INTRODUCTION

This Western Australia Police Academy publication has been written and compiled by Sergeant Bert O'Meagher APM, Co-ordinator of Land Operations Training at the Western Australia Police Academy in collaboration with Dennis Reid and Dr Ross Harvey MBBS Dobst RCOG.

The Police Land Operations Training Unit was introduced to provide members of the Western Australia Police Service with the necessary skills and knowledge to carry out their duties in outback Western Australia and to enable them to co-ordinate or participate in emergency operations and advise on safe outback travel. The unit is concerned with the education of interested community groups and individuals.

Originally the book was produced to provide members of the Western Australia Police Service with a locally produced source of reference for use in training and for dissemination to the public. To this end the book has proved to be extremely successful, this being the 17th edition with over 370,000 copies being distributed since its introduction in 1979.

The book is required reading for several community groups, youth organisations, education institutions and industry trainers throughout Western Australia.

A dedicated group of community minded individuals and organisations have contributed information and items. Their efforts and contributions are much appreciated, they include - Peter Bindon [W A Museum]. Vern Delgado. Ronele and Eric Gard. The Duke of Edinburgh's Award [WA]. The Royal Lifesaving Society [WA]. St John Ambulance [WA]. Red Cross [WA]. Senior Constable Ian Thomson and Sergeant Phil Ramsay of the WA Police Service.

Thanks are also extended to the staff and students of classes conducted by the Police Land Operations Training Unit and members of the community of Western Australia who have provided valuable comments and feedback.

A copy of this publication has been deposited in the Australian National Library.
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SAFE OUTBACK TRAVEL

Adequate preparation before undertaking a journey or accepting employment in the outback will lessen the chance of jeopardising human life. There have been many cases where loss of life has resulted from a lack of foresight into the problems involved.

PRIOR PREPARATION AND PLANNING

There are a number of things to be considered before starting to pack for your trip, these are linked to the premise that -

Note:

Prior Preparation And Planning Prevents Poor Performance.

Equipment Required

The equipment you are taking must be serviceable and sufficient for the trip. Allow additional equipment if in doubt. Maps should cover the entire area of the trip.

Communications

For close range communication between vehicles a citizen band UHF or VHF radio may be used, however for long range communication a HF radio or satellite communication device is essential.

Terrain to be Covered

A map study should be done to ascertain the following:

- Is it accessible by vehicle or by foot?
- Where are the fuel and water source's en route?
- What is the best route?
- What aids to navigation will you have?
- What alternate route could you use if necessary?
- What positions of evacuation are available?
- Where are the local inhabitants?

Use of Maps

The Western Australian bush is very monotonous with very few landmarks and a lack of signposts on outback roads. Be wary of spoken directions as they can be misinterpreted and the wrong track easily taken. In the absence of an official map, try to obtain a rough map drawn on paper with as many landmarks as possible indicated showing the necessary distances.

Note:

Mark your position on the map as you proceed so you can pin-point your location at any given time. Do confirm your position at every opportunity.

Weather Conditions

The weather must be considered as many road conditions vary according to the local rainfall. You should be aware of the changes of season in the area of your trip, this will ensure that you are going at the best time of year.

Time allowance

You should consider carefully the time and space you are allowing for your trip.

- When are you leaving?
- How long will it take?
- Where do you propose stopping to camp?
- When will you arrive?
- Have you allowed a safety margin in case of minor mishaps?

Learn about the country

You should learn as much about the country you are to travel, as possible. This will assist you if you have to survive in it. Things to study would be:

- Native Foods
- Water Sources
- Local Problems

Notifications

Before leaving on a journey through remote areas always notify either friends, relatives, station owners or police of the following information -

1. Estimated time of departure [ETD]
2. Proposed and alternate routes
3. Estimated time of arrival [ETA]

Note:

Don't forget to notify those concerned once you have safely completed the journey.

VEHICLE SELECTION

Selection of a suitable vehicle for safe outback travel will rely on the load that you are going to carry. As well as major items of fuel, food and water you may also be carrying camping equipment, cooking gear, vehicle spares, tools, recovery equipment, an extra spare tyre and passengers. If you choose to travel 'off road' you will need to be sure your vehicle can withstand the harsh and rugged conditions you will encounter.

Vehicle Preparation

Your vehicle will not only be your means of transport but if you are travelling 'off road' it will be your home and of course your biggest aid to survival should something unforeseen happen to you. As such it must be in first class mechanical condition. If you are not a mechanic it is best to take the vehicle to one who specialises in this type of vehicle. Explain the nature of your trip and have them go over the vehicle from top to bottom. Short courses in vehicle maintenance are offered by most community, TAFE Colleges, etc.

Roof Racks

To carry the intended load you will probably need to install a roof rack. Buy only from a reputable manufacturer who specialises in your type of vehicle.

Under Body Protection Plates

These are considered necessary by some people for rocky creek crossings, etc. They can be a problem in spinifex country as after only a few kilometres' spinifex packs tightly under the plate and creates a definite fire hazard.

Roo and Scrub Bars

These are not essential items for off-road travel but they can be good value should you be unlucky enough to hit a kangaroo or other large animal.

Spinifex Protection

Some spinifex grows to a height of nearly 2m and the seeds can be drawn into the radiator. At least 3 layers of fibreglass wire netting should be placed over the front of the vehicle.

Fire Extinguishers

It is good planning to carry at least 5 litres of water in a plastic garden spray for spinifex and grass fires as well as an extinguisher suitable for electrical or fuel fires.

Tyres

It is important to discuss your tyres with your local tyre dealer before your trip. Ensure you have the right tyres for the task. Eight ply radials are recommended as a minimum for off-road use. Two spares plus an additional 2 tubes should be carried.

Wheel Rims

It is easier to change a tyre on a split rim than on a pressed safety rim or alloy rim so stick with the standard steel split rim.

Winches

Types of winches range from hand, electric or power take off. If you have a winch fitted to your vehicle make sure you know how to use it. There are some simple safety rules to follow:

1. Always use a sling around an anchor point rather than forming a loop.
2. Never place your hands within 1m of the drum if the winch is operating.
3. Always leave six turns of cable on the drum.
4. Run the engine when using an electric winch.
5. Cables should be kept straight ahead of the winch. Do not pull if the cable is more than 15 degrees to either side.

Dual Battery Systems

When operating in the outback each battery should be used individually on a daily basis. When making camp for the night the appropriate drill should be used to ensure that the alternate battery is fully charged and will start the vehicle in the morning. The battery used for overnight use [refrigerator, etc.] may go flat.

Fuel

Long range fuel tanks are an excellent idea but make sure yours is fitted in the approximate centre of the vehicle between the chassis rails. Use the rear tank first to equalise load. If you do not have a long range tank then 20 litre jerry cans are an excellent method of carrying fuel. If you carry jerry cans make sure they are metal or designed to carry fuel and use tie wire on all caps to prevent spillage.

Water

Allow 4 to 5 litres of **drinking** water for each person per day while travelling. If you have a built in water tank fitted with an external tap it should be fitted with a tap guard and the tap itself lock-wired when moving.

Emergency Pack

Enough spare food, water and blankets should be included to allow for any unforeseen delays. Emergency rations should last at least three days on top of your planned trip.

A three day emergency pack for each person should consist of -

- 6 ready to eat meals
- 4 litres of water
- Emergency blanket
- Waterproof matches

Vehicle Loading

The loading of the vehicle is critical and the vehicle's centre of gravity kept as low as possible always. Get in the habit of checking whenever you stop.

Vehicle Check List

The following items should be checked at the end of each day. This procedure should be conducted as part of your everyday routine and should never be neglected.

1. Check engine drive belts.
2. Check engine oil and coolant levels
3. Check fuel filter [if possible]
4. Clean air cleaner and radiator fins
5. Check brake, clutch and power steering fluid levels
6. Check engine for oil and coolant leaks
7. Check engine, transmission and differential for oil leaks
8. Check all steering rods and joints for wear and cracking
9. Check all tyres for pressure and damage
10. Check battery levels
11. Check chassis rails for cracks and tighten all mounting bolts, etc.

VEHICLE, TOOL & RECOVERY KITS

A comprehensive tool kit should be carried and should be suited specifically to your vehicle. If you travel in the outback "off road" at some stage you are going to encounter sand dunes, claypans, salt lakes and rocky creek beds. You are eventually going to become stuck and a complete vehicle recovery kit should be carried.

VEHICLE TOOL KIT

Screwdriver, 200 mm
Screwdriver, Phillips
Pliers, general purpose
Pliers, long nose
Spanner, adjustable 200 mm
Tyre pressure gauge
Set metric spanners
Set metric sockets
Small hammer
Hacksaw and blades
Puncture repair outfit
Spark plug socket *
Set of radiator and heater hoses
Tyre pump, hand or foot operated
Condenser *
Coil *
Funnel
Can of aerosol de-wetting agent
Brake fluid, 500 ml
Engine oil, 5L
Gear oil, 500 ml
Trouble light
Araldite fixative
Oil Filter
Insulating tape, roll
Alligator clips, electrical
Electrical wire, roll 3 mm
Tyre levers
Wheel brace
Feeler gauges, set ĩ
Fan belt
Power steering belt
Contact points, set *
Spark plugs, set ĩ
Jumper leads
Grease, 500 gms
Epoxy resin
Fuel filter
Masking tape
Rubber vulcanising tape
Plastic tubing, 8 mm
Paint brush
Magnet
Electrical fuses, set
Block hardwood
Hydraulic jack

Note:

ĩ *Diesel vehicles do not require these items.*

VEHICLE RECOVERY EQUIPMENT

Long handled and short handled shovels
Winch, complete with cables, tree protector and snatch blocks
Chain, 6m x 30 mm [fitted with moused hook and adjusting claw]
Nylon rope, 25m x 27 mm
Wire rope, 5m x 12 mm [ESFSWR with snap lock and hook at each end]
Snatch strap, 8m
High lift jack
Bull bag
Marlin spike

DRIVING TIPS

Listed below are some generally accepted safe driving practises to make your trip both safer and more enjoyable, they include -

- When driving on water-logged roads it is better to keep to the centre and avoid soft edges. While the ride may be rougher the road surface is usually firmer.
- When crossing flooded creeks get out of your vehicle and test the depth and current before crossing. If the rain has stopped the water level quite often drops in a few hours so in the interest of safety it may be better to wait.
- After driving through water do not stop the vehicle at once. Remember that everything under the bonnet will be wet and by running the engine it will have more chance to dry out. Brakes may be ineffective and can be dried out by driving a short distance with your foot on the brake pedal.
- Use the square-on approach to slopes. Go straight up and down hills and sand dunes. Remember that travelling across the face of a slope is dangerous as the vehicle can easily roll over.

HANDY HINTS

If a vehicle breakdown does occur or you encounter problems with your vehicle it may be possible to improvise parts and make the necessary repairs or adjustments. Listed below are some suggested improvisations -

- Nuts, bolts and fixing brackets can often be replaced with wire.
- Nylon panty-hose or soft rope can be tied in a circle can replace fan belts.
- A piece of thick canvas or vinyl can be used to make a sleeve for a blown tyre.
- A flat tyre can be filled with sand, clothing or vegetation.
- A hole in a petrol tank can be sealed by covering it with a piece of rag covered in condensed milk or a wad of chewing gum you may also consider plugging the hole with a wooden plug carved from a stick.
- Mustard or pepper added to a radiator will stop minor leaks, it is a good idea to always carry a packet of epoxy resin bonding agent in your tool kit for longer lasting repairs.
- Quick setting araldite can be used to effect a repair to a holed sump, in several reported cases a coin araldited over the hole was successful.
- When the battery is flat and the vehicle cannot be push-started a vehicle with manual transmission can be started by jacking up a rear wheel and manually rotating the wheel in a forward direction with the vehicle in top gear and the ignition switched on.
- The most useful item of recovery equipment for getting out of a bog if you do not have a winch is a shovel. If the vehicle is deeply bogged then try to clear the chassis rails and diff[s] and form an escape ramp in front of each wheel. Next you will need to jack up each of the four wheels individually and place material such as sticks, stones and any other material to hand under the tyres. This procedure will lift the vehicle out of the bog and at the same time give the tyres a firm surface to grip on. A valuable accessory is the bull-bag. This is a blow-up rubber bag which is placed under the vehicle and inflated by connecting it to the exhaust pipe with the engine running. It’s purpose is to jack up the vehicle, it can be used on any surface.

OUTBACK SURVIVAL

Survival is best defined as simply staying alive. Generally speaking survival in the outback is a day to day proposition. Each day can be broken into two parts, ensuring that once the sun rises your efforts are directed to staying alive to see it set and vice versa once the sun sets to see it rise.

The first rule of survival

The first rule of survival is **don't panic**. You must take stock of your situation.

The survival mnemonic

The survival mnemonic will assist you to avoid immediate panic.

S Size up the situation.

U Undue haste makes waste.

R Remember where you are.

V Vanquish fear and panic.

I Improvise.

V Value living.

A Act like the locals.

L Lean on your basic skills.

BASIC REQUIREMENTS FOR SURVIVAL

You will need four basic requirements to survive, they are -

WATER
SHELTER
WARMTH
FOOD

In general the priorities will be as listed, however, in some situations you may alter them to suit, for instance in the arid zone **shelter** may become number one priority if sufficient water is available. If you have taken the precaution of notifying someone of where you are going and how long you intend to stay, a search will no doubt be conducted to look for you.

Your task will be to use the knowledge and skills you have to provide the four basic requirements to stay alive until found.

