Pathfinder

BUSHCRAFT

Specialty

Resource Material

BUSHCRAFT
Specialty Activities

+ This activity has a camp out activity component.

B1+ Demonstate your ability to tie 10 of the following knots ans know their common use and limitations. Add these knots to your knot board.

Thumb Knot	Overhand knot
Square knot	Double overhand
Slippery hitch	Bow knot
Half hitch	Two half hitches
Lariat loop	Overhand bow
Cat's paw	Clove hitch
Blackwall hitch	Granny knot
Carrick bend	Fisherman's knot
Lark's head	

B2+ Demonstrate your ability to tie 10 of the following knots and know their common use and limitations. Add these knots to your knot board.

Stevedor's knot	Killick hitch
Sheet bend	Double sheet bend
Timber hitch	Sheep shank
Miller's knot	Running knot
Bowline	Bowline on bight
Hitching tie	Rolling hitch
Chain hitch	Taut-line hitch
Fisherman's bend	Halyard bend
Surgeon's knot	Marlinspike hitch
Midshipman's hitch	

B3+ Revise the square and diagonal lashings and know how to do a locking clove hitch to finish a a lashing.

B4+ Revise the sheer and continuous lashings and build an article of camp furniture using them.

B5+ Be able to estimate the height of a tree and the width of a stream.

B6+ Demonstrate your ability to tie the following knots: tape knot, figure 8, double figure 8, alpine butterfly, prussik and truckies hitch.

B7 Demonstrate your ability to care for ropes.

B8 Demonstrate your ability to finish a rope by doing whipping and a double crown knot.

B9 Demonstrate your ability to do a back splice, long splice and an eye splice.

B10+ Revise the safety rules for the use of an axe and a knife and demonstrate the correct method for sharpening them both.

B11+Demonstrate your ability to make a 2 metre piece of three strand twisted rope by hand from native materials.

B12+ Demonstrate two methods of water purification.

B13+ Attempt to start a fire with friction of flint or steel. Demonstrate your ability to start a fire on a rainy day or in the snow by using natural materials.

B14+ Construct one major project, eg bridge,tower etc.

B15+ Participate in a initiative game using bushcraft skills.

ACTIVITY B1

Demonstrate your ability to tie 10 of the following knots and know their common use and limitations. Add these knots to your knot board.

Thumb Knot	Overhand knot
Square knot	Double overhand
Slippery hitch	Bow knot
Half hitch	Two half hitches
Lariat loop	Overhand bow
Cat's paw	Clove hitch
Blackwall hitch	Granny knot
Carrick bend	Fisherman's knot
Lark's head	

OUTLINE

To have a good knowledge of knots and their uses is invaluable. On your camp-outs make camp furniture using the knots and lashings learned during the Specialty. Have each teen make a knot board showing the 10 knots he/she has learned.

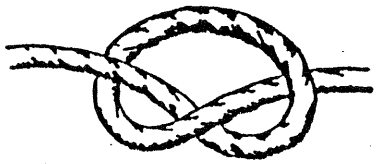
RESOURCE MATERIAL

Refer to Hand-outs Nos 1-5.

BUSHCRAFT

Bushcraft Hand-out 1.

Knots



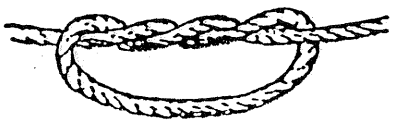
OVERHAND KNOT

The THUMB KNOT, also called the OVERHAND BEND and OPENHAND KNOT, ranks higher than the SHEET BEND in security but it is among the weakest of the bends. It is used to make a stop on a rope end, to prevent the end from fraying or to stop the rope from slipping through a sheave.

SQUARE KNOT

A SQUARE KNOT is tied by holding the two ends of the rope in the left and right hands. Place the left rope over the right and then the right rope over the left. It is one of the most common knots but is apt to slip considerably in the drawing up and occasionally spills and has to retied.

The OVERHAND KNOT may be put to the same use as the THUMB KNOT. It makes a better grip knot, and is easy to undo.



DOUBLE OVERHAND

The DOUBLE OVERHAND KNOT is called a BLOOD KNOT when used on a cat-o'-nine-tails, or the snapper of an ox whip. The JAM KNOT, the HALF HITCH, the FIGURE-EIGHT KNOT and the DOUBLE OVERHAND KNOT, are all first stuck through the eye and then tied around the standing part before being pushed forward and capsized around the neck of the hook. They are then drawn taut.

BUSHCRAFT

Bushcraft Hand-out 2.

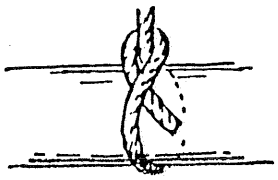
Knots

SLIPPERY HITCH

The SLIPPERY HITCH is also known as the SLIPPERING HITCH is very useful because of the ease with which it can be released in emergency. It holds securely so long as there is a strain on the standing end.

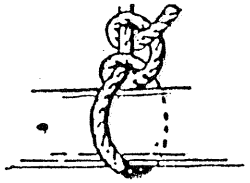
BOW KNOT

The ordinary BOW KNOT used by dressmakers, florists, confectioners, hatters etc., does not differ essentially from the necktie bow except that a ribbon usually has one right side, so that it is necessary, by twisting the ribbon, to keep that side uppermost at all times.



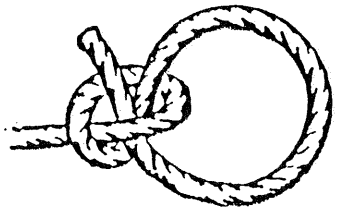
HALF HITCH

The HALF HITCH, tied with the nip at the top with the end leading back through the hook, is secure if it is carefully adjusted before each fresh hoist.



TWO HALF HITCHES

TWO HALF HITCHES - a quick way in which to tie the knot to a post is to first form a loose GRANNY KNOT, leaving a long end. As the ship swings she will take up the slack and the GRANNY will capsize into TWO HALF HITCHES.



LARIAT LOOP

THE LARIAT or LASSO NOOSE is made by reeving the end of the lariat through a HONDA KNOT.

BUSHCRAFT

Bushcraft Hand-out 3.

Knots

The BOWSTRING KNOT or HONDA KNOT appears to have been used by aborigines of several continents. It is the most compact and open of all loops. Mexican and American cowboys have adopted it for their lariats and call it the HONDA KNOT. The end may be either seized or knotted.

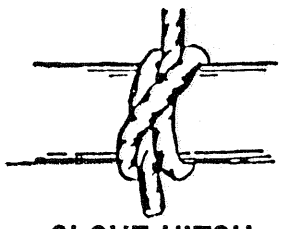
OVERHAND BOW

TWOFOLD OVERHAND BOW. In actual formation this is the same as a TWO-STRAND FULL MATTHEW WALKER KNOT but one of the two ends leads reversely. It is decorative and symmetrical.

CAT'S PAW

The CAT'S PAW is the common HOOK HITCH for slings. It is used for securing a rope to a hook or a spar. It is most useful because it is so easily tied and is the best of all sling hitches. It is often recommended for a slippery rope. The knot spills instantly when removed from the hook. It is the hitch always used for heavy lifts.

To tie the CAT'S PAW in cargo slings: Grasp two bights and hold them well apart. Twist three full turns with both hands (away from you), then clap the bights together and place them over the hook.



CLOVE HITCH

The CLOVE HITCH is used for a securing a rope to a spar. This hitch, if pulled taut, will not slip up or down on a smooth surface. A useful start for lashings.

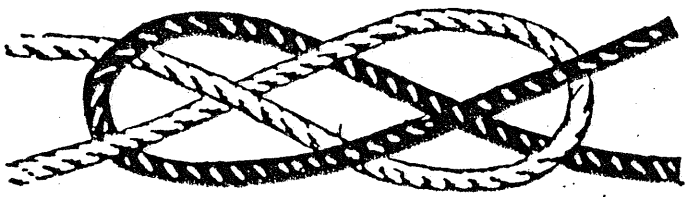
The BLACKWALL HITCH is a quick way to secure a rope to a hook. The strain on the standing end will hold the rope secure to the hook.

BUSHCRAFT

Bushcraft Hand-out 4.

BLACKWALL HITCH

GRANNY KNOT



DOUBLE CARRICK BEND

Knots

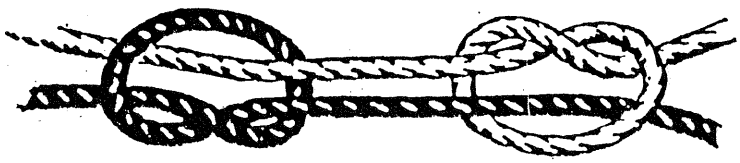
The DOUBLE BLACKWALL HITCH has one more turn and is often recommended as preferable to the former knot. It appears, however, to be even less reliable. The second turn is sometimes jammed below the first in the manner of the AWNING KNOT, but this appears to be no improvement.

The GRANNY KNOT is tied by holding one end of the rope in the left hand and one end in the right hand. Place the left rope over the right making an overhand knot and then place the left rope over the right again forming the knot. If one end of a GRANNY KNOT is pulled, the knot will capsize into TWO HALF HITCHES, which makes a better knot than the REEF KNOT.

The CARRICK BEND or FULL CARRICK BEND is for the secure fastening of two ropes of even thickness together. It is particularly suitable for hawsers and steel cables. It can be readily undone and does not jam, as do many other bends and knots. It may be tied flat for decorative purposes. If tied in needlework, so that all four ends are to be employed, it is called a JOSEPHINE KNOT. The drawing illustrates the CARRICK BEND with both ends on the same side of the knot, which is less secure than the same knot formation with the ends diagonally opposite each other.

BUSHCRAFT

Bushcraft Hand-out 5.

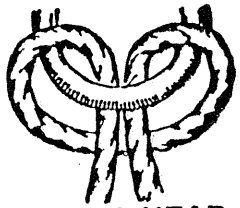


FISHERMAN'S KNOT

Knots

The FISHERMAN'S KNOT is used for joining two springy materials together; suitable for wire, fishing gut or vines. Two thumb knots (one on each rope) pulled tight. The knots lock together.

The LARK'S HEAD is an easy method of securing a rope to a ring or hook. If desired to make more secure, it can be stoppered, as shown, with an overhand or thumb knot.



LARK'S HEAD

ACTIVITY B2

Demonstrate your ability to tie 10 of the following knots and know their common use and limitations. Add these knots to your knot board.

- Stevedor's knot
- Sheet Bend
- Timber hitch
- Miller's knot
- Bowline
- Hitching tie
- Chain hitch
- Fisherman's Bend
- Halyard bend
- Marlinspike hitch
- Killick hitch
- Double sheet bend
- Sheep shank
- Running knot
- Bowline on bight
- Rolling hitch
- Taut-line hitch
- Midshipman's hitch
- Surgeon's knot

OUTLINE

"The ability to join two pieces of natural material together and so increase their length gives man the ability to make quite complicated constructions in the bush, or indeed anywhere.

Sailors were always the leaders in the tying of knots because for them it was necessary to tie securely but also to be able to untie rapidly, often in the dark and in appalling weather with rain-tightened ropes.

In bushcraft work probably half a dozen knots would suffice. But, once started, knot tying can become fascinating for itself.

Knots and lashings take the place of nails for much bushwork. A brief description is given of the uses of the various knots." Australian Bushcraft pg 43.

To have a good knowledge of knots and their uses is invaluable. On your camp-outs make camp furniture using the knots and lashings learned during the Specialty. Have each teen make a knot board showing the 10 knots he/she has learned.

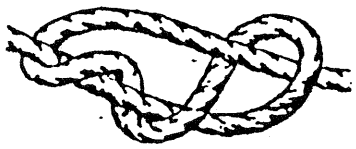
RESOURCE MATERIAL

Refer to Hand-outs Nos 6-10.

BUSHCRAFT

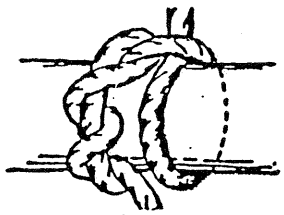
Bushcraft Hand-out 6

Knots



STEVEDORE'S KNOT

THE STEVEDORE KNOT is a SINGLE-STRAND KNOT tied in the end of a rope to prevent unreeving.



KILLICK HITCH

A KILLEG HITCH, also spelled and pronounced KELLIG, KELLAGH, KELLICK, KILLOCK AND KILLICK, consists of a TIMBER HITCH AND HALF HITCH that are drawn closely together around stone. In its stricter application a killeg is a stone-weighted wood anchor, while a stone used alone as an anchor is called a slingston and is used on rocky bottom where an anchor is apt to foul. It is employed in anchoring seines, lobster, crab and eel pots, small boat decoys, etc.

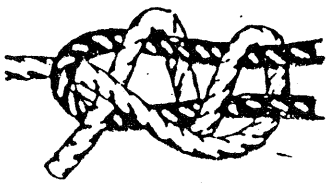
SHEET BEND

THE SHEET BEND is the common general utility bend aboard ship. It was formerly tied in a sheet which is a piece of running rigging that rims a sail, and this accounts for the origin of the name. It serves almost every purpose well, and unties readily without damaging the rope. It is always tied in the manner that has been described for the BOWLINE KNOT which is a LOOP KNOT of similar formation. But instead of tying an end to its own bight, one end is tied to a bight in another end.

