear as possible and consisted primarily of trestle tables and benches, which were easily moved. Exceptions to this were the window seats built into the thickness of the walls and the seating around the pier bases in the early Medieval Churches. By the early 1300’s, however, most halls had a large stationary table, or table dormant, at the head of the hall, usually on a raised platform, or dais.

The end of the 14th century saw an increase in the importance of other smaller rooms such as the solar, which was used exclusively as a parlor and dinning room for the noble family, and separate bed rooms which were often used to receive guests in. More rooms consequently required more furniture, both in terms of number of pieces as well as in diversity.

Documentary Evidence of Furnishings

The earliest detailed inventories of medieval manor houses are from the twelfth century. Where the contents are listed, the Hall contained no more than a table, a settle and a stool or two. Somewhat later accounts of houses near Colchester, compiled for taxation purposes, indicates that furniture was of little importance among farmers, merchants, and craftsmen of the area. Nine out of ten homes consisted of only one room, only a few had a bed and essential cooking equipment. Furniture was not recorded, either there was none or it was not considered as something of value.

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Additional descriptive evidence of household possessions comes from contemporary documents such as wills and tax records. Since none of these are dated prior to the 13th century and most are from the later years when furniture was more common little can be deduced about furniture in the early Middle Ages. As an example, in 1287 the furniture of Guichard Vert, an owner of three small lordships in the old county of Ferez, consisted of a bed, a table, three benches, and five coffers. The tax returns of 1294, and 1301 of Colchester showed that the most prosperous townsman had no more than a bed of two and that many persons had nothing that a tax collector found worth recording.

John of Garland, an eminent English scholar living and teaching in France at the beginning of the thirteenth century, listed the necessary furnishings of an honest man’s house in his vocabulary, probably written between 1218 and 1229. He specified: “a decent table, a clean cloth, hemmed towels, high tripods, firebrands, fuel, logs, stakes, bars, benches, forms, armchairs, wooden frames and chairs made to fold, quilts, bolsters, and cushions.”

One of the most common items mentioned in the inventories is a bed although it is uncertain whether a piece of furniture is intended or simply a mattress and covers. The distinction between a bed and a bedstead was generally stressed by medieval, and later, writers who lavished words upon the bedclothes and hangings but ignored the framework, if any, upon which they were placed.

Furniture Construction Techniques

The role of medieval joiner or junctor, equivalent to the modern (before the 18th century) cabinetmaker, was, until late in the medieval period, of much lower importance than the carpenter. The construction of medieval furniture can be divided into two general time periods. Early timber was usually axe hewn or split rather than sawn. Thus, the production of thin boards was a difficult process before the invention of the sawmill in about 1322. The First simple automatic sawmill, constructed at Hanrey-Mill, Augsburg Germany, was water driven. The metal blade reciprocated up and down. Earlier furniture was therefor, more likely, made of heavy scantling. The appearance of the lumber is not a definitive guide to period since the practice of using heavy scantling, even when thinner material was available, was held over into later times by the conservative bias of guild regulations. Even into the 16th century there are examples of hewn boards used for furniture. In addition to these temporal variations, there were also local variations. In an city or town where a joiner had set up shop more refined techniques could be found. A adjunct craft to the joiner was the upholsterer or upholsterer. The medieval upholsterer made cushions, mattresses, and hangings for beds. The modern idea of attached, cushioned upholstery did not originate until the end of the 15th century.

The extant examples of medieval furniture are in most cases made from oak. Although oak was the wood of choice in the Middle Ages, many woods were available to the medieval carpenter and turner. Chaucer gave a list of them with their uses in The Parlement of Foules, a volume of vocabularies, illustrating the condition and manners of our forefathers, privately printed, London, 1882. These regulations influenced the design of furniture in other ways, for example, in Italy a furniture maker was required to pay a fine to the guild in order to make a chest which was not of the standard dimensions.

The Parlement of Foules is an allegorical love-vision poem in 699 lines, written probably in 1382 in honor of the marriage of Richard II and Anne of Bohemia. It is extant in fourteen mss., most of them in the libraries of Oxford and Cambridge, and was first printed by Caxton in 1477-78. The poem describes a contention between three male eagles for the love of a female, the favorite of the goddess Nature. The other

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and included oak, ash, elm, box, holm oak, fir, cypress, yew, olive and laurel; in *The House of Fame* he mentioned 'a table of sicamour' (sycamore), and in *The Canterbury Tales* named many trees, among them birch, alder, willow, poplar, plane, chestnut, lime, maple, beech and hazel. Much, very fine, pine and fir lumber (and furniture?) was imported from Scandinavia the 14th century. Walnut was not commonly used until about the 15th century but became the primary material by the 16th century.

The apparent dominance of oak as the material of surviving medieval furniture, having withstood the years, is due to the strength and toughness of oak and is not an accurate indication of the preeminence of oak for medieval furniture. Softwoods, such as pine and fir, were also used for furniture in Western Europe, but especially in the northern Scandinavian countries, where conifers are the dominant species.

The common or English oak, native to Europe and Britain, provides a hard, reliable, pale yellow wood, which darkens with age and polishes to a rich brown. When chests and chairs, cupboards and bedsteads the oak were new, they shone like gold, for they were polished with beeswax, which warmed and deepened their naturally light hue. English oak was hard, strong and excellent for shipbuilding and structural joinery, but its coarse, uneven texture was not always suitable for furniture and wall paneling. These short comings were recognized as early as the fourteenth century, when quarter-cut oak, called wainscot, was imported from Norway and the Baltic.

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birds are called on by Nature to judge the dispute, which is left unsettled. The other birds choose their mates (it is St. Valentine’s day); and certain of them sing a roundel in honor of Nature. A roundel or triolet is a short poem in which the first line or lines recur as a refrain in the middle and at the end.  http://www.library.utoronto.ca/utel/rp/poems/chaucer5b.html


\(^j\) *Quercus robur* - Pedunculate Oak, Common Oak, English Brown Oak, Irish Dair. Family - Fagaceae

Description - Large deciduous tree and probably the commonest tree in England. Height 30-40 m. Age 1000 year or more.

Natural Distribution - Throughout Britain and Ireland and most of Western Europe and Asia Minor.

Timber - Pale brown strong wood. More susceptible to epicormic growth.

*Quercus petraea* - Sessile Oak, Durmast Oak. Welsh Derw, Gaelic Darachor, Irish Dair. Family - Fagaceae

Description - Large deciduous tree growing slowly as seedlings but faster up to 199 years. Height 30-40m. Age 1000 years or more.

Natural Distribution - Particularly West and Northern Britain and most of Western Europe and Asia Minor.

Timber - Pale brown hard wood. Less susceptible to epicormic growth than Q. Robur reducing the incidence of knots in the timber.

Uses of Wood - Tanin used to be produced from bark for tanning leather. Acorns formerly used to feed pigs.

http://www.british-trees.com/guide/commonoak.htm
Part II - Furniture Styles

Introduction

Nearly all articles of free-standing furniture are variations of two basic shapes: a platform or a box. Stools, benches, chairs, couches, beds and tables are platforms elevated on feet or legs or underframing, on which you sit, lie, or put things; chests, cupboards and wardrobes are boxes for storing anything from linen and clothes to food, wine, drinking vessels, documents or money; while there are combinations of platforms and boxes, such as sideboards, buffets, dressing tables, writing desks, also chairs, settles and stools with hinged seats and receptacles below.

In the earlier period, the most common furniture items are beds and chests. Everyone had a bed, rich to poor. A distinction was made between the bedstead (frame) and the bed proper including the mattress, sheets, covers, etc. In many cases, a reference to a bed, refers specifically to the mattress etc. often there was no frame at all. These were the beds of the general people who slept in the hall. Only the well to do had bed frames. By the 13th century most of the well to do had bed frames which placed the mattress well up off the floor. In some cases the bed frames were so high that a ladder or steps were needed in order to get into bed. In many cases these steps were formed by a ring of chests around the bed, which also served as seating for the various persons who might be entertained in the bedroom of a nobleman.

Chests were the main method of storage for clothes and other items of value. Chests were often bound with iron to offer greater security for money or valuables. Before the 14th century armories (free standing cupboards, see below) were rarely mentioned and cupboards (in the modern sense) were built into the walls of a building so that the doors were flush with the walls. Small easily carried chests, called caskets, were used for the storage of small items such as jewelry. The coffer referred to slightly larger, portable chests ranging in size from large traveling chests, which often had domed lids (for weather resistance) and were covered with leather and banded with iron, to small money chests. Beds, along with chests, were common possessions of all levels of medieval society.

Armoires and cupboards are, in effect, chests turned sideways or placed on tall legs. The evolution of the cupboard and free-standing armoire came with the increased security afforded by prosperous towns, which made it possible to display ones valuable possessions rather than locking them in a chest.