ACTIONS BY SURVIVORS

A survival situation will be a traumatic experience for most people. The degree of effect it will have will depend on the circumstances. There is a psychology to survival and survivors will face many stresses that can produce a questionable will to survive. To fully understand this process it must be understood that stress is best described as our reaction to pressure. Too much stress leads to distress. Signs of distress in a survival situation may include anti-social behaviour such as angry outbursts, an inability to get on with others and eventual withdrawal from the group. It may also include difficulty in making decisions and an inability to accept responsibility.

Survival Stressors

Events that produce stress are called stressors. The most important survival stressors include injury, illness, death, uncertainty, lack of control, environment, hunger, thirst, fatigue and isolation.

Reactions to stress

There are several natural reactions to stress that need to be recognised, expected and for which strategic interventions need to be implemented. These reactions can include fear, anxiety, anger, frustration and depression. Make sure that your initial reactions to a survival situation give you every chance of survival.

Initial Critical Reactions

Recognise that you are in a survival situation and don't be afraid to make an honest appraisal of the situation. Get your thoughts on track by employing the survival mnemonic and recognise any survival stressors that may be present. Overcome any problems associated with attitude assumptions and adopt a positive attitude. Remember that your life and the lives of others who are relying on you to do your share are at stake.

Questions You Should Ask Yourself In A Survival Situation

- How much **water** do I have and how will I procure more?
- What **shelter** from the elements will I need?
- What is the temperature range and will I need a fire to provide **warmth**?
- How much **food** do I have and what food is available in the area?

Survival Situation Appreciations

There are six elements to a survival situation appreciation, they are -

1. Review the situation.
2. Determine your aim.
3. List the factors affecting your chances of survival.
4. Identify all courses open to you.
5. Select the best course of action.
6. Make a plan.

Note:

Remember your physical strength and emotional resources are at their strongest in the first three days of survival.

PERSONAL SURVIVAL KIT

The following is a list of equipment that should be sufficient to provide the four basic requirements for survival.

Items	Uses
Water bottle	Complete with 1 litre drinking water
Survival knife	Multi-purpose tool
Plastic bags	Ground sheet, improvised raincoat, shelter building, water collection and carrying, carry bags
Foil rescue blanket	Shelter, warmth, water collection, signalling aid
Nylon cord	Shelter building
Fishing gear	Fishing, shelter building, snares
Signalling mirror	Signalling aid
Waterproof matches	Firelighting, signalling
Water purifying tablets	Water purification
Barley sugar	Energy food source
Notepaper and pencil	Keep diary, messages

Note:

Your kit should fit on your belt and must be carried with you at all times.

EMERGENCY PACK

The following is a list of equipment designed to provide the four basic requirements for survival for the three day period following a vehicle break-down or air emergency.

Items	Uses
Water bottles	Complete with 4 litres of drinking water
Foil rescue blanket	Shelter, warmth, water collection, signalling aid
Food	6 ready-to-eat meals in cans [or other]
Nylon cord	Shelter building
Waterproof matches	Firelighting, signalling

Note:

Your pack must be carried in your vehicle or aircraft at all times.

WATER

THE IMPORTANCE OF WATER TO SURVIVAL

In Western Australia people die due to dehydration after becoming lost or having their vehicle break down in the remote and arid areas of the state. Many of these deaths occur because the individuals did not carry out good survival techniques. The average person can expect to survive without water for three to five days [depending on the climate and what they try to do]. Some instances show individuals have perished within hours of becoming lost.

You must conserve any water you have, including that already in your body. Water is required to replace fluid that is lost, so by conserving body fluid you require less water intake.

Fluid Loss

Fluid is lost from the body by -
Perspiring, breathing, urinating, vomiting, crying and talking.

Perspiring

Is a normal bodily process that has a cooling effect as the moisture evaporates from the skin surface. A person sitting in the shade when the temperature is 35C would lose about two litres of fluid in a twenty-four hour period. You should keep your body temperature down to a minimum either by natural or artificial means. It is important to keep activity down to a minimum and conserve existing body fluids.

Urinating

Is also a normal bodily process and cannot be prevented. However, it should be held as long as possible to slow down this fluid loss from the body. On no account drink urine unless it has been distilled. You could apply it to the skin surface with a sponge, in the hope that it will reduce your body temperature.

Vomiting

Can be avoided by leaving bad or harmful food well alone.

Crying

Should also be avoided, but it may be difficult to convince a child of this.

When to consume water in a survival situation

If you are unable to locate or procure water and are limited to the 1 litre of water in your survival kit it should only be consumed in small sips to replace some of the fluid lost to your system. This water may increase your time frame for survival by up to half a day if used wisely.

Note:

Sucking stones is not recommended [it produces saliva]. Do not drink salt water and remember dirty water should only be drunk after it has been purified.

METHODS OF WATER PROCUREMENT

Your first efforts in a survival situation should be directed towards establishing a good water supply. Initially you should look for ground water using the following methods.

Creek beds

Are easily discernible in dry areas because of the relatively green vegetation and taller trees following the course of the creek. Unless there has been recent rain in the area the creek bed will probably be quite dry. You may be lucky enough to locate damp sand or mud at the bends of the creek or by digging in the creek bed at a likely spot. Water can be extracted from the damp sand or mud by soaking a rag in soil and wringing out the water into a container. The exposed tree roots in the creek bed can be cut in lengths and drained of their fluid early in the morning. To reduce the risk of infection, any surface water must be boiled.

Rock Formations

If there is any water seepage from the ground, it is usually to be found near rock formations, where the country is rugged and undulating. It may also be found in some apparently dry areas. Rocky areas are also ideal for rain catchment. Rain soaks very quickly into the soil, whereas it can lie in pools on a rocky surface for as long as two weeks.

Salt Lakes

After rain has fallen, the top 3 mm of a salt lake is fresh water. It can be siphoned off by using a grass straw or tubing from your survival kit.

Windmills

These have been erected in most farming and station country throughout the state at such locations as wells, dams and soaks. These can be seen from a long distance and usually have animal tracks leading to them. Check to see that the water at these mills has not gone salty.

Animal Trails

Animals need water the same as humans and they will travel great distances regularly each day, leaving trails to the water source. Where a large number of trails converge together, it would indicate that the water was not far distant.

Water seepage

Natural springs and soft rock erosion areas [slopes, banks, etc.]

Tree Roots

In the early morning before the heat of the day, the roots from certain trees such as the boab, kurrajong, wattle, some gums and others, can be cut into short lengths, stood end on with their thickest ends down in a container allowing the fluid to drain. It is best to use roots that are easily obtained with a minimum of effort. The ideal location for this is in creek beds and washouts where parts of the roots are already exposed or near the surface.

Coastal Water Sources

Sea water may only be consumed after it has been distilled. You can usually obtain drinking water by digging high up on the beach above the tide mark, or behind the first sandhills. It will taste brackish and should only be used in small quantities.

Dew

The collection is tedious, but of some value in heavy grassland. Tie clumps of grass or cloth around ankles and walk around in dew-drenched grass at dusk or dawn. Squeeze off moisture into a container and repeat until enough is gathered. If you have a vehicle, wipe down the vehicle with a cloth.

Transpiration Method

Water can be obtained by placing **clear** plastic bags over the leafy branch of a non-poisonous tree and securing the end of the branch. Ensure there are no holes in the bag [seal these with black tape, band-aids, etc.]. The action of the sun on the plastic will cause water to be drawn from the leaves and run to the lowest part of the bag. Do not disturb the bag to collect the water, simply cut a small hole in the bag then reseal it. The leaves will continue to produce water as the roots draw it from the ground.

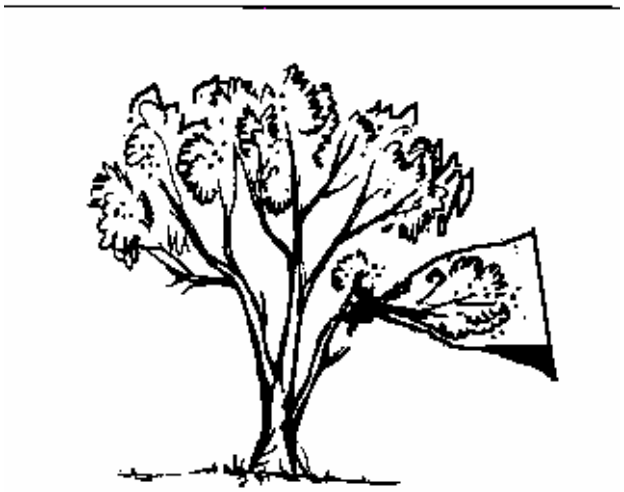


Figure 1 - The transpiration method

The water should be drained off every two hours and stored. Tests indicate that if this is not done the leaves stop producing water. Probably the heavy concentration of moisture laden air reduces the effectiveness of the sun. If there are no large trees in the area, you can break up clumps of grass or small bushes and place them inside the bag. The same effect will take place. If this is done the foliage will have to be replaced at regular intervals when water production is reduced.

Note:

Ensure that these bags receive maximum sunshine at all times. Ensure that exposed roots are tested for water content. Soft pulpy roots will yield the greatest amount of liquid for less effort.

Distilling Sea Water

If only salt water is available a distilling plant can be made. You will have to improvise and use containers that can be found or that you may have. First you require a container of sea water and material to seal the container to prevent steam from escaping. Push one end of the tubing or rubber hose through this seal material and check to see that the seal remains intact while blowing into the loose end of the tubing. Place the container onto a fire and bring to the boil. Steam will be forced through the tube where it condenses and fresh water will drip from the end, into another container.

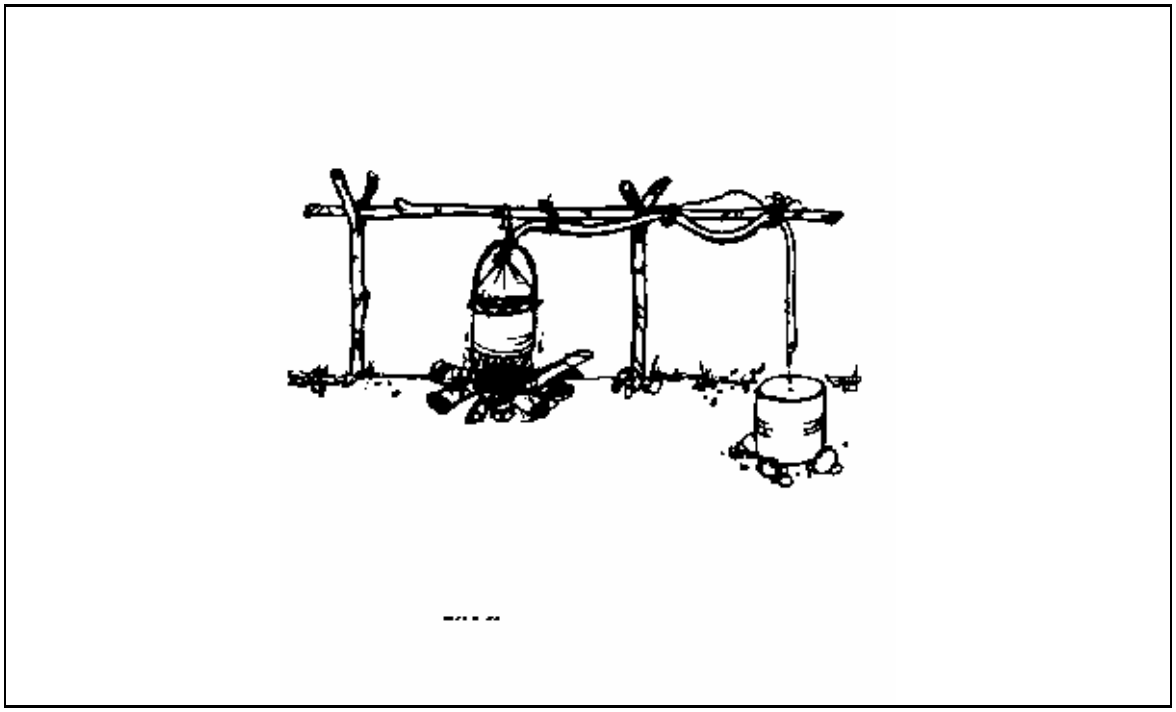


Figure 2 - The condensation method

This is not the only method of distilling water. You may simply bring water to the boil and catch as much steam as possible on a piece of cloth and then ring it out. Although this method works, it is not the most efficient.

You must remember that the steam is the fresh water and therefore you must trap the steam to get fresh water. Any improvised method will do even if you place an open container on the fire and bring it to the boil, then arrange a small plastic "tent" on top of it. The steam will strike the tent, condense and run down to your container or containers.

Note:

Alfoil or similar would make a seal around the container by folding it into a cone shape with the tubing attached to the small end of the cone and placing the large end around the container, secure ends of cone with wire to make the seal. Run the tubing through a cooling agent [water].

WATER PURIFICATION

You must always ensure that the water you drink will not cause internal infection as this will lead to further loss of fluid.

Clarification

The water you drink should be as clear as possible. To achieve this you must strain it to remove the suspended matter, etc. A good method of doing this is to make a filter from the leg of a pair of trousers. Into this place fine sand up to one third the length of the trouser leg, charcoal for the next one third and fill to the top with gravel, small stones, etc. Hang the leg of the trousers in a tree or similar and pore in the muddy water. It will take a little time but clarified water will begin to seep through the filter and drip into a container placed underneath.

Sterilisation

Because the water is clear does not mean that it has no bacteria in it. To make sure of this you must sterilise any natural water that you drink. To sterilise water you can use several methods; the easiest would be to put in sterilisation tablets. The alternatives would be to boil the water or to use other chemicals that will neutralise any bacteria such as Condy's Crystals or Iodine.

