Safe use and Maintenance of Hand Tools

General Principles

• Know your limits – attempting to over exert yourself or a tool are equally likely to result in injury.

• The safe working distance for any tool that is swung is a minimum of two tool lengths.

• When felling, the safe working distance is two tree lengths.

• Better quality tools will enhance your ability to work. Poor quality tools will quickly become damaged, dangerous and frustrating to work with.

• Keep the sharp edges of tools protected when in transport, to protect their cutting edges as well as your hands. An old sock, a length of rag or even a cardboard sleeve will reduce the likelihood of blades becoming chipped or dented, undoing your sharpening efforts in the process!

• Do not leave tools lying about when not in use. Keep spare tools together in a tool bag or designated area and ensure no tools are left with their cutting edge uppermost (unless protected). Unsheathed bow saws must not be hung from tree branches. Lay flat on the ground.

• Never cut directly towards yourself, and avoid cutting into the ground. When sneddung (removing side branches from a stem) you should always cut from butt to tip (excludes saws). This gives a cleaner cut and helps prolong the sharpness of a blade. See Fig 1.

• All edged tools are safest when sharp.

• Gloves will only enhance your ability to work if they are good quality and a good fit. Otherwise they should be avoided when using any swung tool.
Tool overview

Bow saw blades come in two patterns – peg tooth and raker tooth. See Fig 2. The former is designed for dry (seasoned) wood and the latter for wet (green) wood. The 21” bow saw is best for coppicing and small stems up to around 5” dia. as it’s triangular frame affords better access to confined spaces. When sawing, avoid twisting the blade and pinching it in the wood as this will damage the set of the teeth and speedily blunt the blade. Blades for this type of saw cannot be re-sharpened and must be replaced when worn. When sawing, start with slow, steady strokes and try and use the full length of the blade so that it wears evenly. A blade that consistently cuts in a curve should be replaced.

Loppers and secateurs also come in two styles – bypass (like shears and scissors) and anvil. In the latter, over time the anvil will wear away but if your tools are from a reputable manufacturer this should be a replaceable part. An anvil blade may be sharpened on both sides, whereas a bypass blade is sharpened only on one side. The cutting capacity of loppers is based on a ‘rule of thumb’, where the thumb in question is that of the tool operator. Use your thumb as a gauge of the maximum thickness of stem you should attempt to sever with this tool. As a general guide, loppers should not be used on stems over 1¼” (32mm) and secateurs on stems over ¾” (18mm). Cutting nearest the base of the blade will give you the best result but at all times it is vital to ensure the tool is not twisted when cutting. If you find severing a stem is a struggle then it is probably too thick. Avoid cutting sere (dry/dead) wood and also cutting against the ground. Both of these are likely to blunt or damage the blade. Both loppers and secateurs struggle to sever stems at 90 degrees to the grain. Cutting at 45 degrees (angle measured between stem and tool handles) results in an easier cut. See Fig 3.
Axes and billhooks are incredible versatile tools in the hands of an experienced operator but mastering their subtleties deters many from attempting to become familiar with them. The poor quality tools available in recent years are almost entirely to blame for this but happily times are now changing. Either may be used in place of the bow saw/loppers combination commonly favoured by conservation volunteers and both are considerably more resilient, durable and easy to maintain than the alternatives.

With both tools it is vital that you select a weight you are comfortable with and, if you can, choose one with an unvarnished handle as this will absorb moisture and be less likely to slip from your grasp. Always cut from butt to tip to avoid jamming the tool in the wood and always cut away from you. When used for coppicing these tools should be swung so as to hit the target stem on an upward stroke, not downwards towards the ground. The two tool length safe working distance is particularly important with these tools, as is the need to ensure the tool has a clear path to swing through. Even the smallest twig could cause a deflection and potential injury. When not in use, you should not drive a blade into a tree stump or the ground, as both will swiftly blunt the edge. Lay flat in a designated ‘tool area’ and protect their edges with a sheath or other cover. Another good way to blunt these tools is by cutting wood that is covered with mud, or lying on the ground. For a billhook a single blade is the easiest pattern to master, whilst a caulked handle gives the most secure grip. See Fig 4. Ideally these tools are best used without gloves, but in some situations (warmth/thorns) they may be desirable. In this case it is particularly important to make sure that if the tool did fly out of your hand there would be no-one standing in the direction it travelled.

The Slasher is an effective tool for clearing non-woody growth such as brambles, bracken and willowherb, and can also be effective on woody material so long as it is not greater than about 1” (25mm) dia.
Slashers work primarily by being heavy, so a firm footing is essential to operate one safely. As with other edged tools their blades do not cut at their optimum when presented at 90 degrees to the material and a 45 degree cutting angle will always be more effective. Here there is an inevitable conflict between finding the best cutting angle and avoiding hitting the ground, so you should endeavour to start the swing low down and hit the stems you wish to cut on an upward stroke. See Fig 5. Whilst slashers can be very effective tools the difficulty of working with them effectively for prolonged periods (due to their weight) means that for bramble clearance a brushcutter (metal bladed power tool) is usually the more effective solution.