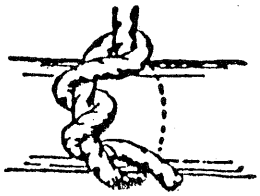
THE SHEET BEND bears a number of other titles including THE BEND, SIMPLE BEND, ORDINARY BEND, COMMON BEND, SINGLE BEND. It is also called, in error, BECKET BEND. But a becket in this case is an EYE SPLICE and the knot resulting is a hitch which at sea is called a BECKET HITCH. The SHEET BEND is used to join or bend two ropes of unequal thickness together. The thicker rope is the bend.

BUSHCRAFT

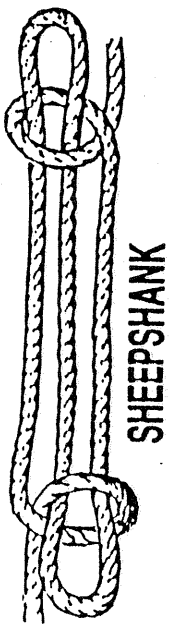
Bushcraft Hand-out 7.



SHEET BEND DOUBLE



TIMBER HITCH



SHEEPSHANK

MILLER'S KNOT

Knots

THE DOUBLE SHEET BEND is similar to single sheet bend, but gives greater security; it is also useful for joining wet ropes.

THE DOUBLE SHEET BEND is sometimes tied by another method. It may be more quickly made in this way, since it has one less tuck.

THE TIMBER HITCH is good for securing a rope to squared timber, round logs, etc. A good starting knot for all lashings. The standing end must pull straight through the loop, not backwards, or the rope may cut upon itself.

There are two practical ways of tying the SHEEPSHANK KNOT. The slack in the rope may be laid out on deck in three parallel parts, forming two bights. A HALF hitch is formed in the standing part and placed over the end of one of the bights. Then the other bight is treated likewise. This is the preferred way for large rope.

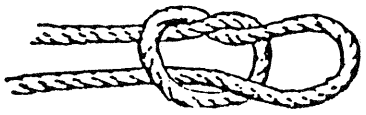
In light rope the three parallel parts of the SHEEPSHANK KNOT are laid out as before, the upper bight is grasped in the right hand, laid across the standing part of the rope and then given a turn which picks up a hitch exactly in the same way that is employed in tying a BOWLINE KNOT. this is repeated with the lower end.

The MILLER'S KNOT is a fairly good BINDING KNOT that is often given in farm bulletins. Any MILLER'S KNOT may employ a bight or loop for the final tuck instead of an end. This makes SLIP KNOTS of them and saves the bag from being damaged when the cord is being cut. It is a fairly good knot for a bag, being simple to tie, but is sometimes capsizes.

BUSHCRAFT

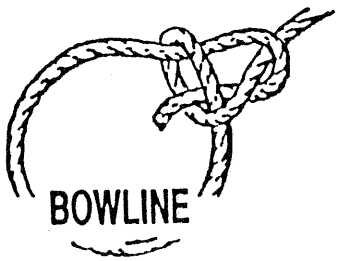
Bushcraft Hand-out 8.

Knots



RUNNING KNOT

A DOUBLE RING or TAG KNOT, also called DOUBLE RUNNING KNOT, is used by lobster and crab men around their pots. As it has no ends, its security is never in question. It is an exceedingly practical knot that is commonly tied in hand.



BOWLINE

The BOWLINE, BOWLING or BOLIN KNOT, sometimes called BOWLING'S KNOT. The name is derived from bow line, a rope that holds the weather leech of a square sail forward and prevents the sail from being taken aback. As the line or rope that provided the knot is no longer in use, the BOWLINE KNOT is nowadays merely termed the "BOWLINE" the word "knot" being dropped.

A BOWLINE is used to form a loop that will not slip on a rope end.

To tie a BOWLINE: Grasp the end of a rope in the right hand and the standing part in the left hand. Cross the end of the rope over the standing part in the left hand, and with a turn of the right wrist put a single hitch around the rope end. Without shifting the grip of the right hand, pass the end of the rope to the left under the standing part, then down through the hitch that was first formed.

BOWLINE ON BIGHT

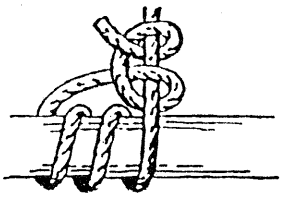
If a BOWLINE is to be towed through the water, a second HALF HITCH may be added. Wet knots are apt to jam, and the extra hitch lessens this tendency.

The BOWLINE with a BIGHT is used to make a double loop that will not slip on a rope end. Also called a BOSUN'S CHAIR.

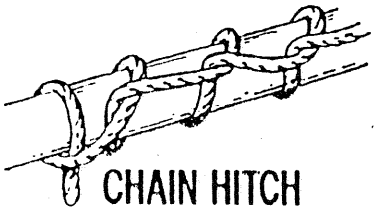
BUSHCRAFT

Bushcraft Hand-out 9.

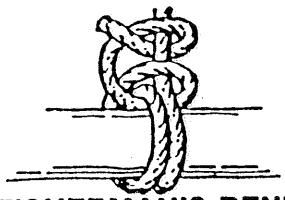
HITCHING TIE



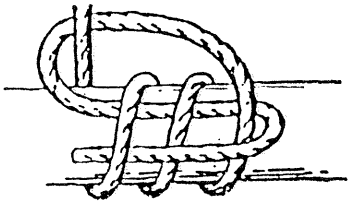
ROLLING HITCH



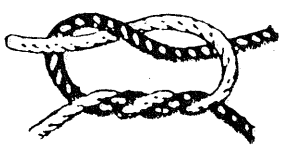
CHAIN HITCH



FISHERMAN'S BEND



HALYARD BEND



SURGEON'S KNOT

Knots

The HITCHED LOOP is a secure knot sometimes seen in a chest lashing. A LOOP KNOT or an EYE SPLICE is tied in one end, the other end is rove through the eye, and after it has been drawn up to the required taughtness, a SINGLE HITCH is made with the end around the eye in the manner shown in the illustration.

The ROLLING HITCH is used to fasten a rope to a spar. This is a very secure fastening.

The ROLLING HITCH formerly called MAGNUS and MAGNER'S HITCH, is simple to tie and the most reliable single knot under a lengthwise pull. It should be made and loaded carefully. This is the way the turns should be taken in bending to a spar.

CHAIN KNOT When a rope is too long for its purpose one means of shortening it is the chain knot. Remember to put a marlinspike or toggle through the last link before you put a strain on the rope.

The FISHERMAN'S BEND is an ANCHOR HITCH. It is strong and will not jam. It is used on running rigging when it is not necessary for the hitch to spill on removal.

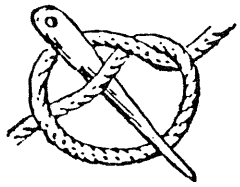
The STUDDING-SAIL HALYARD BEND and the TOPSAIL HALYARD BEND are YARD HITCHES.

The LIGATURE KNOT is commonly called by laymen the SURGEON'S KNOT. But surgeons do not speak of the "SURGEON'S KNOT" any more than a sailor would speak of a "SAILOR'S KNOT".

BUSHCRAFT

Bushcraft Hand-out 10.

Knots



MARLINSPIKE HITCH

The MARLINSPIKE HITCH is used for the hook of a tackle, to any rope where a smart pull is required. If tied loosely, the MARLINSPIKE HITCH will generally draw up to have a double bearing. In this form it is secure and easy to loosen. Also known as MARLINGSPIKE HITCH.

The MIDSHIPMAN'S HITCH is an old-fashioned hitch often used to fasten a block or sheave to a rope's end.

MIDSHIPMAN'S HITCH

ACTIVITY B3

Revise the square and diagonal lashings and know how to do a locking clove hitch to finish a lashing.

OUTLINE

The teens have been learning lashings since the Companion class but many will be "rusty" on the proper procedure. Refer to the hand-outs for some ideas on camp furniture - making the furniture makes learning the lashings more enjoyable.

RESOURCE MATERIAL

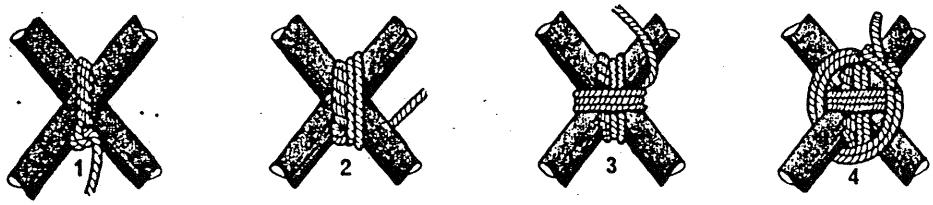
Refer to Hand-outs Nos 11 - 12.

BUSHCRAFT

Bushcraft Hand-out 12.

DIAGONAL LASHING

This is used to "spring" two spars together, that is, to lash together two spars which tend to spring apart and which do not touch where they cross. The lashing is started with a timber hitch around both spars. The timber hitch is tightened so as to bring the two spars together. Three or four turns of the lashing are then taken around one fork and three or four turns around the other fork. Two frapping (tightening) turns are taken about the lashing at the point where the spars cross and the lashing is finished off with a clove hitch around the most convenient spar.

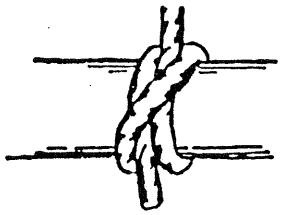


BUSHCRAFT

Bushcraft Hand-out 11.

CLOVE HITCH

As the name suggests this knot is used to fasten the end of a rope to a pole or fixed object and is used for commencing and ending the square lashing. Pass the rope around the pole so that the end with which you are working passes under the standing part. Pass the rope around the pole a second time, above the standing part, making a turn that brings the end through the loop in the opposite direction from the standing part.

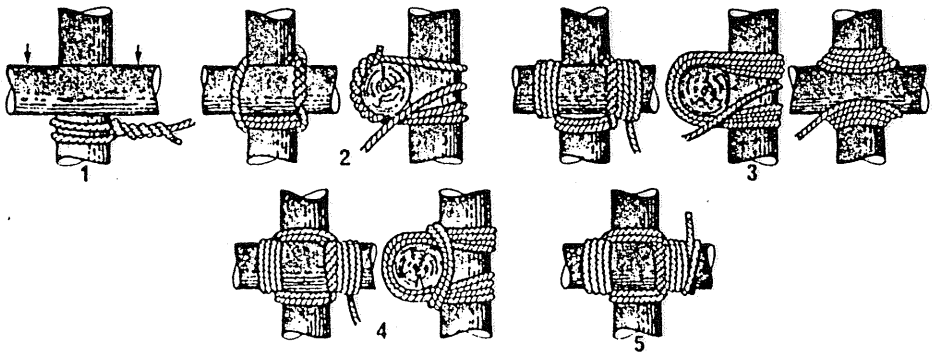


CLOVE HITCH

SQUARE LASHING

This is used whenever spars cross at an angle, touching each other where they cross. It is started with a clove hitch around the upright spar immediately under the spot where the cross piece is to be. Twist the end of the rope into the standing part then "wrap" the rope around the cross piece and upright binding them together.

In wrapping, rope goes outside the previous turn around the cross piece and inside the previous turn around the upright. After three or four right wrapping turns make two "frapping" turns between the timbers. Strain them tightly. Finish with a clove hitch around end of cross piece. Remember: "Start with a clove, wrap thrice, frap twice, end with a clove."



ACTIVITY B4

Revise the sheer and continuous lashings and build an article of camp furniture using them.

OUTLINE

The teens have been learning lashings since the Companion class but many will be "rusty" on the proper procedure. Refer to the hand-outs for some ideas on camp furniture - making the furniture makes learning the lashings more enjoyable.

RESOURCE MATERIAL

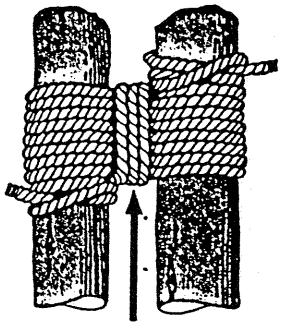
Refer to Hand-outs Nos 13 - 14.

BUSHCRAFT

Bushcraft Hand-out 13.

SHEER LASHING

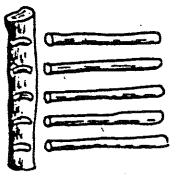
Also known as Round lashing it is used for binding parallel spars together and for forming "sheer legs" which support bridged and the like. Place the two timbers next to each other. Tie a clove hitch around one of them at appropriate place form the top. Bind the two timbers together by laying seven or eight turns of the rope around them, one turn beside the other. Make two frapping turns around the lashing turns between the timbers. Fasten rope with a clove hitch around the second timber. Open out the timbers.
NOTE: two sheer lashings without frappings are used to lash two timbers into one long one.

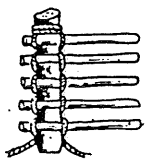


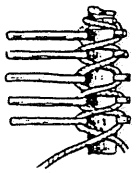
Frapping

CONTINUOUS LASHING

Continuous lashing holds small sticks at right angles to long sticks and is useful in making table tops, seats, etc.. Follow these steps in laying a table top.
a. Cut sticks to desired size and trim ends. Next, notch the frame and place the crosspieces in correct position.
b. Make clove hitch on the frame, in middle of the rope, with knot underneath and ends out to sides. There should be equal lengths of rope on either side of the long stick. The hitch should be placed so that the ends of the rope pull the knot tight as they come up from under the long stick.
c. With one end in each hand, pull rope over one crosspiece and down under frame.
d. Cross rope, making an X. Pull rope tight.
e. Bring up and over second crosspiece. Repeat this procedure until all the crosspieces are lashed.
f. End with two half hitches or clove hitch and tuck ends of rope under last small stick.



