Chapter 6—Selecting the Right Ax for You

The previous chapter covered only a small number of the types and styles of axes that the Forest Service commonly uses. A standard, general-purpose chopping ax may meet your needs, or you may find that several different ax styles and sizes serve you better.

At one time, manufacturers sold ax heads and handles separately. An axman would select the most suitable ax head and handle that fit his or her body size and profile. Manufacturers sold ax handles as blanks (figure 6–1). These handles were typically too large, with the wedge slot in the eye uncut. The axman would shape and cut the handle to accommodate his or her size and profile.

Most axes today come prehung and fitted with a generic handle. The majority of these axes have the head pressed onto the handle. Axmen typically must profile the head and shape the handle to fit their hands properly. Mass-produced axes often have heads and handles that do not align correctly.

If you choose a new, mass-produced ax, remember that it will look and feel completely different after you reshape the head and handle. Be aware that new, mass-produced axes frequently do not have the same quality as vintage or custom/semicustom axes.

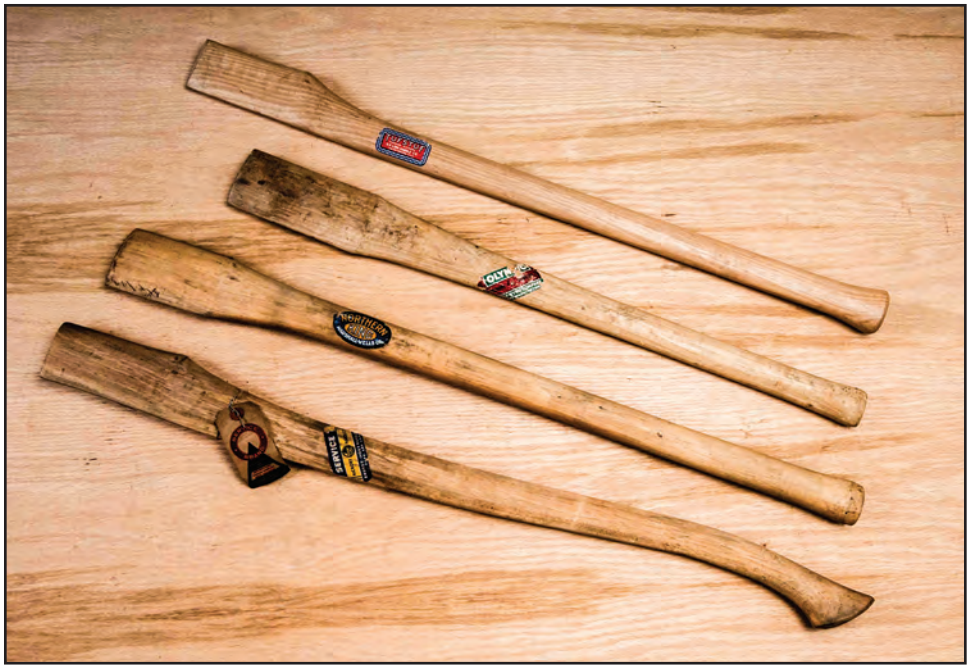
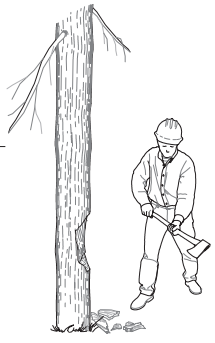


Figure 6–1—Unused old stock ax handle blanks.



Ax Size and Weight

Selecting the correct head weight and handle length are two of the most important factors for any axman to consider. People and axes come in all different shapes and sizes. A head weight or handle length that does not fit your body could prove awkward and dangerous to use. The type of ax you choose depends on your size, physical ability, and the types of chopping you do. To find the right ax, you should experiment with as many types of axes as you can. Ax websites and forums contain considerable discussion about the best weight and size for an ax. Many of these discussions seem to center on occasional ax use, and not on axes used for daily work in the woods. They are also the opinions of the people posting the information and may not be appropriate for you.

You should always be in control of your ax. The weight of the head and length of the handle should be balanced for your body and profile. It is better to start with a light ax and to work your way up to a heavier ax as your chopping skills and stamina improve.

Ax heads typically—but not always, especially with newer, mass-produced axes—have a stamp on the side that indicate their weight (figure 6–2). For example, an ax head made in the U.S. and marked "3.2" means it weighs 3½-pounds (table 6–1). Countries that use the metric system may mark their axes in kilograms. Hence, a 2.1-kilogram ax head weighs a little more than 4.6 pounds.

Table 6–1—Common United States ax head stamps.

Stamp	Weight (pounds)
3^1	3¼
3^2	3½
3^3	3¾

Figure 6–2—Ax heads with the weight marked on the side.

A good starting weight for a working ax head is 3 to 3½ pounds. The proper handle length depends on your height and arm length. As a general starting point, the handle should reach from the ground to your hip (figure 6–3). Using these weight and length criteria as a starting point, you can begin to understand the mechanics of efficient chopping, and can determine the type of ax that works best for your needs and body type. You may change the head weight and handle length of the ax as you gain proficiency.

