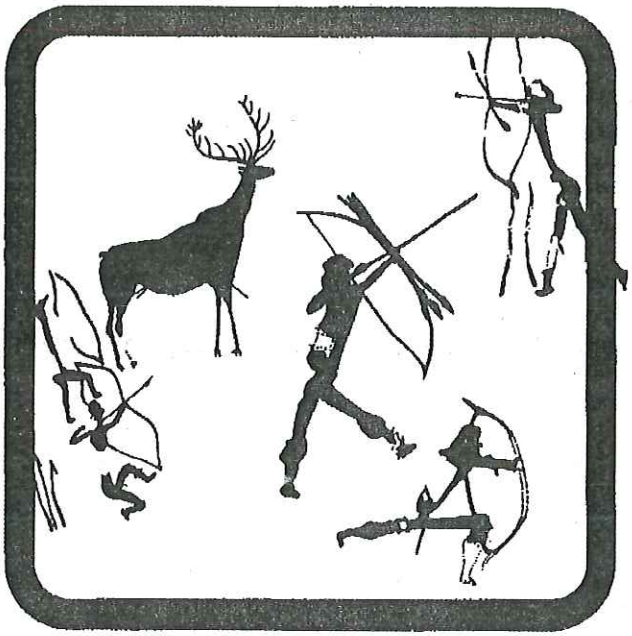
Bowhunting

History

Archery is an ancient shooting skill. The history of archery as a tool of the hunter-gatherer goes back beyond the limits of recorded human history. Pictographs painted or etched on the walls of caves and rock faces by prehistoric humans show that the bow was a tool for hunting and survival. Even Neanderthal Man used crude bows and arrows according to some archaeologists. Archery's history as a hunter's tool and a weapon of war is much longer than that of all firearms combined. In spite of giving way almost entirely to firearms by the mid 1800s, archery has staged an impressive come-back as a popular and growing shooting sport and hunting method.



Archeological and historical evidence shows that the bow arrived in North America with early human invaders, and that it was a primary tool for taking wildlife for survival. As tribal groups developed all over the continent, Indians used the bow as a primary food gathering tool and as a means of defending their families and tribes against enemies. Both sedentary, agrarian Indians and the more nomadic hunter-gatherers used the bow extensively.

When fur traders, explorers and settlers came to North America, they introduced firearms to the resident people. Matchlock, wheel lock and flint lock guns, which had replaced bows and arrows as the tools of the hunter and weapons of the soldier in other parts of the world, were used by pioneer Europeans to hunt for food, clothing and shelter and to protect them from hostile Indians and other European settlers.

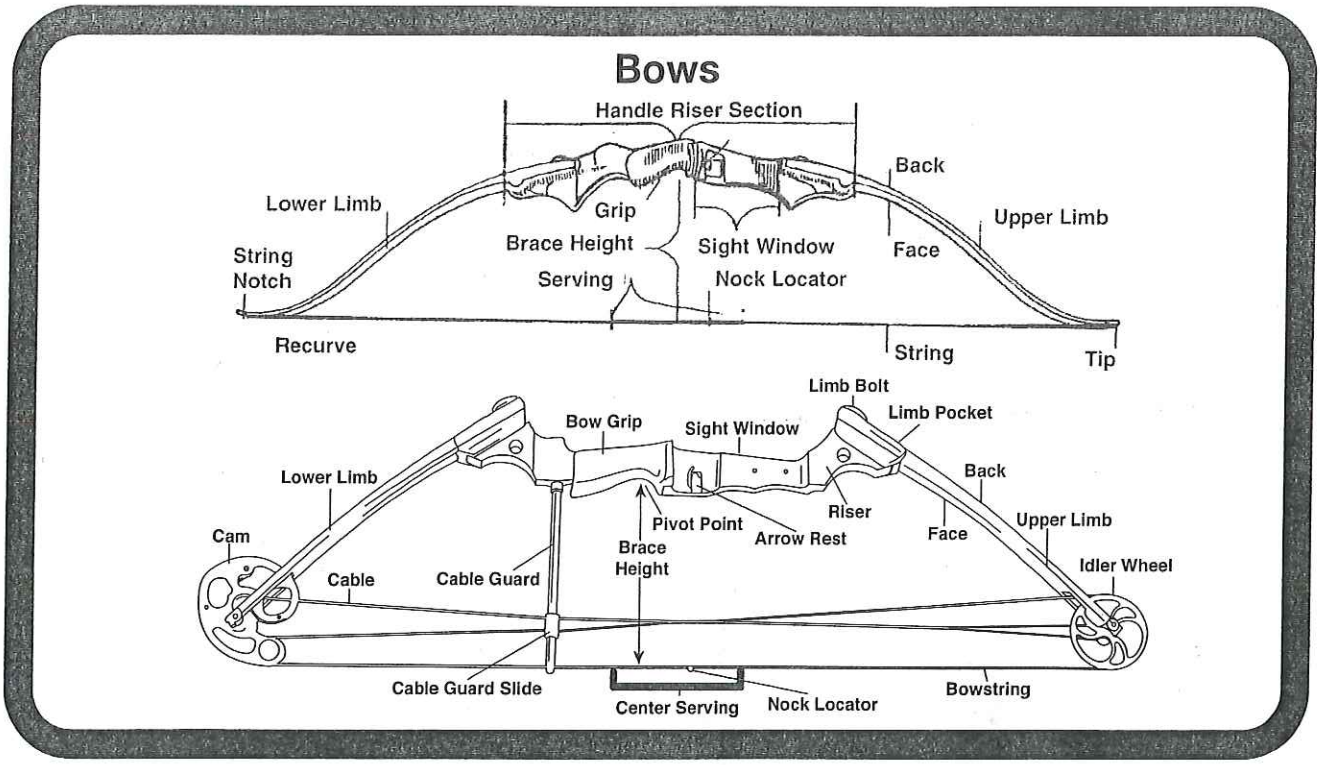
Although the types of firearms changed, firearms remained the dominant choice of hunters for many years. In recent times archery has once again gained popularity. Archery, one of man's earliest shooting skills, is a major sport in many countries and a popular Olympic sport. Bowhunting has returned to prominence, and each season more sportsmen join the ranks of bowhunters.

Introduction

Archery is the art and skill of shooting with a bow and arrow. It does not require great strength, but it does require the mastery of certain fundamental skills and coordinated control of basic shooting form. Form is much more important, even to the bowhunter, than is great physical strength. Development of archery skills requires practice, and practice with relatively light equipment is best for developing sound shooting form. Millions of people have learned to shoot a bow effectively, but learning under the guidance of a qualified archer helps in developing sound fundamentals. Once those fundamentals have been established, the archer is ready to learn how to be a bowhunter.

Although top-of-the-line bowhunting equipment compares with firearms in cost, the basic equipment needed for bowhunting need not be excessively expensive. It must be matched to the task, and the arrows and bow must be matched to each other. Safety requires that the arrows be carried in a quiver that completely shields the broadheads. That type of quiver also keeps the razor-sharp broadheads sharp for quick, clean kills.

Bows



Becoming a bowhunter requires more than learning how to shoot a bow. The new bowhunter must learn the capacities and limitations of his or her equipment. Learning what the tackle can and cannot do is important to shot selection and shot placement, two of the most important elements in making clean kills. Bowhunters also must study the habits of game animals they intend to hunt. That allows them to use those habits to get within adequate range of the game. Bowhunters must limit their shots to unobstructed shots into the kill area of relatively still and undisturbed animals within the range where they are able to place their shots precisely.

Archery Equipment

Bows and Bow Parts

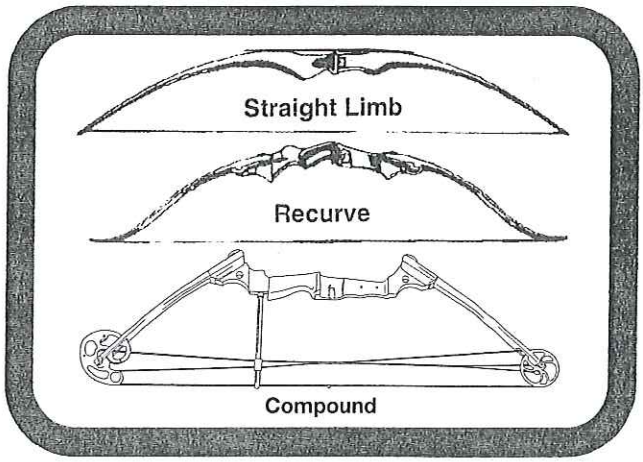
Most modern bows have three sections. The middle section of the bow is called the RISER. The riser includes the grip or handle, the saddle shaped area where the bow rests against the bow hand. Most bows are built to be shot from only one side, and the riser is cut out on the side opposite the dominant eye. Thus a right-handed bow has a sight window on the left side of the riser and a left-handed bow has a sight window cut out on its right side. The bottom of the sight window, just above the grip, has a shelf-like area called the arrow shelf. Most compound bows are drilled and tapped just above the arrow shelf to accept modern arrow rests.

The other two parts of the bow are the UPPER and LOWER LIMBS. They extend above and below the riser section. The limbs are much thinner and more flexible than the riser, and they store the energy that allows the bow to propel an arrow.

As the bow is held with the string toward the archer, the surface of the limbs that faces the archer is called the, FACE of the limb. The surface that is on the back side is called the BACK of the limb. When a RECURVE BOW is strung, the limbs curve back toward the archer, then re-curve away from the archer near their tips. The TIP of each limb is exactly what it seems, and the STRING NOTCHES are the grooves designed to hold the string in place.

COMPOUND BOWS add some additional hardware to the tips of the limbs. They may include WHEELS or CAMS. In addition to the BOW STRING, compound bows have a set of CABLES that transfer the mechanical advantage from the eccentric wheels or cams to the bowstring.

The bowstring has END LOOPS on either end. Those for compound bows often have end loops of the same



size on both ends. Strings intended for use on recurve bows normally have a larger loop on the upper end of the string. This allows it to slide down the limb when the bow is unstrung. The loops are covered with a nylon or dacron serving. The serving in the center of the string is called a CENTER SERVING. It protects the string from wear and helps fit it to the nock on the arrow. The point where the arrow is nocked on the center serving is called the NOCKING POINT. To keep it consistent, the center serving has a NOCKING POINT INDICATOR attached to it. The indicator may be an area of thicker serving, a metal and plastic ring or some other device. Normally the arrow is nocked UNDER the nocking point indicator. A string loop is very popular with compound bow shooters that use a release. Clipping a release to the string loop results in less wear on the string and draws the string square in the nock. The distance from the grip to the string is known as the BRACE HEIGHT of the bow.

Bows are available in three basic designs. Straight limbed bows or longbows are used by many traditional archers. Recurve bows feature a compound curve in each limb, giving greater cast and arrow speed. With both longbows and recurve bows the effort required to draw the string back increases with the length of the draw. Compound bows use the mechanical advantage of eccentric wheels or cams to reduce the force needed to hold the bow at full draw. Typically the greatest effort required occurs near the midpoint of the draw. Eccentric wheels have a relatively smooth transition in draw force requirements. Cam bows generally have a longer duration of peak weight and much more rapid let-off. Compound bows, in addition to the advantage of reducing the effort required at full draw, tend to return more of the drawing effort as arrow speed than do other designs. They are designed to operate within a fairly narrow range of draw lengths, however. Thus they must be set up for the archer who is using them. Limbs are usually made of solid wood, fiberglass, or graphite composite or of layers of those materials laminated together. The latter type of limb is called a LAMINATED limb. Straight, split and parallel limb designs cover the majority of limbs on the market. The parallel limb design has become very popular; this design allows the limbs to move in an up-and-down vertical motion rather than front to back.