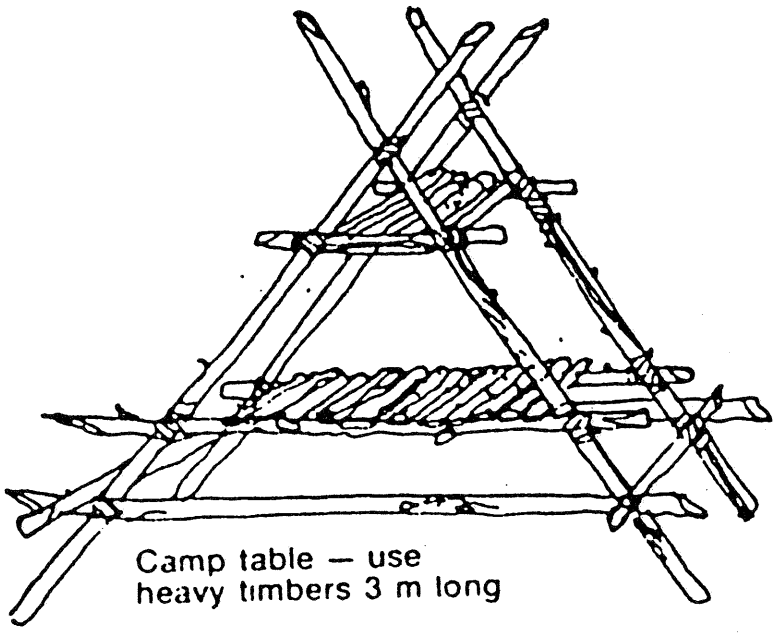




BUSHCRAFT

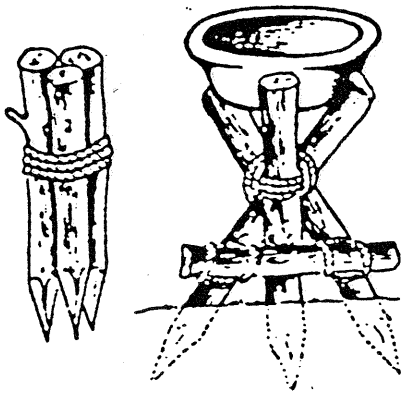
Bushcraft Hand-out 14.

CAMP FURNITURE

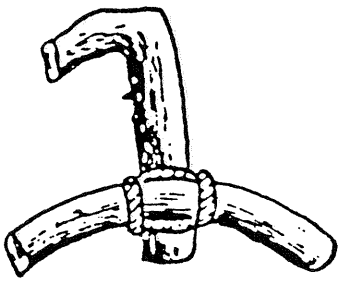


Camp table — use heavy timbers 3 m long

Camp Basin



Coat Hanger



ACTIVITY B5

Be able to estimate the height of a tree and the width of a stream.

OUTLINE

How high is that cliff? How wide is that creek? How far off the ground is that branch? How far apart are those tress? How far away is that hill? These are a few of the questions that you might want to answer while you are on your activities. The way to find the answer is not to guess, but to use known measurements to compare and estimate distance and height. Learn your own personal measurements - height, handspan, length of arm, foot, finger, reach. Know the length of your normal walking pace. Fix these lengths in your mind.

RESOURCE MATERIAL

How High

There are several ways to measure the height of a tree or flagpole etc..

1. Jumping Thumb. Using a Teen who knows his/her exact height, have him/her stand against the bottom of the tree you want to measure. Back off a convenient distance and hold a stick upright at arms length. Sight so that the end of the stick seems to touch the Teen's head. Put your thumb where his/her feet come. Holding the stick tight, move it up until your thumb comes in line with the Teen's head. Notice where the tip of the stick comes on the tree now, and holding the stick firmly, jump your thumb up again to this point. Count how many times you can measure the Teen's height on the tree. Multiply this number by the Teen's height and you have the height of the tree.

2. Falling Tree. Hold a stick at arms length and stand back far enough so that you can sight the entire tree on the stick, the top of the stick at the top of the tree and your thumb at the bottom of the tree. Holding your thumb in line with the bottom of the tree, tip the stick over sideways as if the tree was falling down. Notice where the end of the stick is on the ground or have a friend stand in line with the end of the stick. The distance from your friend to the foot of the tree is the height of the tree.

How Far and Wide

Select a site on the opposite bank A and then drive a stake on the near bank B. Walk at right angles for a known number of paces and then put another marker stake C and continue an equal number of paces and put in a third marker D.

Turn at right angles away from the river and keep moving back until the centre marker stake and the mark on the other side are in line at E.

Measure the distance from the third or last marker peg D to this point E and this distance will equal that of the width of the river crossing.

Refer to Hand-outs 15 and 15B for diagrams.

BUSHCRAFT

Bushcraft Hand-out 15.

To help you judge distances, memorise your own measurements:

My height is _____cms

My handspan is _____cms

The length of my arm is _____cms

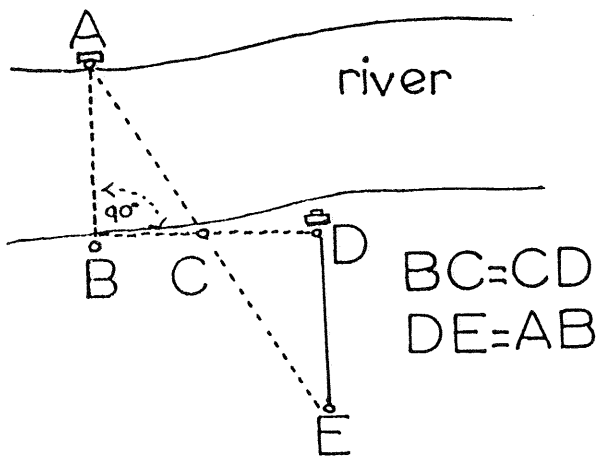
The length of my foot is _____cms

The length of my finger is _____cms

My reach length is _____cms

The length of my normal walking pace is _____cms

Method of measuring the distance across a river



Method of measuring the distance across a river or ravine.

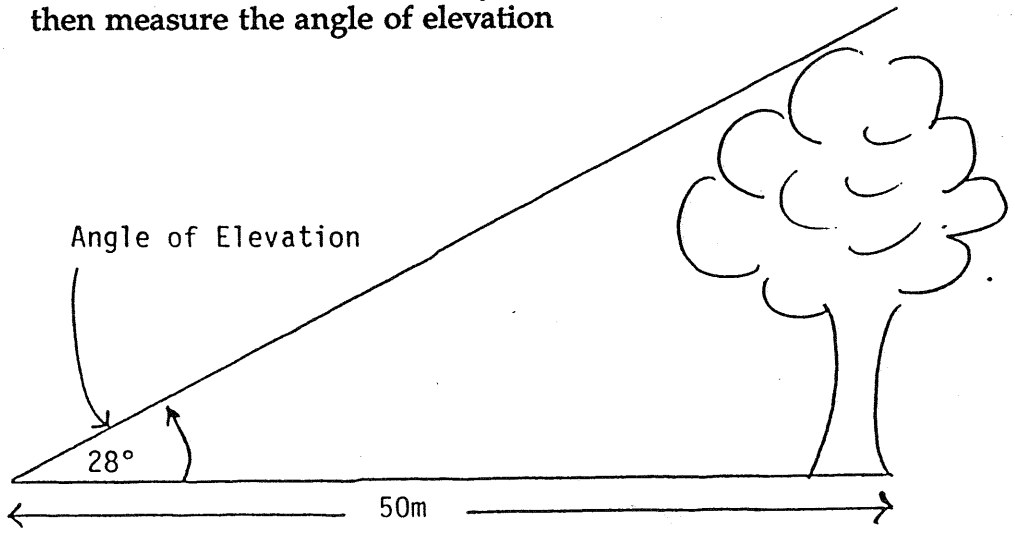
BUSHCRAFT

Bushcraft Hand-out 15B.

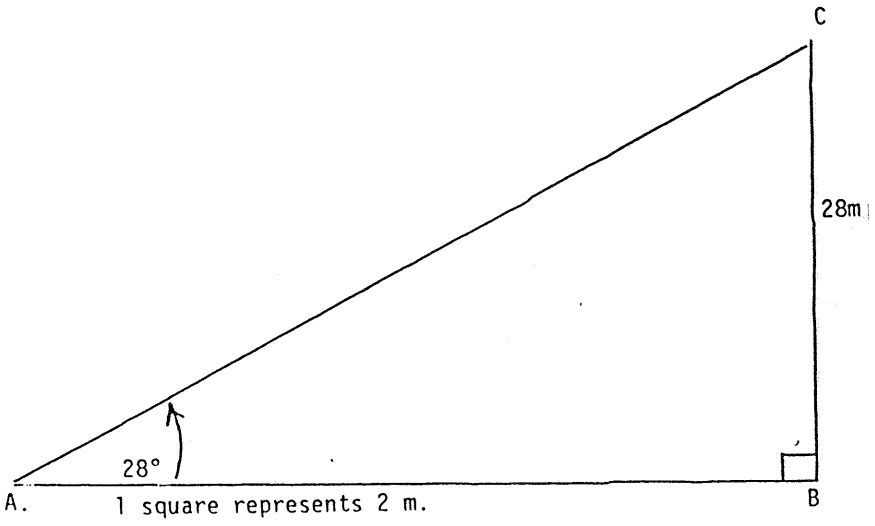
Finding the Height of a Tree

If you want to find the height of a tree, you need to use the measurements as shown:

measure the distance between yourself and and three
then measure the angle of elevation



Now transfer this onto graph paper.



If 1 square represents 2 m, then 50 m is 25 squares.
Draw the line AB 25 squares long.
Measure the 28° with your protractor and draw the line AC to connect the line BC.
Note CB is a right angle.
The height of BC is 14 squares, which is 28m.
Therefore the tree is 29 metres high.

ACTIVITY B6

Demonstrate your ability to tie the following knots: tape knot, figure 8 knot, double figure 8 knot, alpine butterfly, prussik knot and truckies hitch.

OUTLINE

To have a good knowledge of knots and their uses is invaluable. On your camp-outs make camp furniture using the knots and lashings learned during the Specialty.

RESOURCE MATERIAL

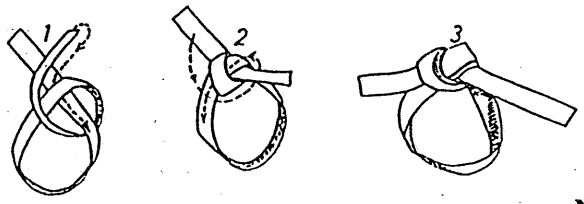
Refer to Hand-out Nos 16 - 17

BUSHCRAFT

Bushcraft Hand-out 16.

TAPE

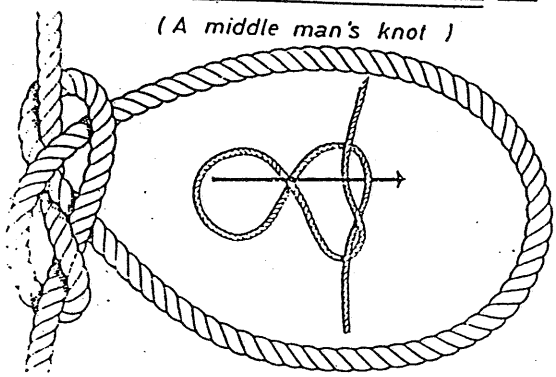
Breaking strain of tape reduced by 30%



ALPINE BUTTERFLY

(A middle man's knot)

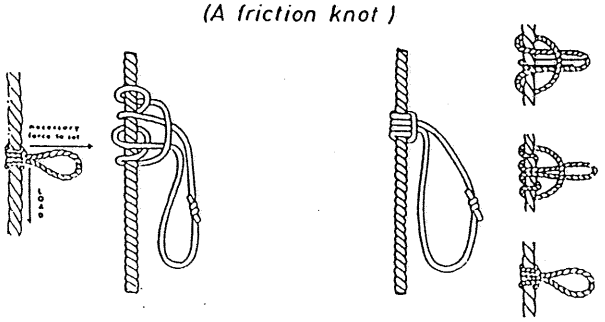
Non-slip loop in middle section of a rope



PRUSSIK

(A friction knot)

Slides up and down the rope when unloaded; grips under load



BUSHCRAFT

Bushcraft Hand-out 17.

The TRUCKIES HITCH is used for tightening a length of rope to secure the load eg trucks and wagons. As is shown it relies on two HALF HITCHES to secure the top end of the hitch.

The FIGURE EIGHT KNOT has a single rim part, which passes completely around the neck and it has another single part at the top which nips the end. The OYSTERMAN'S STOPPER has three parts around the rim and one part at the top which nips the end. This suggests a knot, between the two rim parts, and with the end nipped by a single top part.

DOUBLE FIGURE EIGHT KNOT

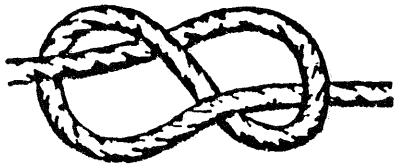


FIGURE EIGHT KNOT

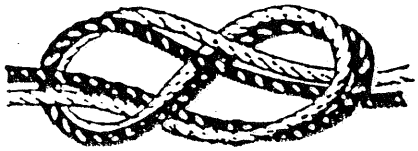


FIGURE EIGHT DOUBLE

ACTIVITY B7

Demonstrate your ability to care for ropes.