Chairs were restricted in the early period for use by only the highest of the nobility (hence the term 'chairman'). Others made do with benches, stools, or, in the case of the very poor, the floor. One of the most popular forms of chair from the earliest periods through the 14th century was the folding stool or cross chair. These were made from wood or iron and were often highly ornamented. In fact, the small-scale ornament of these chairs formed the major part of the ornament grammar of the period and influenced the ornament of all furniture up to about 1300.

Between the middle of the fourteenth century and the beginning of the sixteenth, such basic articles of furniture as beds, tables, chests, cupboards and seats were improved in structure and design. Mediaeval furniture, whether made in France, Flanders, Germany or England, had a comparable simplicity of form, differing only in the character and execution of ornament. In Spain and Italy the shape of furniture had greater elegance and the decoration greater liveliness than in Northern and Central Europe, for the oriental Moorish states of Spain, though shrinking
in size, still wielded a potent artistic influence, and in Italy classic traditions of design, though submerged, were never far below the surface. Progress in design was slow, because furniture lasted far longer than a lifetime, and massive oak chests survived in constant use for generations.\(^k\)

**Armoires**

Type 1, Fixed Locker
- i. Stone recess with wooden doors
- ii. Locker inserted into original structure

Fixed lockers built as part of the construction of a building and inseparable front it. Not considered iii the middle ages as furniture since they were not movable. Most surviving examples are in churches and monasteries. This limited area of survival is misleading since it is clear that fixed armoires were widely used.

Type 2, Freestanding
- i. Single, double, or multi-bayed
- ii. With enclosed drawers in place of shelves

Freestanding armoires were easily moved without modification to the building or themselves. Sometimes these were considered to be movable property and at other times evidence suggests that they were considered part of a house.

This distinction, while of interest, did not affect the use of the armoire, only the ability of the owner to foresee the desired location of the armoire at the time the house was built.

The armoire, fixed or free, evolved into different forms in the later middle ages having drawers behind the doors in place of shelves; having exposed shelves or a combination of shelves and drawers enclosed by doors or exposed. These forms are known as the buffet and dressoir or cub-board.\(^l\)

The construction of armoires was often heavy, solid, and utilitarian. Although sometimes they were painted, carved, gilded, or a combination of these.

**Buffets and Dressoirs**

The important piece of furniture in the hall described variously as buffet, dressoir, or cupboard was used for displaying plate and as a side board for serving wine and meals. These terms were also used to describe the various boards for dressing food and armoires which belongs to service quarters, and to food service area of other rooms as a readily available place to store dishes, utensils, food, and drink.

Eames makes the distinction, based on use rather than on form, that the buffet was the important object used in the hall and chamber for the display of plate and the special service of drinks. The buffet in its simplest form a stepped structure with a number of open shelves, the

\(^k\) Gloag, p. 81.
\(^l\) See Eames, cat. 13-17 & 25.
number of which indicated the rank (degrees of estate or honor) of the owner. Usually when in use the buffet was draped with a cloth and plate arraigned on the shelves. The dressoir referred to the dressing boards, shelves, and other storage furniture which were in service areas or to the arraigned food counters and hatches adjacent to halls and chambers. Since dressoirs were used for preparation, serving, and storing food and utensils they were usually coarse pieces of furniture and few clearly identified examples remain.

### Beds

Most surviving beds are from the 15th century so we must rely on the pictorial record although there are difficulties with accurate interpretation of art lacking true perspectivem. Twelfth century pictures suggest that a characteristic form of bed had the four posts extended somewhat above the level of the mattress and a low railing to contain the mattress or bedding. In all the representations, any curtains which might be present appear to be part of the chamber rather than attached to the bed. In the 13th century the embellishment of important beds began. The canopy, or ceilour, rare in the 12th century, increased in popularity and importance and was a fixture of important beds through the 19th century.

The four poster bed, with the posts supporting the canopy was known in the 14th century but was not the main form of beds until about 1500. The more common form of 14th and 15th century beds was the totally draped bed with a canopy suspended from the ceiling. The bed and canopy were quite separate. The link between the two was established in two ways: 1) by using matching textiles for the canopy and as covers on the bed and 2) by leaving a permanently lowered hanging behind the head of the bed, the tester, dorser, 'dossier', etc. which joined the two parts even in the day time when the curtains were raised.

By the 15th century the canopy became a mark of privilege and was used to denote honor in many contexts, in particular, with respect to seating. The use of a canopy became a measure of the power of the individual. This led to the situation where an important bed was to be displayed although it was never intended to be slept in. Thus, Charles the Bold had a "chambrette" where he slept and a "salette de reception," fitted with "un lit de parement" where he held state.

An advantage of the hung bed was that the bed frame could be very solid, yet inexpensive, and money could be lavished on the hangings which could easily be transported from one place to another. Other various forms of beds existed which had wooden curtains at the head and/or the foot or along one side and with curtain along the open sides.

### Chests

The medieval period was one of mobility and security for household possessions was an important consideration. The adaptability of the chest in its various forms made it the most

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m Viollet-le-Duc warned that the evidence of art cannot always be taken literally for the 12th and 13th centuries.
indispensable single article of furniture. The chest was also a piece of furniture, providing storage and seating, and luggage, in the modern sense, at the same time. The various types of chests can be divided into two broad types 1) footed chests, with flat lids and 2) chests which sit directly on the ground with domed lids.

1. Footed chests were not generally intended to be moved and the feet raised the chest up off damp floors. The tops tend to be flat. Eames describes four main styles.

   a. **Slab-ended** chests were inherently crude. The end boards were large by design and little could be done to streamline the design. Slab ended chests were sometimes (often?) iron banded.

   b. **Ark** chests are the crudest of the forms, in that they are made of riven (split) wood and have the stiles extended to form feet.

   c. **Hutch** chests show the most variation in design and ornament. Some had framed sides while others had plain sides. The fronts of these chests were often carved and the feet were often decorated.

   d. **Paneled** chests developed around the end of the 14th century, became popular in the 15th century. Paneled construction was used mainly for larger pieces such as seats and buffets although there are some paneled chests.

2. Chests without feet, or unfooted chests, were used primarily for traveling. For this reason the tops tended to be domed. Again, Eames describes four styles.

   a. **Dug-out** chests, essentially a hollow log was the most primitive form of chest, but of very solid construction and great strength.

   b. **Box** chests were ideal for storage and for those uses where security and convenience were more important than appearance. The box chest is less graceful than a footed chest, but it is more readily transported and can be blocked up to raise it off the floor. The box chest, in a smaller form, could take the place of drawers for storage in an armoire or larger chest.

   c. **Standard** chests were intended for the transportation of goods and are often large.

   d. **Plinth** chests were a very ornate and sophisticated variation in the later middle ages and were very popular in the 15th century. The feet of the chest are enclosed by the plinth, which rested directly on the ground and may imply that this form of chest was intended to sit on a wood or tile floor. The degree of decoration that these chests received indicate that these chests were important item of estate.
Seating

1. **Seats of Authority** in the early Middle Ages chairs were often raised on a dais to show the importance/authority of the person seated there, and possibly covered with a drapery.

2. **X-seats** are one of the most ancient forms of chair. They were used by the Roman bureaucracy as a conveniently portable folding seat of office (sella curulis). The X-seat continued throughout the Middle Ages to be an expression of supreme majesty.

3. **Post and boarded** forms gave greater design freedom than the X-seat, which it replaced, becoming used as a symbol of supreme authority (the thrown). As such these post seats of authority often bore the image of the King.
   a. Post Seats of Authority
   b. Boarded seats of authority also existed in a great variety of styles or forms which can be grouped into two categories. 1) Seats with turned decoration and 2) with vertical carved members. The importance of the seat of authority was often increased by the addition of a raised dais with steps, tester, and canopy. The footboard of these chairs was also an important aspect.

   Post Seats of Authority
   Boarded seats of authority

   Examples from Eames (1977).

   a. MS Douce 180, Bodleian.
   b. Extant chair from Vallstena church, Gotland; 12th century, Statens Historiska Museet.
   c. From a painting of St. Jerome attributed to Jan van Eych; 15th century, Naples Museum.
   d. Fourteenth century. MS Royal Coll. Of the St Grail, British Museum.
   e. Muchelney, Cat. 51
   f. Coronation Edward II, Corpus Christi Cambridge MS, 20 fol. 682
   g. Fourteenth century, Romance of Alexander, Bodley 360.
   h. Mid-fifteenth century, extant, St. Mary’s Guildhall, Coventry.

4. Chamber seating was often upholstered with leather or cloth and intended for use in a private chamber while company was being entertained. Upholstery in the modern sense of attached cushions did not evolve until end of the 15th century.

5. Benches (seats with backs), and forms (seats with out backs), both for seating more than two persons, and stools for one person were the most common forms of seating in the
middle ages. The bench was considered to be superior to the stool. Benches were often used by great lords for dinning, precedence being indicated by the use of a canopy fixed over the bench and persons on it. As with chairs, the attached footboard was important in contexts of this kind. Benches, forms, and stools were used in halls and chambers alike, although chamber benches were often fitted around the walls.