Bow Construction

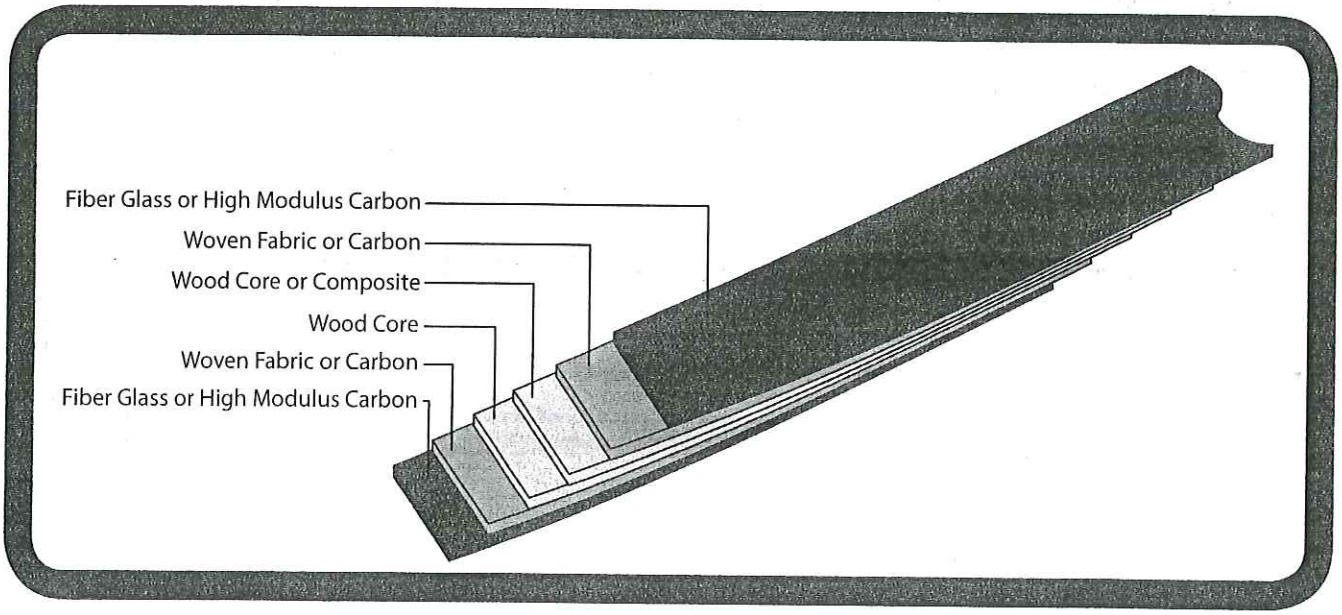
Bows are made of several types of materials, alone or in combination. Risers are usually made of wood, metal or a composite material (fiberglass or graphite). Cast or machined aluminum or magnesium risers are common on compound bows and some take-down recurves. Limbs are usually made of solid wood, fiberglass or graphite composite or of layers of those materials laminated together.

The latter type of limb is called a LAMINATED limb. Lighter, stiffer materials tend to recover faster, increasing arrow speed and cast.

Bow Weight

When an archer speaks of bow weight, they are not referring to the mass of the bow, but to the effort required to bring the bow to full draw. This feature of the bow is known as the bow's DRAW WEIGHT. Draw weight on recurve bows is measured at a standard draw length of 28 inches (71 cm). Compound bows are measured at their PEAK WEIGHT, the maximum effort required during the entire draw sequence.

DRAW LENGTH is the distance from the string (the base of the notch in the arrow nock) to the arrow rest. It is not necessarily the same as the arrow length, particularly where broadhead hunting shafts are concerned. If a recurve bow or longbow is drawn beyond its nominal draw length, the draw weight increases. If it is drawn less than its nominal draw length, the draw weight decreases. As a rule of thumb, the change in draw weight is approximately



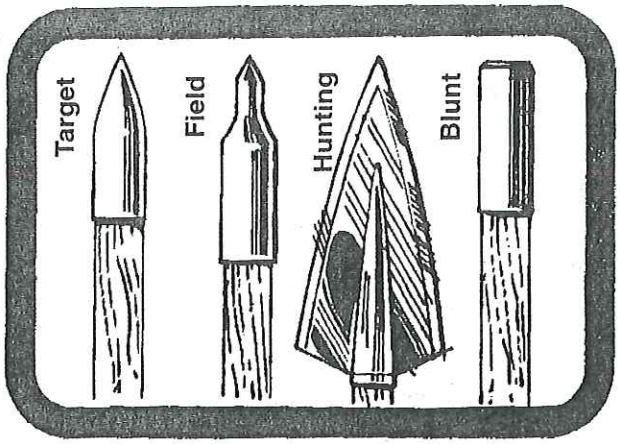
two to three pounds for each inch over or under the nominal draw length. Some bows "stack." That refers to draw weight increasing more rapidly as the draw length is increased. The stacking problem is more common and noticeable in shorter bows. Compound bows are tuned to have a "valley" or maximum reduction in draw weight at the draw length of the archer. The peak weight will be encountered at some point midway through the draw. Thus a 66 pound (30 kg) compound bow requires that much effort at the peak of its draw force curve, while a similar longbow or recurve bow requires that much effort at 28 inches of draw length.

BOW LENGTH or STRING LENGTH refers to the length of the bow, another AMO (Archery Manufacturers' Organization) standard. Bows are available in lengths from AMO 72 inches down. In general, hunting bows are less than AMO 60 inches, although a few custom archery technicians make them in lengths to AMO 66 inches. Compound bows are generally much shorter than most recurve bows or longbows, and hunting bows are usually shorter than target bows. Taller persons, those with longer draws will find the longer bows are much more comfortable to shoot than extremely short ones. Increased length tends to increase the apparent smoothness of the draw while keeping the angle of the string more open at full draw.

While some states or provinces may permit the use of bows with draw weights of as little as 40 pounds (18 kg) for hunting big game, most bow hunters consider a draw weight of about 50 pounds (22.8 kg) just about the minimum for big game. Some regulations are written in terms of a minimum cast, the distance a bow can shoot an arrow. In general, bowhunters tend to use the heaviest tackle they can handle effectively, since speed and penetration (momentum) are both valuable to the hunting archer. Be sure to check the requirements in the areas you intend to hunt to make sure you are adequately prepared.

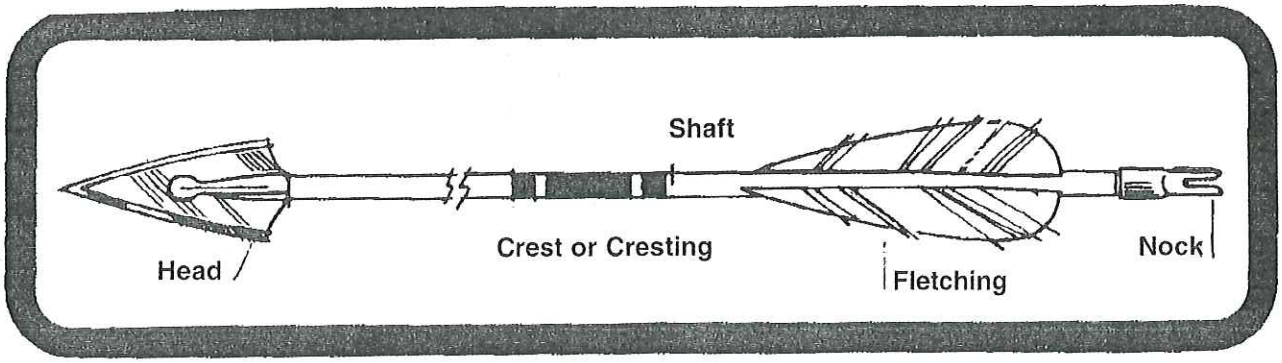
Arrow Parts and Construction

Quality arrows are critical to the bowhunter as well as the target archer. Arrows are composed of four basic parts: shaft, head or point, nock, and fletching.



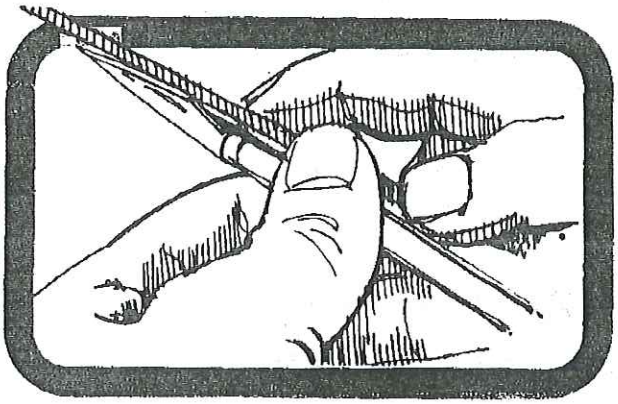
Arrow SHAFTS are commonly available in wood, fiber glass, aluminum, graphite or combinations of aluminum and graphite. The shafts must be matched in SPINE or stiffness to the weight of the bow, since the arrows are flexed powerfully during each shot. Indians in eastern North America, commonly made arrows from maple or viburnum stems, but most wooden arrows are made of Port Orford cedar. This western cedar is light in weight, straight-grained and relatively stable; but no wood shaft is completely stable or easily matched in either spine (stiffness) to the bow. Wood arrows are traditional and relatively inexpensive, but they are both fragile and more difficult to match to the equipment. In addition, wooden shafts may shatter under the stresses applied by modern cammed compound bows, causing potential injury to the shooter.

All other shafts, with the exception of fiberglass fishing arrows, are tubular. Both the diameter of the tube and the thickness of the tube walls, along with the type of material used in their construction impact the stiffness or spine of the shafts. Aluminum shafts are more expensive than wood shafts. They are fairly heavy, relatively straight compared to wood, and more easily matched in mass and spine than wooden arrows. Graphite arrows are similar, although the stiffer graphite fibers permit the use of a thinner, lighter arrow, giving the arrow superior speed off the bow. Aluminum arrows come in a wide variety of alloys, from relatively soft shafts to very hard ones. They are available in a tremendous array of tube diameters and thicknesses, permitting close matching of spine to the bow. In addition, the manufacturing techniques make them extremely consistent in mass. Graphite shafts



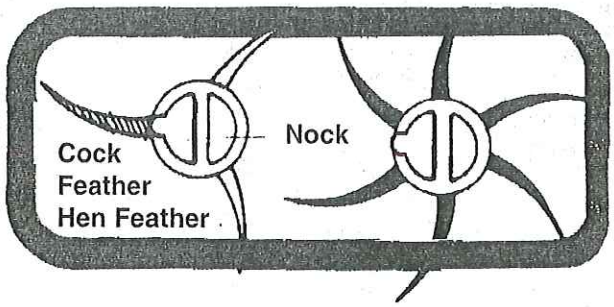
with a thin aluminum tube at their core combine the qualities of graphite and aluminum to make a superior target shaft. All of these materials are more expensive (sometimes MUCH more expensive) than the best of wooden shafts, but most archers consider the differences in cost acceptable for the improvement in consistency, straightness and performance. The standard among bowhunters remains graphite or graphite composite arrows. The majority of hunters feel the performance and durability far outweigh the higher cost of graphite.

The arrow is fitted to the string by a NOCK that is attached to the string end of the arrow. Nocks are usually made of plastic materials. They may fit over a nock adapter or the tapered end of a shaft, or they may have a shaft that is inserted into the back of the arrow shaft. Nocks come in a variety of designs, but most bowhunters prefer a nock that grips (snaps on) the string. For those shooters who use a release aid, the snap-on feature is essential. Lighted knocks have become very popular. When the arrow is fired, the knock lights to assist in seeing where the arrow impacts and finding your arrow after the shot. Check your local game laws to ensure that lighted knocks are legal in your hunting areal.



The FLETCHING is located just ahead of the nock. Fletching may be composed of feathers (usually turkey wing feathers) or plastic vanes. For years, the standard for hunting arrows was to use three, five-inch feathers or vanes set at 120 degrees (use symbol) with one feather or vane set perpendicular to the string. This vane or feather, called an INDEX FEATHER, INDEX VANE or COCK FEATHER, is usually different in color or pattern from the other two to aid the archer if placing it on the string so it faces away from the sight window.

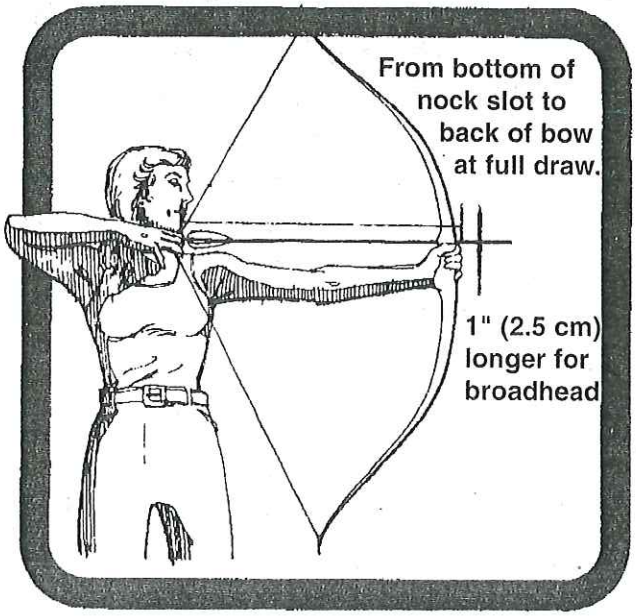
The majority of bowhunters using compound bows are now using 2" to 4" vanes. With the introduction of shoot through and drop away rests, there are no longer issues with vane clearance. Flu-flu fletching is used by many small game and bird hunters. They are built with one or more full-length feathers spiraled around the shaft or with six un-trimmed five or six-inch feathers set at 60°. This specialized fletching pattern rapidly slows the flight of the arrow, making it easy to recover and