OUTLINE

Make this a very practical activity showing the teens some examples of worn or uncared for ropes. Stress the importance of care and storage of ropes.

RESOURCE MATERIAL

1. CHEMICALS

Don't store ropes near acids or alkalis. Both acids and alkalis will quickly corrode and destroy your rope.

You don't have to own the whitest rope in the district, particularly when bleach will break down the small fibres inside your rope reducing the strength of it.

Petrol is very destructive to the fibre of your rope, and alkalis which you find in harsh soaps will also destroy delicate fibres.

2. NEVER STAND ON THE ROPE

When you stand on a rope you grind sand and grit into it. This produces internal abrasion. Now that's the fastest way to destroy a rope.

If the rope is suddenly pulled and you are standing on the cliff face, you could easily be pulled over with the rope so for your own safety, never stand on ropes.

3. KEEP YOUR ROPES CLEAN

General care of a sisal or hemp rope will keep it clean. It is not recommended to wash these ropes as the fibres inside may not dry properly and the ropes will rot. If these ropes get wet at any time, it is important to ensure they are thoroughly dry before storing.

It is recommended to regularly wash the acrylic ropes used for abseiling and rock climbing because the small pieces of grit get into the internal fibres of the rope and break them. This greatly reduces the strength of the rope as 80% of the strength is in these internal fibres.

Don't put ropes into washing machines if they are four chained because it could damage your washing machine. You can wash them with two chains, this doesn't harm your machine at all. However, it is always preferable to hand wash your rope.

What do you use for washing your rope? Are you going to use soft detergent or are you going to use nice natural soap? Both can be used, however detergent is recommended because it keeps small particles in suspension. It is an artificial substance which has an active envoy which soap doesn't have.

4. AVOID HIGH TEMPERATURES

Remembering that some of the ropes we use now, such as those we use for abseiling and rock climbing, are synthetic and therefore are affected by extremes in temperature. Don't store ropes in high temperatures. For example, if you store them in the back of the car, they may get extremely hot. If your ropes are hot, wait until they cool before you use them.

5. NEVER OVERLOAD YOUR ROPES

Ropes are strong, but you should never overload the tensile strength of the ropes.

Say we have a situation where a car is bogged and we tow the car out with the abseil rope. We should never use that rope again for abseiling.

ACTIVITY B8

Demonstrate your ability to finish a rope by doing whipping and a double crown knot.

OUTLINE

A sisal rope will fray unless it is finished off properly. In this activity the teens will learn the principles of whipping and how to go about it.

RESOURCE MATERIAL

If you examine a rope you can unravel it until you have the separate fibres (See Hand-out Sheet No 18. Fig. 1A). These are twisted together to form yarns (Fig. 1B). The yarns are twisted together to form strands (Fig 1C). Most rope is made of three strands twisted together right-handed (Fig 1D.). As you look along the rope, the strands twist away from you to the right. The direction of the twist is called the **lay** of the rope. If the strands are laid up right-handed, the yarns in each strand will be laid up left-handed. It is these two twists in opposition to each other that keep the rope in shape. Braided rope consists of the yarns plaited together around a heart made of other yarns, laid straight (Fig 1E).

When a rope is cut, it very soon unlays itself, and you may have a foot or so of untidy wasted yarns. The end of every rope should be prevented from unlaying, and the simplest way of doing this is to put on a **whipping** (Fig 1G). It is best to put on two temporary whippings before even cutting the rope. With expensive material such as dacron, which soon unlays, this is most important. Cut ends of dacron and nylon can be prevented from unlaying by heating with a flame so that the material melts and rune together. However, a whipping is still desirable, and is essential with the other materials.

As with knots, there are a great many whippings. Not more than three will serve most people. For normal ropes, stout thread is thick enough for whippings. The type sold as **sail twine** is suitable, although coloured carpet thread is attractive. The thread is helped to stay put and is waterproofed if it is drawn through a piece of beeswax or a candle before use.

To make a **common whipping,** put a short length of the line along the rope towards the end and put some tight turns over it (See Hand-out No 18. Fig 1G). Continue until the whipping is almost as long as the thickness of the rope, then double back the end (Fig 1H). Put on another three turns and pass the working end through the little loop (Fig 1I). Pull projecting end so as to draw both parts under the turns, then cut off the surplus line (Fig 1J).

6. AVOID HEAT FRICTION - ABSEIL SLOWLY

Excessive friction overheats ropes. Remember that all the energy your body has at the top of the cliff, due to gravity, is all dissipated as you come down. It has to go into something so it goes into your descender and then is transferred to the rope. This excessive heat damages the rope.

7. AVOID KINKS AND KNOTS IN ROPES

When you are storing your ropes, untie all knots and kinks so there is not a constant strain on the rope. Remember when coiling the rope give it a quarter of a twist to avoid extra kinks developing.

8. STORE AWAY FROM DIRECT SUNLIGHT

This isn't a major factor because the ropes that we use today are made to withstand the ultra violet rays from the sun. However, it is a good practise not to keep the ropes in the sun because they are susceptible to heat.

9. PADDED POINTS OF ABRASION

It is very important to protect your rope from abrasive surfaces. If you are using your ropes in an area where they might be rubbed against rocks or if there is movement from side to side or up and down then it is wise to use rope protectors. These are available and are a cheap way of preserving your expensive ropes. Old pieces of carpet can be very effective also when placed under the ropes.

10. REVERSE ROPE FOR EQUAL WEAR

So that you evenly wear the rope, change from end to end, use the middles, even take it up a metre at a time so that you are using all parts of the rope instead of only one section.

11. NEVER SHOCK LOAD YOUR ROPE

What is meant by this is to never put excessive weight on your rope by lowering a weight over a cliff and then suddenly stopping it abruptly and putting excessive strain on the rope. This can also be done by abseiling too fast and having to stop too quickly.

STORAGE OF ROPES

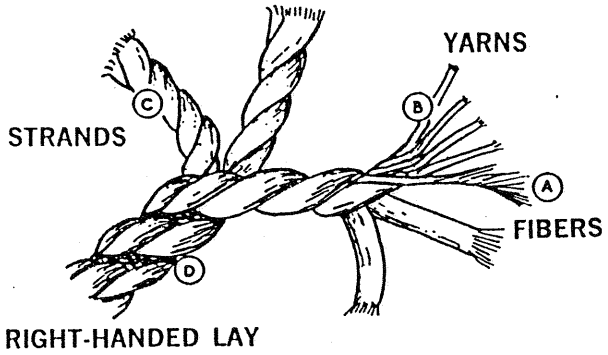
Basically there are two methods of storing ropes. The first way is coiling. The rope is coiled in 1.2 metre lengths twisting each loop 1/4 turn as you go to avoid a figure of eight forming in the coil. Then with the end of the rope you form one little loop at the top and you wind the other end of the rope around and around and around, push it through the little loop and pull the first end tying the two ends tightly together.

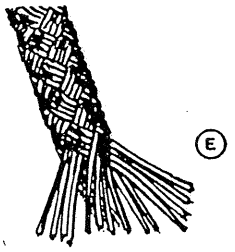
The coiling method is used when storing ropes for long periods of time.

The second method for storing ropes is called chaining. This is a non-tangle method which is easy to handle large lengths of rope, especially when undoing the rope. In chaining your ropes you put a double loop in the end then feed the loop through on a continuous basis until you reach the other end of the rope. Chaining the ropes can only be used in storing ropes for short periods of time because it kinks the rope.

BUSHCRAFT

Bushcraft Hand-out 18.





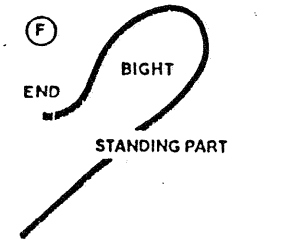
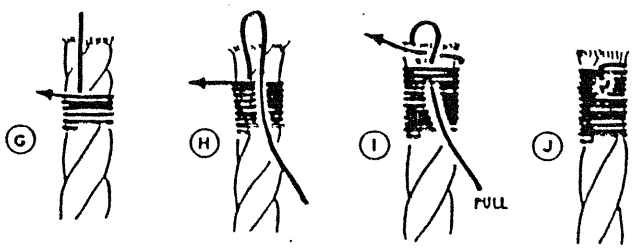


Figure 1



ACTIVITY B9

Demonstrate your ability to do a back splice, long splice and an eye splice.

OUTLINE

When something more permanent than a simple knot is needed in a rope, a splice is called for. The one most frequently used is the **eye splice,** but the **back splice** is easiest to learn and the **short splice** is essential for permanently joining two ropes.

RESOURCE MATERIAL

The ability to splice allows you to make workmanlike jobs of such things as lanyards, guy lines and rigging. A permanent piece of ropework is much better with splices than with knots. While a bowline is a perfectly good knot, an eye splice is neater and smarter when a permanent loop is needed in the rope.

Back Splice

A back splice is a means of turning the strands of a rope back on themselves to prevent the end of the rope fraying. It is an alternative to a whipping, but, as it increases the thickness of the rope at the end, it is not as suitable for situations where the rope will have to pass through a hole or around a sheave in a pulley block.

A back splice in a three-stranded rope is started by unlaying the strands for a short distance. Form them into a crown knot (See Hand-out Sheet No 19. Fig 12A). Take each over its neighbour on the right and under the next, if it is a right-handed rope. Pull up tight evenly, so that the ends form a star across the end of the rope.

Each end strand will be found to be pointing across a stand in the main body of the rope. Lift the next main strand sufficiently to tuck an end strand under it. Do this at all three positions (Fig 12B), so that each strand goes over and under one main strand. Repeat this, taking each end in turn over the strand beside it and under the next one. Do it once more, so that each end is tucked three times. Go around the rope at about the same angle as the lay of the rope, although in the opposite direction. A common fault is to tuck almost straight down the rope. Three tucks are usually sufficient, but for neatness about half the fibres may be scraped out of each strand with a sharp knife, then one more tuck made to give a tapered finish.

Eye Splice

The eye splice may be made as a loop of any size, or it can be made tight around a metal thimble or a wooden toggle. A thimble protects the rope from chafe and is often used for shackling ropes to fittings on boats and elsewhere. A toggle makes a quick joint into another eye splice, and is often fitted to the top of a flag. Practice eye splices should be made as free loops, as a little experience is needed to fit them correctly around solid things.

Unlay the strands for a short distance and double the rope back to form a loop, with the unlaid ends pointing across the lay of the rope. Regard this as the front (Fig 12C). Take one of the ends and tuck it under any of the main strands. Arrange the next one to it on the loop side across the rope and push the third one out of the way behind (Fig 12D). Take the second one under the next strand to the first one, going in where the first one comes out (Fig 12E).

Turn the splice over. There is one strand left, and one main strand without and end strand under it. The end does not have to go in the way it is pointing, but must go under the strand against the lay (Fig 12F), so that it is pointing the same way around the rope as the other ends. See that all three ends come out level with each other and are equally tensioned. Tuck each end again, over one and under one, in the same way as the back splice. Even up the tension, then tuck once more. Taper a further tuck if you wish. Any splice can be rolled smooth between two boards, preferably before trimming off the ends of the strands. Rolling is sometimes done on the floor under the shoe, but this is liable to press grit into the fibres.

Short Splice

A short splice is used for joining ropes, but as it increases the thickness it has the same disadvantage as the back splice if the rope has to pass through a restricted space. As it name implies, there is also a long splice. This does not increase the thickness of the rope appreciably, but it is rarely used in practice.

To make a short splice, unlay both ropes for a short distance and bring them together so that each end comes in a space of the other rope (Fig 12G). For a first short splice it is a help to put a whipping on one rope and temporarily seize the opposing strands over it. In this way half of the splice may be done first without confusion (Fig 12H).

Take each of the free strand ends over and under a strand of the other rope, working against the lay (Fig 12I), as in other splices. Make two whole tucks in this way. Remove the temporary seizing and whipping and make two whole tucks with the other three ends. This total of four tucks should be sufficient, but for neatness there may be taper tucks at each end.

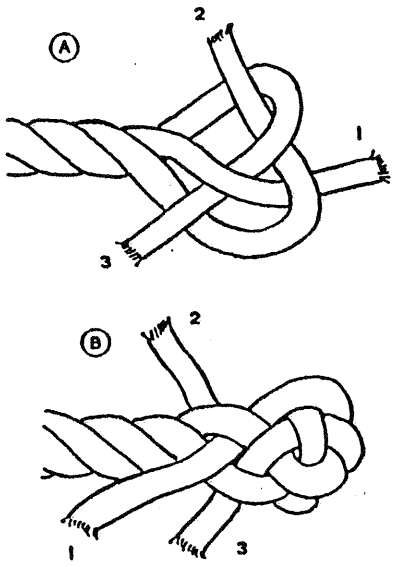
Long Splice

The strands are unlaid for a considerable length and then married as for the short splice. Then the one strand is unlaid and its married counterpart is laid along its place in the rope.

The two centres are simply held with a cross-over knot, and the strands thinned down and spliced as for a short splice. The end strands are finished with a cross-over knot and again the strands are thinned down and finished as for a short splice. This long splice does not appreciably thicken a rope which may be spliced to go through a sheave.