SHELTER

Extremes of heat and cold are the enemies of human survival and both these qualities are found in inland arid regions where very hot days are followed by cold nights.

A shelter will provide you with protection from the elements, insects and animals. It is also a big psychological boost that will help you feel that you are managing. Determine what type of shelter you require and plan accordingly.

Using Vehicles as Shelter

Vehicles are a source of shelter as they provide protection from the sun during the day and the cold air at night. Blankets or branches can be used to keep direct sun from the vehicle. Boot lids and bonnets can be removed.

Rescue And Space Blanket

Space or rescue blankets are cheap, lightweight and an ideal item to assist in providing shelter. The reflective surface reflects the sun's rays from the person sheltering underneath.

Natural Shelter

If nothing else is to hand you will have to use bush materials, when constructing a shelter you should consider the following points:

- Type of protection required.
- Availability of materials.
- Proximity of water.
- Close to your emergency signals.

When you begin construction, use larger branches for your basic frame as you will find a roof fairly heavy when it is wet and they will have to support it. Branches can be tied together using vines, strips of bark or sword grass. If you are near your vehicle, strip out wires to use for this.

Remember that your ability to improvise and see alternate uses for items that you may have available to you could mean the difference between life and death.

TYPES OF SHELTERS

Any survival situation will involve the construction of some form of shelter from the elements. The need for shelter and the type of shelter should be as identified in your survival situation appreciation. It is important that you base any decision to build a shelter on your survival plan. Be careful not to use items from your survival kit which have a higher priority of use. Some fairly simple types of shelter which you can build with a minimum of effort include the following -

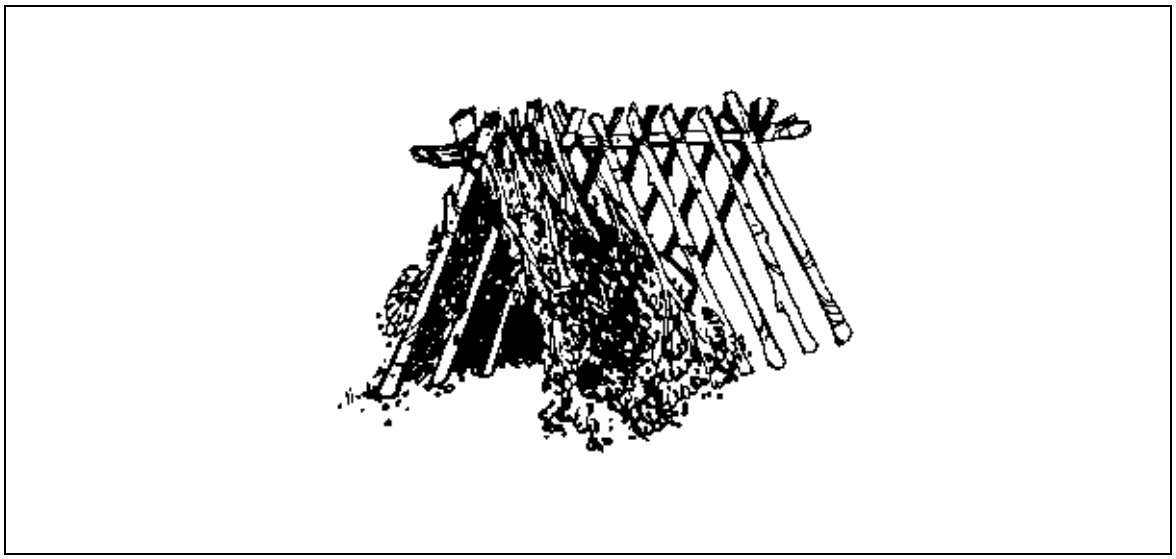


Figure 3 - The A-frame shelter

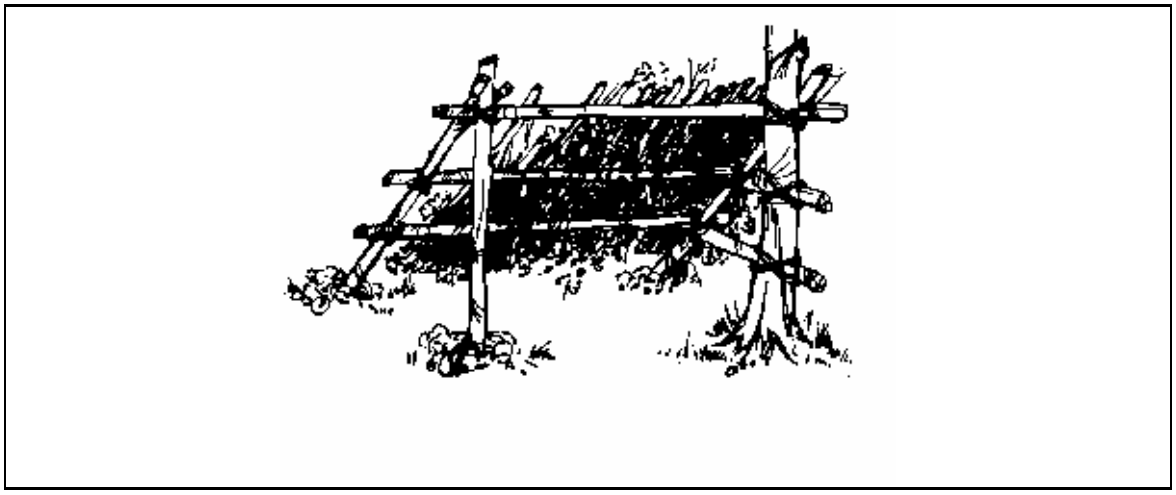


Figure 4 - The lean-to shelter

Figure 5 - The aboriginal shelter

Roofing

If your vehicle is handy, you can pull out the head lining to use to make a waterproof roof. If not, then blankets, sleeping bags or even spare clothes can be used for a sunshade.

Thatching

Thatching can be done by using materials such as leaves from palms or leafy branches, even tufts of grass tied together will provide a thatch. Some types of thatching you can use include the tufted grass thatch and the batten thatch.

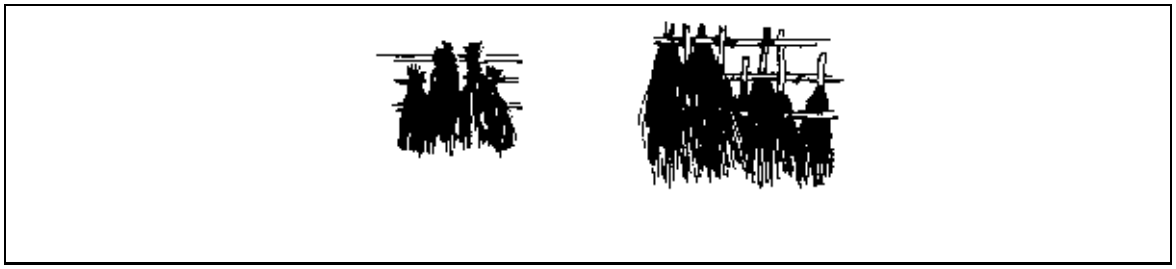


Figure 6 - Batten thatch using grass and palm fronds

Use Of Debris

Once you have constructed the skeletal structure for your shelter in cold or wet weather you should consider the use of debris for protection and insulation. Over the framework heap on a pile of light soft debris. Leaves, grasses, brush, almost anything will do. The debris should eventually form a large dome shaped mound some 60 cm thick over the structure. Remember the thicker the pile the better the insulation and the steeper the pitch the better the rain protection. On top of the debris add some bark slabs or moss to form a protective waterproof layer.

Your shelter will depend largely on what is available to use and what the conditions are. Common sense will guide you but be warned, a shelter takes a good deal longer to build than one imagines. If you can find something that will provide a part of a shelter such as a hollow log, then use it as the basis of your shelter, this will save time and energy.

Note:

Whilst building your shelter remember that heat stroke and loss of body fluid can be avoided by keeping in the shade and moving as little as possible during the heat of the day.

WARMTH

FIRELIGHTING WITHOUT MATCHES

Fire cooks, warms, sterilises and acts as a signal if necessary. To start a fire requires an understanding of combustion. For combustion to occur requires the presence of fuel, heat and oxygen. Fuel consists of dry vegetable matter, dry animal manure, reactive chemicals, kindling and timber. Heat can be provided by friction, chemical reaction, spark or magnification. Remember that oxygen is the essential ingredient to produce flame from heat and fuel.

Always carry some form of fire starter with you on trips such as waterproof matches or lighter. If you do not have these then your skills should include at least one of the following methods. Remember that traditional methods of fire lighting require a high degree of patience and skill and should be learned and practised in a training environment.

Vehicle Method

Your vehicle has probably been fitted with a cigarette lighter. Use this to ignite a petrol soaked rag [outside the car]. If you do not have a lighter then pull out two wires from the vehicle and attach these to the terminals of your battery, run them away to the ground. When the ends are touched together they will spark and ignite tinder.

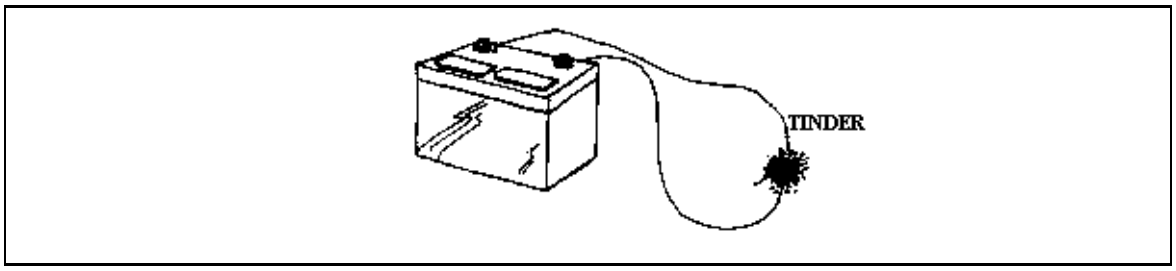


Figure 7 - The battery method of fire lighting

Note:

The gas produced by a battery is highly volatile and if exposed to a spark could cause an explosion. Make sure the fire is started away from the battery.

Torch Battery Method

A fire can be started by holding very fine steel wool over the negative terminals of a 6 volt torch battery and brushing it against the positive terminal. The sparks produced should ignite the steel wool [make sure you have tinder ready].

Chemical Method

Condy's Crystals from your survival or first aid kit can also be used to start a fire by mixing in equal amounts with sugar [barley sugar can be used] and grinding them with the flat of a knife blade. The result is a brief intense flame.

The Fire - Bow Method

This method is used by many indigenous people around the world. To use the fire-bow take a turn around the drill with the nylon cord attached to the bow [if you have used green timber for a bow the tension will be applied automatically, otherwise use your fingers to hold it tight]. Place the tip of the drill into the base starting groove and hold the head stock onto the top of the drill. Push and pull the bow to rotate the drill. The over-heated shavings [punk] will fall through the groove in the base onto the tinder. The small ember which will form should be held in the timder and blown until it ignites.

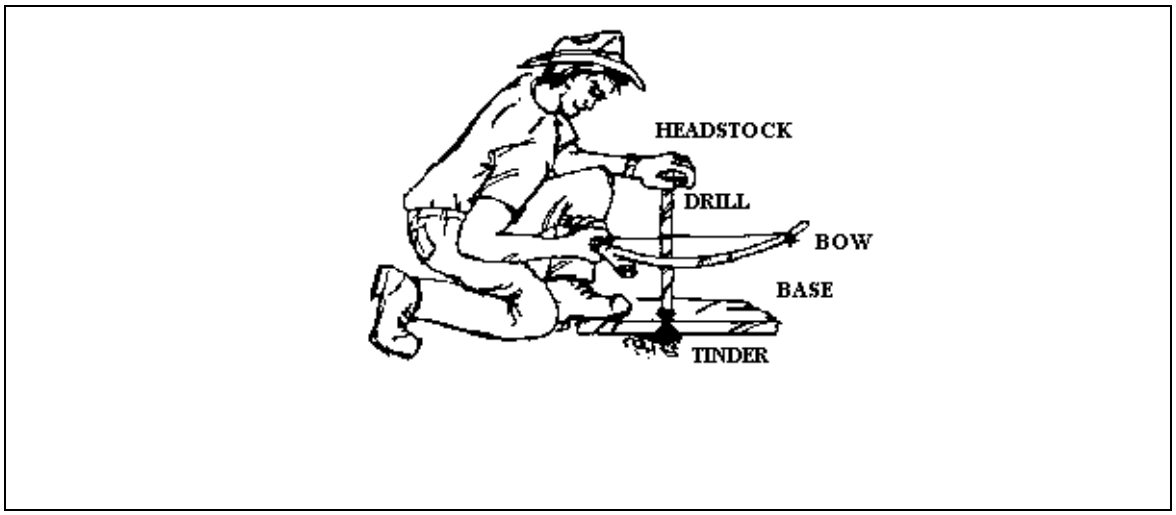


Figure 8 - The fire-bow method of fire lighting

The Bow - can be any branch of a tree and should be approximately 45 cm to 60 cm. **The Head Stock** - is a piece of hardwood to hold the top of the drill and allow it to rotate.
The Base - is a softer piece of dry wood flattened top and bottom so it will sit on the ground to allow the drill to start. A small groove is cut into the side of the base directly beside where the drill is to be used to allow the shavings or **punk** to fall onto the tinder.
The Drill - consists of a piece of dry wood of soft texture 30 - 40 cm long and as straight as possible. The diameter should be 1.5 cm to 2 cm, the drill sharpened to a point at both ends to fit into the starting groove of both the base and head stock. One of the better types of wood to use for both the drill and base is the lower portion of blackboy stalk.