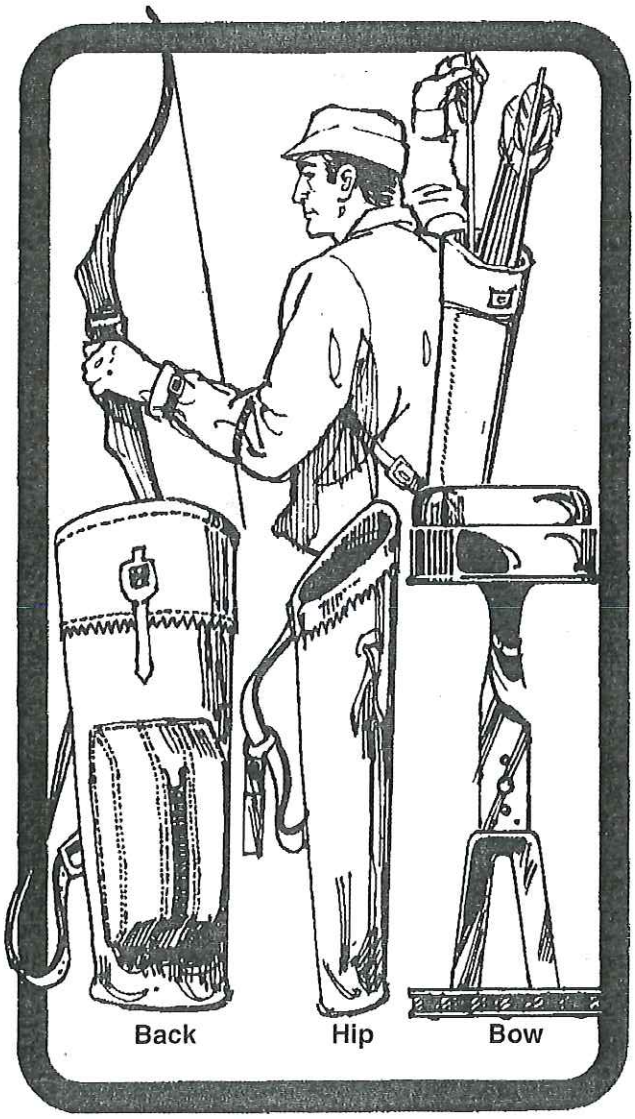
safer to shoot while retaining enough momentum at short distances to kill small game effectively. The selection of fletching type and material is a series of compromises. Plastic vanes are relatively slicker in flight than feathers, causing less drag on the arrow and allowing greater retained momentum. They offer less control for the shaft, so feathers are more forgiving of small errors in release or shooting form. Under wet conditions, feathers may matt, greatly reducing their effectiveness. Vanes are stable across a wide range of weather conditions. Finally, vanes are quieter in flight than feathers under most circumstances.

Regardless of the type of fletching material being used, the fletching may be applied straight, angled or in a helical pattern. Straight fletch offers the least guidance, but it retains the maximum amount of arrow speed. Angled or helical fletching coverts some arrow speed into rotation, producing a more forgiving arrow flight. The choices in fletching material, arrangement and application are left to the individual archer.

Many bowhunters like to have a CREST or SIGNATURE on their arrows. These rings of colored paint can be used to identify the arrow, like a brand. While it has negligible impact on the flight of the arrow, the cresting has an aesthetic value to many archers.



The down-range end of the arrow carries a POINT or HEAD. Arrow points come in a wide variety of shapes for a wide variety of purposes. Target points are sharply angled conical points or light bullet-shaped points. Their primary purpose is to make a clean entry into the target and backstop. Field points are sometimes shaped like heavy target points. They may also have an elongated tip somewhat smaller in diameter than the rest of the point. Field points are available in a wide variety of weights, allowing the bowhunter to match a field point to the broad heads being used to make practice easier. Blunts are either arrow diameter or larger points with a relatively flat striking surface. They are used for roving or shooting small game, where the kinetic energy of the arrow is used to kill the game. Some specialized bird heads have wire loops that enlarge the striking area of the point. Judo heads resemble a field point with four tiny, spring-loaded arms. They are used for roving because the spring-loaded arms tend to make the arrow pop up on impact, allowing the bowhunter to locate it more easily.



Broadheads are the type of point used in hunting big game and tougher species of small game or upland birds. Broadheads come in a bewildering array of types, sizes and designs; but all broadheads used in hunting big game animals should share a few common characteristics. First, they must have smooth, razor-sharp edges. Anything less is unacceptable. They must be tough enough to survive hard impacts with bone. They must have adequate width to meet or exceed legal requirements and to create a quick-killing wound channel. In addition, they must be easy to re-sharpen or replace in the field. Finally, they must fly well and consistently from the bowhunter's bow.

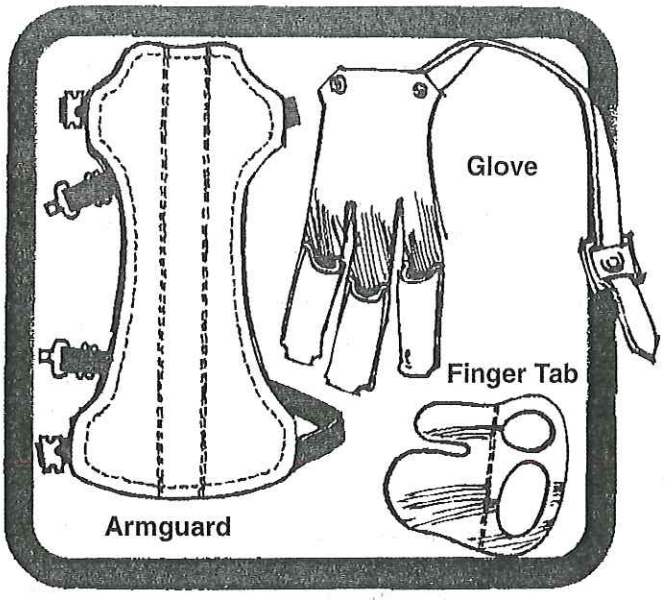
Broadheads are available with two, three, four, five and six cutting edges. In general, as the number of edges on the broadhead increases, the cast required to completely penetrate a big game animal increases; but the size of the wound channel increases as well. Opinions vary a great deal about the "best" broadhead design, but most of those on the market are effective if they perform well out of your bow. Many bowhunters like the mechanical or retractable blade broadheads. Because of their compact size during flight, mechanical broadheads tend to fly like a field point. Others feel that too many things can go wrong with a mechanical device to risk using them.

Every bowhunter should know how to sharpen or replace their broadhead blades safely. Once those blades are sharpened or replaced, every precaution should be used to keep them sharp until they are used. Because the razor sharp edges cut fingers and hands as well as other flesh, every archer using screw-in points should use a broad head wrench when handling broadheads.

Bowhunting Accessories

Every bowhunter needs to have some additional equipment. The bow arm should be protected with an ARM- GUARD. The armguard prevents the string from slapping the forearm during release (an indicator of poor shooting form). Its primary purpose is to keep the clothing out of the string's way, allowing a cleaner shot. Bowhunters who shoot with their fingers need to have a SHOOTING GLOVE or FINGER TAB. This device aids in getting a clean release as well as protecting the fingers from the abrasion and friction of the serving during each shot. Tabs tend to allow cleaner releases than gloves, but mechanical releases offer the cleanest releases. The decision to use or not to use a release aid is personal. It adds one more item to be forgotten, dropped from the stand or broken; but it helps those who cannot devote the time to develop a clean release using their fingers. A release aid will improve any shooter's ability to hit targets consistently.

Many different types of QUIVERS are available for the archer. Quivers for broadheads must have two basic elements: complete protection of and from the broadheads and preventing the broadheads from striking or rubbing



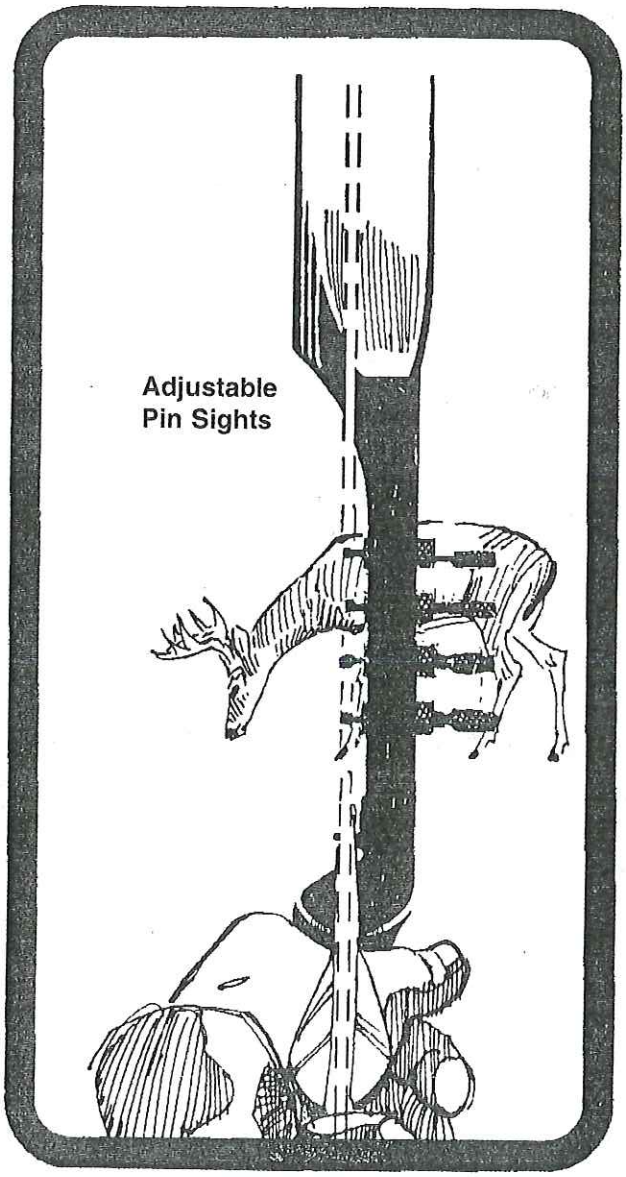
against each other. Hunting quivers include three basic designs: back quivers, hip quivers and bow quivers. The only back quivers that should be considered by a bow hunter are those that lock each shaft in place and cover the blades of the broadheads. Hip or stalker quivers are preferred by many bowhunters. Bow quivers are both convenient and stabilizing. The mass of the arrows and the quiver can act as a bow stabilizer as well as a storage place for arrows. A variety of tube quivers and back quivers can be used for field shooting or roving. Selecting one that operates like the one you use in hunting can be a wise investment.

Most bowhunters carry a fanny pack or day bag containing some other essentials. An extra bowstring that has been set up and "shot in" is critical. Allen wrenches and/or a bow stringer is essential if a string change is required.Most archers place string silencers on their bowstrings to dampen the "twang" of the bowstring. Recurve shooters usually include brush buttons to deflect grasses, twigs and other debris away from the string. Sharpening equipment and a pair of pliers are important for a variety of tasks, including getting an imbedded point out of a tree stump. A broadhead wrench is essential, as is a small cake or tube of string wax. A spare rest, a set of necking point pliers and a bow square can let you repair a problem that is hunt ending. A tube of fletching cement and a few nocks are also very useful. Most bowhunters include field dressing equipment, a drag rope and a few small adhesive bandages as well. A hauling line and FULL BODY FALL ARREST HARNESS SYSTEM are essentials if the bowhunter is going to use tree stands or other elevated blinds.

Sights

Traditional bowhunters shoot instinctively. They shoot an arrow like they throw a baseball, by concentrating on the target and allowing the muscle and mind memories to make all the corrections. Most modern bowhunters use some type of sight. Bow sights are available in a wide range of designs and prices. Many hunters prefer a single sight pin set and hold over or under slightly to compensate for range differences. Others prefer several pre-set sight pins for the array of ranges they are comfortable in using. A few archers even use optical sights. At the modest ranges involved in bowhunting, simple pin sights are completely adequate. Many archers prefer to include a peep sight attached to the string to refine their hold on the game being hunted. This requires most archers to close one eye, reducing their field of vision and reducing the visual field of the shooting eye. Most bowhunters rely on consistent shooting form to establish a consistently placed rear sight.

Since the archer adjusts the front sight (the rear sight is the relationship between the anchor point and the dominant eye), the rule for sight adjustment is to chase the hits with the sight. Thus if an arrow strikes low and to the left, the archer should move the sight down and to the left. If the point of impact relative to the point of aim changes without explanation, check the necking point indicator to see if it has moved.



Arrow Rests

There are many types of arrow rests on the market for compound bows, but you can break them down into a few basic categories. Shoot through, drop away, and standard rests encompass most of the arrow rest choices on the market today.