A lighter ax is easier to swing, allowing you to chop for longer periods without becoming overly fatigued. In addition, learning to chop with a lighter ax allows you to improve your accuracy. After you become proficient with a lighter ax, you can move up to heavier axes until you find the right head weight. You should only increase head weights in half-pound increments. Half a pound is actually a considerable weight difference, especially when swinging an ax throughout the day.

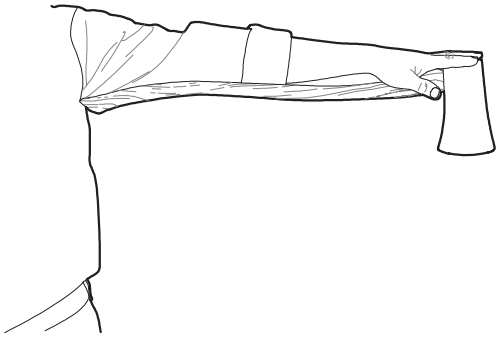
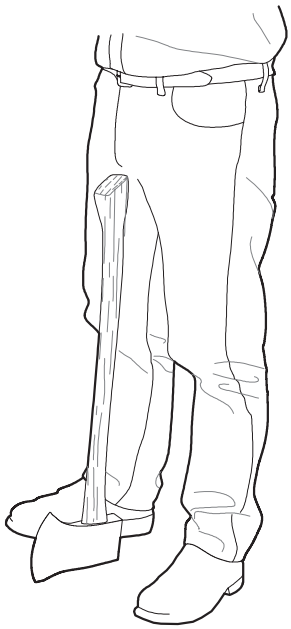
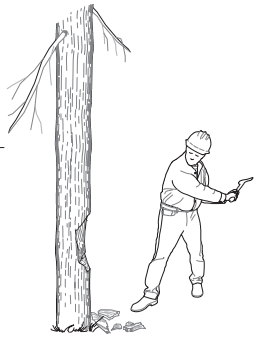


Figure 6–3—Various ways of measuring a suitable ax handle length.





One style of ax is usually sufficient for most people and their basic chopping needs. Someone who uses axes for multiple purposes or specialized needs may require more than one style of ax. The author's ax head weights range between 2½ and 5¾ pounds and his handle lengths range between 26 and 44 inches. Each handle has the proper shape to balance with each ax head.

The ax in figure 6–4 has a 2¼-pound head on a 26-inch handle. This combination is a good, lightweight camping ax. It is suitable for cutting and splitting small firewood, limbing, driving wedges, and felling small trees. Although this small ax is capable of heavier work, it is best suited for light-duty chopping.

Small axes require additional energy and effort when chopping large material. Using a heavier ax would save time and energy. The head weight of an ax is an important component in severing fibers and displacing wood chips. A short-handled, 2¼-pound ax is not ideal for chopping wood all day; you really should not use it for anything more than light-duty work.

One of the author's favorite axes is a 3½-pound Rockaway head with a 34-inch handle (figure 6–5). This handle is a little long, but is perfectly balanced for the head. A 3½-pound head is excellent for field or trail work and is suitable for someone who does not chop every day.

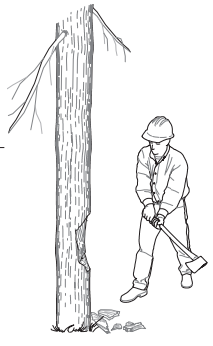
Figure 6–4—A 2¼-pound single-bit ax head on a 26-inch handle. The inset shows the weight marking.

Figure 6–5—A 3½-pound Rockaway head on a 34-inch handle.

Consider Australian- (figure 6–6) and New Zealand-pattern chopping axes for chopping large-diameter logs or for chopping on a regular basis. You can typically find these single-bit axes in the 4½- to 5½-pound head weight range with 28- to 30-inch handles. This head weight enables the ax to hit harder and penetrate deeper. The shorter handles also increase accuracy. These axes can remove larger chips from a log. Many people may find these axes too heavy for extensive use, but axmen who chop on a regular basis prefer these patterns and weights above all other axes. Heavier axes with shorter handles are better suited for experienced axmen and may not be appropriate for novice axmen (figure 6–7).

Figure 6–6—Hytest Australian-pattern ax heads.

Figure 6–7—An Australian Keech ax (top) and a standard American single-bit ax (bottom). The Keech ax has a heavier head and shorter handle that is more appropriate for an experienced axman.



The double-bit Puget Sound felling ax is ideal for felling large-diameter trees. Figure 6–8 shows a Puget Sound felling ax with a 4-pound head on a 42-inch handle. The long, narrow blade and long handle length enable deep penetration across the breadth of large-diameter trees. The author has a similar ax head hung on a 44-inch handle, but finds the additional 2 inches of the 44-inch handle make a significant difference in the accuracy of his swings.