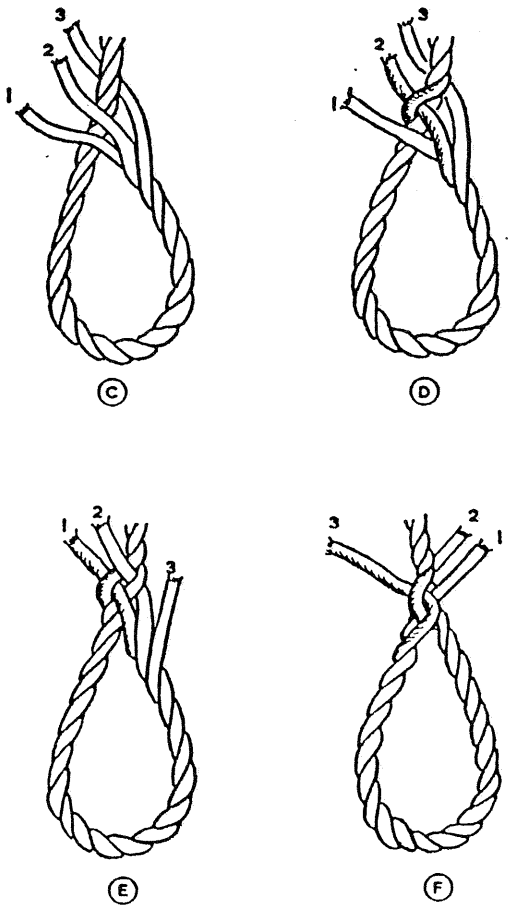
BUSHCRAFT

Bushcraft Hand-out 19.



BACK SPLICE

Figure 12



EYE SPLICE

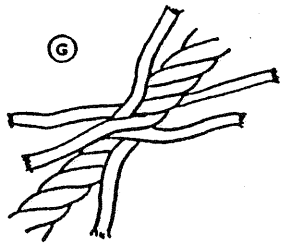
Figure 12 *(cont.)*

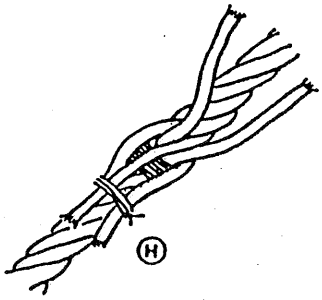
BUSHCRAFT

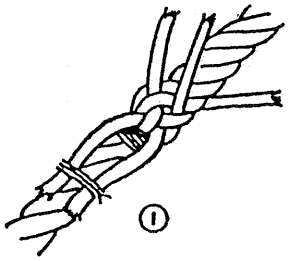
Bushcraft Hand-out 20.

SHORT SPLICE

Figure 12 *(cont.)*

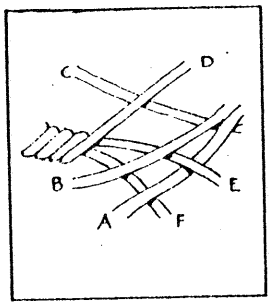






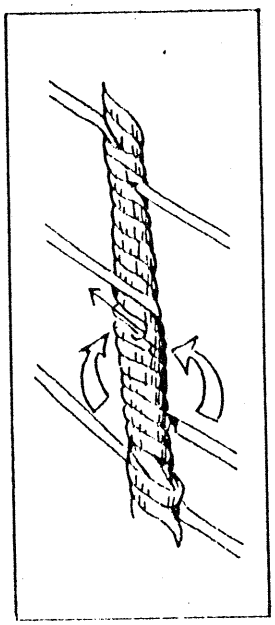
SPLICES

SHORT SPLICING: Unlay the strands and marry them together; butt hard up to each other. The strand D first goes under the standing end of A, butt over strand B and over C on the standing end. Thus each strand at either end goes over one strand of the standing end on the opposite side and under the next strand, so that there is a strand of the standing end between each short side of the splice. Continue working the free strand of each end four or five times into the strands of the standing end.



LONG SPLICING: The strands are unlaid for a considerable length and then married as for the short splice. Then the one strand is unlaid and its married counterpart is laid along its place in the rope.

The two centres are simply held with a cross-over knot, and the strands thinned down and spliced as for a short splice. The end strands are finished with a crossover knot and again the strands are thinned down and finished as for a short splice. This long splice does not appreciably thicken a rope which may be thus spliced to go through a sheave.



ACTIVITY B10

Revise the safety rules for the use of an axe and a knife and demonstrate the correct method for sharpening them both.

OUTLINE

The proper handling and sharpening of axes and knives is essential for all to learn. On the camp-outs revise the safety rules and enforce their strict use in the minds of the teens. Have practical times for sharpening axes and knives.

RESOURCE MATERIAL

Safety Rules for Axes

1. A dull axe can be very dangerous, as it may bounce and strike the person using it. Keep your axe sharp so as to bite into the wood.

2. Always check the head of an axe before using it. An axehead that comes off a handle can fly through the air with the force of a bullet. One temporary means of tightening it is to soak it in water. The wood will expand and tighten in the head. At first opportunity, repair the axe permanently.

3. Never allow the axe to lie on the ground. When using it, cut in such a way that the blows will never end up in the sand or dirt, or your feet.

4. Never cut trees just for the fun of it. Misuse of an axe can damage a tree and finally destroy it. The misuse of an axe in a forest can give you and your club a bad name.

5. An axe is not a hammer, a mallet, or a wedge; do not use it as such unless it is designed for this purpose (eg a Kelly axe).

6. Before using an axe be sure that the area is clear around you and overhead. Be sure there is nothing the axe will catch on as you swing it. Everything must be more than two axe lengths away. This means the combined length of your arm and your axe.

7. An onlooker should stay at least two axe lengths away, for not only is the axe itself dangerous but flying chips can strike one in the eye.

8. It is dangerous to work with an axe when one is tired, for it is easy to lose control. Always rest when tired.

9. When the axe is not in use, keep it in its sheath. If the axe is to be used again soon, strike it into a log so that the blade is covered.

10. When carrying an axe it is best to keep it sheathed. Otherwise, carry it with the sharp edge turned outward, away from your body.

11. When handing the axe to someone else, always hand it handle first and head down.

Rules For Chopping

1. When you cut a limb or a stick in two, using a tomahawk hold the stick with one hand so that it rests directly on a chopping log, then cut down on an angle through the stick and into the chopping log.

2. To cut a green sapling, bend the sapling over with one hand, creating a strain on the grain. Then cut with a slanting blow close to the ground and toward the ground.

3. To split a small log with a tomahawk, place the edge of the tomahawk in a crack, then lift the tomahawk and the stick together, bringing them both down together on the chopping block. (You may be lucky and this idea work. Don't get too upset if it doesn't.)

4. When using a felling axe grasp the handle with both hands together near the butt end. Touch the axe head to the log to get the proper distance, then following all the safety rules, raise the axe sliding the right hand up about three quarters of the way toward the axehead, and bring the axe up over your right shoulder. Always keep your eye on the log at the spot where you want the axe to hit. As you bring the axe down, slide your right hand along the handle until it touches your left hand. The axehead should enter the log at an angle of about 45 to 50 degrees. The object is to cut a V-shaped notch in the log. The top of the V should be as wide as the log is thick. (Ever seen confetti being made?)

5. Never fell a tree unless there is good reason and you have permission to do so. Felling a tree can be very dangerous. Do not let anyone fell a tree unless you know that he is an experienced axeman. When felling a tree, decide where you want it to fall. It is best to fell it in the direction in which it is leaning. Clear the ground by removing all underbrush and overhanging branches so that the axe will not get caught in them while you are swinging. Make two cuts, the first one on the side on which you want it to fall, close to the ground, and the second cut on the opposite side, two inches higher. In making a box cut, the lower cut goes straight in and the upper cut comes down to a 45 degree angle, forming an irregular V. Be sure that when the tree is ready to fall, everyone is out of the area in which it will fall. Using the old woodman's signal, shout "Timber!" and step back for often a falling tree kicks backward. If in any doubt about which way the tree is going, drop your axe and go for your life in the opposite direction.

Knife Rules

As the wearing of sheath knives in public is now an offence in most states of Australia, it is now recommended that the wearing of a pocket knife in a suitable sheath be encouraged.

1. A knife is of no value unless it is one made of good steel that will hold an edge. A knife should be kept sharpened and free from rust at all times. When sharpening a knife, use the carborundum sharpening stone and draw the blade over the stone with the edge foremost. Each group should have a stone available for use by the Teens.

2. When whittling or cutting, always cut away from yourself, to prevent accident.

3. Never split a piece of wood with your knife by hammering it on the back of the blade. This will ruin the blade and will weaken the hinge.

4. Always keep the blade away from fire. If it is overheated, the temper of the steel will be affected, the knife will become soft, and will never hold an edge again, also the handle will probably go up in smoke.

5. When a pocket knife is not in use, be sure it is closed and in your pocket or back in the sheath. The sheath should be carried on the belt just back of the hip joint.

6. Remember your knife is a valuable tool and not a toy. Don't play with it or damage it in any way, but keep it in good condition so that when a need arises, it will be serviceable.

7. Never run with your knife open.

8. Throwing a knife into the ground will soon ruin it, not to mention any person who gets in the way.

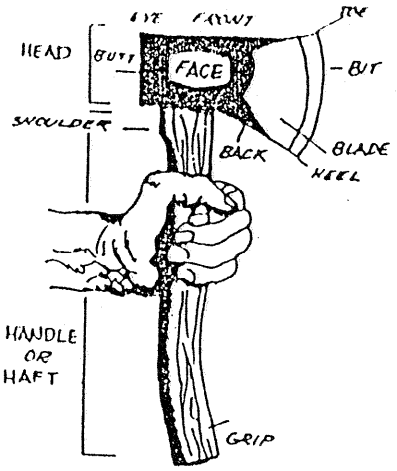
9. A good woodsman never throws his knife into living trees, this also refers to carving initials etc. in trees.

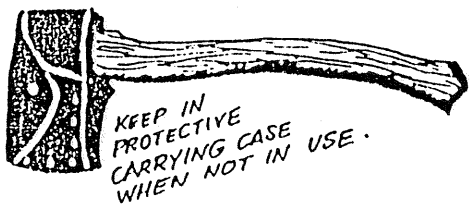
BUSHCRAFT

Bushcraft Hand-out 21.

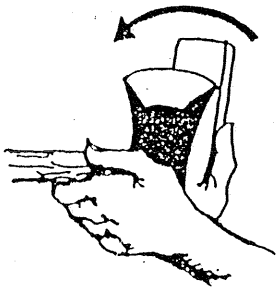
- Safety Rules For Axe -

PARTS OF AN AXE



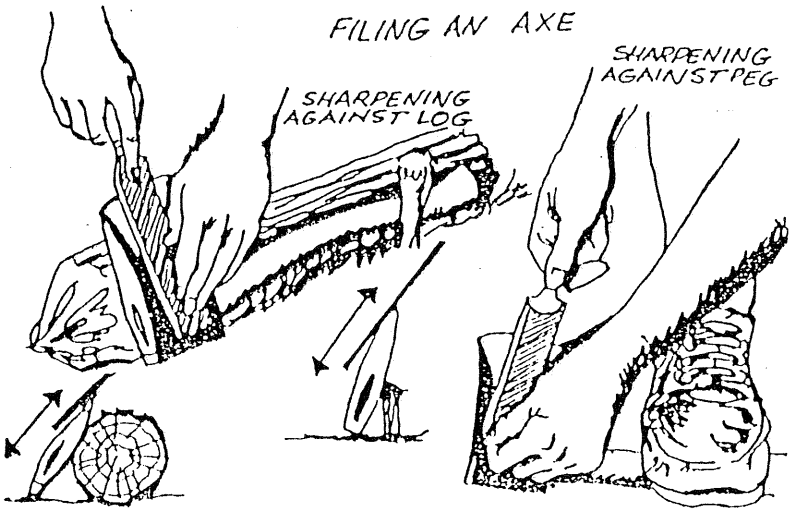


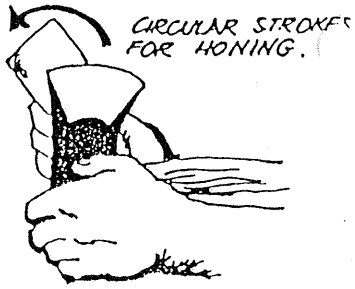
SHARPENING WITH A CARBORUNDUM STONE (AXE OR PENKNIFE)