Shoot Through Arrow Rests ("Whisker Biscuit" style rest)

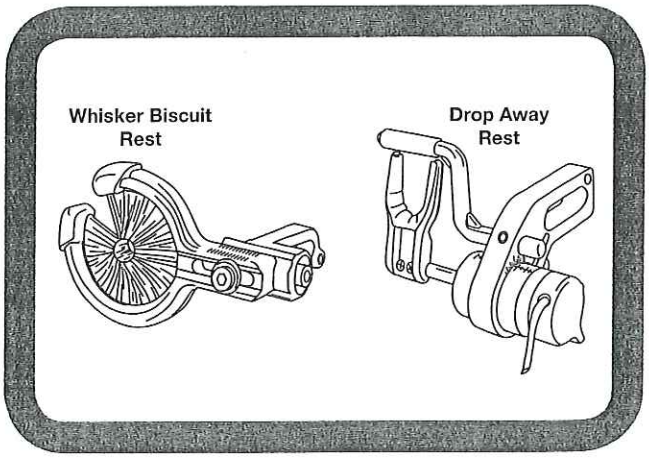
This rest uses a disk of stiff bristles with a hole in the center that the arrow fits into. This rest keeps contact with the arrow until the very end of its flight from the bow string, providing maximum stability before the arrow takes flight on its own. You will lose about 2 feet per second of arrow speed with this type of rest. However, it is easily adjustable, it holds your arrow securely, which is great in a tree stand and is quiet to shoot. Not a lot can go wrong with this arrow rest, which makes it very popular.

Drop Away Arrow Rest

Drop away arrow rests do just as the name implies. They drop away before the fletching on your arrow passes the arrow rest so no contact is made with the fletching. The rest is attached to a small cord that as you draw your bow, pulls the rest into position. The upside to this arrow rest is that it has absolutely no contact with the fletching of the arrow, however, you have to tune the rest precisely so that it drops at just the right moment, or you will not have enough contact with your arrow shaft to ensure stable arrow flight downrange. This arrow rest will also allow you the maximum feet per second in arrow speed because they have very little contact with the arrow.

Standard Arrow Rests

Standard arrow rests are typically a flipper or two prong designs that have your arrow sitting on a small, usually spring-loaded arm made with wire or metal covered in plastic to deaden any noise. The arrow makes contact at some point with the rest, so many of today's bows shooting at faster speeds struggle with these arrow rests.



They are very forgiving to poor shooting form and are generally easy to tune, but the technology has simply moved beyond them at this point. The new shoot through and fall away rests provide the opportunity for much better arrow flight and accuracy.

Equipment Tuning

The best starting point for equipment tuning is to thoroughly understand how your bow operates. An archery pro shop can provide extremely valuable assistance with the process. Start with an arrow manufacturer's selection chart. It will help you select an arrow with the proper spine for your draw weight and arrow length. Having the proper spine is critical, since the arrow flexes both laterally and vertically as it is released. This condition results from both the string oscillation and the tendency of the rear of the shaft to move before the head end starts in motion. Arrows that are too stiff or too weak will not fly true, veering off to the bow-hand side and the string-hand side, respectively. Finger shooters have much greater lateral string movement and arrow flexing than do those who use mechanical release aids. Remember that it is easier to tune a bow with an arrow that is slightly too stiff than with one that is too weak or soft in spine, particularly for shooting broadheads. Arrows can be fine-tuned by changing the mass of the string (adding or subtracting strands), changing the mass of the broadhead (lightening the head stiffens the shaft), reducing the draw weight or increasing the amount of fletching.

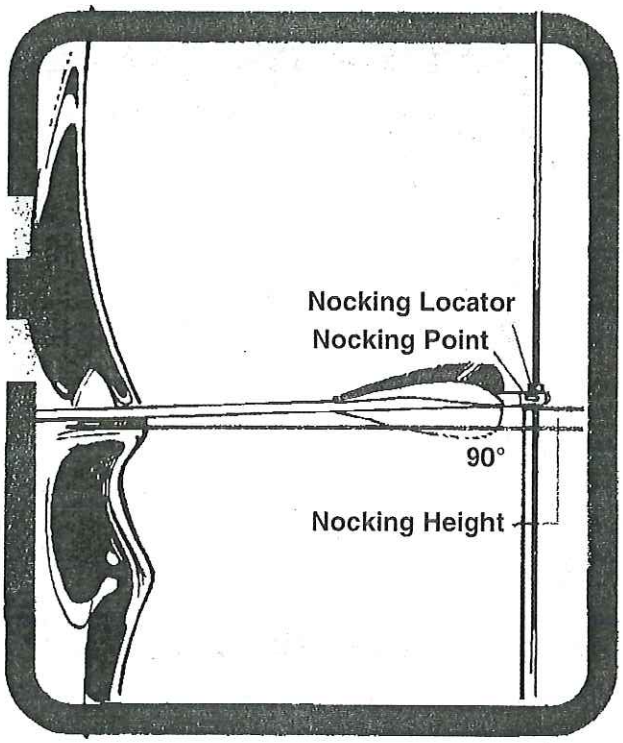
Although there is a strong temptation to load the bow with as many accessories as possible, most experienced bowhunters tend to keep things pretty simple. Make sure, for example, that the type of arrow rest selected is suitable for the shooting style you will be using. Shoot-through launchers are intended for use with release aids. They should not be used when shooting with fingers. Finger shooters will find spring, folding lever or collapsing rests much more effective. Before you begin tuning your bow, you must determine the proper arrow length. Hunting shafts are cut a bit long, about an inch to one and one-half inches longer than the true draw length. This gives a margin for error when adrenaline causes the archer to over draw the bow under hunting conditions. The best way to determine the proper arrow length is to draw an arrow and have another person mark the shaft. The use of a draw check arrow and an extremely light bow is recommended, particularly for archers who are not used to shooting heavy tackle. Bowhunters should have all their arrows cut for broadhead lengths.

Your pro shop or manufacturer 1s literature will suggest starting by using either the bare shaft method or the paper tuning method to get your bow tuned properly. Tuning always starts by adjusting the height of the necking point indicator to eliminate porpoising, the vertical oscillation of the shaft in flight. Locate the necking point indicator on your string by using a bow square. Set the indicator about ¼ to ½ inch above horizontal. This is a good starting point for most hunting equipment. Once that has been accomplished,

the archer can concentrate on reducing the amount of fishtailing or lateral oscillation in the arrow. When these two movements have been minimized, your equipment is tuned and ready to use on the range.

Archery Fundamentals

Like any other hunter, the bowhunter must master the use of his or her equipment before taking to the field for a hunt. While these instructions do not substitute for training with a competent coach or instructor, they do outline the basics of shooting a bow successfully.



Master Eye

As in other types of shooting, it is important for an archer to determine their master or dominant eye. For most people, the dominant eye is on the same side as the dominant hand, but a significant minority are cross-dominant, that is, their hand dominance and eye dominance are on opposite sides. Since it is far easier to train the hands than it is to train the eyes, the archer should learn to shoot from the side matching his or her eye dominance.

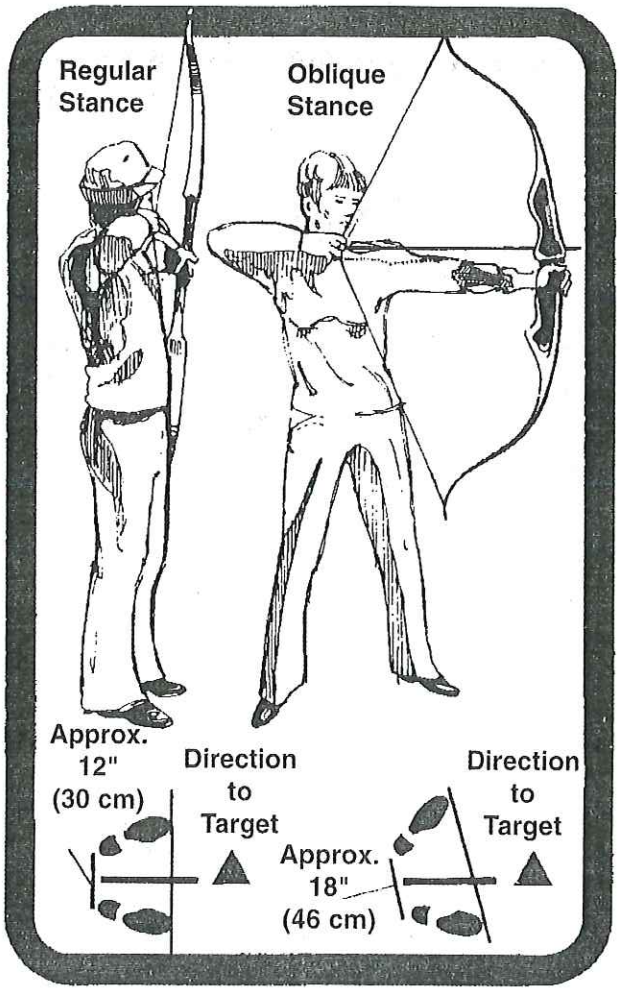
Determining eye dominance is easily accomplished. Using a partner can detect the occasional "cheater" who is trying to force their dominance to one side or the other, but it can be accomplished quite nicely alone. Stand square to another person or small object with both eyes open. Lay the thumb of one hand on top of the thumb of the other hand and cross the fingers of the top hand across the fingers of the bottom one. This should leave a small triangle. With your arms extended at waist height and both eyes open, focus on the object or the other person's nose.

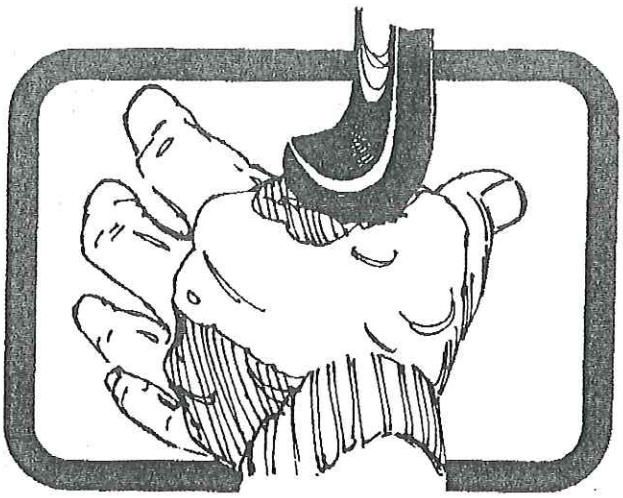
Bring your hands up and center the object or the nose in the triangle, keeping both eyes open. If a partner is used, they will immediately see your dominant eye through the opening. Now, keeping the object or nose in the opening, slowly bring your hands back to your face. They should come back to your dominant eye.

Proper archery shooting form usually dictates keeping both eyes open, but the dominant eye is the primary aiming device. A right-eyed shooter should draw the bow with the right hand while a left-eyed shooter should draw the bow with the left hand. Thus the drawing (string) hand corresponds to the dominant eye and the off (bow) hand is on the opposite side.

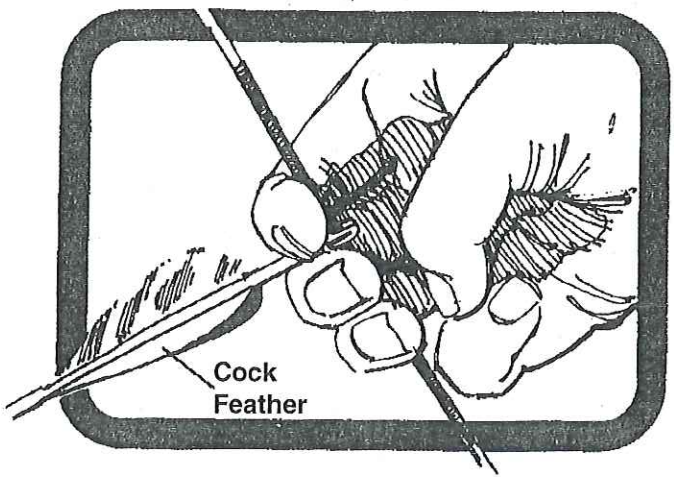
Shooting Form

Proper archery shooting form is learned best with light equipment. Excessively heavy archery tackle tends to lead to developing form faults that are difficult to correct. The fundamentals consist of approximately nine steps, with four of them being parts of a continuous dynamic motion.





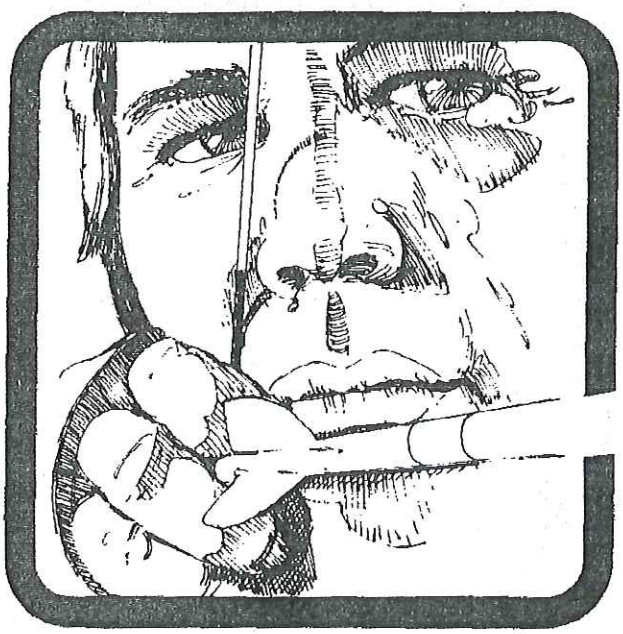
These nine steps include the stance, nocking the arrow, setting the hook and bow hand position, pre-draw extension of the arms into a T-shape, draw, anchor, aim, release and follow through. The draw, anchor, aim and release are part of a continuous process. Practice is the key to developing and maintaining consistent shooting form. For the first few series of shots (ends) it is helpful to shoot at a blank target with a small stick-on dot or other aiming point placed on it. Concentrate on grouping your arrows. Once you are able to group arrows consistently, moving that group to the center of a target is a simple process.