A 5¾-pound, single-bit head on a 44-inch straight handle is a good ax for splitting firewood (figure 6–9). The weight of the head and the long handle increase the head speed and power of the swing, making it easy to split most knot-free rounds of wood.

Figure 6–8—A True Temper Kelly Works Puget Sound felling ax.

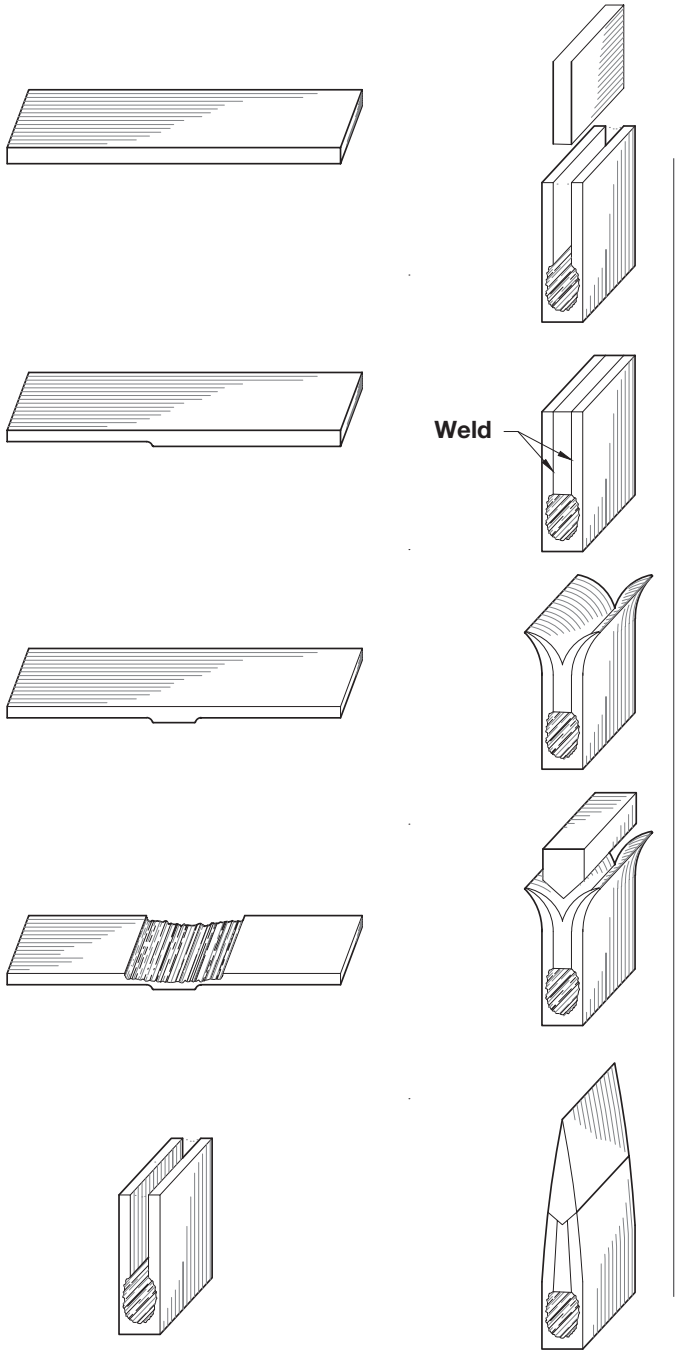
Figure 6–9—An American Axe and Tool Company splitting ax.

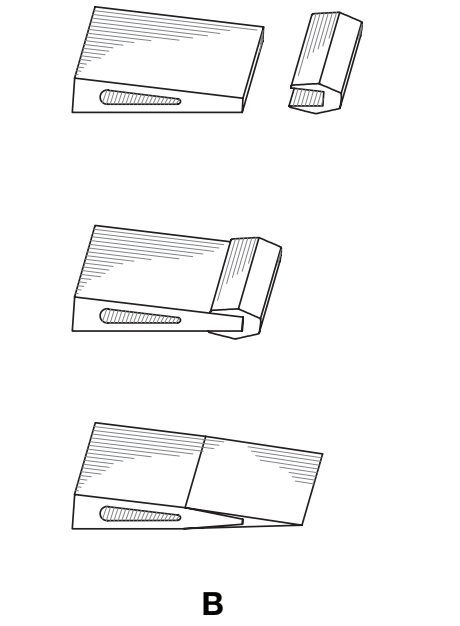
Ax Head Construction

Understanding how manufacturers make an ax head is an important part of evaluating and shaping the head.

Ax Head Materials

Historically, ax makers forged vintage or traditional ax heads out of iron and inlaid or overlaid hardened steel cutting edges into the blade during the forging process (figure 6–10). Modern ax heads are a solid piece of steel with the cutting edge tempered at the end of the manufacturing process.