The Lens Method

Strong sunlight focused through a lens can produce enough heat to ignite tinder. The lens can come from a magnifying glass [including the base of some compasses], binoculars, camera or telescopic sights from firearms.

Flint, Steel and Magnesium Blocks

Flint is a stone which if struck with a piece of steel [knife] produces sparks which will ignite tinder. Magnesium blocks [flint attached] are available commercially for inclusion in survival kits as emergency fire lighters.

FOOD

LIVING OFF THE LAND

Although food is not as important as the other three requirements for survival it is necessary for a prolonged survival situation. Any available foods should be eaten sparingly, keeping in mind that it is better to have one meal a day than to nibble small amounts. The average healthy adult can live for several weeks without food so this will give ample time to locate nourishment from natural sources if necessary.

FOOD SOURCES

Sources of food available to survivors include; animals, bird life, marine life, insects, grubs and plant life.

In considering natural sources of food, there are some important points to remember -

1. Most animal, bird and plant life are protected and should only be used for food sources in emergencies. Should it be necessary to kill, only kill what is necessary for your survival.

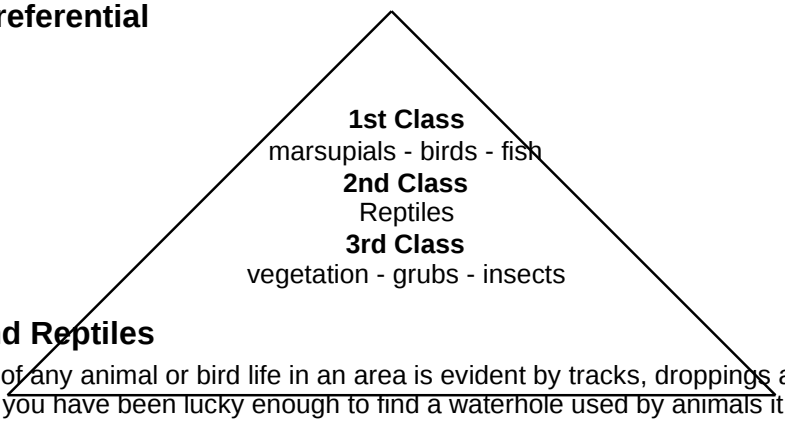
2. The body needs fluid to digest food, so foods with a high water content should be considered before others. If no water at all is available, then food should be avoided, particularly meat, which requires more fluid to digest than vegetation.

3. You do not need to be a skilled hunter to obtain food in the bush. Even without weapons of any description enough lizards, insects and grubs can be found to keep a person alive for several days simply by looking under rocks and dead branches, tree stumps and anthills.

4. If possible all foods should be cleaned carefully by washing, then cooked, thus lessening the chances of any infection or stomach upsets.

5. Generally bush food is tough, fibrous, unpalatable, and to some, even nauseating; nevertheless it is food.

The food preferential



Animals and Reptiles

The presence of any animal or bird life in an area is evident by tracks, droppings and traces of fur or feathers. If you have been lucky enough to find a waterhole used by animals it is a simple matter to sit under cover, down-wind from the water source and either shoot or snare the animals as they come to water.

Even by walking through the bush quietly during the day it is possible to surprise sleeping animals in creek beds, under shady trees and amongst rocky outcrops.

Some of the most likely animals seen in the bush include; kangaroos, small marsupials, wild goats, donkeys, pigs, rabbits, snakes, lizards, frogs, sheep and cattle.

Some imagination and bushcraft skills are needed in knowing where to look, how to recognise tracks and how to snare the faster moving animals.

SNARING ANIMALS

Without a firearm or manufactured animal trap most animals can be snared with a wire noose placed in a convenient position such as the entrance to a hole or above an animal path between two trees. The noose should slide freely and the other end of the wire should be anchored securely to a tree or post. As the animal passes through, the noose tightens around the neck quickly killing it as it tries to pull free. This type of trap is generally successful at night when the animal cannot see the snare. Care should be taken not to leave any human smell on the wire. Owing to the cruel nature of the snare, it should only be used when other methods fail.

If setting a snare look for signs of fur around a tree's base or signs along a fence line to indicate where an animal has passed through. Animals will return to the same place to sleep and will continue to negotiate fences at the same spot.