Stance: The basic stance for correct shooting involves having the toes more or less perpendicular to the target with the weight evenly distributed. Lines drawn through the hips and the shoulders should point directly to the tar get. Alternatively, the front (off) foot can be moved back slightly, perhaps three to six inches, to open the stance slightly. The head should be erect and relaxed, turned toward the target and facing it as squarely as possible.

Nock: The arrow's nock should be snapped on the string under the nocking point indicator. If an arrow with three vanes or feathers is being used, it should be nocked so that the index fletch is facing away from the sight window on the bow. For release shooters using launcher-type rests, the odd vane should be positioned to clear the rest.

Grip: Two major schools of thought exist about the bow hand grip. Both agree that the grip should be relaxed and consistent. If you cannot seem to master a relaxed grip, try and open hand with a wrist sling. The sling ties to bow to your hand so it cannot fall out during the shot. Never shoot with an open hand and no wrist sling. This forces you to grab the bow, which will affect your shot. One uses the analog of glass bedding a rifle barrel. Most target shooters use this low, relaxed wrist and allow the grip to bed itself in a relaxed hand. The other uses the analog of a free floated barrel, holding the wrist high with an extended hand and allowing the grip to pivot on the web between the thumb and the forefinger on the bow hand. The first one is preferred for people who are able to control their emotions and maintain a relaxed grip when a huge buck is approaching. The second is better for those individuals who tend to get excited and may tense the hand or wrist under such pressure.



The drawing hand makes a Boy Scout salute — thumb touching the pinky, with the other three fingers hooked sharply at the first joint. The thumb on the pinky tends to keep the hand flat. The deep hook tends to keep the archer from flexing the fingers during the draw and torqueing the arrow off the rest. ALL THREE fingers should be placed under the nock of the arrow. This technique is better for beginning archers and many continue to use it for all shooting.

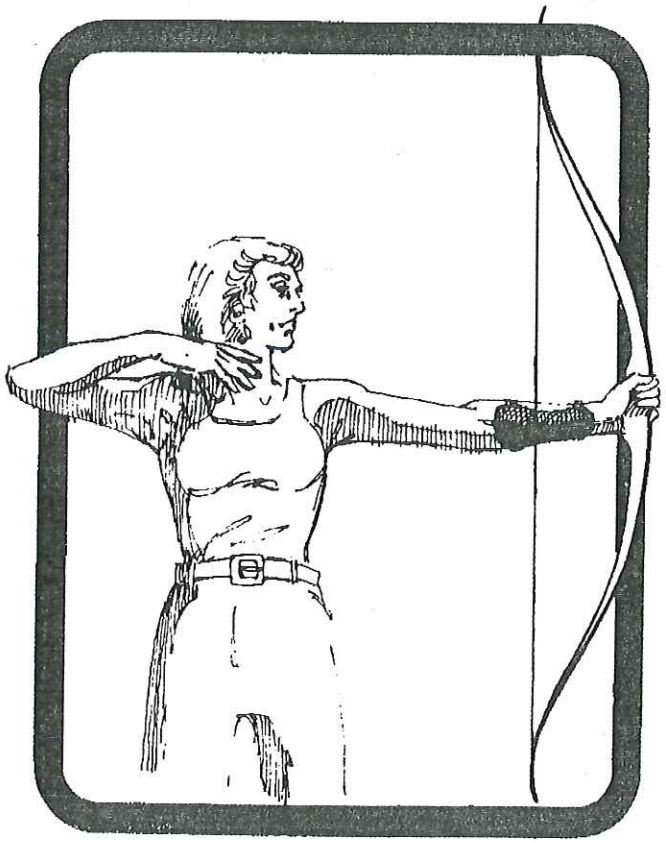
Pre-draw: The pre-draw consists of raising the extended bow arm and the elbow of the string hand until they form a T-shape with the upright and relaxed trunk. Aiming actually begins at this point, as the eyes focus on the target and the sight pin comes into view in rough alignment with the aiming point that has been selected. The elbow of the bow arm is rotated out by rotating the shoulder inward while keeping it level. Experienced bow hunters may merge the pre-draw with the actual drawing of the bow to minimize movement, but the beginner should learn proper alignment by keeping this a separate step.

Draw: The next four steps are actually one dynamic motion. They are broken down here for ease of under standing and because many times a bowhunter will find it necessary to hold the anchor for a modest amount of time. The draw is accomplished by pulling the string hand back to the corner of the mouth (alternatively to under the center of the chin). The forearm should be aligned with the arrow, making a straight line to the target.

Anchor: The anchor is merely contacting the same point on the face in the same way with the same amount of pressure applied EVERY TIME. Having a consistent anchor is essential. The relationship between the anchor point and the dominant eye establishes the location of the rear sight for the bow.

Aim: As in other types of shooting, nobody can hold the pin completely motionless on the target. The archer should concentrate on the target and allow the sight pin to settle in the proper alignment with that target. During this time the bow hand should be pushing toward the target and the shoulder muscles of the drawing hand should be pulling the elbow of the string hand back.

Release: When the mind tells the fingers that the hold is correct, the string hand fingers are relaxed. The tension on the hands will cause the bow to push slightly to the bow hand side and the fingers of the string hand to flow back wards along the face (or along the side of the neck with the low anchor point under the chin). Mechanical release aids are easier. Simply draw, anchor, aim, and then squeeze the release trigger or button. The key here is squeezing – not punching- the release. If you slap the trigger or button, your whole body will move and the arrow will not fly true.



Follow-through: The bow hand and string hand should remain in their post-release positions until the arrow strikes the target or hits its mark. In a bowhunting situation, the follow-through often lasts while the hunter observes the reactions of the animal to the hit. It is one of the most crucial elements of making good shots with a bow.

Once these fundamentals have become practiced habits, the wise bowhunter will try shots from all sorts of contorted positions. The key to successful shooting is maintaining that basic T-shape to the upper body and shoulders and keeping the head erect and relaxed. If everything from the waist up acts as a unit, the archer can still hit effectively. If you plan to hunt from a tree stand or elevated blind, make sure you practice from an elevated stand. Concentrate your practice at hunting distances (about 5 to 30 yards) and shoot each arrow as though it were the only one you would shoot. This forces intense concentration and first arrow hits - the essence of bowhunting success. A well practiced archer can concentrate on the critical questions of bowhunting: safety, shot selection, arrow placement and clean, efficient kills.

Analyzing Groups to Improve Shooting Form

Once the bow is tuned and the arrows are grouping, you can use the shape, size and location of those groups to analyze inconsistencies in your shooting form. This will help you concentrate on the positive things you must do to correct the form and increase your shooting accuracy.

Correcting each problem should be done by thinking about what must be done to accomplish the shot properly, NOT what is being done wrong!

Groups Strung High and Low: Inconsistent anchor point, mouth open (as in chewing gum), arrows nocked inconsistently, nocking point not properly locked in place, bow hand position too high or too low.

Groups Strung Right to Left: Gripping the bow tightly and inconsistently, bow arm not fully extended, wrist not extended, canting the bow, anchor point inconsistent laterally, stance not aligned with target (failure to establish the natural point of aim).

Groups High: Overdrawing the bow, heeling the bow (applying too much pressure with the heel of the hand, "helping" the arrow by pushing the bow arm on release, releasing by pulling the string hand downward, nocking point set too low.

Groups Low: Dropping the bow hand on release, moving the head forward to meet the string, fatigue, allowing the bow hand, arm or shoulder to collapse during the release, letting the string hand creep forward on release, nocking

above the nocking point indicator, raising string hand on release.

Groups to Bow Hand Side: Pulling hand away from face on release, arrows too stiff, hitting clothing with string during release (usually low and to bow hand side).

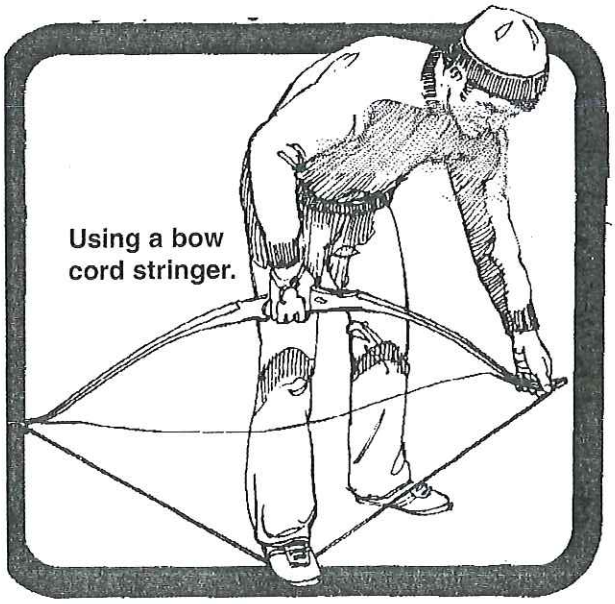
Groups to the String Hand Side: Arrows undespined, moving anchor point toward center of face, failing to align with the dominant eye.

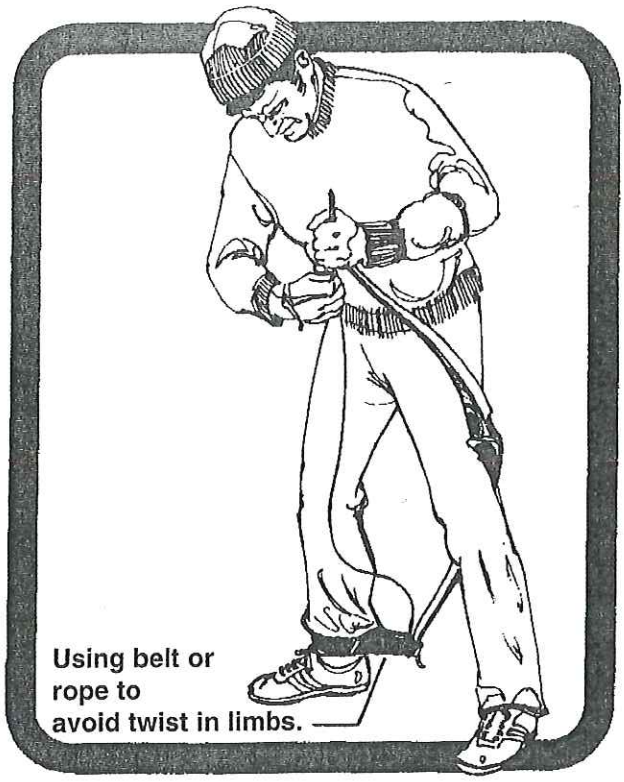
Groups Grossly to the Bow Hand Side: Shooting with the wrong dominant eye.

Equipment Care and Maintenance

Archery equipment is durable, and with minimal care it should last for many years of shooting. Starting with quality equipment that is properly sized to the shooter is important. An archer with a long draw will eventually damage a bow that is over-stressed by that draw. A protective finish can both camouflage your bow and seal it from moisture. Heat is a bow killer. Avoid storing bows where temperatures reach extremes. Arrows stored under high heat conditions or in the presence of ozone producing equipment will need frequent replacement of plastic fletching. Similarly, feather fletching can become a feast for moths or other insects if it is not protected. Store arrows and bows in suitable cases or by hanging them properly. Bows should be stored either suspended from the upper limb or string loop or horizontally, resting on the limbs near the riser. Arrows should be boxed or stored in vertical arrow racks.

Wooden arrows may be straightened by heating them over a flame and bending them across the heel of one hand. Aluminum arrows may be straightened effectively by using a commercial arrow straightener or by taking them to a pro shop. Check the condition of your arrows frequently and thoroughly. Replace damaged or loose fletching using a fletching jig to properly align the feather or vane with the shaft and the nock. Spin test broadheads to make sure they are properly aligned. Put the broadheads away sharp and ready for the next season, and protect them by coating each blade lightly with a rust inhibiting material, like petroleum jelly. Check the condition of the threads on screw-in adapters.


Using a bow cord stringer.