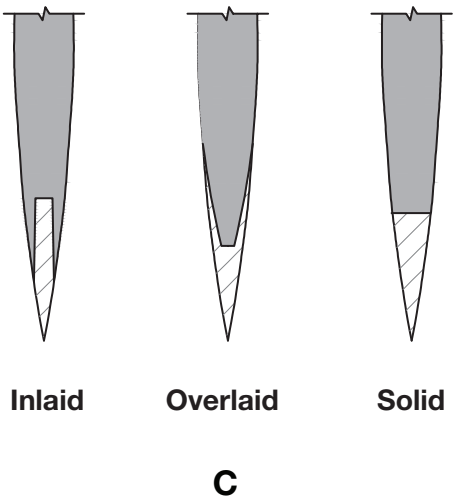


Figure 6–10—The processes for forging ax heads using inlaid hardened steel (A) and overlaid hardened steel (B). Completed heads made using inlaid steel, overlaid steel, and a solid piece of steel (C).

The hardened (tempered) cutting edges were durable and long-lasting. The softer center mass of the ax also provided an important feature: as the hardened steel cutting edge sank into a piece of wood, it transferred the shock of the blow into the ax head (figure 6–11). When the shock reached the cheeks of the ax, the softer metal helped absorb and dissipate the energy, reducing the amount of shock that transferred down the handle and into the axman's hands.

As noted earlier, manufacturers today forge or machine axes from a single piece of metal and harden the edges afterward. The rest of the ax body (including the poll on a single-bit ax) is generally softer. The rafting-pattern ax is one exception; it has a hard poll.

The choice between a forged or machined ax head is a personal preference. Forged axes are much more common. Look for quality craftsmanship, good steel, and proper tempering when purchasing a new or used ax head. Both forged and machined heads provide excellent service when properly profiled, sharpened, and maintained.

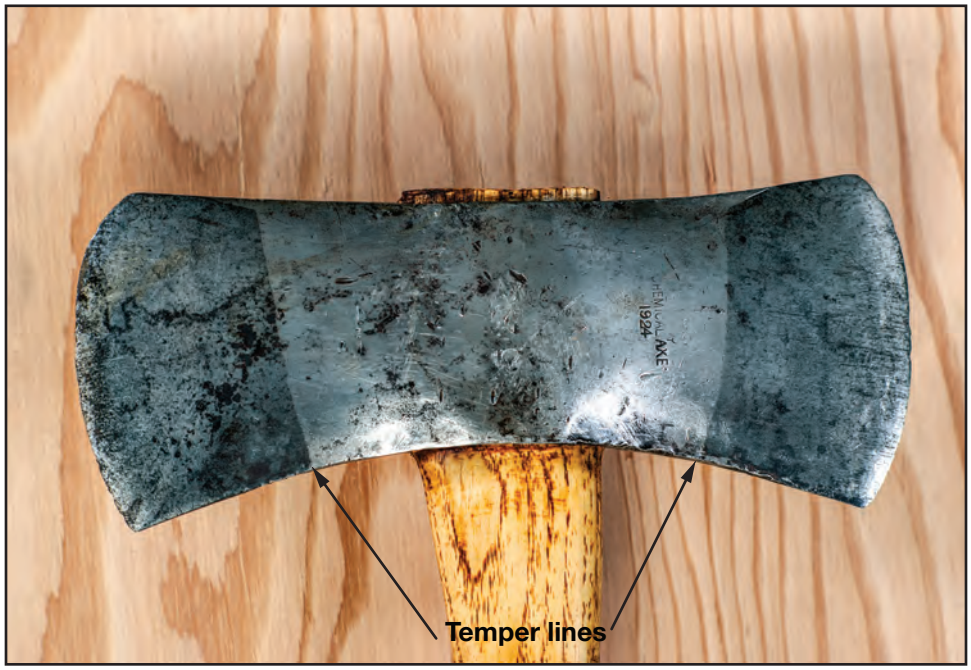


Figure 6–11—A 1924 Sager Chemical ax head with the temper lines of the blade indicated. The tempered steel is harder than the softer center of the ax head.

Ax Head Patterns

Ax head patterns in the U.S. developed rapidly in the 19th century. At one time, the U.S. manufactured hundreds of ax head patterns. The ax is such a fundamental tool that ax head patterns emerged for purposes other than chopping wood. Of those ax head patterns designed for chopping wood, manufacturers included slight variations to distinguish their designs from their competitors' designs. Rival ax manufacturers commonly produced similar ax patterns with different names to build brand loyalty, naming the pattern after the shape of the ax or its intended use. To foster regional loyalties, manufacturers also named patterns after the areas where the patterns were developed or commonly used.

As people traveled or moved around the country, the most common ax head patterns became more widely recognized and the names and styles became more standardized. Ax patterns that provided the best form, function, and durability endured, while other patterns faded away.

Single-bit ax heads (figure 6–12) offer more versatility for chopping and driving wedges, while double-bit ax heads offer better symmetry and an extra cutting edge. New, mass-produced axes come in limited styles and weights. Refer to "Chapter 5: Types of Axes and Related Tools" for a more complete description of single- and double-bit axes.