**Tables**

The ordinary forms of medieval tables must have existed in many different forms although there are few examples. Softwoods and oak were used for tables although marble and other stone were used.

1. **Movable tables** were generally used in halls where many people had to be seated for meals, yet the floor space needed to be cleared for other activities. The common solution for this was the dais table for the lord (and other important members of the household) and a number of tables placed at right angles to it arranged down the hall. These hall tables were often heavy planks (boards) laid across trestles. After the meal, the table boards could be stacked and the trestles moved out of the way for dancing or entertainment. A similar situation existed in the chamber and the trestle table could also be found there. At all times it was usual for diners to sit on only one side of the table in order to leave the other side free for the servers; this meant that the table could be relatively narrow but quite long. Trestles are of two forms 1) those with separate splayed legs and 2) the tower or column type with a heavy fixed base. The splayed leg version appears to have been more common.

2. **Fixed tables or tables dormant** were not intended to be moved. They were fixed in two ways: 1) the frames and boards were attached to one another and the whole table fixed to the floor, and 2) only the legs were fixed to the top allowing the table to be somewhat moveable (the modern concept of a table).
### Part III - Furniture Examples

<table>
<thead>
<tr>
<th>Slide 1</th>
<th>Cupboard at Obazine, Corrèze, France, of uncertain date but probably late 12th or early 13th century (Musée de Beaux-Arts, Tours). Mercer Plate 17.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slide 2</td>
<td>Cupboard in Halberstadt Cathedral, probably 13th century, monumental both in form and in style of decoration (VEB Verlag der Kunst, Dresden). Mercer Plate II.</td>
</tr>
<tr>
<td>Slide 3</td>
<td>15th century English livery cupboard. (Metropolitan Museum, New York). Salomonsky Plate 69</td>
</tr>
<tr>
<td>Slide 4</td>
<td>Late medieval English livery cupboard. The ventilation panels are formed, and ornamented, by openwork tracery (Victoria and Albert Museum, London). Mercer, Plate 72.</td>
</tr>
<tr>
<td>Slide 5</td>
<td>Late 15th century buffet of French origin, with tracery ornament above and linen-fold below. The plate stood on the upper shelf and the less valuable utensils on the lower shelf (Wallace Collection). Mercer, Plate 73.</td>
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<tr>
<td>Slide 6</td>
<td>Cupboard of circa 1500; some of the ornamental tracery panels are left open for ventilation (Burrell Collection, Glasgow Art Gallery and Museum). Mercer, plate 76.</td>
</tr>
</tbody>
</table>
Slide 7 (top) The Franks casket of the 7th or 8th century. It is covered with scenes from the Bible and Roman and Norse mythology, and has a runic inscription (British Museum). (bottom) Twelfth century lead casket with silver and enamel enrichments, probably from Lorrain (Fitz-William Museum, Cambridge). Mercer, plate 18,19

Slide 8 (top) Late 12th century casket of wood sheathed with copper and silver and partially gilt and enameled; made to hold a piece of bone supposed to have been part of Charlemagne’s arm (Louvre, Paris). (bottom) Fourteenth century ivory casket carved with scenes from the siege of the Castle of Love. (Victoria and Albert Museum, London). Mercer, plate 20,21

Slide 9 (top) Sixteenth-century Swedish chest with lifting rings to slide a stout pole through (Nordiska Museet, Stockholm). (bottom) Plank-built German chest of circa 1300. The front is covered with well-carved and often charming animal figures, but all in a wholly unorganized design (Kunstgewerkemuseum, Berlin). Mercer, plate 22,23


Slide 14 Late 12th century marriage chest made of wood with a painted parchment covering, in Vaunes Cathedral. Mercer, Plate 100.

Slide 15 Late 12th century marriage chest made of wood with a painted parchment covering, in Vaunes Cathedral. Mercer, Plate 103.

Slide 16 Hutches of softwood from Valère, Switzerland; probably early 13th century. The most outstanding surviving example of the use of Romanesque architectural forms in furniture ornament (Musée de Valère, Switzerland). Mercer, plate 31,32.

Slide 17 (top) English chest of circa 1500 with late gothic ornament (Victoria and Albert Museum, London). (bottom) Early 16th century chest, medieval in form but with quattrocento ornament (Rijksmuseum, Amsterdam). Mercer, plate 142,143.

Slide 18 Detail from *Death and the Miser*, by Hieronymous Bosch (c. 1450-1516) National Gallery of Art, Washington.
Slide 19 Desk and cupboard for books (Victoria and Albert Museum, London). Tracy, Plate 114a.

Slide 20 A room in a 15th century house; notice the double window seat contrived in the thickness of the wall (from the French manuscript: Royal MSS.14 EV f.291, British Museum). Mercer, Plate 48.

Slide 21 A settle used as a bed, an illustration of the 'Story of Tobit' from the late 15th century Bible Historiale (Royal MSS.15 Di f.18 British Museum, London). Mercer, Plate 55.

Slide 22 Late 15th century canopied bed with bench-chest at side; from The Birth of the Virgin, by M. Reichlick (Alta Pinakothek, Munich). Mercer, Plate 60.

Slide 23 Early 16th century bed from the Château de Villeneuve, Auvergne. The paneling at the head and along one side shows that it was always intended to stand in a corner (Musée des Arts Cororatifs, Paris). Mercer, Plate 69.

Slide 24 Robert Campin's Annunciation, center and right panels of the Merode Altarpiece. This triptych was painted in ~1426. Campin was among the first and most influential painters of furnished interiors.
The painted scenes upon 15th century marriage chests, or cassoni, were often works of art in their own right (top) 'The Death of Procris,' by Piero di Cosimo (National Gallery). (bottom) Marriage ceremony (Victoria and Albert Museum, London). Mercer, Plate IV.

Christ in the Home of Simon, by Dirk Bouts (c. 1415-1475), Berlin Gallery. This painting illustrates the story of Christ in the House of Simon the Pharisee (Luke, 7, 36-50). Trestle tables were widely used in the Middle ages for feasting. The trestles and boards (tops) could be easily set up and readily taken down and moved out of the way. (Ball & Campbell, p 67)

Between Two stools, by Peter Brugel (c. 1525-1569), shows a befuddled peasant falling between two enormously popular pieces of medieval furniture. Such triangular stools, a northern European specialty throughout the Middle Ages, provided simple seating. Cushions were often used to soften the seat. (Ball & Campbell, p 99)


Late medieval chair with open tracery on the back and on the seat front. In Ketteringham Church, Norfolk (Royal Commission on historical Monuments, England). (right) The chair of the Master of the Guild of St. Mary, St. John, and St. Catherine at Coventry. This heavy piece was meant to stay in its permanent position on the dais (City of Coventry). (bottom) Early 16th century settle with linen-fold ornament (Victoria and Albert Museum, London). Mercer, Plate 94,95,96
Slide 30 'The Annunciation,' by Rodger van der Weyden, probably before 1440. Notice the textile canopy above the bed and the covering of the Virgin’s seat (Louvre, Paris). Mercer, Plate III.

Slide 31 St. Barbara, by Robert Campin. This panel depicts a young girl reading placidly in a room warmed and lit by a burning fire and decorated with exquisite objects. The glints of the nails of the beams and of the wooden shutters are a prodigy of execution and make this one of the artist’s best works. Note the cushions on the bench, the footrest, and the hanging between them. The back of this bench can be flipped front to back allowing one to sit facing either direction.
Part IV - Construction of Medieval Furniture

Introduction
In the Middle ages furniture of one sort or another was made by most (all?) woodworkers, which included carpenters, coffer makers, joiners, and turners. The style of furniture each of these made varied because of their respective skills. Our modern concept of a furniture- or cabinet-maker did exist until the late 16th century. This work will examine the tools, skills and the techniques, and materials used in furniture construction. The hand-tools, skills, and techniques of the medieval woodworker, have, with a few exceptions, evolved only slightly to the modern day. This evolution was due, primarily, to the introduction of new tool designs and increasingly sophisticated furniture designs. The exceptions are due to the introduction of electric power tools beginning about 1910 and the subsequent decline, since WW II, in the use (and quality) of hand tools.

Making medieval furniture using traditional methods requires developing skills with hand tools. The skills of the medieval craftsman, figure 1, are essentially the same as the late 19th century cabinetmaker, figure 2. Mastering all these skills, e.g. linen-fold panels, dovetail joints, carving etc., will provide you with years of pleasure. The use of modern power tools\(^n\) can replace some of the skill and expertise gained by a medieval craftsman over the many years that would be spent as an apprentice. In addition, the use of power tools allows work to be completed more quickly; however, their accurate (and safe) use still requires the development of certain skills. If one is to invest the time to learn a new set of skills, I encourage you to learn the skills associated with hand tools. There are several readily available books, listed in the bibliography, from which you can learn many of these skills. The best approach, which is not always possible, is to work with directly with a skilled woodworker. Many larger cities and towns have a woodworkers group or club\(^p\). Joining one of these organizations will provide you with access to persons with a wide range of skills and opportunities to obtain help with your projects.