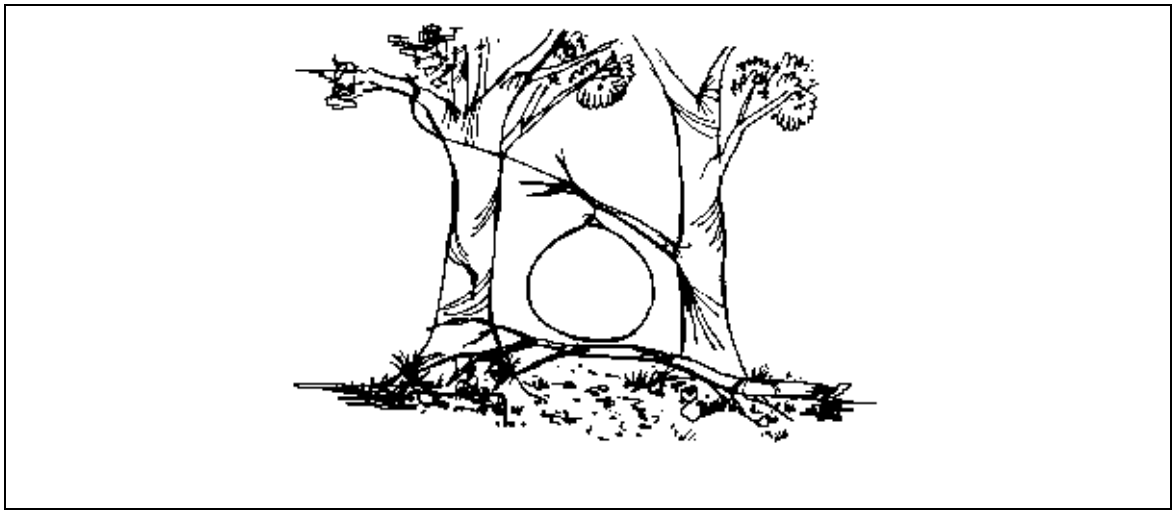


Figure 9 - The animal snare

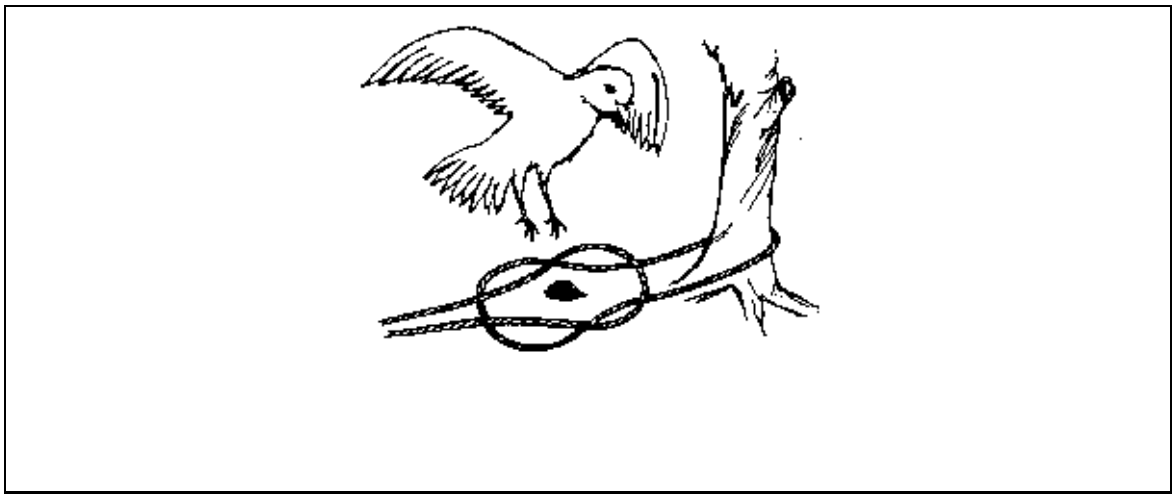


Figure 10 - The reef knot snare

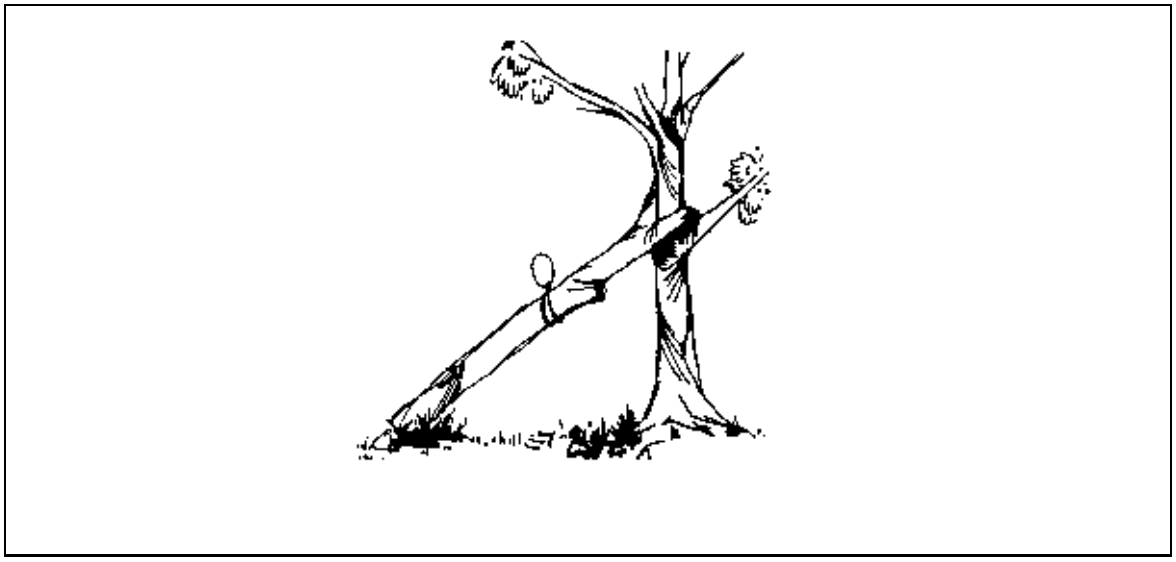


Figure 11 - The possum snare

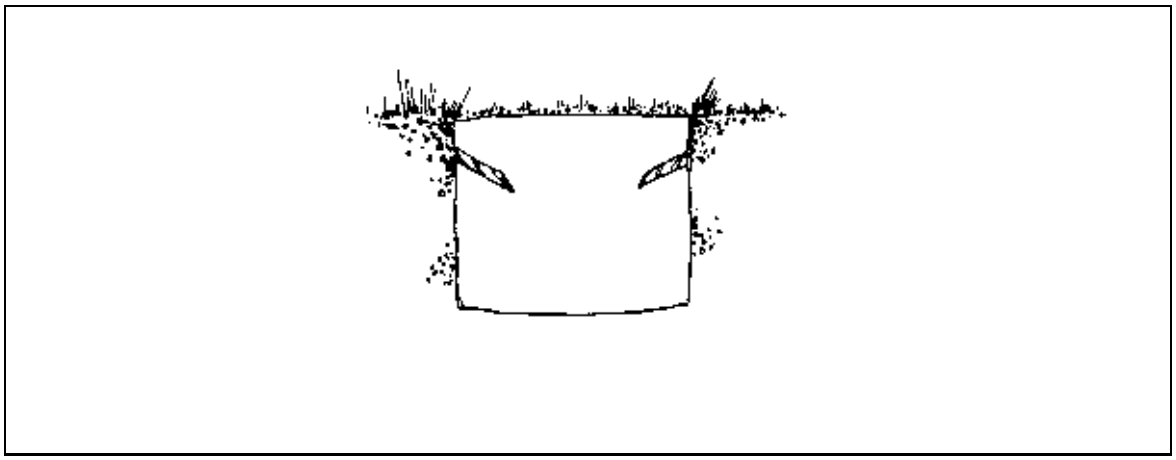


Figure 12 - The pit trap

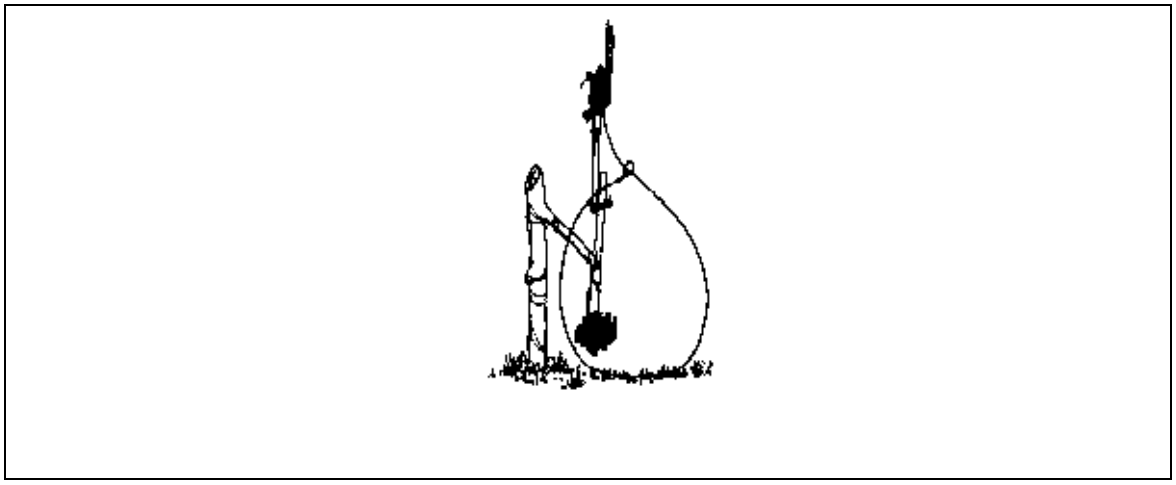


Figure 13 - The bait-stick snare

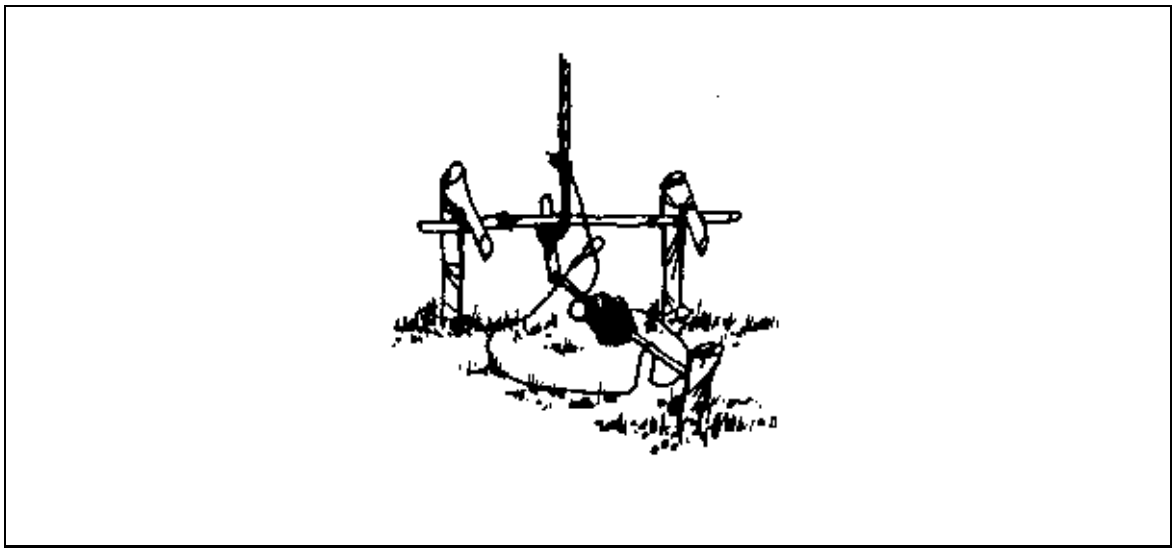


Figure 14 - The toggle stick release snare

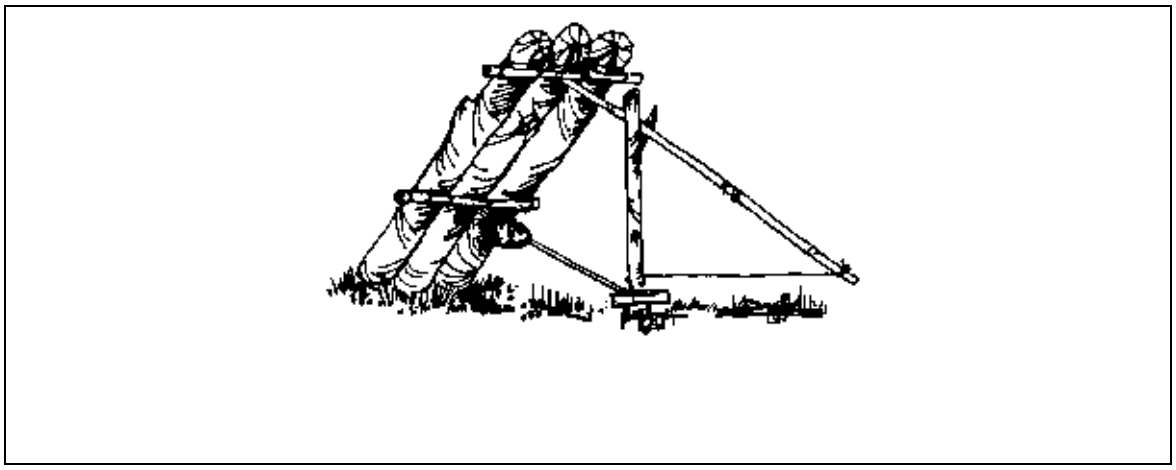


Figure 15 - The toggle stick deadfall

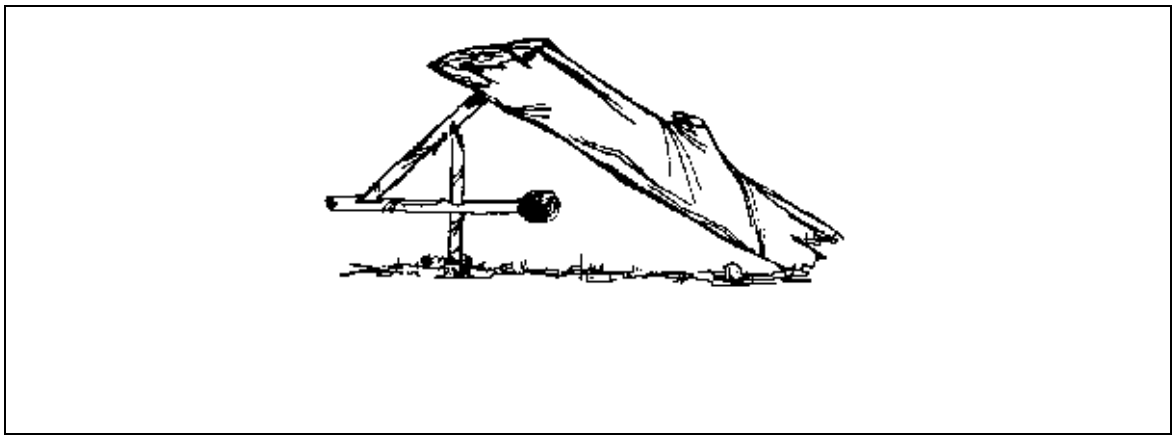


Figure 16 - The figure four deadfall

Note:

Remember traps and snares are illegal and should only be used in survival situations when your life is in danger.

Bird Life

Ground feeding birds can be trapped by placing grass or other bait under a cage made from wire netting or green sticks woven together. The cage is propped up with a stick that is pulled out by a hidden observer tugging a string as the bird walks under the cage. The cage falls, trapping the bird.

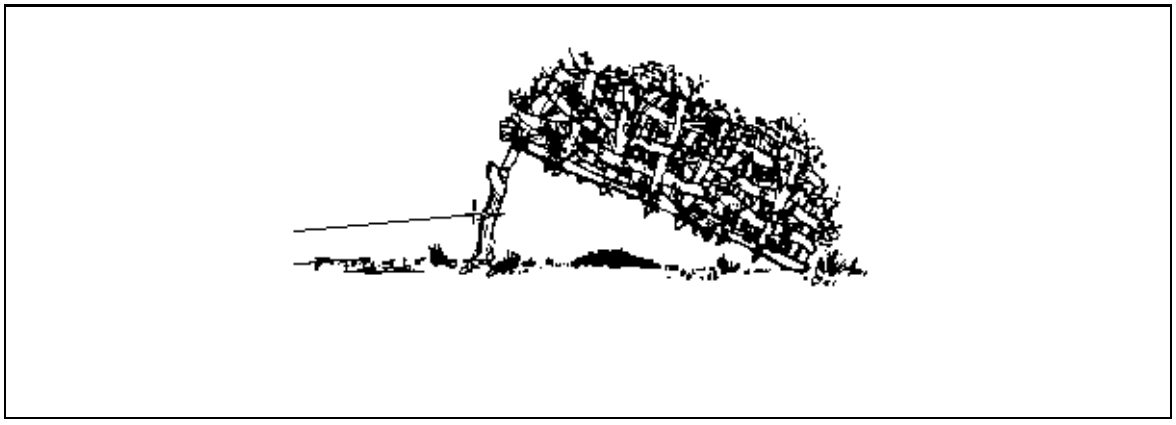


Figure 17 - The bird trap

A fishing line can also be used successfully. Bait the hook with an insect, bread, or other edible matter, tie the line to a tree or stick where the birds frequent.

Birds are rather difficult to shoot or trap because of their flighty nature but you may be lucky enough to locate a nest, either on the ground or in the trees, containing eggs or young. Most birds try to confuse intruders by flying away from their nest at the approach of any danger. This has the effect of leading the intruder in the wrong direction, thus protecting the eggs or young.

Emus are very common in outback areas and can be enticed towards bright objects waved by a person hiding behind a bush. As the bird's inquisitive nature leads it within metres of the object, the person can then step out and kill the bird with a suitable weapon.

When shooting or trapping, frequent a water source if possible. Stealth, not speed, is of great importance when shooting and patience at a water hole at dawn or dusk is usually rewarded.

Reptiles

All reptiles are edible including venomous snakes [remove the head and portion of the neck to remove the venom glands]. Goannas being reptiles are fatty and oily so if you have to eat these, overcook them. Remember, care must be taken when catching venomous snakes and other reptiles, as their bite can be fatal or lead to infection.

Marine Life

Fish can be caught using the usual method of a baited hook whether in the sea or inland rock holes. They can also be trapped near the water's edge by using a fence of upright sticks pushed into the sand close together. This type of fish trap is used by fishermen in tropical areas with extreme tides where netting is used in place of the sticks. The fish are trapped by the mesh of sticks and easily removed when the tide goes out. Another method of gathering sea food is by digging in the sand or turning over rocks for shellfish after the tide has receded. This is how some fishermen collect bait for line fishing.

Insects

Insects and their larvae are often overlooked as a source of food even though they are widespread and easy to obtain. One hundred grams of fried termites have a calorie value that puts them amongst the richest foods. Most other insects have a high food value and are a particularly good source of nourishment. They also have a high food value as well as a having a high fluid content. In some overseas countries, maggots, grasshoppers and termites form part of the natural diet. Termites can be obtained by breaking open anthills or dead wood and picked up on the end of a wet fingertip. The taste is in no way offensive and the same can be said for ant eggs.

The insect larvae known as the bardie or witchetty grub is obtained by breaking open dead trees and blackboy stumps after examining for the characteristic borer holes. Other insect larvae may also be present and can be eaten if there is no offensive smell or taste.

Do not eat furry grubs or grubs with black showing through the skin. Snails and slugs can be eaten but are an unlikely source of food as they favour wetter areas and there would be alternate food available.

Honey ants can be collected near the base and on the branches of trees in tropical areas. The fluid from their abdomens is good nourishment as is honey from wild bees if you are lucky enough to locate any.

ANIMAL BUTCHERY

Most animals can be eaten although most of us have a preference for herbivorous animals such as cattle sheep, pigs, horses, rabbits and poultry. There is no reason however, that you cannot eat vermin in a survival situation.

Disease

Check all animals for disease, the body should look well fed and be clean smelling. If in doubt a small piece of meat can be boiled in a covered pot, when the water is boiling if the vapours have a bad smell you should not eat the meat. Do not eat birds when the flesh is flabby, purple, a green discoloration around the neck, stiff feet, collapsed eyes or a sour smell present. If you can pull out a rabbits' fur, if its eyes are enlarged and dull or its body cavity slimy it should not be touched.

PREPARATION OF GAME FOR COOKING

The size and type of animal will determine your method of preparation for cooking.

Large Animals

Should have the throat cut to 'bleed' the carcass, then hung up by the hind legs, the gut contents, head, and skin removed then cut into joints for cooking.

Snakes

Should have the head, skin and stomach removed and be cut into small pieces.

Lizards

Are prepared simply by removing the head and gut contents.

Birds

Should have the head removed along with all the feathers and the intestines.

Rabbits

Should be skinned, gutted and have the head and feet removed before cooking.

Note:

Remember to wash all meat of blood before cooking, also make sure in the interests of hygiene that you wash all blood and meat from your hands after handling dead animals.

EDIBLE PLANTS

A vast number of plants that can provide food in an emergency occur naturally in Western Australia. However, many of them are hard to identify without expert help and many more have sharp or tangy juices that discourage people who cautiously taste them.

The seeds of many of the native pea and bean family are highly poisonous. It is best to avoid these native plants even though garden varieties are good to eat. After all, if you are already working hard at surviving, you do not want to add illness to your misfortunes.

You should also avoid the palm-like plants. Zamia palm fruits contain poisons and so do the young shoots. Unless you are absolutely certain of the identity of the palms that you are about to eat they are best left alone. Fungi are another group of plants best avoided. Although many of the fungi that are found in Australia can be eaten they provide little nourishment and there is no rule to eliminate the deadly species.

THE TASTE TEST FOR PLANT EDIBILITY

Should you find vegetation that you think is edible you must carry out the taste test to reduce the chance of eating something that will harm you.

LOOK

Does it look like something you can eat, look for poison indicators such as milky sap.

SMELL

Break open, crush it and smell it, be wary of things that smell like almonds or peaches.

TOUCH

Rub on to a tender part of your body and wait 20 minutes to see if a rash develops.

TASTE

Rub on the inside of the lip and tip of the tongue, testing for flavour and reaction.

EAT

Eat a very small portion [if all the above tests prove negative] and wait a few hours to see if there are any reactions. If there is no reaction then you may eat a larger portion, continue to do this until you are sure that even large quantities will not harm you.

Note:

Should the part you have tested prove inedible then do not discard it as cooking may make it edible. If one part of a plant proves to be inedible then test the rest.

SOME COMMON TYPES OF EDIBLE VEGETATION

This list gives only a few of the well-known plants that grow in Western Australia and are fairly easy to identify.