Figure 6–12—Single-bit, lugged ax patterns.

Single Bit or Double Bit?

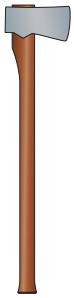
Choosing an ax is a personal preference. Both single- and double-bit axes provide unique advantages. Single-bit axes have a poll for driving wedges, while double-bit axes have two cutting edges. A newly purchased double-bit ax may provide better symmetry and balance, but you must profile the ax head and modify the handle to meet your individual needs. A single-bit ax head and handle properly shaped to your needs and size also provide symmetry and balance. Whichever type or pattern of ax head you choose, be prepared to spend time shaping and profiling the head and handle.

Competition Axes

People commonly refer to the style of ax head on chopping axes as a competition pattern. Head pattern is not the only thing that determines a competition ax. Manufacturers produce grades of axes and grinds specifically for competition. Competition patterns with appropriate grinds are applicable for fieldwork and general chopping.

Selecting an Ax Handle

A good ax head without a good ax handle has limited value. People also call ax handles "hafts." The terms are interchangeable. For consistency, this manual uses the term "handle."



The trees wept as they fell, for the handle of the ax was of their own.

—Bob Beckley

People often take great care to choose an ax head, but neglect to choose a good handle. Do not underestimate the value of the handle; it is an integral part of the tool and requires careful selection.

You may have better luck purchasing a high-quality handle directly from a manufacturer. Commercial retail outlets order handles in bulk and may not specify the grade or quality of the handle they sell. By contacting a handle manufacturer directly, you can request the qualities you seek in the handle, such as hickory, sapwood, heartwood, straight grained with no grain runout or knots, and so forth.

There are ax handle manufacturers that produce quality products, but finding them may require diligence. Refer to the "Additional Resources" section for more information. When ordering handles, the author always orders the best ("AA grade").

Ax Handle Materials

Historically, manufacturers made wooden ax handles, but they now also produce axes with fiberglass or synthetic handles (figure 6–13). These handles are unbreakable, but can increase vibration when you chop. Manufacturers do not design fiberglass and synthetic handles for you to reshape them. Properly shaping a handle to fit your hands is an important ergonomic aspect of chopping. With this in mind, this manual focuses only on wooden handles.

In America, hickory is the preferred wood for ax handles. Hickory is a dense, tightly grained hardwood known for its durability and strength. Oak and ash are also suitable American hardwoods for ax handles. While hickory may be the preferred wood for ax handles, do not overlook other woods, especially if you use a lightweight ax or hatchet.

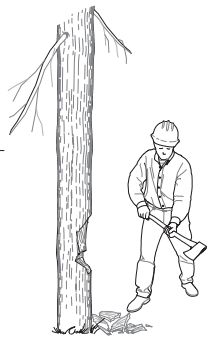
Other countries use beech, gum, or other, less dense woods for ax handles. These woods may be acceptable, depending on the type of chopping you do and the types of handle wood available.

Avoid softwoods, such as pine, fir, and spruce. If you are unsure what type of wood the handle is, run your thumbnail along the side. If your thumbnail leaves an indentation, the wood is most likely a softwood.

Wooden Handles

Experienced axmen use wooden handles because these handles reduce blisters, vibration, and shock.

Figure 6–13—A pulaski with a synthetic handle.



Pay attention to variations of heartwood and sapwood in the handle (figure 6–14), which often appear as two different colors of wood (i.e., part of the handle may have darker wood and part may have lighter wood).

Experienced axmen have had a long-standing debate about the strength and durability of handles that contain both heartwood and sapwood. Heartwood comes from the middle of the tree, while sapwood comes from the outer portion of the tree. Heartwood is darker in color while sapwood is lighter. Some axmen feel that there is a natural weak point in a handle where heartwood and sapwood join, making the handle more prone to splitting along this seam. Some feel that heartwood is harder but more brittle. Others feel that sapwood is the best choice because it is more limber and provides a subtle whip action to the chopping stroke. Still others feel there is no difference between heartwood and sapwood, and that it is simply a matter of aesthetics. Finding quality ax handles commercially is becoming increasingly difficult, especially handles that do not contain some combination of both heartwood and sapwood.

Interestingly, this debate has caused some measure of prejudice against hickory heartwood (red hickory), which people often place in a lower grade than hickory sapwood (white hickory) simply because of its color. Although this debate continues to this day, Forest Products Laboratory (FPL) research has conclusively shown that red, white, and mixed red and white hickory all have the same strength characteristics. FPL's research is available in the report, "Hickory, an American Wood" <http://www.fpl.fs.fed.us/documnts/usda/amwood/241hicko.pdf>.

Figure 6–14—A handle containing both heartwood and sapwood (top), and a handle containing only sapwood (bottom). Research has shown that there is no difference in the strength and durability of handles containing only sapwood, only heartwood, or a combination of the two.