The items to be covered in this part are divided into three sections:

**The types of woods** available to the medieval woodworker, their properties, and what similar woods available in North America today.

**The tools** available to the medieval woodworker tools, how they compare to tools available today, and where to get good woodworking tools.

\(^n\) The information in this section is excerpted from my six-week, hands-on class: An Introduction to Medieval Woodworking.

\(^m\) My power tools include a bandsaw, planer, drill press, lathe, jigsaw, and various small tools such as a router, sabersaw, and disk/belt sander.

\(^p\) Woodcraft's stores, www.woodcraft.com, offer classes and demonstrations. Their Woodworkers Clubs located in selected stores in CA, CT, FL, KS, MD, VA, and WV, offer a fully equipped shop, professional instructors, and hands-on classes.
The techniques of Medieval woodworking, the joints commonly used by medieval craftsmen and how are they constructed.

Medieval wood finishes and furniture hardware are covered in Parts V and VI.

**Properties and Types of Wood**

As discussed above in Part I, most, but not all, medieval furniture was constructed of English Oak (Quercus robur) or Sessile Oak (Quercus petraea) both species are members of the family Fagaceae although, several varieties of pine, lime-wood (bass-wood or linden), elm, walnut (Juglans regia), etc. were also used. In North America, there are about 650 native species and over 100 introduced species of trees. The European woods are of the later category and are generally difficult to get and/or expensive. Fortunately, there are native woods, both hard and soft, that are readily available, affordable, and sufficiently similar to the European varieties for most furniture projects. North American woods similar to ones which were available to the medieval craftsman include:

- **White Ash** - heavy, hard, very elastic, coarse grained, and compact. Tendency to become decayed and brittle after a few years. Color, reddish-brown, with sap wood nearly white. Used for interior and cabinet work but unfit for structural work.

- **Red Ash** - heavy, compact, and coarse grained but brittle. Color, rich brown, with sap wood a light brown sometimes streaked with yellow. Used as a substitute for the more valuable white ash.

- **White Cedar** - soft, light, fine grained, and very durable in contact with the soil; lacks strength and toughness. Color, light brown, darkening with exposure. Sap wood very thin and nearly white. Used for water tanks, shingles, posts, fencing, cooperage, and boat building.

- **Red Cedar** - strong pungent odor repellant to insects. Very durable and compact, but easily worked and brittle. Color, dull brown tinged with red. Used as posts, sills, ties, fencing, shingles and lining for chests, trunks and closets.

- **Hemlock** - brittle, splits easily and likely to be shaky. Soft, light, not durable, with coarse and uneven grain. Color, light brown tinged with red and often nearly white. Used for cheap rough framing timber.

- **Hard Maple** - heavy, hard strong, tough and close-grained. Medullary rays are small but distinct. Curly and circular inflection of fibers gives rise to "curly maple" and "bird's eye maple". Susceptible to good polish. Color, very light brown to yellow. Used for flooring, interior finish, and furniture.

- **White Oak** - heavy, strong, hard, tough, and close grained. Checks if not carefully seasoned. Well known silver grain and capable of receiving high polish. Color, brown, with lighter sap wood. Used for framed structures, ship building, interior finish, carriage and furniture making.

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4 All the oaks in Europe are of the white oak family.
5 The terms hardwood and softwood refer to whether the tree is deciduous (hard) or coniferous (soft).
6 For on-line assistance in identifying trees, see e.g. [http://www.oplin.lib.oh.us/products/tree/index.html](http://www.oplin.lib.oh.us/products/tree/index.html)
7 Descriptions are from Audels Carpenters and Builders Guide. See also Gary Halstead’s web page: [http://www.medievalwoodworking.com/articles.htm](http://www.medievalwoodworking.com/articles.htm)
**Red and Black Oak** - More porous than white oak and softer. Color, darker and redder than white oak. Used for interior finish and furniture.

**White Pine** - light, soft and straight grained and easily worked, but not very strong. Color, light yellowish brown often slightly tinged with red. Used for interior finish and pattern making.

**Red Pine** (Norway Pine) - light, hard, coarse grained, compact, with few resin pockets. Color light red, with a yellow or white sap wood. Used for all purposes of construction.

**Yellow Pine** (Long Leaf Pine) - heavy, hard, coarse grained and very durable when dry and well ventilated. Cells are dark colored and very resinous. Color, light yellowish red or orange. Cannot be used in contact with ground. Used for heavy framing timbers and floors. As house sills, sleepers, or posts it rapidly decays.

**Douglas Fir** (Oregon Pine) - Hard, strong, varying greatly with age, condition of growth and amount of sap. Durable but difficult to work. Color, light red to yellow, with white sap wood. Used in all kinds of construction.

**Poplar** (White Wood) - Soft, very close and straight grained, but brittle and shrinks excessively in drying. Warps and twists exceedingly, but when dry will not split. Easily worked. Color, light yellow to white. Used in carpentry and joinery.

**Red Spruce** - light, soft, close and straight grained and satiny. Color, light red and often nearly white. Used for piles, lumber, and framing timber, submerged cribs and cofferdams, as it well resists decay and the destructive action of crustacea.

**Black Walnut** - heavy, hard, strong and checks if not carefully seasoned. Coarse grained but easily worked. Color, rich dark brown with light sapwood. Used for interior finish and cabinet work. Carves well.

**Sweetgum** - heavy, hard, but not very strong. Takes an excellent finish. Color, dark, reddish-brown. Used for interior work.

**Purchasing Lumber for Furniture**

Good quality lumber is becoming harder to find and the price is going up accordingly. Nevertheless, good quality materials are necessary to building a fine piece of furniture. The results from the hours spent on the project will justify the cost.

There are many sawmills and lumber companies that specialize in the sale of furniture grade lumber. Before you head off to one of these places, first determine how much material you will need for your project, then call to see if they have it in stock (inventories typically vary). Sawmills and lumber companies generally sell rough cut lumber by the board foot, a unit of volume. A board foot of lumber is $12\times12\times1 = 144$ in$^3$ of wood. Lumber is rough cut to standard thickness expressed in quarters of an inch. For example lumber one inch thick is called 4/4 (four quarter) lumber and two inches thick is called 8/4 (eight quarter) lumber. Finished lumber is typically reduced by 1/4" in thickness. Thus, 4/4 finished boards will be 3/4" thick (the price will still be figured as 4/4). As an example, a rough cut 4/4 oak board 12" wide and 8'

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* See [http://www.woodfinder.net/home.html](http://www.woodfinder.net/home.html) for help locating a lumber supplier near you.
* The terms timber and lumber refer to cut wood in different forms. Timber is a large piece of dressed (squared and surfaced) wood for building, i.e. a beam. Lumber is wood that has been sawn or split into boards or planks; specifically boards.
* Standard thickness of rough cut lumber are 4/4, 5/4, 6/4, 8/4 12/4, and 16/4.

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long will contain 8 board feet of lumber. White oak sells for about $3/board foot, thus, this piece of wood would cost $24. If it is surfaced, it will be 3/4" thick, and the additional surfacing costs added.

Lumber is sold rough-cut, directly from the sawmill, or surfaced. Surfaces lumber is surfaced (run through a planer) on the top and bottom, and indicated as S2S (surfaced two sides). Surfaced three sides, S3S (top bottom and one edge straight), and surfaced four sides, S4S (smooth and straight on all four sides), is less commonly available\(^a\). When possible strive to get all your boards from the same tree so that the color and grain will match.

Figuring the number of board feet (bf) of lumber for a project is straightforward once accurate drawing have been made. As an example of material estimation, consider the footed six-board chest, shown in Appendix 1. All pieces can be cut from 4/4 material about 12½" wide with minimal waste. The top, bottom, front, and back are all about 2’ long each and the two sides require another 3’. The linear total for all pieces is about 11’ or about 11 bf. The extra ½” in width will sometimes not be 'counted' at a sawmill. When buying rough cut material the estimated number of board feet should be increased by about 10%. Thus, this chest would require the purchase of about 12 bf of lumber. Sources for hardware for this chest are discussed in section 3.

**Medieval Woodworking Tools and Modern Equivalents**

The make up of a wood worker's tool kits varied with, both period and location. W. L. Goodman, in *The History of Woodworking Tools*, includes the following in his list of medieval tools:

- **Stone Age:** Axe, Adze, Knife, Chisel, Auger
- **Bronze Age:** Hand-saw, Cross-cut saw, Bow drill
- **Iron Age:** Drawknife
- **Greek & Roman:** Rule, Smooth, jack, plough, & moulding planes
- **Dark ages:** T-axe, Breast auger
- **Middle ages:** Brace, Try, mitre, & shoulder plane, Fret-saw

Additional items, which came in to use after 1600, include the tenon-saw, spokeshave, marking gauge, breast drill, screwdriver, twist drill, all-metal planes, and metal brace. Goodman lists the major or common tools. There were likely temporal and geographic variations in the variety and specialization of tools used by medieval woodworkers. For example, the tool kit of a Roman jointer in London was more extensive than that of his medieval counterpart living in a small village 1,000 years later. The reason for this is that the level of civilization which determines the number and variety of tools available, it also determines the kind of work which is needed to be done.