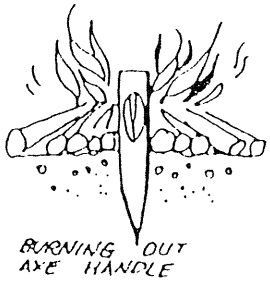
Keep Your Axe Sharp

FILING AN AXE

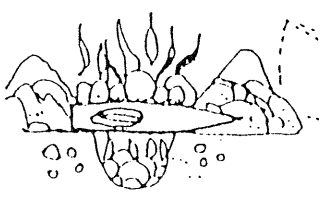




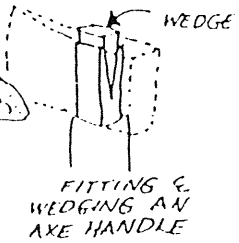
Keep The Handle Tight



BURNING OUT AXE HANDLE



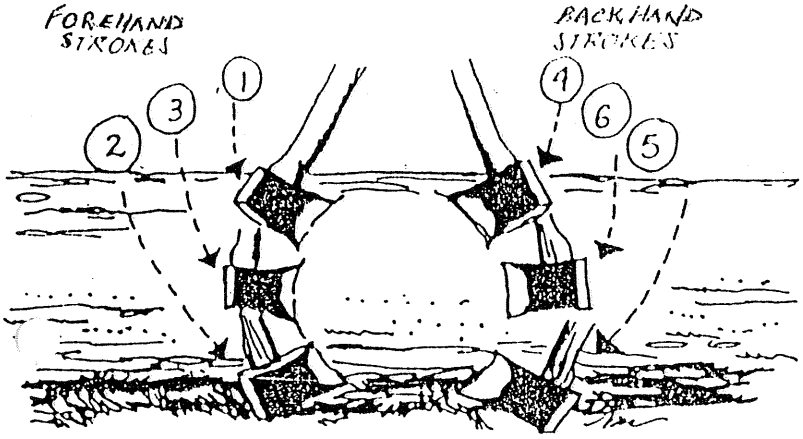
REMOVING A BROKEN AXE HANDLE



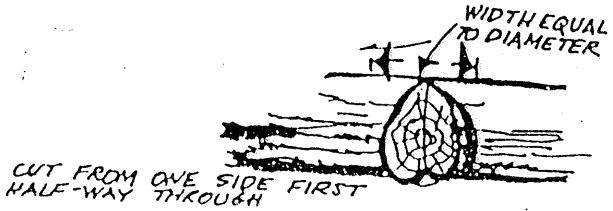
FITTING & WEDGING AN AXE HANDLE

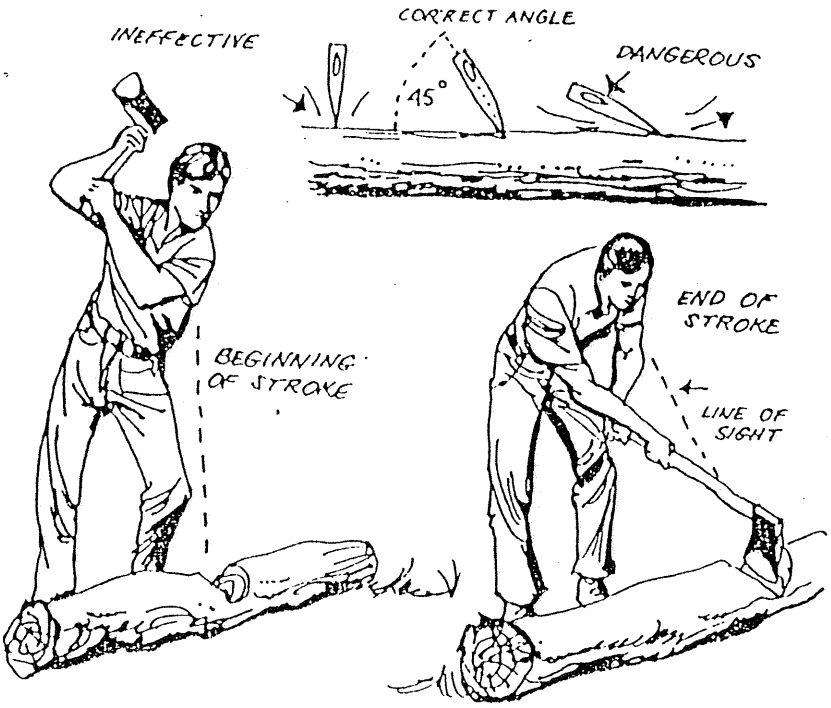
BUSHCRAFT

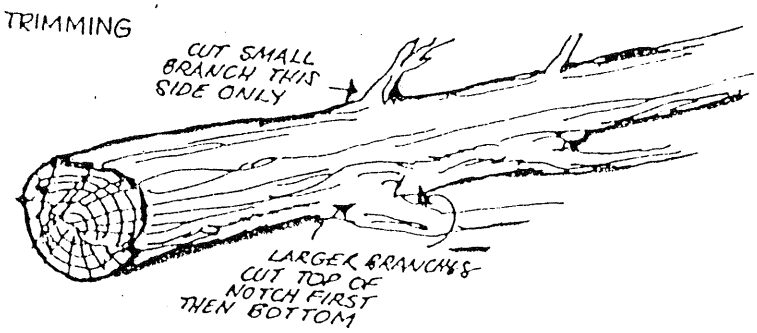
Bushcraft Hand-out 22.



- PROPER USES OF YOUR AXE -







ACTIVITY B11

Demonstrate your ability to make a 2 metre piece of three strand twisted rope by hand from native materials.

OUTLINE

As one of the basic skills in Bushcraft is to be able to join poles or sticks together by using lashings, we should be able to substitute natural materials and make a rope in case of an emergency when no rope is available. How to find the natural materials and how to spin or plait the fibres in ropes is covered in the Resource material.

RESOURCE MATERIAL

Selecting Rope-making Materials

To discover whether or not a material is suitable for rope-making it must have four essential qualities:
It must be reasonably long in fibre
It must have strength
It must be pliable
It must have adhesion or grip so that the fibres will bite into one another.

There are three simple tests to find out if any material is suitable.

First pull on a length to test it for strength. If it does not snap immediately or pull to pieces, it should be twisted between the fingers and the fibres should be rolled together. If it will stand this and not snap apart, tie a knot in the material and slowly and gently tighten it. If the material does not cut in on itself and you can pull the knot reasonably tight, it is suitable for rope-making, providing it will bite or grip together and does not slip apart instantly.

You will find these qualities in all sorts of plants; in ground vines, in most of the longer grasses, in some of the water weeds and rushes and in the inner bark of many trees and shrubs.

Some green, freshly gathered materials may be stiff or unyielding. However, they may still be suitable for rope-making. Pass them over the flame of a hot fire for 30 seconds or so. The heat will often cause the sap to burst through some of the cell structures making the material pliable.

Apart from fibre sources in the plants mentioned above some seaweeds can be useful sources for rope-making material as can members of the large aloe family.

Gathering and Preparing Materials

In some plants there may be a high concentration of vegetable gum. This can often be removed by soaking in water (such as the black-eddy of a stream or in a waterhole) for several hours until the material is cleaned. A running stream is suitable only if the material can be anchored or secured. Large stones are useful for this. If large enough containers are available the material can be boiled. A third method is to dry out thoroughly in the sun and then tease the fibres out.

Some materials have to be used green if any strength is required. Those that should be used green include the sedges, water rushes, grasses and liane vines. Grasses, sedges and water rushes should be cut and never pulled out of the ground. Cutting above ground level

with a sharp knife or machete is harvesting. Pulling it out destroys the root structure and kills the plant.

When harvesting, work over as wide an area as possible. Do not completely clear any one site. Remember to leave at least some strands of the plant to go to seed to allow for regrowth. Thus with the sedges and grasses be particularly careful with your harvest. Cut what you require above ground level and take only from the biggest clumps.

Palm fibre in tropical or sub-tropical regions used to be regularly harvested as a matter of course and was put to many uses. It is found at the junction of the leaf and the palm trunk. I can also be found lying on the ground beneath many species of palm. It is one of the best rope and cord making materials available.

The lawyer vine or Calamus must be approached with some caution. Normally found in the rainforest areas of northern Queensland it can also be obtained (although it is rarer) in similar areas in the southern part of that state and in northern NSW. The leaves of the lawyer vine have needle-like prickles and the "branches" are armed with sharp hooks - once much used by the aborigines to catch fish.

Once the difficult process os stripping off the leaves and the hooks themselves is completed, the lawyer vine, if the outer bark is not removed, will be found to have enormous strength. In the past it has been used for making cables to haul logs, as rigging for boats, in suspension bridges and in the making of fish traps and baskets.

In temperate areas fibrous matter from the inner bark of certain trees and shrubs is an excellent souirce of rope making material. It is most suitable when the tree is dead and the material has dried out. The inner bark of many eucalypts possess this useful fibre. If the tree is dead when the fibre is teased and separated the natural gum will have dried out and will separate from the material as a fine powder.

Do not use the bark from green trees or shrubs unless it is absolutely essential; even then cut off branches rather than fell the whole tree. Never cut down a complete tree simply because you want some of its bark for a length of cord.

If there is no alternative to green timber, test before you cut. Slice a small section about 10 cm in length and about 5 cm wide from the selected branch. This sample should be cut through to the sapwood. Peel it off the tree and then test the different layers. If it is not oozing gum it will probably be suitable, but it should still be soaked in water for some time and then sun dried.

In the case of green lianas and vines only the outer skin is usually strong. This will split off easily if the main stalk is bent away from the skin. This principle applies to palm leaf stalks and most other green material. If a split starts to run off, the material must be bent away from the thin side. It will then gradually gain in size and come back to an even thickness with the other split side.

Plaiting

One person alone may need a considerable length of rope but making such a length by one's self is an arduous and slow process. However one may be lucky enough to have at hand a considerable amount of material that is reasonably long - say between 30 cm and 1 metre or more.

This material can be plaited or braided into a suitable rope length. The normal three plait makes a flat rope, which while quite good does not have the finish or shape of a true rope.

A general rule for all plaits is to work from the outside into the centre.

In learning to plait or braid there is no need to "go bush", as it were, nor even to use bush materials. The skills can be acquired using standard ropes and twines or leather straps.

Once the skill is acquired with these more manageable and familiar materials then trials can be conducted with various bush products to see which plait or braid is most suited to what is at hand.

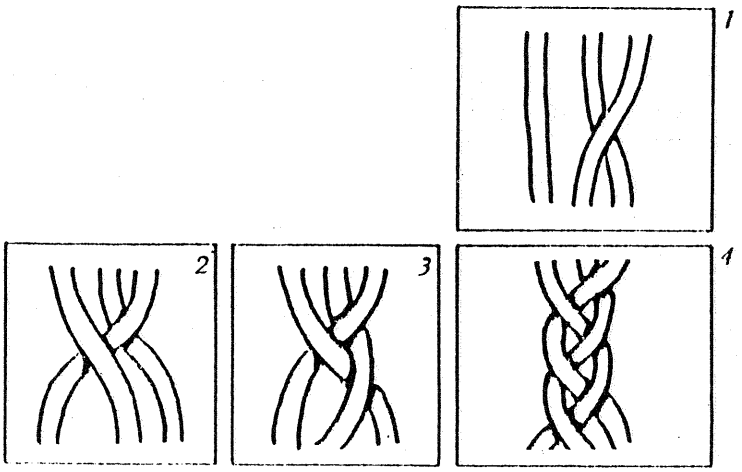
See Hand-out No 23. for instructions and diagrams of the three plait.

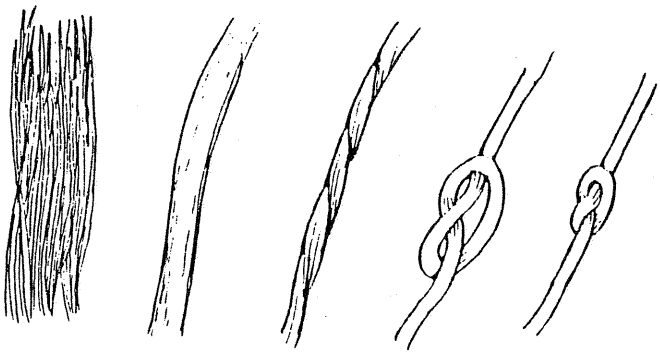
BUSHCRAFT

Bushcraft Hand-out 23.

THREE PLAIT

Take the right-hand strand and pass it over the strand to the left.
Take the left-hand strand and pass it over the strand to the right and repeat alternately from left to right.





Strong bush ropes can be made only if the materials are suitable. The fibres, as in grass or bark, must be long enough to be worked, they must be able to be twisted and be pliable enough to take a simple knot without snapping.

If material is hard or stiff it can be passed over a fire to make it more pliable.

ACTIVITY B12

Demonstrate two methods of water purification.

OUTLINE

Even clear running water may not be suitable for drinking so it is important that all who spend time in the bush should know about purifying the water supply. Practice these methods on your camp-outs.

RESOURCE MATERIAL

Refer to Hand-out No 24.

BUSHCRAFT

Bushcraft Hand-out 24.

Boiling

Boiling the water is the age-old remedy for every ill, whether caused by protozoa, bacteria or virus.

Chemical Purification - Iodine Additive

Tablets containing tetraglycine hydroperiodide, or TGHP (Globaline, Potable-Aqua) are convenient and readily available. A single fresh tablet dissolved in a litre of water gives the required iodine concentration of 8mg/litre. The compound is stable in an unopened bottle but loses iodine when exposed to the air; bottles of tablets should probably be discarded a few months after first being opened. Use is very easy, demanding only that the disinfected water be visually inspected to ensure that enough iodine has been released to produce a definite brown colour. A single tablet, let stand 10-20 minutes, ordinarily suffices. A second tablet should be used in very cloudy water, and 20-30 minutes allowed in cold water.

Tincture of iodine, sold at pharmacies, is widely recommended but has little if any advantage over the TGHP.

Filtration

Expensive - not recommended.

ACTIVITY B13

A. Attempt to start a fire by friction, or by flint and steel.
B. Demonstrate your ability to start a fire on a rainy day or in the snow by using natural materials.

OUTLINE A

Fire lighting by friction consists first, in generating a spark or tiny coal and then nursing it to a flame.
The principle of fire lighting by flint and steel is to ignite readily combustible material by means of a spark.