Scythes are another tool whose heyday had passed but are again gathering a following. Here too there has been a dearth of quality equipment in recent decades but modern scythes from countries where they are in current agricultural use are now available to buy in the UK. The scythe represents a huge subject in its own right – too broad to be covered by these notes. For those interested in exploring the scythe please use the contact details provided in the references section.

Do not confuse lighter grass cutting tools with heavier bladed weeding hooks. The former will be damaged by hitting woody material whilst the latter will not be sharp enough to cut grass.
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Figure 1: Snedding direction

"Butt" end of trunk
All axe/billhook cuts should swing from 'butt' to 'tip'.
Cut → this way.

"Tip" end of trunk.

Figure 2: Bow saw blade patterns

- Peg tooth, for dry/seasoned wood.
- Raker tooth, for wet/green wood.

Figure 3: Working with loppers

This angle enables the blade to exert a slicing cut, which is less effort both for the tool and the operator.

Figure 4: Caulked handle
Unvarnished handles are less slippery to hold.

Figure 5: Cutting on the upward stroke

Hazel stool

Bramble
Sharpening

- Tools must be sharpened according to their intended use. The delicate edge of a scythe blade would crumble and bend if used to sned coppice, whereas an exquisitely honed billhook would still make little impression if used on a meadow.
- When sharpening, always follow the existing bevel of the blade.
- Sharpening is something that can only improve with experience, so do not be afraid to experiment and make mistakes. Err on the side of caution and you are unlikely to make the situation worse – who knows, you might find you have made it better!
- Avoid using an electric grindstone as these can very easily overheat the metal and damage the tool.
- When sharpening you should always aim to be pushing the stone or file away from the cutting edge. Wear gloves if this is not possible.
- Chips and dents are best removed with a coarse cutting mill file. Files cut only on the push stroke. Pulling them across the tool will blunt them.
- Once filing has been completed you should proceed to hone the blade with a progression of sharpening stones. Stones must not be used dry, and will require either water or oil as a lubricant. Check with the manufacturer as to what is recommended.
- Work from a coarse grit to a finer grit, eg 150 grit, 240 grit, 320 grit etc. Skipping grits does not speed up the process.
- Sharpening stones are guided with a circular motion along the blade.
The following is intended as an indication to the level of sharpening required for each tool. It is based on my own experience and not on manufacturers’ guidance.

Bow saw – cannot be sharpened. Replace blade when dull.

Loppers – medium grit (240 – 320). If blade becomes chipped it should be replaced.

Secateurs – as loppers.

Axe – mill file, coarse grit, medium grit, to around 400 grit.

Billhook – as axe.

Slasher – mill file, coarse grit, to around 150 grit.

Scythe – fine file, medium grit, fine grit, to around 1000 grit.

**Sharpening equipment**

- Mill files (metal cutting) come graded as bastard cut, second cut and smooth cut.
- Sharpening stones come in three main types – oil stones, water stones and diamond stones. All require lubrication and must not be used dry. Their lubricant is in the name – diamond stones can be used with wither lubricant.
Where to buy tools and get more information

For billhooks there is currently only one maker worth mentioning – Morris of Dunsford
http://www.woodsmithstore.co.uk/shop/Products/Tools/Billhooks,%20Slashers%20and%20Grass%20Hooks/

Those who would like to get to grips with a quality scythe should look here http://www.thescytheshop.co.uk/ and possibly also here http://scytheassociation.org/courses/

The best quality bow saw blades are manufactured by Bahco. They also make loppers and can supply spare components for the tools in their professional range http://www.bahcostore.com/

Superior axes are made by Gransfors Bruks http://www.gransfors.com/htm_eng/index.html and also by Wetterlings http://www.woodsmithstore.co.uk/shop/Products/Tools/Axes/

Axminster Power Tools have a comprehensive range of gloves and other paraphernalia. They will also recommend suitable equipment if you phone them up.


Sharpening stones - http://www.axminster.co.uk/page/find/?name=sharpening%20stone&page=1

A general tool supplier for conservation work is The Conservation Volunteers (formerly known as BTCV). However please note they do not have the best quality for more specialist equipment such as scythes and billhooks. They are however good value for pretty much all other tools. http://shop.tcv.org.uk/shop/category?l=level2;lid=73

Think I’ve forgotten anything or looking for a recommendation? Then please contact me here alistairphillips@btinternet.com.