\(^{a}\) The local Home Depot™ carries red oak and poplar surfaced four sides.

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There are some additional tools which, based on the extant furniture examples and pictographic evidence, figure 3, must have also been common in the medieval joiner's toolbox. These include the marking gauge, scratch stock, chalk-line, square, files and rasps. There are probably more.

**Modern Equivalents of Medieval Tools**

The entire list of medieval tools above was commonly used by woodworkers in the U.S. and Europe up until the popularization of electric power tools in the early 20th century. The production of hand tools in the U.S. reached its height in the 1920-40s, and declined rapidly after WWII. Most of these tools have changed very little since roman times. Thus it is possible to acquire a fairly complete set of medieval style tools.

In acquiring your own medieval tool kit, start with the tools you will use the most. The adze is definitely out. The axe is probably not very useful at first as are the auger, plough, moulding, mitre & shoulder planes, and drawknife. The basic tools which are needed the most, and to do any major work, include chisels, hand-saw, rule, smooth and jack plane, drill and fret-saw (the commonly available coping saw is similar).

**Sources of good hand tools**

The basic tools listed above can all be purchased today in large hardware or DIY stores, or through several mail order houses. These tools will be functional, i.e. they will work, but most will lack the appeal which marks a tool made by someone who is also familiar with using the tool. These better quality tools can be obtained from any of several mail order tool companies. Ones I have dealt with are given in the source list.

Today, most fine woodworking tools (hand tools) are made in Europe where they are used more commonly than in the U.S. Some of the best modern hand tools were made in this country up through the 1940's by the Stanley Tool Works. For reasons unknown to me, some of the Stanley tools are being made today by the Record Tool Company in England. These tools and the few that are still made in this country are the ones available through the mail order houses.

A source of old (19th and early 20th century) hand tools is in antique shops. Not the shops with furniture and knick-knacks, but more the "junk shop" variety. It is in these shops that old tools can often be found. Though most of the time the "tools" that one finds are worthless and to be avoided, one can sometimes find a good tool. A good tool is one that is or can easily be put into operating condition. A severely battered wooden plane or one without its iron or an extremely rusty chisel are not salvageable and should not be bought. The opposite problem also exists. The few good tools are often so overpriced as not to be affordable. The search for good tools is a long one and should be approached as such. Go slowly until you have a feel for what prices are fair and reasonable.

The "junk shop," fondly remembered from my youth, has been replaced, in my opinion, by eBay ([www.ebay.com](http://www.ebay.com)). There is an amazing range of tools available for auction. The quality ranges from scrape iron to the finest collectible tools. The comments above also apply to eBay.

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A Modern List of Carpenter's Tools

This early 20th century list, from Audel's *Carpenters and Builders Guide*, is a good guide to the diversity of tools which were available and considered necessary for doing all aspects of woodworking.

Here the tools are listed with respect to use.

I. Guiding and Testing tools

   - **Straight edge**
   - **Squares:**
     - Try square
     - Mitre square
     - Combined try/mitre square
     - or **Steel combination square**
     - Framing square
   - **Sliding T bevel**
   - Shooting board
   - Mitre box
   - Mitre shooting board
   - Level
   - Plumb bob
   - Plumb rule

II. Marking Tools

   - **Chalk line**
   - **Ordinary pencil, Carpenter's pencil**
   - **Scratch awl**
   - **Scriber**
   - **Compasses and dividers**

III. Measuring Tools

   - **Carpenter's two foot rule**
   - **Various folding rules**
   - **Rules with attachments**
   - **Lumber scales**
   - **Marking gauge**

IV. Holding Tools

   - **Horses or trestles**
   - **Clamps**
   - **Vices**

V. Toothed Cutting Tools

   - **Saws:**
     - **Hand, cross-cut** and rip
     - Power, circular and band
   - **Files and rasps, Sand paper**

VI. Sharp Edge Cutting Tools

   - **Chisels:**
     - **Paring, firmer**, framing, slick, corner
     - **tang and socket butt pocket and mill**
     - **Draw knife**

VII. Rough Facing Tools

   - **Hatchet**
   - **Axe**
   - **Adz**

VIII. Smooth Facing Tools

   - **Spoke shave**
   - **Planes:**
     - **Jack**, fore, trying, jointer
     - **Smooth, block**
     - **Moulding** and special

IX. Boring Tools

   - **Brad awl**
   - **Gimlets**
   - **Brace and auger bits**
   - **Drills**
   - **Hollow augers**
   - **Spoke pointers**
   - **Counter sinks**
   - **Reamers**

X. Fastening Tools

   - **Hammers**
   - **Screw drivers**
   - **Wrenches**

XI. Sharpening Tools

   - **Grind stones**
   - **Abrasives**
   - **Grinding wheels**
   - **Oil Stones, natural and artificial**

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³ Planes are named according to their use. The Stanley Rule & Level company, from the middle of the 19th century up to WW II, made some of the finest hand tools in the world. With reference to their numbering system, examples of the various types of planes are: Smooth #1-4, Jack #5, Fore #6, Try or Joiner #7-8, Mitre #9, Dado #39, Scrub #40, Plow #50, Rebate #78 or 80, and Shoulder #90-94. See Patrick Leach's web page for a complete description of all the Stanley planes. [http://www.supertool.com/StanleyBG/stan0.htm](http://www.supertool.com/StanleyBG/stan0.htm)
This list of tools represents a goal, by no means are all of these tools required prior to beginning woodworking. Those marked in bold are, in my opinion, the minimum required to do most work. Others things not included in the above list are a solid bench, good lighting, safety equipment, wood, money, time…

The Cost of a Minimal Set of Tools

The following are available from Woodcraft among several other mail-order companies.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Code</th>
<th>Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Bar clamps, 12”</td>
<td>03J54</td>
<td>$8.99</td>
<td>$17.98</td>
</tr>
<tr>
<td>2 Handscrews, 8</td>
<td>15J28</td>
<td>$14.99</td>
<td>$28.98</td>
</tr>
<tr>
<td>1 Coping saw</td>
<td>141403</td>
<td>$12.99</td>
<td></td>
</tr>
<tr>
<td>1 Coping saw blades</td>
<td>141406</td>
<td>$6.99</td>
<td></td>
</tr>
<tr>
<td>1 Backsaw &quot;Gent's Saw&quot;</td>
<td>17Z01</td>
<td>$14.99</td>
<td></td>
</tr>
<tr>
<td>1 HSS Drill Bits, 1/16-1/4</td>
<td>06J23</td>
<td>$17.99</td>
<td></td>
</tr>
<tr>
<td>1 No. 602 low angle block plane</td>
<td>01B11</td>
<td>$46.99</td>
<td>$15-20</td>
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<tr>
<td>1 No. 5 jack plane</td>
<td>123403</td>
<td>$67.99</td>
<td>$20-30</td>
</tr>
<tr>
<td>1 Marples Bench Chisels</td>
<td>111165</td>
<td>$29.99</td>
<td></td>
</tr>
<tr>
<td>1 Try square, 6”</td>
<td>14C11</td>
<td>$17.99</td>
<td>$5-15</td>
</tr>
<tr>
<td>1 Rule, 12”</td>
<td>129208</td>
<td>$22.99</td>
<td></td>
</tr>
<tr>
<td>1 Combination square</td>
<td>12C11</td>
<td>$26.99</td>
<td>$10-20</td>
</tr>
<tr>
<td>1 Honing guide</td>
<td>03A21</td>
<td>$12.99</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>$325.85</td>
<td></td>
</tr>
</tbody>
</table>

From The Home Depot or similar DIY store.

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Cost</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>1 Electric drill</td>
<td>$20.00</td>
<td></td>
</tr>
<tr>
<td>1 Awl</td>
<td>$3.00</td>
<td></td>
</tr>
<tr>
<td>1 Tape measure, 16’</td>
<td>$8.00</td>
<td></td>
</tr>
<tr>
<td>1 Hammer, 16oz</td>
<td>$12.00</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$43.00</td>
<td></td>
</tr>
</tbody>
</table>

**Total $368.85**

The items should in bold type can be readily purchased through eBay, where 40+ year old, better quality old tools can be purchased for the amounts shown on the right in bold. When looking for planes on eBay, the older, better STANLEY tools are those marked 'made in USA' rather than those made in England. In general, the older STANLEY tools, if they have not been abused, are all excellent. I recommend reading *Restoring, Tuning & Using Woodworking Tools* by Micheal Dunbar and *Antique and Collectable Stanley Tools* by John Walter before bidding on eBay.
Sharpening Wood Working Tools
Sharpening of woodworking tools is necessary for the proper and safe operation of these tools. It is only with sharp tools that fine work can be accomplished. The traditional sharpening process uses a selection of natural and/or artificial stones progressing from coarse to fine grit. To sharpen chisels and plane blades, a flat stone is used. For gouges, carving chisels and other curved edges, special shaped stones, called slips, are used. The grit size of a stone is a measure of the size of the individual grains in the stone. Fine grit stones cut slower than coarse grit stones and leave a smoother surface. Stones require the use of oil or water to lubricate the stone, cool the tool and suspend the steel particles removed from the tool. Most stones in use today in the U.S. are oilstones, although the Japanese water stones are also popular.