RESOURCE MATERIAL

1. Fire Lighting by Friction

There are several friction methods, one being the twirling method used by the aborigines, but this is not as easy to master as the method of rotating the spindle by means of a bow and thong.

Materials Needed for Friction Set
a. **A spindle** 12"long. Cut a stick of the right kind of wood, about 5/8" in diameter. It must be soft wood.

In WA, the best woods are "snap-and-rattle" mallee, birdbush, "black-boy" flower stalks.

In SA, they are "black-boy" flower stalks, tecoma sticks, wild peach and white mallee.

In Victoria, "black-boy" flower stalks, and sticks from the underbrush of tall forests.

In NSW, "black-boy" flower stalks and lantana.

In QLD, lantana, white cedar, pink burr, wild orange, cottonwood and palm leaf mid-ribs.

In New Guinea, bubulamana and palm midribs.

The main thing is to get a wood which is light in weight, that cuts cleanly and is firm in grain. It need not be absolutely dry, but it must be dead, though not so old as to be brittle.
Make a blunt point on each end of the spindle.

b. **A hand-piece.** 1 1/2" by 2". Get a piece of the hardest wood you can find, and shape it to fit comfortably into your hand. In the centre of it, bore a hole to take the top end of the drill. Lubricate this top bearing with soap, fat or lead pencil scrapings.

c. **A bow.** Cut a stick as thick as a finger, of strong, flexible wood two feet long, and fit it with a slack bowstring or strong cord of leather.

d. **"Bullswool".** Prepare this by teasing fibrous bark or dry grass and rubbing it into fluff.

e. A fire board 4" wide and 12" long. Gouge a spindle hollow in the fire board, and make a V-shaped cut from the edge of the board.

Method of Fire Lighting.

a. To make a spark with this outfit, put the base-stick on the ground and hold it firmly with the left foot. Kneel on the right knee.

b. Take one turn of the bow-cord around the centre of the drill-stick and put the lower end of the drill in the hole.

c. Place the top bearing on the upper end of the drill, hold it with your left hand and keep it steady by putting the left arm around the outside of the left leg, with the arm on the shin bone.

d. Now move the bow to and fro parallel with the ground, pressing lightly but firmly on the top bearing. This makes the drill spin rapidly. Brown powder gathers around the base of the drill and falls out of the notch on to a little pad of bullswool which has been placed below it.

e. When the powder turns black, tends to stick together and gives off a smell something like burning sugar, give a couple of very quick movements of the bow and lay it and the drill aside. You will now see that a little thread of smoke continues to rise from the heap of black powder.

f. Breathe gently on this and it will glow; pick up the bullswool, fold it around the spark, blow gently again and you will get a flame.

A tip given by some authorities is to put a little charcoal or gritty material in the hole in the foot piece. This is said to enable more powder to be ground out, and the spark to be obtained more quickly.

2. Firelighting by Flint and Steel

Materials Needed.

a. Flint. This does not occur naturally in Australia, except on a small beach at Port McDonnell in South Australia, so it is useless to look for it. However, any other hard rock such as quartz, chert, diorite, chalcedony etc.. will do almost as well. Synthetic flints used in cigarette lighters are much better than natural flint. Get a piece of flint and press it into a piece of heated perspex and plunge the perspex into cold water to shrink it, thus holding the flint securely.

b. Steel. This must be carbon steel, such as is found in the blade of a knife, a piece of file, a safety razor blade etc.. Soft iron or alloy steels will not do. The only naturally occurring material that will suit the purpose is iron pyrites.

c. Tinder. This must be kept in an airtight tin. An ordinary boot polish tin will do. Clean it thoroughly to remove grease. Next take a piece of old, worn cotton material almost the size of a handkerchief, and wash thoroughly. Place tin on the ground. Light a fire and, holding the cloth with two sticks over the fire, keep it from actual contact with the flame. This will ensure that it is thoroughly dry and will scorch it. When the material is smoking all over, let it take fire. It will flare up in a second. Just as the last flame is dying out, lower it into the tin, packing it down with the sticks, and at once clap on the lid. When the tin has cooled off, remove the lid and the black flakes you will see are the tinder.

Another method od preparing tinder is to get some dry, beaten grass, finely teased bark etc., and impregnate this with a solution of salt-petre, dust with very finely ground charcoal and place in an airtight container.

Good, natural tinders are the fine, dry inner bark of stringybark, ironbark and many other eucalypts, the dry inner bark of dead leatherbark, and dry palm fibres, wild cotton, thistledown, the brown fluff at the base of the Macrozamia palm, kapok. These substances are first teased into a large ball, then lit, and at once packed into the tin and the lid put on without the loss of a minute.

Another method of making tinder is to collect the large, white bread-like fungus growing on dead trees and rotting logs. Break into little chips, dry thoroughly, and heat on a sheet of tin held over a fire or on a very hot stone. They first go brown, and then start to glow. Rake them into the tin at once and put on the lid.

Beside the charred fibres, prepare some "bullswool" - dry grass or fibrous bark which has been teased and rubbed into fluff.

Method of Lighting Fire with Flint and Steel

a. To light a fire, place the tin on the ground with the lid off.

b. Hold the bit of stone between the finger and thumb of the left hand about 3" above the tinder.

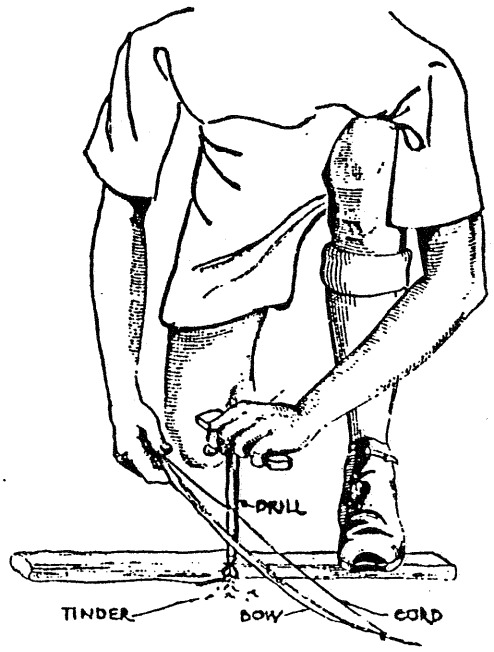
c. Now take the steel between the finger and thumb of the right hand and strike a light, quick blow with the sharp edge of the stone, moving the steel parallel with the ground. Do not strike downwards. A shower of sparks flies off if the blow is delivered in the right way, and if one of them touches the tinder, it will start to glow.

c. Pick out the burning piece of tinder and at once put the lid back on the tin. If you do not, the rest of the tinder may burn to an ash in no time.

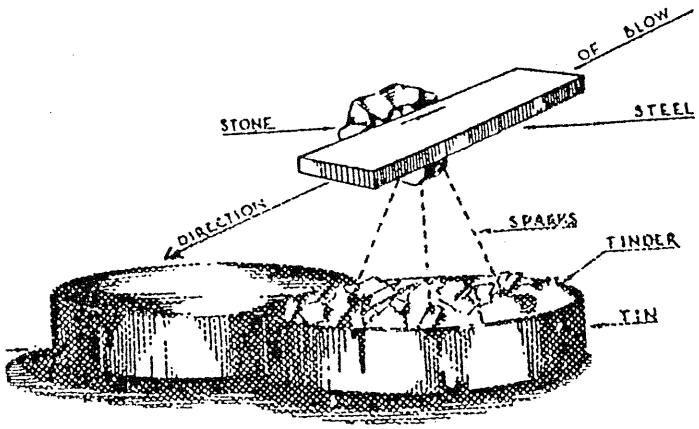
d. Place the glowing piece of tinder on the "bullswool" and breathe very gently on the burning tinder. It will glow like a hot coal, and the surrounding fibres will burst into flame.

BUSHCRAFT

Bushcraft Hand-out 25.



Fire-lighting by Friction.



Lighting Fire with Flint and Steel.

OUTLINE B

It is in the cold, wet weather that a fire is especially desirable, hence it is wise to know how to light fires under adverse conditions. Anyone can light a fire after a spell of dry weather, but after rain the fire takes more coaxing, and its lighting calls for more skill.

RESOURCE MATERIAL

If you have not taken the precaution of putting a supply of dry fuel, wrapped in a ground sheet, in your tent the night before, or if you have arrived at your camp site in the rain, the first thing to do is to look for fuel.

You will not find dry fuel on the ground. Decayed or rotting logs are useless. Good sources of fuel are:

a. The lower layers of bark of living trees, especially stringbark, paper bark and ironbark.

b. The inside of dead saplings whittled into shavings.

c. Upright dead twigs on standing shrubs, which shed the rain.

d. The under surface of a fallen tree not resting entirely on the ground.

e. Dead standing stumps, or the inner wood of a dead standing tree.

f. Dry material under the head of "black boys".

g. Fuzz Sticks. Take a thick piece of wood and split off the outer wet layer. Shave the inner dry wood down in curls all the way around the stick.

h. Most countries have a counterpart of the Queensland "Kerosene Tree", Halfordia scleroxyla, which has wood that burns while green. In New Zealand it is the Tawa. Casuarina and Wattle are good for this purpose, also Gidgee.
Cut a slab off any of these, and split off little splinters. Make wigwam-type fire in a sheltered spot. The pyramid shape creates the best forced draught to establish the fire. Arrange wet logs around to dry.

Be Prepared for Wet Weather

While fine weather may be desirable when camping, it cannot be ordered, so it is wise to be prepared for unfavourable weather.

a. Matches are your best friends for fire lighting in wet weather. Do not depend on primitive methods. Waterproof your matches beforehand by dipping them, one by one, in candle grease, paraffin wax, shellac or varnish. Carry them in a screw-top container, together with the striking side of the match box in cellophane. Keep your matches in several places, eg. in your pack and in several pockets. In this way, if you lose some of them, you do not lose all, as you might if they were all in the one box.

A useful hint should your matches get wet: A wet match placed in the hair will dry in a few minutes.

b. A roller bandage soaked in kerosene is very useful. It can be used to start a fire, and if not needed for this purpose, is not spoilt by the kerosene, but rendered even more sterile.

c. Take some Meta (dried alcohol) tablets on a camping trip.

Fire Building in the Snow

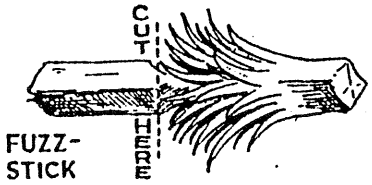
a. First clear away the snow if it is not too deep.

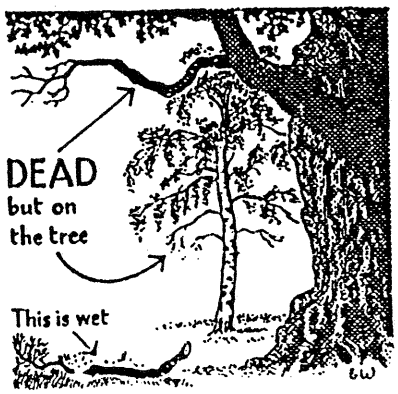
b. If this is not possible, make a platform of green wood logs to keep the snow from melting and putting out the fire.

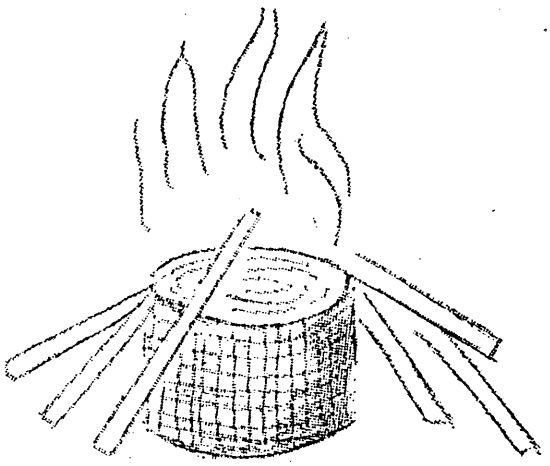
c. Build one this platform, whatever fire is appropriate for the purpose.

BUSHCRAFT

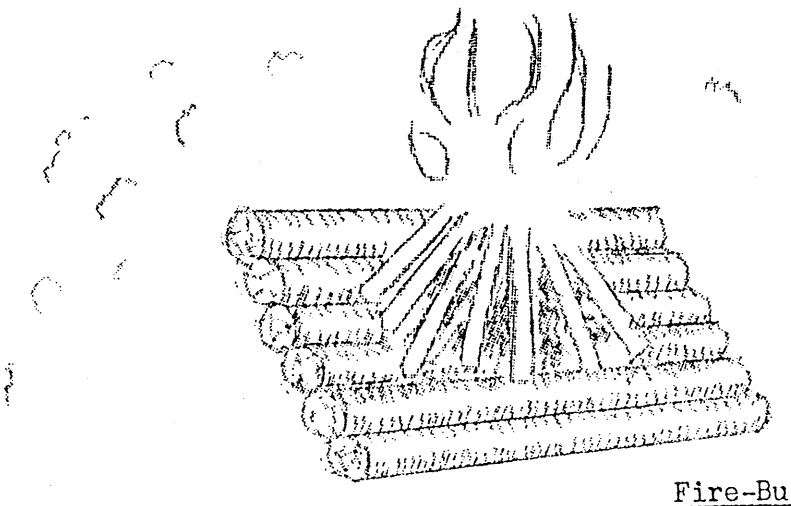
Bushcraft Hand-out 26.