Banksia and Grevillea

Many of the flowers of the Banksia and Grevillea family contain large amounts of sweet nectar that can be sucked directly from the flower or they can be stirred in water to make a refreshing sweet drink.

Blackboy [Xanthorrhoea sp]

Has an edible white substance at the base of the green leaves, this is quite sweet when eaten raw. The plant is killed when you remove this growing heart so treat this plant strictly as emergency food.

Bracken Fern [Pteridium sp]

This and some other large ferns are edible while the green shoot is in the "fiddle head" stage. Although they can be eaten raw, they are more palatable when cooked, the underground stems although stringy are rich in starch and roast up well in the campfire.

Bulrush [Typha sp]

Is recognised by its brown flower spikes rising above the erect grass like leaves. These plants generally grow along the edges of lakes, swamps and large dams. The horizontal stems are rich in starch but need pounding to separate this from the strong fibres running through the plant.

Emu Plums [Podocarpus drouynianus]

A low shrub found in the southern forests yields a dark purple, edible fruit of good flavour. The attached green "seed" should be discarded.

Figs [Ficus sp]

Fig trees of one kind or another are found across much of Australia's inland, their glossy, green leaves are very distinctive and the red, pulpy fruits are excellent eating.

Geebungs [Persoonia sp]

These shrubs or small trees are found mainly in the south of the state. Their small fruits are edible and are tastiest when collected from beneath the tree bearing the fruit. These sticky fruits are also given the unappealing name "snotty gobble".

Kurrajongs [Brachychiton sp]

The trees have dense crowns of bright green leaves and are easily identified by their boat shaped, woody seed pods filled with shiny, yellow seeds. Use a stick to remove the seeds from their pods as the small hairs surrounding the seeds are very irritating to the skin. The seeds, rubbed free of their individual shells in a dish [hub cap] can be
pounded and roasted with a little water to make porridge. Roasted until black and then crushed, the seed can be used like ground coffee to provide a drink.

Native Banana [Leichardtia Australia]

Is a vine with greyish leaves, tiny flowers and white, milky sap. Even though milky saps usually indicate that poisons are present, these immature, large, greenish, pear shaped fruit can be eaten raw or cooked, once ripe only the yellow seeds are edible.

Pigweed [Portulaca sp] and Pigface [Carpobrotus sp]

Are succulent plants found in sandy areas of the state and often near the coast, the water in their fleshy leaves is a little salty but can be purified. The ripe, red fruit of Pigface contains a sweet, jam like substance that can be eaten raw.

Quandongs [Santalum accuminatum]

Are well known for their round, wrinkled seeds the roasted kernel of which is edible and quite nutritious. The bright red, outer flesh of the ripe fruits is also edible tasting somewhat like an unripe apple. A related species, the Native Plum [Santalum lanceolatum] bears a tasty, dark purple fruit.

Saltbush

Many of these have small, juicy, yellow or red berries that are edible. Boiling the young leaves in several changes of water produces a substitute for spinach.

Water Lilies [Nymphaea sp]

Are among the water plants that have edible tubers or potato like growths at the base of the stems, they taste best when roasted in the ashes of the camp fire. The stems of the leaf and flower of the giant water lily have the texture of celery and can be eaten raw.

Boab Nut [Adansonia gregorii]

The nuts should be collected when mature but before they harden, the seeds and pith can be eaten raw or soaked in water.

Bush Tomato [Solanum diversiflorum]

These grey coloured shrubs grow to about 70 cm and have prickles on the stem and leaves, the flowers are purple. The fruit when ripe are pale yellow with black seeds surrounded by pulp. The seeds and pulp are removed and the sweet juicy flesh eaten.

Sugar Bread

The activity of insects on plants leaves a crusty white substance on gum leaves. These sweet tasting crusty particles can be eaten or dissolved in water as a refreshing drink.

Mulga Apples

These are the result of an insect that burrows under the bark of Bloodwood and Mulga trees. Inside the galls are a small amount of fluid and an edible caterpillar.

Note:

Always carry out the taste test on anything that you cannot positively identify.

DIRECTION FINDING

In almost every case it is best to stay with your vehicle or aircraft as searchers will locate this first. However you may have become isolated from a walking party and find yourself lost without a compass. For this reason you will have to know how to navigate without map or compass to proceed on the escape route to safety.

Watch Method [by day]

To find north using your watch simply -

1. Stand holding your wristwatch horizontal with the figure 12 pointing at the sun
2. Bisect the angle between the hour hand and the 12 O'clock position
3. The line will indicate north [approximately]

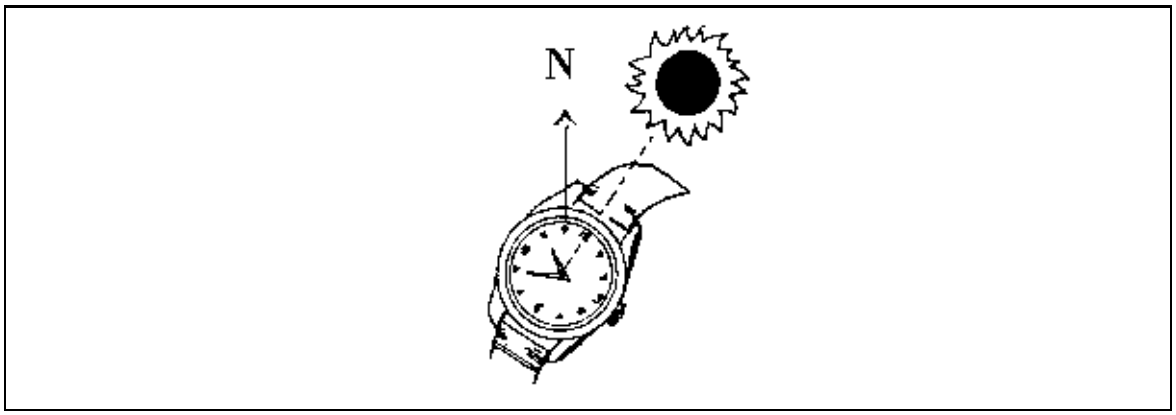


Figure 18 - direction finding using a wrist watch

Note:

This method will not apply to areas north of the Tropic of Capricorn during the period of the midsummer equinox for your area.

Sun movement [by day]

The sun crosses the imaginary north/ south line [meridian] every day at noon and there are 24 hours between crossings of the meridian. During this time the earth revolves through 360°. It can therefore be said the sun travels from east to west at a speed of 15° per hour. To find north simply note the time and plot the sun from its present position backward or forward as the case may be to its noon position.

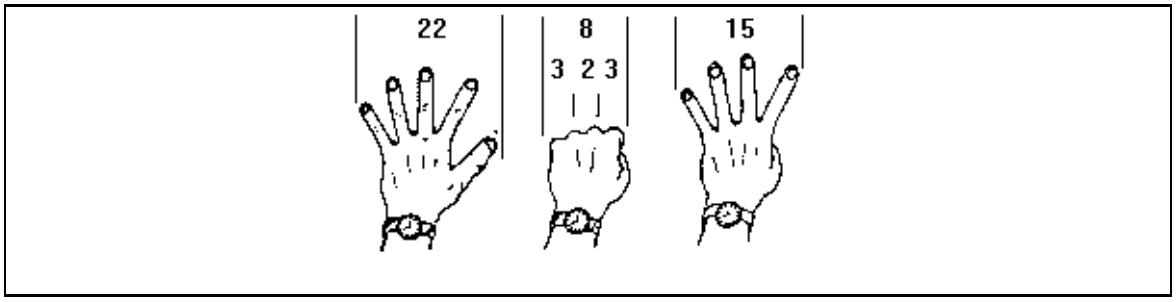


Figure 19 - The hand-span method of measuring sun movement

Shadow Stick Method [by day]

To use the shadow stick method -

1. Push a stick vertically into the ground
2. Place a stone at the end of the shadow
3. After a wait of 20 minutes place another stone at the end of the shadow
4. A line drawn from the first stone through the second stone will be a west-east line
5. Stand facing the stick with your left foot between the stones and your right foot past the stones on the line drawn and you will be looking north.

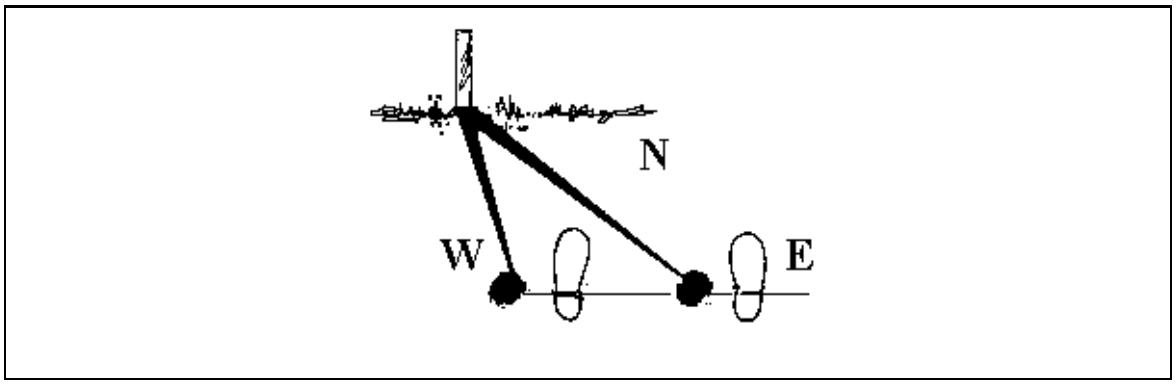


Figure 20 - The shadow stick method of direction finding

Note:

In midsummer in areas north of the Tropic of Capricorn the shadow stick will be behind you.

Bushman's method

A rough estimate of south can be obtained by remembering that kangaroos rest in areas of shade during the heat of the day. As we are in the southern hemisphere the shade areas will be on the southern side of bushes [look for disturbed areas of earth].

The Southern Cross method [at night]

The Southern Cross can be used to indicate south at night by -

1. Extending an imaginary line through the long axis
2. Locating the two pointers and bisecting them at right angles with another line.
3. Where these two imaginary lines meet drop a line straight down to the horizon
4. This will indicate south [approximately]

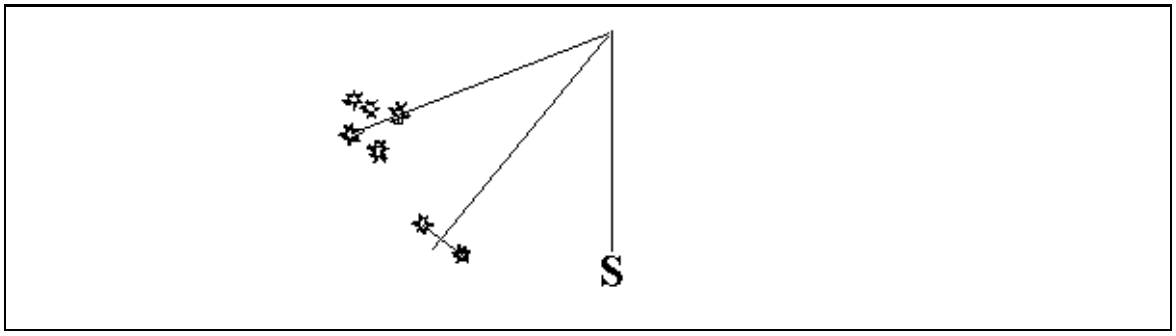


Figure 21 - Direction finding at night using the southern cross

NAVIGATING AT NIGHT WITHOUT A COMPASS

You will find it very easy to navigate using the stars, particularly in the more arid regions of Western Australia. Firsts establish where north or south is then draw a line on the ground indicating north - south, bisect this line with another line at 90^{o}, this will then show east and west. You now have your compass.

Once you decide in which direction to travel, you can stand on your makeshift compass and face the direction you intend moving. Look for a bright star or better still, a group of stars that are in the required direction and move towards them.

Note:

Try to select stars that are not right on the horizon as you will lose sight of these when moving around trees. Remember that stars move from east to west in the same manner as the sun and you will have to allow for this at 15^{o} per hour. Stop periodically and check your direction by drawing your compass on the ground again.

EMERGENCY PROCEDURES

In the interests of prior planning and preparation those who live, work or travel in the outback of Western Australia should be prepared for any foreseeable emergency whether they are on foot or in a vehicle. **Actions on** should be planned and the knowledge and skill to carry them out should be acquired through training.

A personal first aid kit and a personal survival kit should always be carried, notifications should always be posted and safe practices must be a priority.

PROCEDURE IF LOST

If you do become lost, try to remain calm as panic will put you at a psychological disadvantage, the situation is not as hopeless as you may think.

If by any chance you have taken the wrong track and do not know where it is going to lead you, it is pointless going on any further. It would be safer to return the way you came by retracing your tracks back to a point where you can establish your location.

Case histories reveal that most people, when lost push on blindly in a state of panic, hoping that they might end up **somewhere.** In these cases their efforts either take them further away from civilisation or around in circles. Do not under estimate the huge vastness and great distances of our Western Australian outback.

If in a vehicle stay with or near your vehicle as it is a source of shelter and water [provided there are no chemical additives in the radiator]. Also it is easier for search parties to locate a vehicle than to locate a solitary human wandering around somewhere in the bush.

If you have to leave your vehicle temporarily to search for food or water mark your trail on the ground with sticks or stones so you can find your way back. Otherwise you may find it hard to locate your vehicle once it is out of sight. Only walk in the cool part of the day to minimise fluid loss and exposure to the sun.