Artificial Stones

Carborundum - a very hard abrasive made from silicon carbide (SiC). Carborundum stones are available in coarse, medium and fine grits. Crystolon is a trade name for carborundum stones made by the Norton Company. These stones cut fast, but are rather soft and tend to develop a cupped surface with use.

India - made from alundum (aluminum oxide, Al₂O₃). India stones are hard, sharp, tough and uniform. India stones are oil filled which makes them easy to use. They are made in three grits, coarse, medium and fine.

Japanese Water Stone - Come in a wide range of grits from coarse to very fine. These stones, which use water as a lubricant, are easy to use and less messy and less expensive than oil stones. They are however quite soft and need to be flattened often.

Natural Stones

Arkansas - natural stones composed of pure silica crystals. Arkansas stones are available in two grades, hard and soft. The hard Arkansas is extremely fine which makes it slow cutting, but excellent for sharpening tools. Soft Arkansas is not so fine grained so it cuts faster and is well suited for sharpening woodworking tools.

Washita - natural stones found in the Ozark Mountains of Arkansas. It is similar to the Arkansas, but much more porous. Washita makes the best sharpening stones, but is almost unavailable today.

How to sharpen tools
There are five stages to sharpening an edge, see the table below. To minimize the time spent sharpening a tool, it is important to start at the appropriate stage. Usually, new tools can be started at stage 3. If the tool is sharpened when purchased, it may require only stage 5 to finish the edge. In order to do good work, the edge of a cutting tool must be kept in perfect condition. The cutting edge must be keen, free of nicks and have the proper bevel.

The five stages of sharpening an edge

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Grinding and reshaping edges:</th>
<th>Grinding Wheel (or belt sander)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coarse Crystolon Stone</td>
<td>Coarse Japanese Grinding Stone</td>
</tr>
<tr>
<td></td>
<td>Coarse Japanese Grinding Stone</td>
<td>Medium India Stone</td>
</tr>
</tbody>
</table>

©2001 Stanley D. Hunter, all right reserved
Soft Arkansas (wide range stone)
#800 Japanese Stone

**Stage 3**  
General purpose sharpening:
Soft Arkansas (wide range stone)
#1000 Japanese Stone

**Stage 4**  
Fine sharpening:
Fine India Stone

#1200 Japanese Stone
Hard Arkansas (wide range stone)
Black Hard Arkansas

**Stage 5**  
Polishing:
Japanese Finishing Stone
Red Rouge on Leather

The 'Scary-Sharp™ Sharpening System

I have found that all the messing around associated with sharpening stones, steps 2-5 above, can be very nicely replaced by the Scary Sharp™ system of sharpening using sandpaper**, figure 3. "No oil, no water, no mess, no glaze or flatness problems to worry about, and a cutting edge that is scary-sharp." This is the way to go for tool sharpening, cheap, easy, and fast.

**Angle of the Bevel**

Before the bevel of a plane blade or chisel is sharpened, the back of the blade must be ground and polished absolutely flat. Only then will a sharp, long wearing edge be achieved.

The bevel of a plane blade is ground at an angle of 30°. However, the shape of the cutting edge has different amounts of curvature depending on the plane it is to be used in, figure 4. It is usual to grind a jack plane blade slightly curved, a fore plane almost flat and a jointer or smooth plane flat except at the corners.

Chisels, on the other hand, have straight edges, but varying bevel angles depending on their use, figure 5. Make the bevel angle 15° for paring, 20° for firmer and 30° for framing chisels.

The easiest way to grind the bevel on a plane blade or chisel is to use one of the several sharpening or honing guides on the market. These guides hold the

**Figure 3** - Author's setup for scary-sharp tool sharpening. The grit of the silicon-carbide sandpaper increases from left to right, 220, 320, 400, 600, 1000, 1200, 1500, 2000. The ninth sheet is crocus cloth for a final polish.

**Figure 4** - Proper shapes for the cutting edges of plane blades. From Audels 1943, figures 757-9.

**Figure 5** - Chisels are classified with respect to duty; paring, firmer, or framing for light, medium, or heavy duty, which also determines the angle of the bevel. From Audels, figures 664-6.

**Note:** See [http://www.shavings.net/SCARY.HTM#original](http://www.shavings.net/SCARY.HTM#original) for the original, rather humorous, description of this technique using sandpaper glued to plate glass. I purchased 5-sheet packs of 3M wet or dry silicon carbide paper in 220, 320, 400, 600, 1000, 1200, 1500, 2000 grits (3M also makes a 2500 grit) from The Autobody Store, [http://www.autobodystore.com](http://www.autobodystore.com). The ½" thick plate glass came from a local glass shop.
chisel or plane blade at the correct angle and allow one to concentrate on the sharpening. They also keep the bevel flat. There are special guides that are useful for grinding a curved edge such as a gouge.

Once the bevel is ground and sharpened through stage 4, honing the edge can be done by hand. First remove the wire edge on the top of the bevel by placing the blade flat on the stage 4 stone with the bevel up. A few circular strokes will remove the wire edge. Then bold the blade bevel down on the leather strop at a slightly higher angle than the bevel and pull the blade towards you a few times to hone the final edge. A few strokes on the back side will complete the honing process. Test the edge by cutting across the grain of a piece of soft pine. The blade should cut smoothly and there should be no tearing of the wood. Each time, before using a plane or chisel, the blade should be honed. This will keep the edge sharp and always ready for use. The last 1 or 2 steps (grits) of the Scary-Sharp system will hone the edge.

Wood Working Joints

In carpentry, the term joint means the union of two or more pieces of wood. Joinery is the art of making joints. A thorough knowledge of joinery is important to good carpentry. There are a wide variety of joints used in woodwork. They can be divided into two general classes depending on the manner in which the joined pieces are brought together. The table below lists some of the more common joints used in furniture construction. Most of these joints, those indicated by a "M," were used in medieval furniture construction as testified by the artistic record. The "?" after the "M" indicates that I am uncertain whether the joint was used or not, because the joint is externally indistinguishable from a butt joint, although I think that it probably was used.

<table>
<thead>
<tr>
<th>Plain or butt joints</th>
<th>Lap joints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight (butt)</td>
<td>M</td>
</tr>
<tr>
<td>Dowel pin &amp; Feather</td>
<td>M?</td>
</tr>
<tr>
<td>Corner, square and mitre</td>
<td>M?</td>
</tr>
<tr>
<td>Mitre</td>
<td>M?</td>
</tr>
<tr>
<td>Rabbet (housed butt)</td>
<td>M</td>
</tr>
<tr>
<td>Tongue and groove</td>
<td>M?</td>
</tr>
<tr>
<td>Mortise and tenon</td>
<td>M</td>
</tr>
<tr>
<td>Dovetail</td>
<td>M</td>
</tr>
</tbody>
</table>

Butt Joint - The plain butt joint, figure 6, is the simplest form of joint and is quite useful for joining wide boards out of narrow ones. To make a good butt joint requires skill in the use of the joiner plane. The pieces are usually glued and clamped together. In making a straight side butt joint, it is important to plane the two surfaces of the boards to be joined at the same time. This makes it easier to get the boards to lie straight and true. The plain butt joint can be strengthened by added a feather cut from cross-grain wood.

Corner butt joint - The corner butt joint, figure 7, is also very simple, can be nailed together, and is fairly strong. This joint is typical of early 'six board chest' construction.

Fig. 6 Plain or butt joint. This joint can be strengthened by adding dowels or a feather.

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b) See for example the *Wood Joiner's Handbook* by Sam Allen. This book also contains a good introduction to joinery with hand tools.
**Rabbet Joint** - This is also called a housed butt joint. A rabbet is cut across the side of one of the pieces to be joined and the second piece is slid into the rabbet. The rabbet can be open, at the end of the board, or closed. When cutting the rabbet, lay out the joint and then cut across the wood grain with a knife. Using a chisel form a shallow angled trench by cutting the waste wood. This trench then will guide the backsaw to give an accurate cut. The remainder of the waste wood can then be removed using a chisel. The vertical sides of the rabbet can be smoothed with the chisel is necessary, although care is needed to keep from widening the joint excessively, figure 8. If the cut is made across the grain then the joint is called a dado.