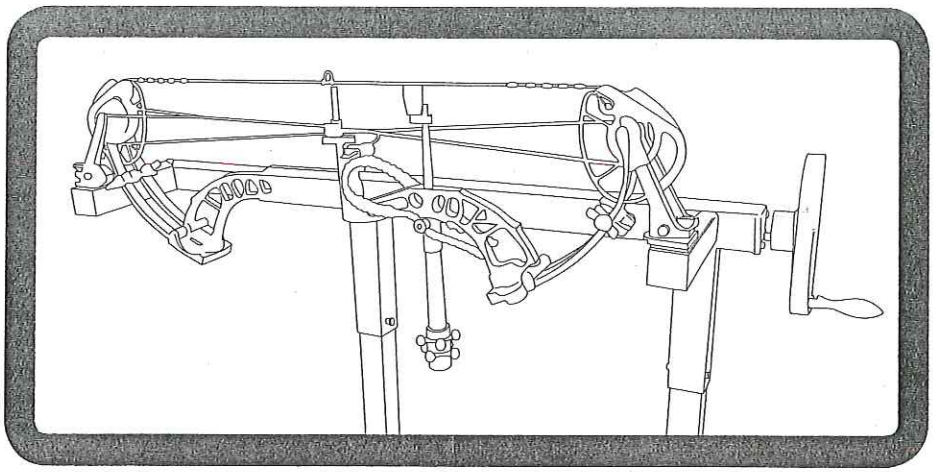

Using belt or rope to avoid twist in limbs.

Clean arrows shoot more consistently, and they are easier on rests, cushion plungers and other equipment.

Aluminum and carbon arrows can be cleaned effectively with soap and water. Once they have dried, adding a very thin coat of hard paste wax can protect them from dirt and make them fly a bit better.

Lightly lubricate the moving parts on compound bows. As with other sporting equipment, too much lubricant can be worse than not enough. Lubricate the axles and other pivot points on the bow with a dry lubricant or a light grease. Be sure to check the cables for signs of wear or damage. Replace them as needed.

Inspect each bowstring thoroughly. Check the servings for damage and repair or replace the strings as necessary. Keep bowstrings well waxed with a quality string wax. It increases their strength and makes them last much longer. Work the wax into the strands using a small patch of leather or other smooth material.



Stringing the Bow

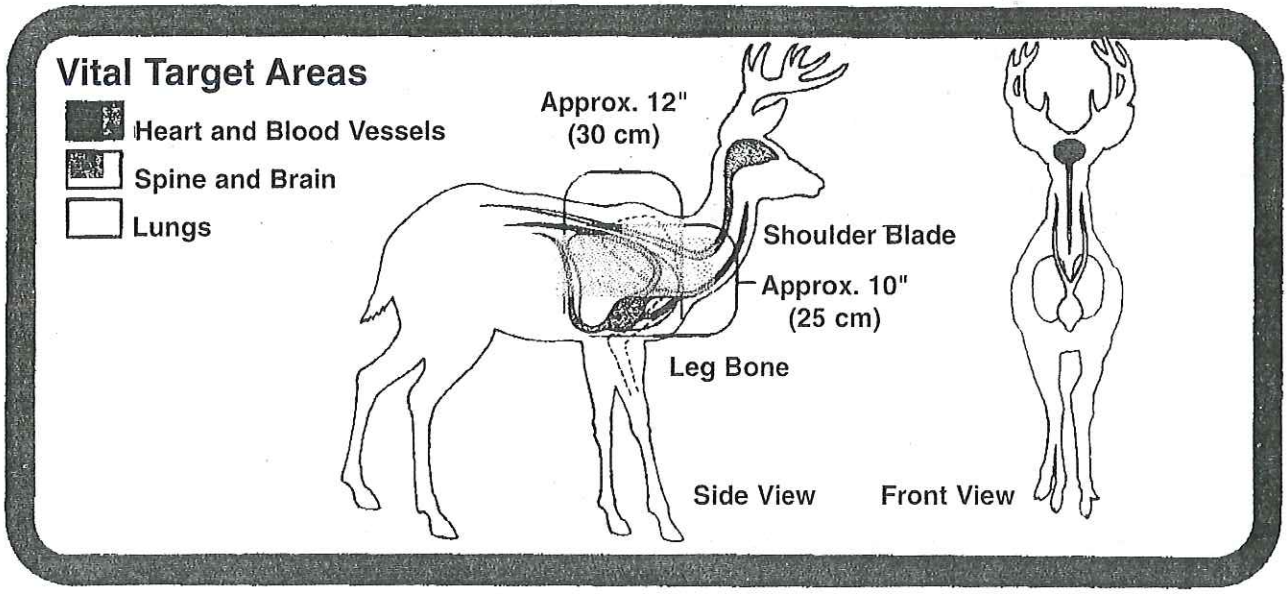
Compound bows come from the factory or pro shop strung and ready to use. They can be stored strung, only being unstrung to replace cables, wheels, cams or strings. With today's modern bows, a bow press is the only way to safely relax the bow, allowing any work or adjustments to be completed.

All other bows should be un-strung between uses. These processes must be done carefully to avoid damage to the bow or injury to the archer. The only safe way to string or unstring a recurve bow is to use a bow stringer. Several types of stringers are available on the market, but the most convenient ones for bowhunters are cord stringers. These may have two pockets or a pocket and a saddle. The pocket or the larger pocket is placed over the lower limb tip. The smaller pocket is placed on the upper limb tip, or the saddle is placed over the upper limb near the recurve. The shooter stands on the cord, raises the bow with one hand and slides the upper loop of the bowstring into the string notches with the other. Once they are checked to make sure they are properly seated, the shooter can relax the pressure on the stringer and remove it. Unstringing the bow is the same process in reverse. Box or wall stringers are also useful, but neither the step-through nor the push-pull methods should be used to string or unstring a recurve bow.

Longbow shooters may use either of these methods or use a simple box stringer. Great care is essential to prevent twisting the limbs of the bow or having the bow snap back and hit you.

Bowhunting

Just as bow hunting requires special equipment, bow hunters must have special knowledge and skills. They must be completely familiar with their archery equipment and both its limitations and their own. They must be very familiar with the habits and habitat of the game being hunted and capable of placing themselves in a position to get within their sure-kill range of the game animal. They also must have a precise knowledge of the anatomy of the game animals being hunted and of the best shot placement to make vital hits. Perhaps the most important knowledge required is the understanding of themselves and their limitations. Bowhunters must have enough self-discipline and self-control to pass on questionable shots, demanding of themselves that they accept only those shots that offer a high probability of quick, sure kills and recovery of the game being pursued. Building this knowledge base is a challenge much like the challenge of bowhunting itself.



With so much to learn, prospective bow hunters should use every means possible to build their knowledge base. Guidance of experienced bowhunters or archers can be extremely helpful with shooting techniques and other aspects of the sport. Reading, watching DVD's and hunting shows or using the internet can be very helpful as well. Perhaps the single, most valuable learning experience is the International Bowhunter Education Program. This comprehensive course is designed to equip a beginning bowhunter with the basic knowledge, attitudes and skills necessary to become a successful and ethical bowhunter. These things provide a foundation on which experience can build. The key to maintaining the skills and knowledge is to practice using them on the range, in the field and at home or in the office. You can practice the critical skill of distance estimation by estimating distances to objects and pacing those distances during the course of your daily activities. Constant practice can keep your shooting skills sharp and precise. Tracking and observation during the off-season can sharpen your observational skills and your knowledge of wildlife. These things also extend the bowhunting experience beyond the actual season.

Some Requirements

Bowhunting requires getting very close to your quarry. Ranges are seldom over 30 to 40 yards on responsible shots, and often they are less than 10 yards. Getting this close demands intimate familiarity with the game and with the local habitat and conditions. In many cases that goes beyond general knowledge of the species, like food habits and movement patterns, to the specific habits and behavior of an individual animal. The successful bowhunter knows how to determine where an animal travels, eats, sleeps, relaxes and how to intercept them in those activities. Bowhunters must accept both their own limitations and the limitations of their equipment. A well-placed arrow, equipped with a razor-sharp broadhead and delivered with sufficient momentum from a reasonable distance is quickly lethal. That requires an accurately-placed arrow driven through a prime vital area. Mastery of marksmanship, knowledge of game anatomy and the self-control to carefully select shots are essential before attempting to take game in the field. Since the first shot is often the only one the hunter will get, practice should focus on first shot placement.

Approximations of proper shot placement that might be acceptable to a firearms hunter are not acceptable in bowhunting. Since arrows are penetrating instruments that kill by hemorrhage, major bone masses must be avoided. Most bowhunters agree that the heart-lung region of the chest is the best area for shot placement. Other shots may kill an animal, but this one is reliable and offers the greatest margin for error while avoiding wounding hits. Most bowhunters prefer a broadside or quartering away shot, placing the arrow so it penetrates both sides of the body and emerges near the far shoulder. Neck, spine, brain or femoral artery shots may be lethal, but they involve much greater risk of wounding hits.

Ability and determination to follow up on every hit is vital to the bowhunter. Any hit that penetrates the body cavity should be considered a vital hit, but strategies for recovery differ with the conditions and the shot placement. The bowhunter must be able to assess the hit by observing the arrow placement and the evidence left at the hit site and nearby. The color and texture of the hair, the behavior of the animal, and the color, amount and appearance of blood or other fluids aid in assessing the type and location of the hit. Once that is determined, a strategy for recovery can be developed. Heart-lung hits are often fatal within seconds, but most bowhunters wait from 30 minutes to an hour before beginning to follow the trail. Muscle hits may be recoverable if the animal is followed immediately.

Abdominal hits, indicated by rumen contents or other gut contents, may require a wait of 8 to 12 hours. Regardless of the hit or the strategy devised, the bowhunter must continue to trail any hit until the animal is found or overwhelming evidence accumulates to prove that the wound is slight and the animal will recover. No bowhunter will leave a vitally-hit animal in the field without expending every effort and seeking help to make the recovery. Incidentally, teams of two or three people are often far better when following up on a hit. One person can follow the trail, marking it as required, while the flankers watch for the animal and signs that it may have turned from the trail.

If all of this leaves the impression that a bowhunter must be powerfully committed to the sport, the right impression has been left. A bowhunter worthy of the name commits the time and energy necessary to acquire, sharpen and

maintain the necessary skills of the sport. He or she learns the game and the hunting area. Shooting skills are practiced until marksmanship is almost reflexive, and where needed help is found to improve those skills. The requirements for success is high and bowhunters must elect to meet or exceed those standards. Bowhunters who accept this challenge and rise to it reap the rewards of both personal satisfaction and successful bowhunting experiences.

Bowhunting Regulations

Regulations applied to bowhunting vary with the state or province. These regulations may dictate the cast or draw weight of bows that may be used to hunt big game. They may require certain characteristics of broadheads and prohibit others. Other gear restrictions may apply as well. For example, an archer in one state may use an artificial light to find his or her way to and from their stand in the dark. In other states, the possession of a light may be considered prima facie evidence of jacklighting. Some states may require that tree stands or climbing steps do not penetrate or otherwise damage tree bark. Responsible bowhunters will research the regulations for any area they intend to hunt and make sure they abide by them. State or provincial wildlife agencies are excellent sources of information, but the local conservation officer or game warden can offer insights on interpretation and any new changes in the law.

Crossbows

History

Crossbows have been around for more than 2,000 years. It is not known whether they were developed in Asia and imported to Europe by early explorers, or developed simultaneously on both continents. Eventually, the English long bow dominated the use of crossbows and proved to be a superior military weapon because its shooter could draw and release up to six arrows for every one the crossbow was able to release after re-cocking.

The development of the modern crossbow began in the early 1960's with the introduction of laminated fiberglass limbs for bows and the invention of the compound bow.

Modern Crossbows

Today's hunting crossbows use pretty much the same terminology used for modern vertical archery equipment.

The front end of a modern hunting crossbow is a bow. It consists of a riser and limbs – either recurve or compound. Recurve limbs are powered by a bowstring attached to the ends of the limbs, and compound limbs are powered by cables and a string rigged to a wheel or cam pulley system mounted to the ends of the limbs.

Because the compact crossbow has a shorter power stroke and shorter limbs than the vertical bow, its limbs are fabricated with a heavier draw-weight to generate speed and power comparable to the vertical bow. Like a vertical bow, the strength of crossbow limbs, combined with the length of the power stroke, determine the ballistic performance of its arrow.

Compound crossbows come equipped with limbs strung with a bowstring and cables attached to a wheel or cam system that creates a mechanical advantage when drawn and held in a cocked position. Recurve crossbows are powered by a single string attached to the ends of its solid limbs and generally require a longer power stroke and wider limb span to deliver ballistic performance similar to that of a compound crossbow.

Crossbow limbs attach to a riser in the same way vertical bow limbs attach to a riser. Crossbows generally come with a foot stirrup mounted to the front of the riser. When manually cocking a crossbow, the shooter places a foot into the stirrup up to the arch to prevent slippage and bends over the stock to pull the bowstring using arm, leg and back strength.