If on foot once you decide you are lost consult your map and use it in conjunction with your recollection of the country you have traversed to try to identify a feature. You can consider retracing your route to your last known position, or you can make for higher ground in an attempt to fix your position.

Note:

If you are operating with a pre-set escape route then you should proceed on the bearing to safety.

ELECTRONIC SAFETY AIDS

There are many aids available to the outback traveller and it is worth considering these when planning for outback travel both on foot and by vehicle.

Radio communications

For communication between vehicles a UHF citizen band radio is recommended. If travelling in more remote outback regions a HF single side band transceiver will be required. These sets will allow you to communicate with the Royal Flying Doctor Service and although expensive to buy they can be rented through local agencies. Radio schedules can be organised with the Royal Flying Doctor Service.

Position indicator beacons

There are several rescue instruments available for the purpose of signalling for assistance, these include different types of rescue beacons. Travellers in isolated or outback areas should seriously consider their use.

Satellite Navigation Systems

Global positioning systems are available in Western Australia for purchase or hire. These are a hand held system that allows you to find your exact position. They also allow you to plan routes and navigate by giving you a read out of your exact speed and heading. Even though the cost may be a factor these units are of obvious value to off road travellers, particularly when travelling through unfamiliar territory.

Note:

Due to the technical nature of global positioning systems, users are advised to ensure they understand their operation fully. Map suppliers should be consulted to ensure that maps used are compatible. Not all maps [particularly older ones] use the grid system of reference used by GPS.

EMERGENCY SIGNALS

The following methods can be used to indicate your position.

Fires

A smoking fire will aid searchers, both in daylight hours and at night. Extreme care should be taken when lighting signal fires as some have got out of hand to the extent of causing major bush fires further endangering survivors and searchers.

Whistle Signals

Distress signal by lost party	**three** signals together, regularly spaced.
Searchers looking for lost party	**one** blast at regular intervals.
Acknowledgement of distress signal	**two** blasts repeated regularly.
Recall signal for search parties	**four** blasts.

Gun Shots and Torch Flashes

The same as whistle signals, guns should be discharged into soft ground, not the air.

Mirror

Your survival kit will contain some foil that can be used if you do not have a mirror or heliograph for use in bright sunlight.

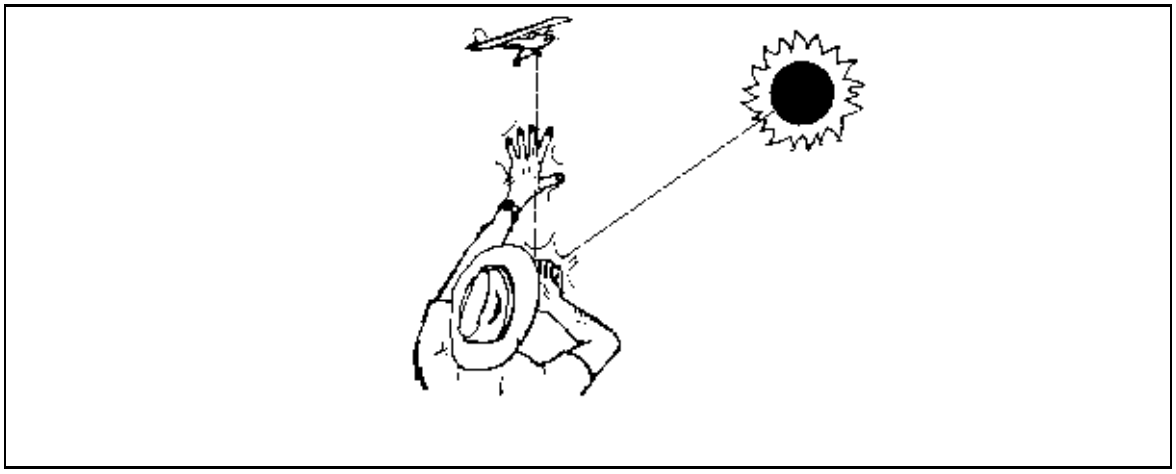


Figure 22 - Signalling using hand held mirror

Ground to Air Code

This is a universal code used to communicate with rescue aircraft. The figures should be approximately eight to nine metres in length and contrasting material such as rocks, logs or brush should be used. Trenches in sand can also be used to throw a shadow.

Ground to air visual code for use by survivors

I/ we are unable to proceed	**X**	No or negative	**N**
Proceeding in this direction	□	Yes or affirmative	**Y**

If in doubt use international symbol - 'SOS'

Actions by Aircraft

The aircraft will indicate that your signals have been seen and understood by rocking from side to side in day light hours and by making green flashes with a signal lamp at night.

If ground signals have been seen by the aircraft and not understood, it will fly in complete right hand circles in daylight hours or make red flashes with a signal lamp at night

Rescue Helicopter

Never approach a helicopter from the rear, position yourself in front, in view of the pilot and wait until approached by a crew person.

BUSHFIRE SURVIVAL

Every year in Australia there are serious bushfires in which people are caught and sometimes die. In some cases these deaths could have been prevented if the people involved had not panicked and had a basic knowledge of bushfire survival. Here are some basic rules.

Panic

Causes energy loss and poor judgement, act calmly and do not run.

Breathing

When the smoke is dense the air closest the ground will be cool and fresh.

Heat

Radiated heat is the real danger, use anything to avoid it such as culverts, running streams, ponds, rocks or depressions.

Flame Fronts

Do not attempt to run through large flame fronts. Always move downhill from a fire as fires travel faster uphill.

Critical Periods

When you have no possible escape you should lie on the ground [bare ground, in a rut or behind a log or rocks] or bury yourself and stay put.

Clothing

When you realise that you are in danger from a bush fire cover as much exposed skin as you can with any clothing available. Do not use nylon clothing. If your clothes catch fire do not run as this feeds air to the fire, roll on the ground or use items such as blankets to smother the fire.

In a vehicle

Many tragedies have occurred because people left the safety of their vehicles and tried to flee from a fire. Your vehicle will provide much protection from radiated heat.

RIVER CROSSINGS

The question of crossing creeks and rivers is a vexed one and one that usually results in people avoiding them because of the inherent danger. It is possible in a survival situation however that you may have no option but to cross a swollen creek or river to make your way to safety.

If you are required to cross a water hazard then there are accepted methods and safety procedures that can be applied.

APPRECIATIONS

Before proceeding conduct a mental appreciation including reviewing the situation and making sure there are no alternatives and the crossing is unavoidable. Have a clear understanding of what is required by listing the factors that will help or hinder you. Consider the courses open to you and select the best course.

Considerations
If you decide you have to cross then there are several points you should consider, these include -

1. The shape of the river
2. The composition of the river bed
3. Speed of flow of the river
4. Turbulence of the river
5. Depth of water
6. Temperature of the water
7. Proposed entry and exit points
8. Capabilities of members of your group

Acceptable places to cross

There are two places where you should be safe during a crossing including shallow water [approximately thigh deep] over a gravel bed with accessible banks or a deep, slow flowing river that is not too wide.

Unacceptable places to cross

High and discoloured water with excessive flow, volume and river width.

Note:

Remember you will need to consider whether to cross or not, where to cross and which method to employ.

METHODS OF CROSSING CREEKS AND RIVERS

Without aid

Used when the water is below knee deep, the crossing should be in a diagonal downstream direction with the body parallel to the water flow.

Single pole crossing

Used when the water is between the knee and groin in depth and the bottom is smooth with no obvious obstacles. The line of crossing should again be diagonal and downstream. The pole [2 m long x 5 cm diameter] should be used as a prop and you should lean in to it and walk in an arc until you have to stop and re-position the pole.

Group pole crossing:

Used when the water is above groin height. This method provides mutual support and is suited to groups of 3 to 6 people. The crossing should again be diagonal and downstream in direction. The group should be parallel to the flow of water with the strongest person on the upstream end and the next strongest on the downstream end. The pole should be grasped with the upstream arm over and the downstream arm under, it is not necessary to link arms with the others in the group but you should link your arms.

Note:

If conditions prove too difficult then retreat, ***do not try to turn around.***

Swimming method

Used where the crossing is deep, the river is clear of debris and the current is not a problem. Waterproof your pack and use it as an aid by holding it in front of you with one hand and using your other hand and legs to propel yourself forward.

Points to remember

The following points are listed to assist you in any water crossing -

- Always move side on to the current
- Always take small steps and keep your eyes on the far bank
- Always move diagonally across the river to lessen the effect of the current
- Never fight against the current
- Never hold onto submerged logs or rocks
- Keep your boots on and avoid loose baggy clothing
- Wear thermal clothing next to the skin in cold conditions
- Waterproof your pack and contents
- Loosen the shoulder straps and unfasten the waist band on your pack

BUSH FIRST AID

First Aid is what you can do to assist an injured person at the scene using only what is available under the prevailing circumstances. You may only have your two hands, remember that first aid does not rely on equipment.

In some circumstances if there is nothing, or nothing **more** to be done then first aid may mean going for assistance. Remember the patient is relying on you to go carefully to avoid accident or injury to yourself.

Possibly the most important aspect of practical first aid, particularly in the bush, is clear logical thinking and the ability to improvise.

Factors

First aid is based on two factors -

- Common sense
- Knowledge and technique

Order of urgency

1. Protection of the patient from further injury.

2. Ensuring the first aider has regard for his or her safety.

3. Restoration of breathing and heart beat.

Further responsibilities

Stop bleeding, minimise pain, reassure the patient, seek further aid and if necessary transport the patient to hospital.

Making a diagnosis

Having regard to the foregoing, before you can commence rational treatment, a diagnosis must be made consisting of-

History the story of how the injury occurred

Symptoms what the patient feels

Signs what you can observe or find out by examination of the patient

CONDITIONS

Unconsciousness, shock, bleeding, pain and hysteria

Unconsciousness

There are many causes and these include, heart attack, drowning, electrocution, head injury, fainting and smoke inhalation.
General treatment is the same -

- Remove the patient from the cause or the cause from the patient
- Examine the patient quickly
- Commence cardio pulmonary resuscitation where necessary
- Stop bleeding if necessary
- Turn the patient in to the recovery position

Shock

Shock is a fall in blood pressure that, if unchecked results in irreversible changes in the body functions at cellular level resulting in death. **There is a point of no return.**

The onset of shock is often delayed, such as when a person first starts bleeding. They may not be shocked, but if they go on bleeding [externally or internally] they will eventually become shocked.

Prevention is extremely important because of the ease and sublety with which a state of irreversibility can develop.

One General Cause of Shock.

The actual or relative reduction of intravascular volume where not enough blood is available for the heart to pump to vital organs, or the pressure is too low to be of any use.

Specific Causes of Shock

Bleeding, burns through loss of fluid to damaged tissues, heart attack, painful injuries, fractures, fainting and blood loss at fracture site.

Shock is also caused by disease and infection, heat stroke, fluid loss, salt loss, fatigue and vomiting.

Recognition of Shock

Cold and clammy, rapid feeble pulse, rapid shallow breathing, thirst, weakness, anxiety, restlessness, inability to speak and nausea

Treatment of Shock

Minimise fluid loss, raise the legs, protect from elements, maintain temperature, reassure, moisten lips and **do not** give alcohol.

FRACTURES

The key to the treatment of fractures is immobilisation. A mobile fracture is painful, can cause internal bleeding, may become compound [break through the skin] and is a major cause of shock.

Treatment of Fractures

Assess the situation and see if you can immobilise the site, reduce or re-position [only reduce a fracture if you must] and then support [axial traction if necessary.]

Method of Immobilisation

Fingers	strap the broken one to the adjacent finger
Legs	strap legs together or splint
Pelvis	strap legs together
Upper arm	collar and cuff sling and bandage upper arm to chest
Ribs	leave alone

Note:

If the patient faints with pain do not stop, reduce and splint the fracture

FRACTURES OF THE SPINE

Fractures of the spine are associated with large forces and may be complicated by damage to the spinal cord. Therefore to avoid permanent damage, careful protective handling aimed at minimising spinal cord damage is essential.

Signs and Symptoms

These may range from severe pain to loss of sensations and lack of control over limbs.

Treatment

The aim of treatment is to prevent farther damage by immobilising the spine. If the patient should be immobilised do so by strapping the legs together, maintaining body position with improvised padding and keeping the head straight and in extension to ensure an open airway.

SPRAINS

Sprains involve the abnormal stretching or the partial tearing of the supporting ligaments of any joint, ankles are the most common in outdoor activities.

Diagnosis

Pain, swelling, tenderness and bruising but still able to use the joint or limb.

Treatment

In bush walking situations it may be better **not** to remove the boot if it comes above the ankle. Otherwise contrast bathing if available [alternate bathing in warm and cold water, 5 minutes at a time] or immerse in cold water for 15 minutes then bandage.

HEAD INJURY

If a patient is unconscious and he/ she has not obviously been electrocuted or drowned then you should think of head injury, remember there may be no signs. Bleeding from the nose, mouth or ears may indicate a fracture of the skull. If a patient who has been unconscious recovers and then loses consciousness again you may assume head injury.

Treatment

Treatment is very simple and general first aid principles apply. Turn into the recovery position and transport to hospital.

BURNS AND SCALDS

1st degree Superficial burns such as sunburn
2nd degree Partial thickness burns where blisters are present
3rd degree Full thickness with charred skin or white skin with a red edge

Rule of 9's

The area of burn is important once the burn has been diagnosed as 2nd degree or worse. The burnt area can be assessed as a percentage of the body surface using the following table-

Arms	9% x 2	18%
Lower leg	9% x 2	18%
Upper leg	9% x 2	18%
Stomach	9% x 1	9%
Buttocks	9% x 1	9%
Chest	9% x 1	9%
Back	9% x 1	9%
Head	9% x 1	9%
Groin	1% x 1	1%
		100%

Note:

Tremendous fluid loss to the damaged tissues occurs with burns and in the event of a person sustaining partial thickness burns then 5% will require hospitalisation and 9% will require intra venous fluid, with full thickness burns 2.5% requires hospitalisation and 5% will require intra venous fluid.