**Mortise and Tenon Joint** - The mortise and tenon joint is used in a wide variety of ways to joint two pieces of wood. The mortise is the hollowed out space in a board designed to receive the projection, the tenon, on another board, figure 9. For this joint to be as strong as possible, it is important that the mortise and tenon exactly correspond in size. The tenon may project completely through the mortised board or be flush with the face. When the mortise and tenon do not extend completely through the board, it is called a stub tenon. The mortise is cut with a chisel, whose width matches the width of the mortise. In cutting a through mortise, cut only half way from one side and then finish the cut on the other side. The tenon is cut with a backsaw and if necessary, a finishing cut may be made with a chisel. The tenon should be pointed by chiseling on all four sides. The tenon can be secured in the mortise by several means. Draw boring, split wedges and draw wedges are common methods. Draw boring uses a pin (dowel) driven through a hole across the joint. The hole in the tenon is offset so that the dowel pulls the tenon into the mortise. The tapered, round mortise and tenon joint is used for stool and table legs.

**Dovetail Joint** - The dovetail joint, figure 10, is a very strong corner joint, but is not the simplest joint to make. First the pieces must be accurately cut as for the corner butt joint (fig. 7) above. Then the tails (or pins, depends on ones preference) are laid out and cut on one piece. This piece can then be used to transfer the layout to the other piece to cut the pins (or tails).

There are of course many variations on these basic joints and other special purpose joints. A book, such as Sam Allen's *Wood Joiner's Handbook*, will give you lots of ideas.
Part V - Medieval Wood Finishes

Introduction

Specific information about the finish, if any, applied to medieval furniture is sparse. The following materials discussed below were known to the medieval craftsman, whether they were used on furniture is uncertain.

Shellac

Shellac is one of the oldest finishes still in use today. Shellac is a very desirable finish in that it is easy to apply, dries quickly, and forms a flexible, elastic finish. It does have two major drawbacks, it is not very water-resistant (water left on the surface will cause a white milky spot) and alcohol will dissolve it. Another disadvantage is a limited shelf life.

Shellac is purchased in the form of flakes. There are four grades of refined shellac, which have shorter shelf lives in proportion to their degree of refinement. The more refined grades also seem to provide a less durable finish than the less refined grades.

- **Button shellac** - The least refined grade of shellac. It is a dark brown color.
- **Orange shellac** - A refined grade of shellac that still retains some of the orange-brown color of raw shellac.
- **Blond shellac** - A highly refined grade of shellac that is light amber in color.
- **White shellac** - The most highly refined grade of shellac. It is bleached to remove all of the orange cast of the raw shellac.

To make liquid shellac, the flakes are dissolved in ethyl alcohol. Liquid shellac is categorized by the amount of flakes used in relation to the amount of solvent. Typically, shellac is mixed as a four-pound cut. The cut refers to the ratio of the weight of dry flakes, in pounds, to the volume of solvent (ethyl alcohol), in gallons, used to make liquid shellac. For example, a 'four-pound cut' refers to a mixture of four pounds of dry shellac flakes dissolved in one gallon of alcohol. At the time of application this mixture is thinned to a one-, two-, or three-pound cut. The first coat of shellac should be a one-pound cut; subsequent coats can be a one- or two-pound cut. Sometimes a three-pound cut is used for the final coat.

Shellac can be applied with a brush, although applying it with a pad, a technique called French Polishing, is the traditional (18th century) method. French polishing is a three-step process that uses round pads of wool. Step one - sand the wood surface with pumice powder lubricated with very thin shellac. The pumice powder mixes with the wood dust and fills the wood pores. Step

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dd lac, n. shellac', shellack', shelllac', [shell and lac, used as translation of Fr. laque en écailles, lac in fine sheets. Hind. Lakh, Sans. laksha] a resinous substance deposited upon certain trees (plum trees in southern Asia (India) by a variety of scale insect (Lac bug, *Tachardia laccata* or *Laccifer laccata*). While still attached to twigs and dries, it is called stick-lac, when dissolved out and separated from the twigs it is called seed-lac, and when strained through a cloth and dried it constitutes shell-lac or the shellac of commerce. Lac is used extensively in making varnishes, lacquers, sealing wax, dyes, etc.

ee Liquid shellac call be purchased but it has an even shorter shelf life.

ff To make one pint of four-pound cut shellac, put 8 ounces of shellac flakes in a jar and add one pint of alcohol. Cover the jar and allow the flakes to dissolve. When the flakes are completely dissolved, strain the shellac through several layers of cheesecloth.
two - build up a thin film of 'French polish' using one-pound cut shellac. Oil is used to lubricate the pad. Step three - 'Spiriting off' uses alcohol to remove the oil left on the surface.

Tung Oil
Tung oil comes from the seeds of several species of *Aleurites*, primarily *Aleurites fordii*, a deciduous shade tree native to China. Tung oil dries quickly when exposed to air and polymerizes into a tough, glossy, waterproof coating that makes it especially valuable in paints, varnishes, linoleum, oilcloth and printing inks. Tung oil is a very easy finish to apply to wood because it penetrates into the wood, hardens and seals the top surface of the wood to form a protective barrier. A penetrating finish will not chip or flake off the surface and dents and scratches are not as visible since the finish extends under the top surface of the wood.

Penetrating finishes are usually applied with a rag. Cover the wood with a generous amount of the oil and let it soak into the wood for about ten minutes. Reapply oil to any areas that have soaked up all the applied oil. Pumice can be used, as with shellac, to fill the pores of open woods. Apply a coat of oil to the surface and sprinkle a little pumice onto the oil. Rub the wet surface with a rag to sand the surface as in French polishing to fill the pores of the wood. Allow the oil to dry and then apply another coat.

Apply as many coats as desired to get the desired appearance. After the final coat is dry, burnish the surface by rubbing vigorously with a clean soft cloth or a piece of lamb's wool. The surface can be left as is or apply a coat of wax.

Linseed Oil (Boiled)
Linseed oil is obtained from the seed of the flax plant by pressure. The raw oil will not dry. "Boiled" linseed oil is made from the raw oil. The raw oil is not boiled but heated and driers are added to make the oil dry.

Linseed oil is another penetrating oil finish that is applied as tung oil. It takes a lot of coats of linseed oil to make a good finish. Because of its drying qualities it is a major ingredient in a variety of finishing products and is used in making oil paints, printer's ink, etc. Linseed oil is often used on wooden bows.

Turpentine
Turpentine is often used as a solvent in oil-based finishes. It is regarded as the ideal thinner for products containing linseed oil because it aids in the drying process by conveying oxygen to the oil.

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88 tung oil, [from Chin. yu t'ung from yu, oil, and t'ung, name of the tree.] a yellow, poisonous oil from the nuts of the Chinese Tung tree grown in China, Japan, and Florida, used instead of linseed oil in paints, varnishes, etc. for a higher gloss and more water-resistant finish. It is used by itself or mixed with other oils to make penetrating oil finishes. It is also used in many paints and varnishes because it dries faster and harder than linseed oil.

89 flax, n. [ME. flax; AS. fleax, flex.]

tur'pen·tine, n. [ME. turpentyn, terbentyn; Ofr. turbenine; L. terebinthinus] 1. the brownish-yellow, sticky, semifluid oleoresin (Chian turpentine) exuding from the terebinth tree. 2. any of the various oleoresins flowing naturally or by incision from several species of coniferous trees, such as the, pine, larch, fir, pistacia etc.

Common turpentine is obtained from *Pinus sylvestris*, and some other species of *Pinus*. Venice turpentine is yielded by the larch, *Larix europae*; Strasburg turpentine *Abies picea* lacr., Bordeaux turpentine by *Pinus pinaster*; and Canadian turpentine, or Canadian balsam, by *Abies*
Varnish

Varnish[^3] is a surface coating that builds up a layer in top of the wood rather than penetrating into the wood. Natural oil varnishes are classified by the amount of oil they contain. Varnishes with a lot of oil are called long oil varnishes and those with less oil are a called short oil varnishes. The large amount of oil in long oil varnishes makes them very tough and elastic. Exterior, spar and marine varnishes are long oil varnishes. They dry slowly and produce only a moderate gloss. They are well suited to situations where weather resistance is a concern. They are not well suited for furniture work because they can't be rubbed or polished and their long drying times makes it more likely that dust will be trapped in the finish. Medium oil varnish has more gloss than a long oil varnish yet is still durable. Medium oil varnish is called cabinet varnish and is well suited to a variety of projects. This finish can be rubbed with pumice or rottenstone; however the finish won't be as fine as with a short oil varnish. Short oil varnishes are best when a rubbed finish is desired. The finish produced by a short oil varnish is hard and somewhat brittle so it is used only on fine furniture that will not receive hard use. The hardness of the finish is what allows it to receive a high rubbed finish. Short oil varnishes are called rubbing varnish, polishing varnish or piano varnish.

Varnish is usually applied with a brush. Press the brush against the side of the can to remove excess without creating air bubbles. Flow on a rather heavy coat of varnish working with the grain. If the coat is too thin, brush marks may be evident.