The wood grain of many mass-produced ax handles often runs at an angle or even perpendicular to the cutting edge of the ax head. The grain should run parallel to the ax head for added strength and durability (figure 6–15). A handle with wood grain that runs perpendicular to the direction of the ax head is more likely to break. When selecting a handle, ensure that the grain runs parallel to the ax head and inspect the grain throughout the length of the handle. Depending on how the manufacturer cut the handle, it may contain sections where the grain does not run the full length of the handle. This is known as "runout" grain (figure 6–16). Areas where the grain runs short have an increased chance of splitting or separating. Runout on the belly or back of a handle (figure 6–17) is a clear indication that the grain of the handle is wrong.

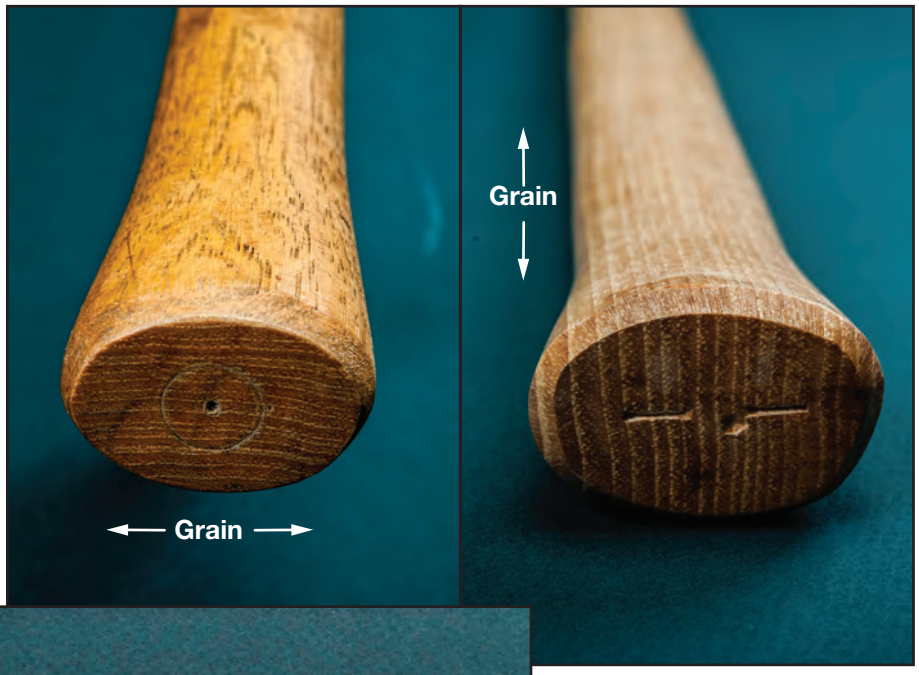
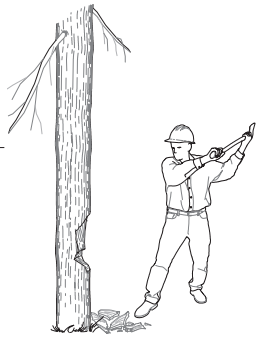


Figure 6–15—The grain of an ax handle running parallel to the ax head (left) and perpendicular to the ax head (right).

Figure 6–16—Wood grain that does not run the full length of a handle ("runout" grain).



Growth rings are another issue of long-standing debate. Many experienced axmen feel that an ax handle should have no more than 17 annual growth rings per inch of radius. The publications "The Ax Book: The Lore and Science of the Woodcutter" by Dudley Cook and "An Ax to Grind: A Practical Ax Manual" (9923–2823P–MTDC) <https://www.fs.fed.us/t-d/php/library_card.php?p_num=9923%202823P> (figure 6–18) by Bernie Weisgerber reinforce this view. However, many environmental factors influence a tree's growth and ring patterns. In the author's opinion, the characteristics and strength of the wood species and the direction or alignment of the wood grain in the handle are more important than the number of growth rings.

Figure 6–17—Runout grain on the back or belly of an ax handle is a sure sign that the grain runs the wrong way.