Foot Stirrup: Bracket into which the shooter's foot is placed before pulling the string upward

Limb: Sections of flat fiberglass that are bent more when the bow is cocked

Wheel: A pulley that the string wraps around to aid in bending the limb

String: Braided strands that connect bow limb tips used to propel the arrow

Cables: A pair of braided or metal strands that connect wheels so they pull limbs evenly

Arrow Flight Groove: Slot running length of barrel that bottom vane of arrow slides through

Arrow Retention Spring: Pushes downward to hold the arrow in place before bow is shot

Sights: Optical or a set of front and rear points of aim used to adjust arrow point of impact

Stock Cheek Piece: Area of stock shooter holds against cheek to position head to align with sights

Trigger: Lever pulled by shooter finger to fire bow

Stock Forearm: Forward part of stock that shooter holds to position bow

Safety: Lever or button to select fire or safe position of the trigger

Stock Butt Plate: Rear of stock that is held against the shooter's shoulder

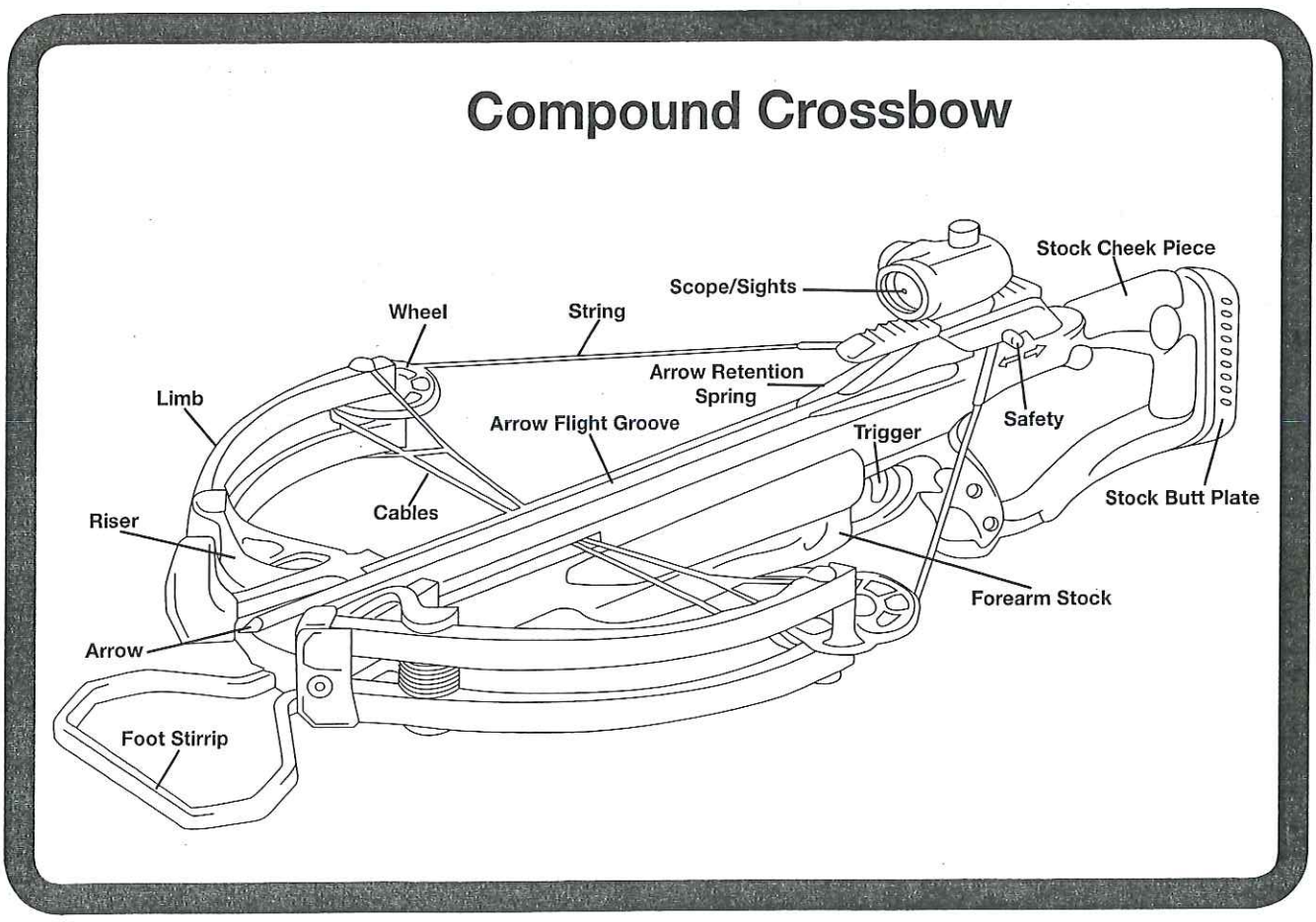
Riser: Section of bow that the limbs and barrel are connected

Arrow: Cylindrical shaft that has fletching and a nock at the rear and a point on the front

Crossbow Arrows

The term "crossbow bolt" is archaic and refers to a shorter dart-like projectile without fletching that was commonly used with ancient crossbows, and is currently used with some European tournament crossbows. While modern crossbow arrows are typically shorter than vertical bow arrows, they nevertheless, are arrows, not bolts.

Modern crossbow arrows average 18 to 20 inches in length and are mostly made of extruded aluminum or wrapped carbon fiber. The business end is fitted with a threaded insert that will accept a hunting broadhead or a practice or field point. The guidance end is fletched with plastic vanes or turkey feathers and is fitted with a capture, moon, flat or universal nock. Always use the type of arrows and nocks recommended by the manufacturer for your bow.



Cocking Devices

As the crossbow industry has grown, bow assemblies have become narrower and their draw weights have become heavier, increasing the importance of and need for cocking devices.

The most common cocking device is a simple rope-cocker, and probably every manufacturer sells one or more versions of rope-cockers. The standard version consists of a high-strength, synthetic cord. The rope-cocker reduces the amount of force required to pull a bowstring by 50 percent.

Follow the directions that came with your cocking rope so the rope is placed on the correct location of your bow. After placing the cocking rope on your bow, per the manufacturer's instructions, grasp the rope handles. Cock your bow by keeping both arms straight and stand up slowly while pulling on the cocking rope handles until the bowstring engages the string latch inside the trigger mechanism. With a little bit of practice, the rope cocker is very efficient and makes cocking heavy draw-weight models relatively easy.

There are versions of this type of cocking mechanism that use a cocking sled rather than pulley-hooks and some that draw the cords by means of a cranking mechanism, which may be integrated into the buttstock or attached to it. There are also gear-reduction cranking mechanisms that reduce the effort required to draw a bow to as little as five pounds.

Uncocking a Crossbow

It is necessary for the crossbow user to learn how to safely un-cock a crossbow. The safest and most common way to un-cock a crossbow is to fire a practice arrow into a rock-free, soft or sandy ground, or into a target.

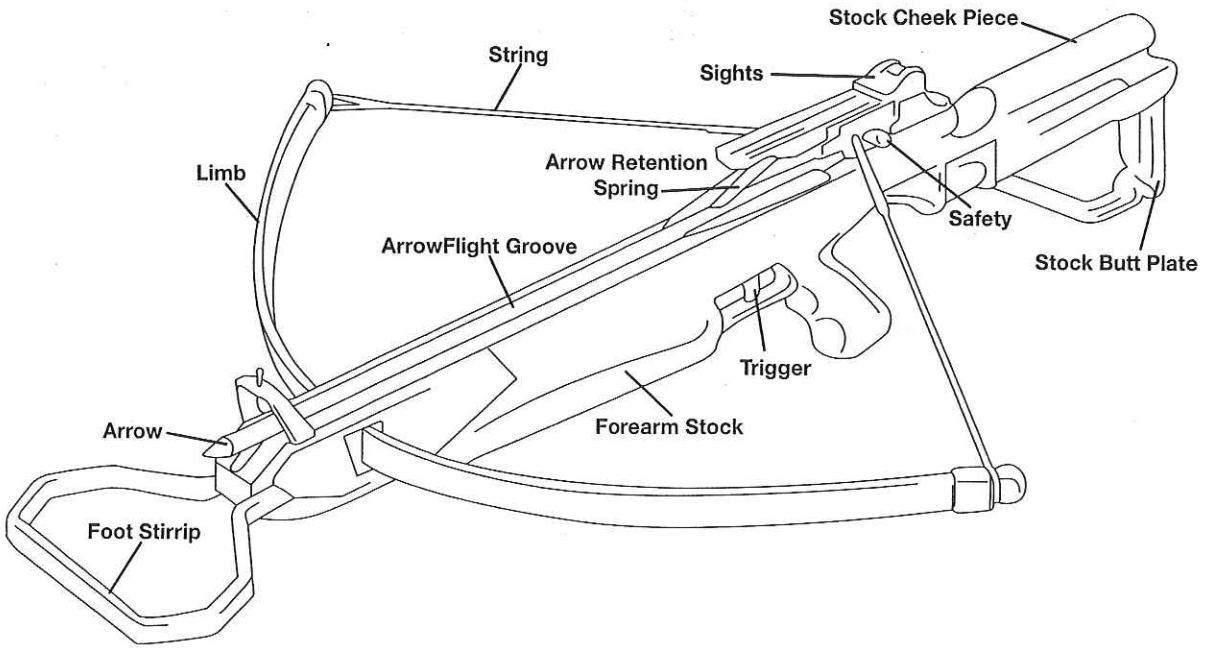
Bowhunting Safety

Bowhunting safety is mostly common sense. The basics closely parallel the basics of hunting safety, but a few additional precautions are specific to the equipment being used.

Always check the condition of your equipment before using it. Check the limbs of the bow for any signs of damage. Check the string to make sure it is sound and without frayed or broken strands (except for Flemish strings, a bowstring is really only one continuous strand of material, so a broken strand is a broken string). Check the nocks, points and fletching of each arrow to make sure they are not damaged. With wood, glass or graphite composite arrows, check the shafts for cracks, splits or other damage.

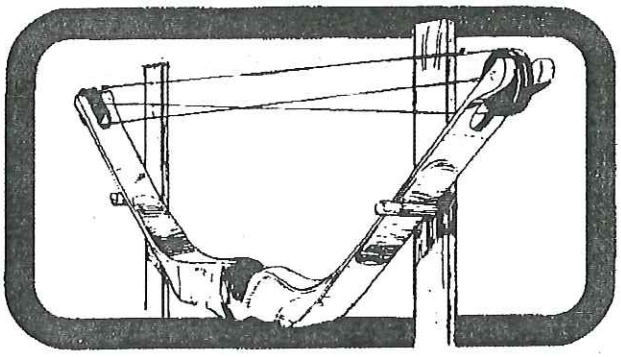
With all arrows, check the shafts for straightness and check the broadheads for proper alignment. Repair or discard any damaged equipment.

Recurve Crossbow



Make sure that only properly matched equipment that, meets manufacturer and AMO (Archery Manufacturers Organization) standards is used. Ultra-light arrows may cause the bow to behave as though it were being dry fired, a practice that may damage the bow or cause injury to either the shooter or others nearby. Arrows that are too light for the bow may bend or even shatter during the release. Remember that heavy broadheads may require a bit more spine in the shafts to stabilize them properly. Matching equipment is both a safety factor and an accuracy factor.

Keep arrows pointed in a safe direction at all times, either on or off the string. This includes having a quiver that adequately protects both the broadhead and the shooter from injury. Only quivers with a hood that completely covers the broadheads should be used. In addition, arrows should be kept in the quiver until placed on the string in immediate anticipation of a shot. An arrow carried in the hand can be dulled by contact with brush, twigs or grass stems; and it poses a threat to the archer and others nearby. Only draw or fire a bow when it is in safe operating condition, a properly matched arrow is nocked and the area is safe. Remember that the limbs move during the draw and the release, so check to make sure the area around the limbs is clear before shooting.



Make absolutely sure to identify your target and the complete flight path of the arrow before beginning to draw the bow. As a close range sport, bowhunting should never encounter a "mistaken for game" injury. Since even minor obstructions can deflect an arrow and turn an excellent shot into a terrible hit or a miss, bowhunters should pass any shot where twigs, grass stems or similar obstructions are present, waiting for a completely clear shot. In addition, the entire flight path of the arrow must be visible and safe in order to justify a shot. Skylined shots or similar ones where the arrow may go beyond the bowhunter's field of vision cannot be taken. Always make sure there is an adequate backstop in practice or in the field. An arrow is dangerous until it comes to a complete stop.

Never shoot an arrow straight up into the air. Falling back to earth the arrow regains its velocity and its small profile makes it almost impossible to see. Since the exact landing place of the arrow cannot be determined, this practice is extremely dangerous. Shooting at a high angle requires a substantial safety area except when limited flight arrows like flu-flus are used.

Exercise extreme care in field dressing bow-killed animals, particularly if the broadhead and arrow were not recovered intact. Bits of blade, broken pieces of shaft material or sharp bits of bone may remain in the body cavity or flesh causing injury during the field dressing process.