Wax

A wax[^lk] finish is one of the easiest to apply; however it is not very durable. To make a wax finish, plane some shaving from a block of beeswax. Pour turpentine over the shaving and let them soak until they are completely dissolved. The resulting mixture should have the consistency of thick paint. Rub the wax onto the wood with a cloth and let it dry, then buff it with a soft cloth. Several coats are usually needed. This finish works well on closed-grain woods, but on open-grained woods like oak, the wax will accumulate in the pores and eventually turn white. To counteract this, lampblack or burntumber is added to the wax. This black wax will accentuate the pores of open-grained woods. Wax is usually used to polish and protect a finish, however some antique finishes use wax as the only protective coat.

Paint

There is little information about the application of paint as a furniture finish, other than we know that it was used from extant examples. Medieval painter used wood panels, which had a layer of gesso applied, as the basis for their work. It is reasonable to extrapolate this technique as one possible technique used to decorate furniture. Gary Halstead, on his web page[^ll], provides the following information.

[^3]: varnish, n. [ME. vernisch; Ofr. vernis] a transparent finish made of resinous substances dissolved in oil (oil varnish) or in a liquid like alcohol which evaporates quickly (spirit varnish), and used to give a glossy surface to wood, metal etc. Varnishes harden by combining with oxygen and are more resistant to water and alcohol than shellac.
[^lk]: wax n. [ME.; AS. weax] - A fatty substance that may be animal, vegetable or mineral in its origin. Beeswax is obtained from honeycombs. Paraffin is a petroleum product. Carnuba wax is from the Brazilian wax palm and ceresin is a synthetic wax.
Paint is a combination of a pigment, a binder to hold the pigment to the painted surface, and a liquid vehicle to help the paint flow. The type of paint is usually distinguished by the binder. Types of paint known in period include:

Oil - Oil based paints use a drying oil such as linseed or walnut oil and a thinner (usually turpentine). Salzman documents the use of oil-based paint for interior woodwork.

Tempera - Tempera is based on egg yolk or egg white and water.

Distemper - Distemper is a mixture of glue (generally hide glue) and water.

Casein - Casein or milk paint is made principally from milk, lime, and water. It produces a very tough surface. Despite numerous sources that insist that milk paint has been used since remote antiquity, I (G.H.) haven't found anything to indicate that it was (or wasn't) used on period furniture.

All of the paint recipes I've (G.H.) been able to find are for artist's paints. The sources indicate that high-style furniture (e.g. Italian cassoni) were decorated by artists using the same materials and paints used for panel painting (i.e. a gesso base with either egg tempura or oil paint). What I haven't been able to document are the paints used for lower end furniture. Chinnery states there are no sources for furniture paint formulations before about 1660.
Part VI - Furniture Hardware

Introduction
Making furniture, except for the earliest times or the crudest pieces, requires some metal work for the hinges and lock. Unless one is lucky enough to have a local blacksmith who is interested in making locks and hinges, finding the correct hardware for medieval furniture can be a challenge.

Nails
Hand forged nails were used fairly extensively in mediaval furniture to hold the pieces together and to attach the hinges, hasps, and locks. Today hand-forged nails are fairly expensive. Londonderry Brasses Ltd.\textsuperscript{mm} carries a very nice line of hand forged nails, figure 11.

The Tremont Nail Company\textsuperscript{nn}, established in 1819, offers a wide range of machine cut nails in sizes from 4d (1½") to 20d (4"). Although cut nails are not medieval, their Decorative Wrought Head nail, figure 12, is nearly indistinguishable from a hand-forged nail and they are relatively inexpensive, at about $3 per pound. One pound, about 85-100 of the smaller size nails, will suffice for several projects. The main difference between a hand forged nail and a cut nail is that the latter has a square point. I heat these nails with a torch and forge the ends to a sharp point.

Hinges
There are several suppliers of wrought iron hinges. A web search for 'butterfly hinges' will turn even more sources.

Horton Brasses Inc.\textsuperscript{oo} manufactures brass and iron hardware for fine furniture and cabinetry. They offer a very nice line of very authentic butterfly, strap and snipe (cotter-key like) hinges, figure 13. They will also make pieces to order with fairly quick delivery.

Ball and Ball\textsuperscript{pp} and Acorn Manufacturing Co.\textsuperscript{qq} are other sources for butterfly and strap hinges.

\textsuperscript{mm} http://www.londonderry-brasses.com/index.html, P.O. Box 415, Cochranville, Pennsylvania 19330, (610) 593 6239 Fax: 610 593 6246 E-mail: londonderry68@hotmail.com

\textsuperscript{nn} http://www.tremontnail.com, P.O. Box 111, Wareham, MA 02571 (800)-842-0560, 508-295-0038 Fax: 508-295-1365, E-Mail: info@TremontNail.com

\textsuperscript{oo} http://www.horton-brasses.com/index.htm, Tel: 860-635-4400, FAX: 860-635-6473, e-mail brockwell@horton-brasses.com

\textsuperscript{pp} http://www.ballandball-us.com/index.html

\textsuperscript{qq} http://www.acornmfg.com/2001price%20list.htm

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Locks

Medieval style lock are harder to find in catalogs. The Trunk Shoppe,” however, does carry has a rather nice iron hook and hasp and a key hasp lock, figure 14, as well as butterfly hinges and forged nails ($2/dz.).

Installation of Medieval Hardware

Hinges and locks on medieval furniture should be nailed on, *do not use screws!* The nails should be clenched to prevent them from pulling out, figure 15. Clenching is a three, really four, step process. First the wood *must* be drilled for the nail, particularly in oak or other hard wood. The diameter of the drill used to make the hole should be about the same as the thickness of the nail near its head, figure 15. Finish your piece of furniture before installing the hardware.

*Figure 14 - iron hook and hasp and a key hasp lock from the The Trunk Shoppe.*

*Figure 15 - Three steps to clinch a nail. First, drive nail about ¼” through a pre-drilled hole. Second, bend the end of nail over. Third, drive nail the rest of the way home, then bend nail over again burying the point into the wood.*

http://www.thetrunkshoppe.com/content.html
Appendix - Six Board Chest

Footed Six-board Chest

Permission granted for non-commercial use.
10” strap hinges for top not shown

<table>
<thead>
<tr>
<th>List of materials</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>12”×24”×3/4”</td>
</tr>
<tr>
<td>Bottom</td>
<td>10½”×22½”×3/4”</td>
</tr>
<tr>
<td>Front, back</td>
<td>11¼”×24”×3/4”, two pieces</td>
</tr>
<tr>
<td>Left, right sides</td>
<td>12”×17¼”×3/4”, two pieces</td>
</tr>
<tr>
<td>Hardware:</td>
<td>two 10-12” stap hinges, lock or hasp, nails</td>
</tr>
</tbody>
</table>

Bibliography

**Furniture History**


**Houses and Life Styles**


**General Woodworking and Furniture Making**


Buchanan, George, *Making Country Furniture*, Taunton Press, 1997. Contains step by step instructions for 15 pieces of country furniture. With strong emphasis on hand tool techniques. Although the designs are a bit 'country,' they can easily be modified to have a more period appearance. The oak chest, a copy of a 16th century original, is particularly nice.


Graham, Frank D., *Audels Carpenters and Builders Guide*, in 4 vol., Theo. Audel, New York, 1939. An older book that goes into great detail about tools and how to use them. This is often available on eBay or used book dealers. Get volume 1 separately if you can't get all four volumes.


**History of Woodworking Tools**


**Web Resources**

*Medieval Woodworking*, Gary Halstead has a very extensive bibliography of woodworking tools on the Web at [http://www.medievalwoodworking.com/toolbib.html](http://www.medievalwoodworking.com/toolbib.html), along with a lot of other information on medieval woodworking.


**Catalogue Suppliers of Woodworking Tools**

Garrett Wade - (800) 221-2942, [www.garrettwade.com](http://www.garrettwade.com) - A complete supply of tools.

Japan Woodworker - (800) 537-7820, [www.japanwoodworker.com](http://www.japanwoodworker.com) - Wide selection of Japanese tools, but also lots of western tools.

Lee Valley & Veritas (800) 871-8158, [www.leevalley.com](http://www.leevalley.com) - Extensive line of hand tools for all aspects of woodworking. If you must have an adze…

Leichtung Workshops - (800) 321-6840, - Unusual, but limited selection of tools.

Rockler Woodworking and Hardware - (800) 279-4441, [www.rockler.com](http://www.rockler.com) - A general selection of hand and power tools.

Tool Crib - (800) 884-9132, [www.toolcrib.amazon.com](http://www.toolcrib.amazon.com) - Lots of power tools.

Trend-Lines - (800) 767-9999, [www.trend-lines.com](http://www.trend-lines.com) - More power tools.


Woodcraft - (800) 225-1153, [www.woodcraft.com](http://www.woodcraft.com) - Very complete line of fine tools, hardware, wood, and accessories.

Woodworker's Supply - (800) 645-9292 - A complete line of fine tools, hardware, wood, and accessories. More hardware than Woodcraft.