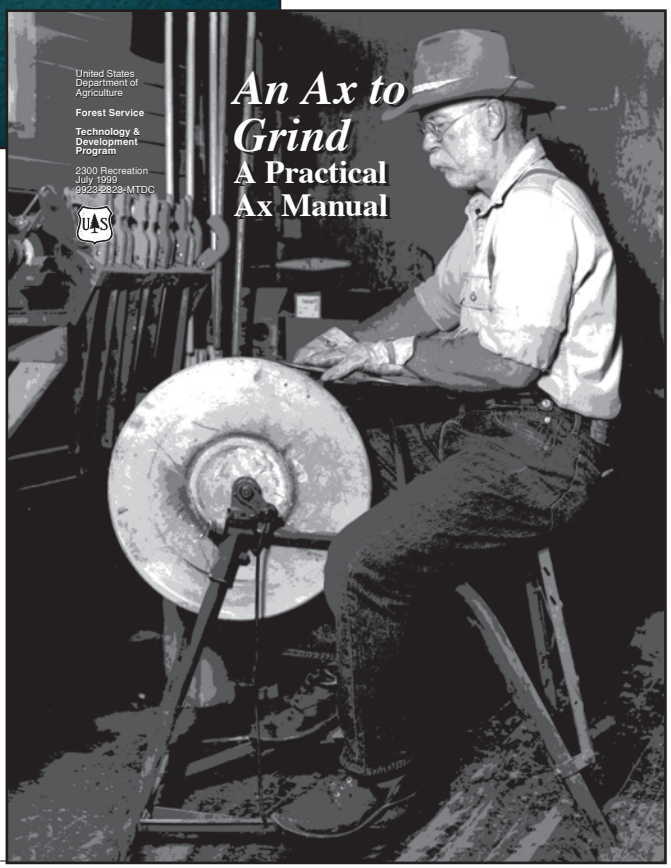


Figure 6–18—The publication "An Ax to Grind: A Practical Ax Manual."

Knots are another characteristic to focus on when choosing an ax handle (figure 6–19); they are a natural weak point where the ax handle could break. Try to select a handle without knots.

Be wary of painted handles when selecting an ax handle. Paint could hide defects in the wood or a grain that is not parallel to the ax head.

Ensure that the handle is not bent, bowed, or twisted (figure 6–20). A bent, bowed, or twisted handle affects accuracy. The handle should run straight and true when sighting down the length from the knob (end of the handle) through the eye. You may be able to correct some minor deviations when shaping the handle and fitting the handle to the ax head, but you should avoid a handle with a significant bend, bow, or twist.

Figure 6–19—A knot in an ax handle.

Figure 6–20—A bowed ax handle.

Types of Ax Handles

There are two basic types of ax handles: curved and straight (figure 6–21). There are also numerous variations of these basic types. Single-bit axes typically have curved handles, but can have straight handles (figure 6–22). Double-bit axes only have straight handles to enable users to chop with either blade.

Choosing a straight or curved handle for a single-bit ax is a matter of personal preference, but straight handles for single-bit axes are not as readily available as curved handles. If you cannot purchase a straight handle for your single-bit ax locally, you can purchase one through an ax handle manufacturer.

"Appendix B—Technical Drawings" provides technical drawings of handles for both single- and double-bit axes.

Axmen often debate which type of handle is best for single-bit axes. Many feel that the curved handle is purely aesthetic and that it actually detracts from chopping accuracy and power. Dudley Cook makes an excellent case for straight handles on single-bit axes, feeling that the straight handle is both stronger and more accurate. Other axmen feel that the curved handle facilitates ergonomic chopping and point to the fact that competition choppers use single-bit axes with curved handles.

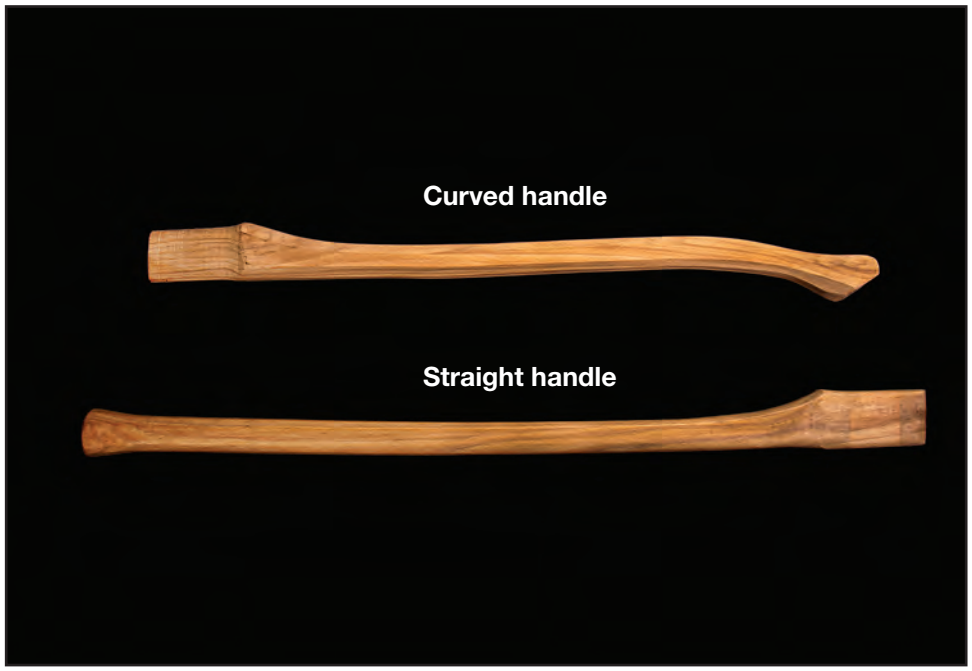


Figure 6–21—A curved single-bit handle and a straight single-bit handle.