A roller bandage soaked in kerosene is very useful.



Fire-Building in the Snow.

ACTIVITY B14

Construct one major project, eg bridge, tower etc.

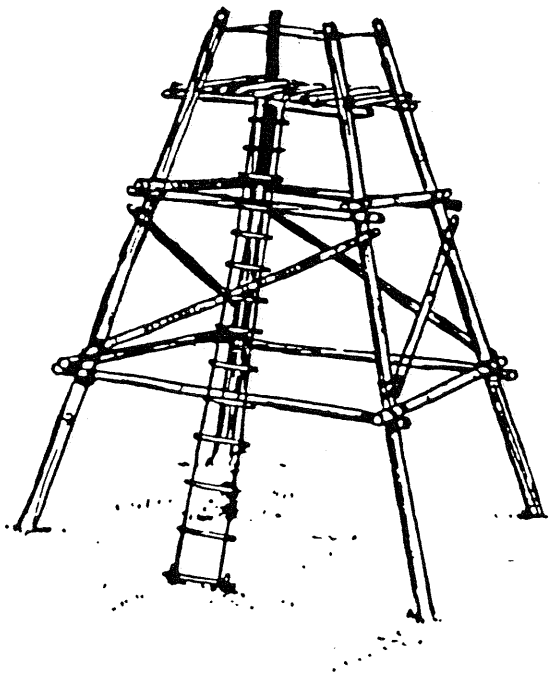
OUTLINE

This activity allows the Pathfinders to put the skills they have previously learned into practice in a fun way. Objects could be a camp table, shower cubicle, bridge, lookout tower etc.

RESOURCE MATERIAL

There is a real sense of achievement in making a bridge, tower or some other major apparatus uring round timber ane lashing rope. It is great working together using your Pathfinder skills and achieving the desired structure. Some basic bridge and tower structures are enclosed below but d not limit your ideas. Read some Scout Books, or think up some original brilliant ideas yourselves. The main thing with making a major project is:

Plan what has to be done
Know how to correctly lash
Work together
Share the work load with everyone
Construct safety features
Construct where it is designed to be used or as part of a bigger activity ie bridges always cross water, and towers always warn of an approaching enemy armed with water bombs and flour!

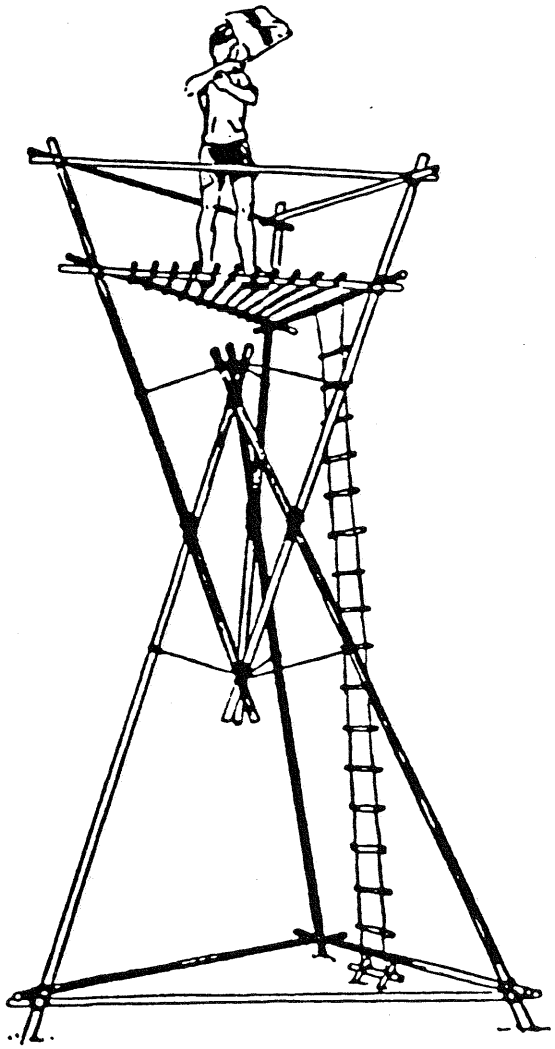


Signal Tower.

From the drawing you will see that this tower is constructed from two similar three sided pyramids which are lashed together and held in place by short guy ropes. There is very little to say about the building of it but it would be much easier to construct the two towers quite separately and to build them with th elongest sides on the ground and join them together as shown and pull it erect using long guy ropes for the purpose.

There are several small points that you will need to note. The first is that figure of eight lashing ought to be used where the three spars meet on each pyramid. Also you need to sink the butts of the base pyramid 7-10 cms to give it a secure footing. And finally, make sure that the rope ladder is in place before erecting the structure as you will find it very difficult to attach it afterwards. This type of structure can be built inside and could be used on a display night or open night for your Club. Its possible uses: as a signalling tower, for nature spotting and certainly for anyone interested in nature photography or aerial photography.

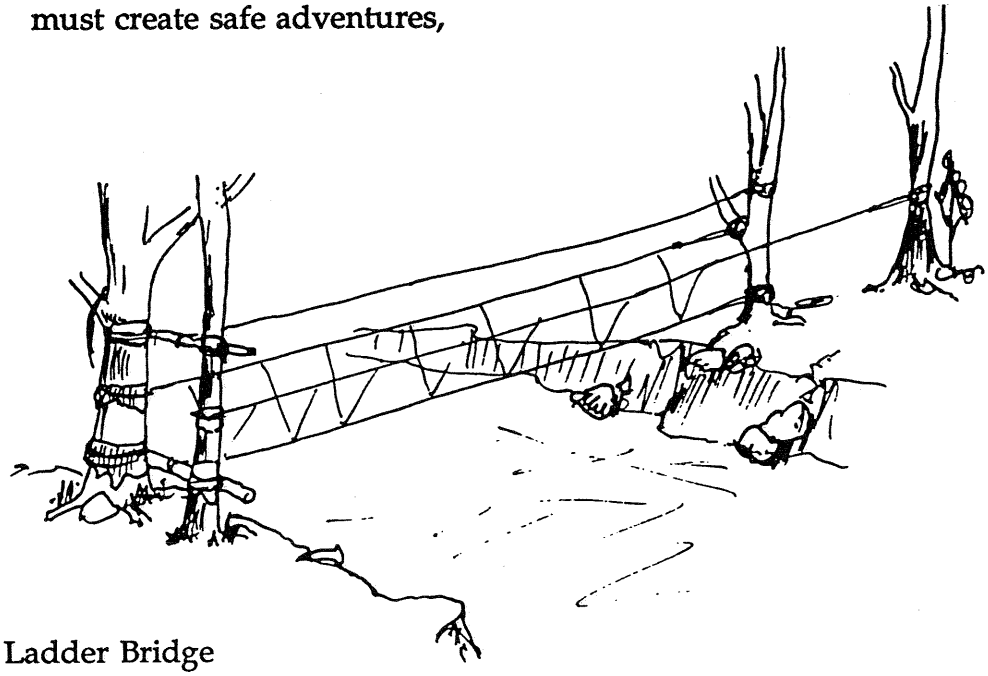
Suggested height of the tower is 4 metres to the platform.



Rope Bridge

It is very straight forward:

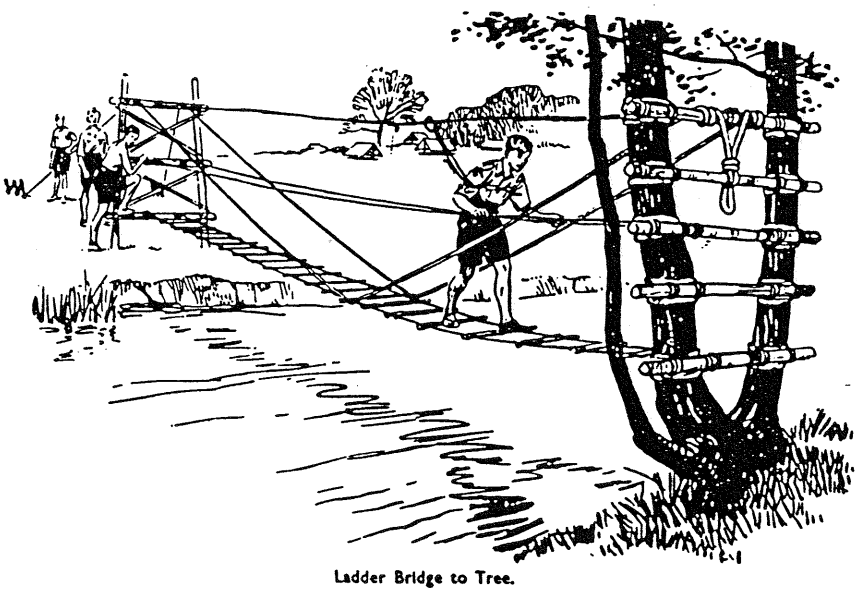
* Tie off on one side.
* Use truckies hitch to increase the tension on the opposite side
* Make sure that every tree ha sacking around where any rope or wood touch it. We must be good Pathfinders and leave no trace of our adventure behind except in our memories, cameras or videos.
* Note - An extra line is added directly above the foot rope. This is so a safety line can be attached using a sliding karabena and a safety line around the Pathfinders waist. The days of taking risks are past. We must create safe adventures,



The Ladder Bridge

Whether attached to a frame or to a tree, it is a suspension type bridge. It is stratight forward to make and would be a lot of fun.

Notice the extra line above the boy crossing the bridge. This has the sliding karabena which is attached to a safety line around his waist should he slip.



Ladder Bridge to Tree.

ACTIVITY B15

Participate in an initiative game using bushcraft skills.

OUTLINE

This is where the Pathfinders have a problem that they have to successfully solve bu using bushcraft skills. There are many ways of achieving the same result, but that makes it fun.

RESOURCE MATERIAL

General rulse of Initiative Games are:

a) Appoint someone as the group leader for the activity
b) Carefully read the problem
c) Brainstorm ideas as a group
d) Choose the best way to solve the problem
e) As a group work together achieving it
f) Rejoice greatly when finished

There are four idead listed here. Staff may come up with some more great ideas, or one group could think up a situation for another group to solve.

1. Death Swamp

Your unit has been pushing through dense undergrowth when suddenly they come onto the edge of vast expanses of stinking, smelling, vile looking swamp. The time is 11.58 am, the wind is from the North East. The group discover their exact location at 392071. They discover a note on the map - Death Swamps - "This area is highly poisonous and will cause skin blisters if contacted."

The shortest distance across the swamp is approximately 6 metres. The group watch amazed as Pukakes walk without effect through the much (Pukake or Swamp Hen legs are about 23cm long). You discover someone has left a dump of boards and old paint tins where the original homestead was located.

You have to get across because you oberve that the Cumulus cloud build up is rapid and the barometer reading is falling. (John B Wells)

2. Shipwrecked

Your unit has just struggled ashore on an island. It is low tide at the moment but on the turn. The island is presently 10cm above sea level. The sea is a beautiful blue colour. This area has 2 metre tides every 100 minutes. the local fishing fleet will sail past on the other side of the reff 8 klms out from the island (where you were wrecked) in just 48.5 minutes.

As the area is known for its four metre long white death munchies, it is believed your unit council will want to take immediate action to overcome this minor problem.

The one legged inhabitants of the nearest island 20 klms distant have the same problem, only they have learnt that the munchies can jump 1 metre out of the water. It is a definite fact that a person standing on something two metres above high tide level will be easily visible to the fishing fleet, and will attract their attention. The wind is from the north, and the temperature is a warm 30°. No rain is reported. There is some driftwood and beach vines on the island (drifted over from "One Leg Island"), also a it of equipment washed up on the last high tide. A flag of distress at least 6 metres above high tide level will be sure to attract attention if waved like made. (Don Craig)

3. Piranha Downs

The area you presently occupy will be indundated y 1.4 metres of piranha infested water shortly due to a weird weir wall collapsing. It is a well known fact that piranha can jump at least 60 cms out of the water, biting all the way up and all the way down. The flood will come from the North East.

It is strongly recommended that your unit move to a "place of refuge" - you cannot flee to higher ground as the inundation will be very general. In this locality floods bring swars of mosquitoes and sand flies. Your repellent stocks gave up the ghost yesterday, and you left the insect spray at home. However, your erstwhile captain believes smoke will keep them at bay. SES have just sent a message that the flood is 48.5 minutes away. All trees were cleared in the area 6 weeks ago. There is some driftwood and vines lying around, also some equipment left behind by a group. Sunrise is at 0520 hours. The wind is northerly and the barometer indicates a high coming. Piranha leap out of the water at 60 kph and fall back at 10 metres per second per second. (Don Craig)

4. Crocodile Reunion

Your unit has been bravely fighting off massive mosquito attacks as they walk carefully beside a slow moving creek that is having a homecoming for crocodiles that have jaws that are 500 cms wide. The gruop are very tired and are walking at a pace of 3 kms per hour. The sun is just past its zenith on your left hand side. The map reveals that the river stays at its present course for the next 38.3 klms and is presently 1 metre in depth and increasing at the rate of .25 metres every .5 klms.

The parents are meeting you some 10 klms to the south. Because of the density of the crocodile renunion, you will have only one chance to cross the creek.

Unfortunately the last flood destroyed all the trees standing, scattering them across the flood plain. You have to move quickly. The parents are meeting you at 3pm and the gates to the National Park close at 4pm. You have no food left. Sunset is at 6.30 pm, the wind is from a westerly direction and the barometer is falling. (John B Wells)