Store archery tackle safely. Keep equipment in a case or store them in a secure area. Bows should be stored horizontally, and arrows should be stored in an uncrowded vertical position. During the off season, sharp broadheads should be kept in a case or other secure storage to prevent damage to the blades or injury to people. Check the condition of your equipment when it is being put away and correct any problems at that time.

Treestand Safety

Treestands are commonly used by bowhunters, and they present several other considerations for bowhunting safety.

Use a Full Body Fall Arrest System (FBFAHS) – Always wear and properly use an FBFAHS that meets stringent industry standards recognized by TMA. Wear an FBFAHS every time you leave the ground, including while ascending or descending. Single strap belts and chest harnesses are no longer allowed and shall not be used. Failure to use an FBFAHS could result in serious injury and/or death.

Use your harness properly – Always attach your Full Body Fall Arrest Harness System (FBFAHS) in the manner and method described by the manufacturer. The FBFAHS tether should have no slack when sitting. Failure to do so may result in suspension without the ability to recover into the treestand. Be aware of the hazards associated with hanging suspended in a FBFAHS and the fact that prolonged suspension in a harness may be fatal.

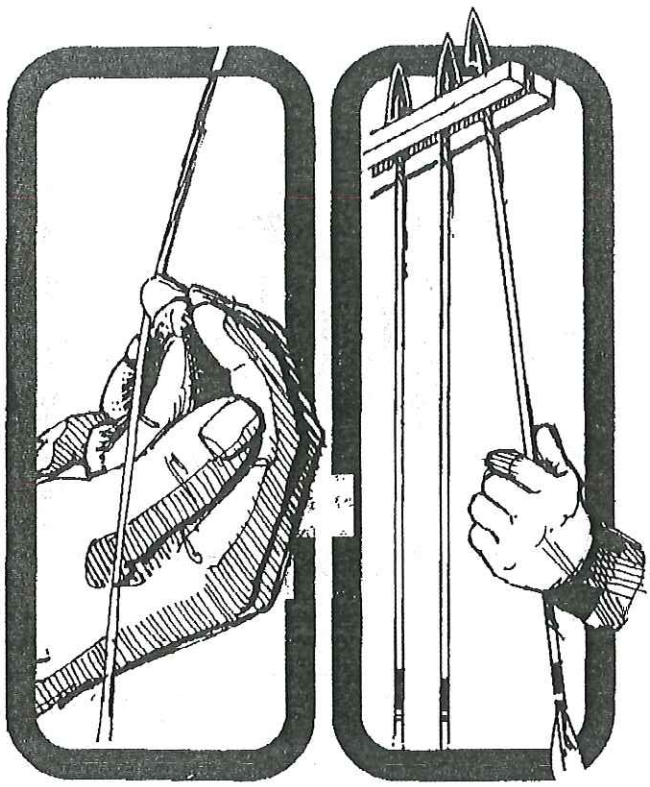
Read, understand and follow the instructions – Always read and understand the manufacturer's WARNINGS and INSTRUCTIONS before using a treestand and Full Body Fall Arrest Harness System (FBFAHS) each season. If you have any questions after reviewing the WARNINGS and INSTRUCTIONS, please contact the manufacturer. Maintain the WARNINGS and INSTRUCTIONS for later review as needed, for instructions on usage to anyone borrowing your stand or harness or to pass on when selling these items. Use all safety devices provided with your treestand. NEVER exceed the weight limit specified by the manufacturer.

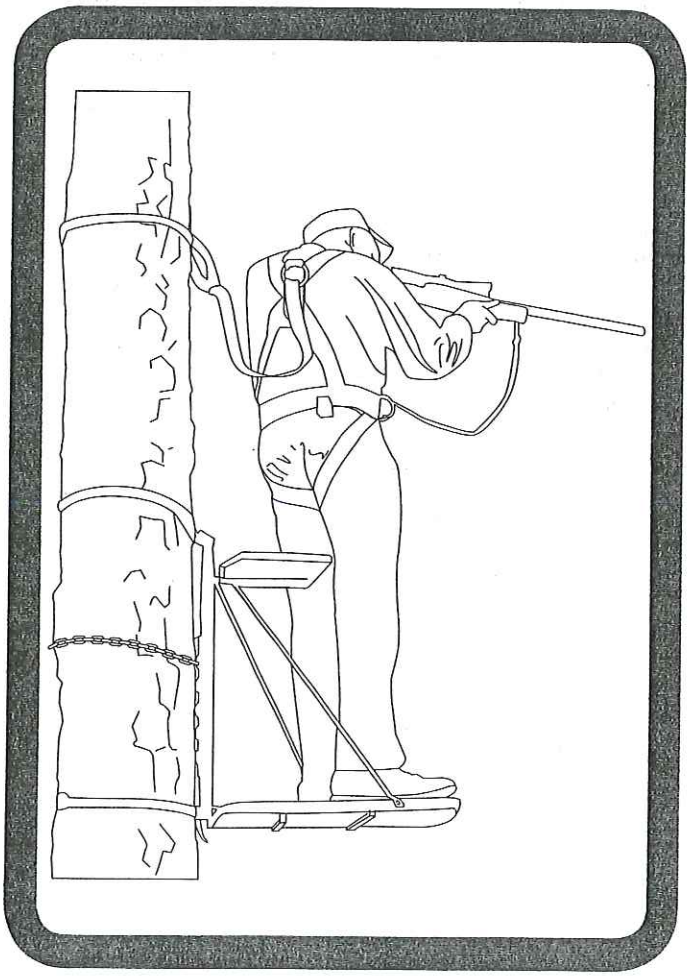
Use a haul line – Always use a haul line to raise your backpack, gear, unloaded firearm or bow to your treestand once you have reached your desired hunting height. Never climb with anything in your hands or on your back. Prior to descending, lower your equipment on the side of the tree opposite of your descent route.

Practice before hunting – Always practice using your Full Body Fall Arrest Harness System (FBFAHS) in the presence of a responsible adult prior to using it in an elevated hunting environment, and learn what it feels like to hang suspended in the harness at ground level. Practice installing and using your treestand at ground level and with a responsible adult present before you go hunting.

Have a plan for recovery/escape – Always have a plan in place for rescue, including the use of cell phones or signal devices that may be easily reached and used while suspended. If rescue personnel cannot be notified, you must have a plan for recovery/escape. If you have time to hang suspended for a period of time before help arrives, exercise your legs by pushing against the tree or doing any other form of continuous motion. Failure to recover in a timely manner could result in serious injury or death. If you do not have the ability to recover or escape, hunt from the ground.

Replace damaged or expired harness and stands – Always inspect the treestand and the Full Body Fall Arrest Harness System (FBFAHS) for signs of wear or damage before each use. Contact the manufacturer for replacement parts. Destroy all products that cannot be repaired by the manufacturer and parts that have





exceeded the recommended expiration date. Destroy products if the manufacturer no longer exists. The FBFAHS must be discarded and replaced after a fall has occurred.

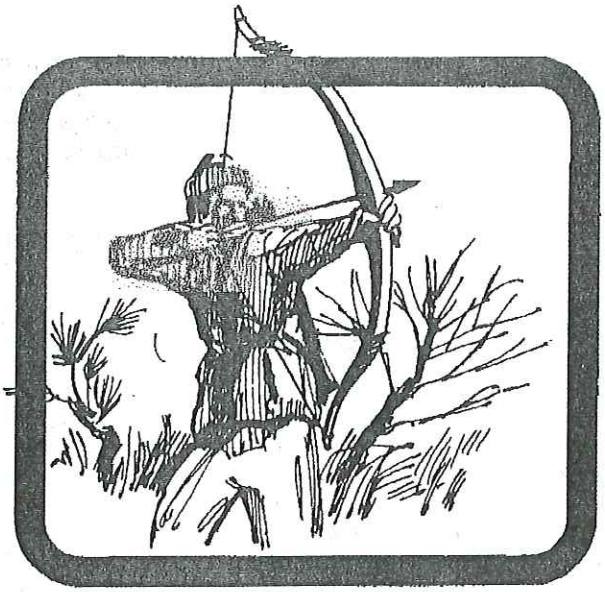
Be prepared ahead of time – Always let other know your exact hunting location, when you plan to return and who is with you before you go hunting. Hunt with a buddy – it's more enjoyable and you'll have someone to help if an emergency situation arises.

Carry emergency signal devices – Always carry emergency signal devices such as a cell phone, two-way radio, whistle, signal flare, PLD (personal locator device) and flashlight on your person at all times and within reach, even while you are suspended in your FBFAHS. Watch for changing weather conditions, In the event of an accident, remain calm and seek help immediately.

Select a safe tree – Always select the proper tree for use with your stand. Select a live, heathy and straight tree that is within the size limits recommended by the manufacturer. Never select a leaning tree. Never leave a treestand installed for more than two weeks since damage could result from changing weather conditions and/or from other factors not so obvious with a visual inspection.

Know your limits – Always know your physical limitations. Don't take chances. If you start thinking about how high you are, don't go any higher.

Don't rush-be safe – Never hurry! While climbing with a treestand, make slow, even movements of no more than ten to twelve inches at a time. Make sure you have



proper contact with the tree and/or treestand every time you move. When using any treestand with a ladder or steps, maintain three points of contact with each step. This means having two hands and one foot (or one hand and two feet) in contact at all times.

Only use certified equipment – Never make modifications to a purchased treestand without the manufacturer's written permission. Only purchase and use treestands and Full Body Fall Arrest Harness System (FBFAHS) that meet or exceed industry standards recognized by TMA. For a detailed list of products that are certified to industry standards recognized by TMA, contact the TMA office or refer to the TMA website at www.tmastand.com.

Game Recovery

If a hit is made, watch the animal until it disappears. Take a compass bearing on the spot where you last saw the animal and record the bearing and any details of the spot.
Then take careful note of the spot where the animal was standing when the shot was taken. If a heart-lung hit was made and weather is not threatening to hide the trail, wait about 30 minutes or an hour before climbing down. Use the time to review the shot, the hit and the animal's flight path. Lower your equipment to the ground and climb down. Try to spot the last place you have seen the animal from the ground, then collect your equipment and look for your arrow. Check the shot location for cut hair, blood or other signs, and check the arrow for damage or missing parts. If an arrow cannot be located assume a high hit.

Mark the hit location and begin to follow the trail carefully and staying slightly to one side of it. If a clear blood trail is present, the trailing may be easy; but high hits sometimes do not show any appreciable blood trail for some distance as the body cavity fills. Punch marks, disturbed leaves and similar signs can mark the trail for a careful and skilled tracker. Watch for blood on the ground, on stems, twigs or leaves along the trail and on any objects that had to be crossed. Take your time and work the trail carefully, marking it with toilet paper bits, engineer's tape or similar materials as needed. Keep watching for the animal as well as for signs, and expect it to be in the first patch of cover beyond the hit site. Trail the animal with your best stalking technique to avoid routing it if it should still be alive.

When the animal is sighted, pause to observe it. If it appears to be down and dead, cautiously approach it from the back side watching for chest movement or other signs of life. Shoot the animal through the chest again if necessary. It is better to make a couple more holes and risk a little tissue damage than to prolong a chase unnecessarily. If no life signs are observed, cautiously touch the animal's eye with a limb tip or arrow point, being sure to stay away from the hooves and antlers or horns. If no blink reflex is present the animal is ready to field dress.

If the animal is down but obviously alive, exercise extreme caution. Freeze where you first spot the animal and observe it. Determine if it is failing or alert. An alert animal probably is evidence that a relatively poor hit was made. Remember that any hit that penetrates the body cavity should be recoverable. If a clear and makeable shot is available at the heart-lung area, take it. Avoid taking shots at the head or neck. They are low percentage shots. If a good shot is not available, determine if you can work into a shooting position. If a shooting position is easily obtained, consider stalking to that position for a follow-up shot. If not, wait. Moving can cause the animal to bolt and make recovery more difficult. Withdrawing is as likely to cause the animal to move as is moving forward. Patience is on your side, so exercise it.

Patience is a virtue on poor quality hits as well. The animal will normally stop in the first good cover after being hit. If you do not route it from that cover, it will bed down until the arrow does its work. Even gut-shot animals should be recovered if you allow them about 8 to 12 hours before attempting the recovery. Remember to get experienced help if needed. Bowhunters are quick to help others when they need help to recover an animal.

When following up an animal at night (where it is legal), be sure to contact the local warden or conservation officer to prevent their being called out on a wild goose chase. Gasoline lanterns equipped with a shield provide excellent tracking and field dressing light. Headlamps with krypton bulbs are also useful. Just make sure that your equipment and activities are legal where you are hunting.

No bowhunter wants to wound an animal, and careful shot selection coupled with excellent marksmanship will minimize non-vital hits. Patience, persistence and caution, along with careful observation, will result in recovering almost every animal hit. Most of them will be found within about 300 to 600 yards of the spot where they were hit.
Careful selection of hunting conditions, like refusing to bowhunt in a driving rain, will account for most of the remainder. Non-vital hits usually heal quickly and completely because of the clean wound with minimal tissue damage caused by a sharp broadhead.