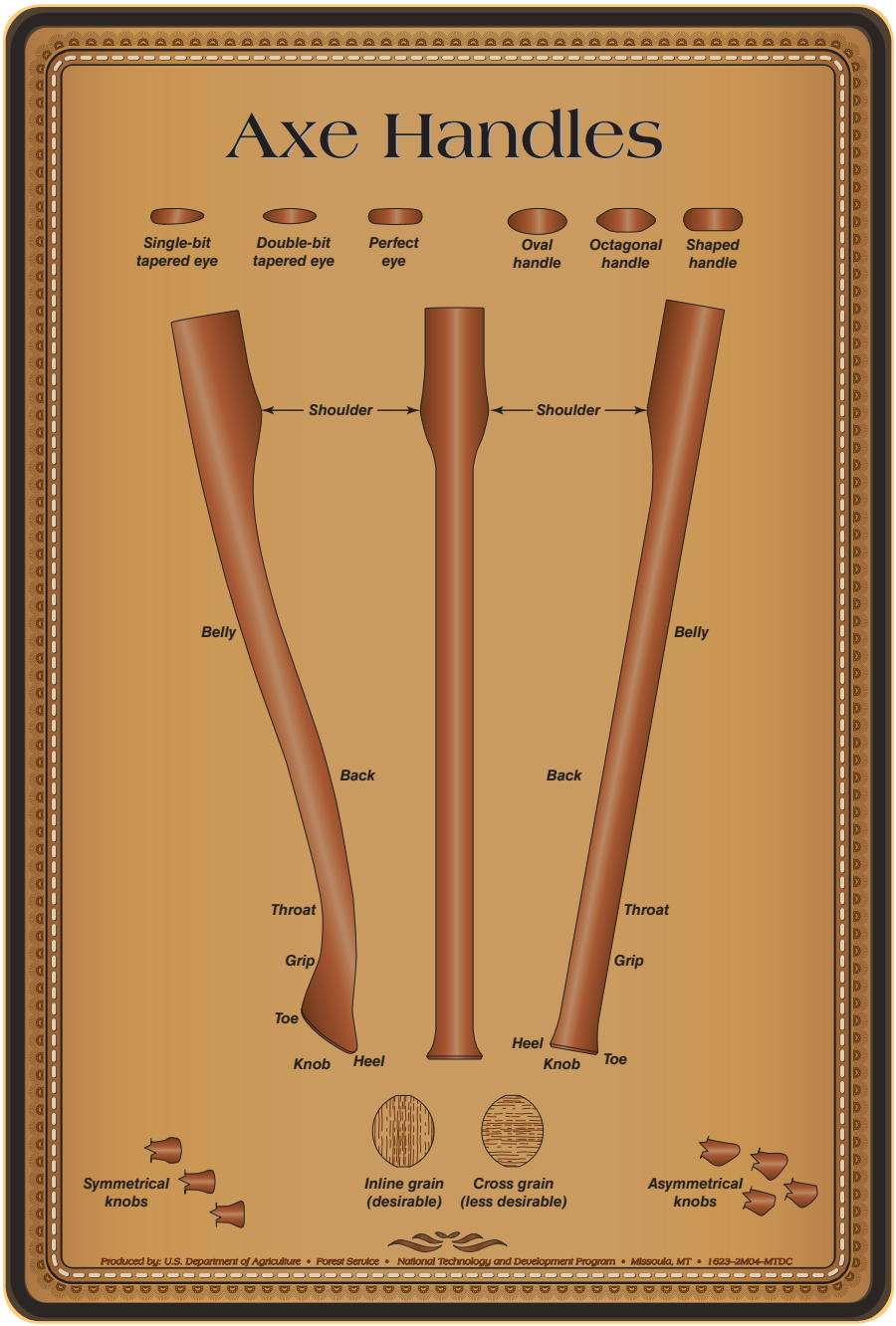


Figure 6–22—The parts of curved and straight ax handles. Refer to "Appendix A—Full-Page Ax Illustrations" for a larger version of this illustration.

With a curved handle, the striking angle at your wrist is more in line with your arm. With a straight handle, the striking angle at your wrist is slightly out of line with your arm (figure 6–23). When the hand, wrist, and arm are in line, a fluid transfer of power occurs, causing less fatigue on your wrist and arm. When using a straight handle, you bend your stationary hand at the wrist. Conversely, when using a curved handle, the wrist on your stationary hand is more in line with your body. When your stationary hand grips a curved handle above the fawn's foot (knob), keeping the axis of pivot more in line with the axis of a straight handle, your accuracy improves. The fawn's foot may also provide better control and reduced wobble while chopping.

Regardless of which handle you choose, your body is excellent at adapting to the nuances of the tools you use. With practice, you will develop accuracy with either handle style.

Figure 6–23—The angle of the wrist when using a curved handle (left) and a straight handle (below).