Treatment

Cold water should be used for any burn of any thickness. **Do not use butter** as this will introduce bacteria and leave any blisters intact.

The use of antibiotic cream or betadine is useful because infection will convert a partial thickness burn into a full thickness burn.

BLEEDING

Blood flows through the circulatory system using arteries and veins, if there is a break or a hole in an artery or vein then bleeding will occur.

Treatment

Simply plug the hole, do not worry about whether it is arterial or venous bleeding. Remember, bleeding is bleeding. First wipe away any blood or remove the clothing so you can see where the bleeding is coming from. Next hold, press or apply pressure with a pad and bandage the source of the bleeding. Then elevate the bleeding site if practical.

If there is much bleeding the patient will develop shock quickly.

Note:

Tourniquets are generally a big 'no - no' and are only to be used if you cannot stop the bleeding in any other way. Tourniquets do cause more damage and the limb may be lost altogether but use common sense, if the limb is severed use a tourniquet first as you cannot do any further damage to a limb that is not there.

PAIN

There are many causes of pain. They may be uncomfortable, incapacitating or minor injuries. [Stings, bites, splinters, blisters] remove the cause and/ or treat the injury.

HYSTERIA

Defined as irrational behaviour caused by fear or anxiety such as claustrophobia when caving, freezing when climbing a rock face or crossing a stream by way of a log bridge.

Treatment

Reassure and secure the patient from danger. This may mean immobilising him/her or roping them to a rock face or whatever. Retrieve the patient by leading or removing him/her off the offending environment to a secure position.

ASPHYXIA

Asphyxia is a state of unconsciousness induced by lack of air due to drowning, smoke inhalation, choking [foreign body in throat], foul air or gas, suffocation by sand or paralysis of respiratory muscles as in blue ringed octopus bites or cone shell stings.

Treatment

Begin cardio pulmonary resuscitation [CPR] and keep going until help arrives, remember this may be 1 or 2 hours or more.

Note:

Marine stings, cone shell and blue ringed octopus victims may start breathing by themselves some considerable time after lapsing into unconsciousness.

INSECT BITES

The only **fatal** bites are from ticks [spiders are not insects]. Redback spiders and scorpions cause pain, not death

The other major problem is allergy. An anaphylactic [severe allergic] reaction may occur in some cases such as bee stings, wasp stings, ant bites or ingestion of certain foods such as shellfish for some people.

Treatment

Insects inject their venom below the skin and the skin is there to keep in what's in and what's out, out and it mainly does that, but things like ammonia and methylated spirits may be useful as counter irritants. In the case of bee stings the poison sac is attached to the sting and the sting being barbed will often remain in the skin. It should be removed with the blade of a knife or the edge of a piece of paper, **not** between the fingers as the squeezing action of the fingers will squash the venom sac and inject more venom.

SNAKE BITE

Ninety per cent of snake bites in Australia are at the ankle or below, eight per cent occur on the hands and two per cent elsewhere on the body.

Treatment

Apply a pressure bandage by bandaging straight over the bite and winding the bandage up the limb towards the body, keeping a firm pressure.

Do not bleed the site of the bite as a cut will only allow poison into the body.

Do not wipe or wash the site of the bite because the residual venom on the skin may be identifiable in the laboratory when the patient arrives at the hospital. Venom is harmless on external contact.

The pressure bandage is used because the venom is conveyed from the site of the bite in small superficial lymph vessels located just under the skin. These are easily compressed by a pressure bandage.

Avoid excessive activity [by the patient]. Carry the patient or walk him/her slowly. **Reassure the patient and seek medical attention urgently.**

Prevention

The **best** guard against snake bite is protection. If you wear above ankle boots and/or thick socks and long trousers you are less likely to be bitten by anything. Use gloves when collecting firewood, never put your hand under anything without first rolling it over with your boot. Watch where you put your feet when walking and never step over logs, always step up on them and then step down.

CUTS AND ABRASIONS

Treatment

Clean with water and apply antiseptic cream or solution as this may prevent infection later. Cover with band-aid, dressing or bandage to avoid further contamination of the wound.

BLISTERS

Treatment

Leave them intact, if you make a hole for the fluid or blood to get out you have made a hole for germs to get in. Pad away from the area causing pressure using band-aids, felt strips, a felt pad with a hole cut in it or a specially designed blister dressing

Note:

Do not put the dressing directly on the blister unless it is specifically designed for this purpose as this increases pressure.

SPLINTERS

Treatment

The skin is very elastic therefore a splinter stretches the skin as it goes in and the skin then closes over it or at least grips the splinter. A small [painless] superficial cut with a scalpel at the site of entry is helpful in removing the splinter.

CARE OF FEET

Your feet get you wherever you are going, especially on bush walks, it is therefore important to take care of them. Wear suitable footwear, preferably hiking boots or shoes with a heavy sole, hygiene is important so wash feet daily and apply foot powder

CASUALTY ACTION

If you are on foot in a group and a member sustains an injury preventing him/her being carried out then a team consisting of at least two people should remain with the casualty. A second team of no less than two people should continue to the next organised check point or aid station with a written casualty report containing -

1. Designation of the group
2. The names of all group members.
3. Name of casualty
4. The nature of the problem or injury.
5. Assistance required.
6. Map details and the location of the casualty.
7. The food and water state of the group.

HYPOTHERMIA

Hypothermia is the lowering of the body core temperature.

Mild Hypothermia

Skin feels cold, looks blue or livid [mottled], the patient shivers and feels cold.

Severe Hypothermia

Skin is cold and mottled, no shivering [shivering response has failed], irrational behaviour and speech, may be uncooperative, may be unconscious. If so is near death.

Treatment

Shelter in a warm dry environment and replace wet clothing with dry clothing, leave arms and legs cold but insulate limbs with blankets to minimise further heat loss.
Re-warm critical areas [chest, neck and head] by body to body contact with two or more persons or by placing heated objects such as hot rocks [wrapped in towels to prevent burning the skin] about the areas mentioned, particularly the sides of the chest.

Breathe warm air near the patient's mouth [several people if possible] to warm the air breathed into the lungs.

If conscious re-hydrate with warm drinks [non-alcoholic]. If unconscious, transport to hospital and **leave the patient cold** while transporting, insulate with blankets to prevent further heat loss.

Note:

A victim if cold can be resuscitated after a much longer period of technical death [when no pulse or breathing can be detected] than a patient at normal temperature.

FROST BITE

Recognition

Pain in extremities with failure of skin sensation, skin does not move freely over toes and knuckles.

Treatment

Do not thaw if likely to re-freeze, do not rub frozen parts, thaw rapidly and completely in warm water in 40º to 42ºC. Protect thawed regions, do not break any blisters and keep the whole body warm to promote circulation.

HYPERTHERMIA

Hyperthermia is Heat Stroke and may be fatal.

Factors Influencing Development

These include high air temperature, conditions of high humidity and unsuitable clothing that reduces sweat evaporation.

- Level of exercise — sustained exercise causes internal heat generation.
- Body build — big, well muscled or fat people are more susceptible.
- Level of fitness — fit people have better blood flow to muscles and skin
- Dehydration reduces blood volume
- Age — Elderly at higher risk than young.
- Climate — Acclimatisation to hot conditions reduces risk.

Recognition [In hot conditions]

Skin feels hot
Face flushed
Rapid pulse at rest
Dizziness
Excessive fatigue
Lethargy - no will to go on
Irrational behaviour
Cessation of sweating

Treatment

Transfer to cool shaded location and immerse in cold water, apply ice packs, water or alcohol to skin, concentrate on cooling head, neck and chest.

Re-hydrate by giving cool fluids orally and keep the patient at rest.

SALT DEPLETION

Recognition

Muscle cramps after sweating in hot conditions.

Treatment

Give oral fluids, preferably one of the commercially marketed balanced electrolyte replacements dissolved in water.

INDIVIDUAL FIRST AID KIT

This first aid kit is recommended for bushwalkers and those required to provide themselves with basic emergency first aid.

Items

Triangular bandage
Wound Dressing, [medium]
Elastic bandage [10 cm]
Band-Aids [assorted shapes]
Adhesive strip dressing [8 cm x 50 cm]
Gauze swabs
Non-stick sterile dressings
Scissors
Tweezers
Sterile needle
Safety pins
UV sun filter cream
Medicated insect repellent
Paracetamol tablets

Note:

Any personal medication can be added if and as required.

BASE/VEHICLE FIRST AID KIT

This first aid kit is recommended for extended or remote area trips for those required to provide themselves and others with basic emergency first aid.

Items

Survival blanket
Disposable latex gloves
Triangular bandages
Tissues
Elastic bandages [10 cm]
Elastic bandages [5 cm]
Wound dressings [medium]
Sterile eye pads
Gauze bandages [assorted]
Gauze swabs
Non-stick sterile dressings
Band-aids [assorted shapes]
Adhesive strip dressing [8 cm x 50 cm]
UV sun filter cream
UV lip salve
Medicated insect repellent
Paper towels
Notebook and pencil
First aid manual
Scissors
Tweezers
Sterile scalpel blades [size 23]
Sterile needles
Safety pins
Antiseptic ointment
Paracetamol tablets
Paracetamol tablets [with codeine]
Cough mixture [dry cough]
Cough mixture [congested]
Medicated throat lozenges
Saline solution eye wash
Antihistamine tablets
Stingose insect bite solution
Electrolyte replacement powder
Water purifying tablets
Antacid powder or tablets
Laxatives
Anti diarrhoea tablets

Note:

Those responsible for group first aid should have a current relevant first aid qualification and ensure that all treatments are recorded.

DEALING WITH DEATH

While it is an accepted fact that only a qualified Medical Practitioner can certify that a person is dead, and that treatment once started should be continued, there are occasions where the casualty is dead and a decision must be made to start or stop treatment [as the case may be].

Signs of Death

- Fixed dilated pupils, not responding to resuscitation.
- Absence of spontaneous heart beat in spite of prolonged resuscitation.
- Rigor mortis [stiffening of the body] is a late but reliable sign of death.

Note:

Resuscitation should never be stopped when medical aid is imminent.

Dealing with a Dead Body

Whilst this may be an unpleasant topic it is a possibility that should be dealt with properly to avoid further stress among witnesses and address the problem in a manner to satisfy the law and to facilitate the later recovery of the body.

If on foot the group should not attempt to carry the body out with them and for purposes of morale should not split themselves up and have some of the group remain while others go for help. They should leave the body and walk out in a group.

Before doing this you should -

- Get everybody in the group to take careful notes of the circumstances surrounding the death as statements will be required for the coroner.

- Wrap the body in a tent or ground sheet and firmly secure it with rocks etc., to protect it from animals and the elements.

- Mark the spot and the trail out to allow easier location later.

- On return to civilisation report the matter to the police.

- Note any valuables on the deceased and have somebody witness them. Give them to the Police when you are able.

Effects of Death on Others-

Watch for signs of shock [witness shock] in the party. At the very least there will be depression and distress that must be handled by the group before it leads to worse manifestations of stress and shock.

NAVIGATION

Good map reading is an essential requirement for bushwalkers and travellers in the outback. Maps enable users to find their way about the country; allow recognition of features and enables the user to understand the information given on the map and the ground. They also assist in the transmission of information.

MAP READING

Map reading is the extraction of information shown on the map; the relationship of the ground to the map and the map to the ground. To make full use of a map, it is necessary to give and read grid references; to take bearings and to measure distances. The ability to use or read a map, is called "map craft".

Reliability of maps

A map is a plan of the ground. Remember however it is a plan of the ground at a certain date. If it is a long time since the map was produced or revised much may have changed. Towns grow, roads and railways are built, forests grow and are cut down. No map can be taken as being reliable except concerning the main physical features of the land. Even these may change slowly, as coast lines erode and in some places rivers may even change their courses. It is therefore very important to note the date the map was produced or revised and to judge its reliability accordingly.

Care of maps

Maps are valuable documents and the supply is never unlimited and they should be treated with care to prevent damage. Most damage to maps occurs when the users open them outdoors or in moving vehicles. There is always a slight breeze to catch them and start small tears that quickly spread. To prevent tears, maps should be folded in such a way that any part can be referred to without having to be fully opened.
Once a map is folded, leave it folded, the detail at creases is sure to deteriorate but less than if the map was constantly unfolded and folded. Protect the folded map by placing it in a plastic map case when not in use.

Marginal information

Printed around the margin of the map is the information needed when the map is being used. This is referred to as Marginal Information. The type of information and the layout may differ from map to map. On Australian maps a standard layout is adopted which gives the following information.

- Sheet Name
  This is usually shown on the top centre of the map

- Map Edition
  Usually located at the top right of the map

- Sheet Number
  Maps are commonly referred to by sheet number, name and edition

- Grid Reference Block
  Located at the bottom of the map and explains how to calculate a six figure grid reference

- Legend Panel
  Located at the bottom of the map and gives a legend of the conventional signs used

- Sheet History
  Located at the bottom of the map and gives production details

- Index to Adjoining Sheets
  Located at the bottom the map

- Magnetic Variation Information
  Located at the bottom of the map and gives the annual magnetic variation

- Reliability Diagram
  This diagram, which does not appear on all maps, indicates the reliability of the information shown on a map

- Representative Fraction
  A method of indicating the scale of the map. Usually located at the top left of the map.

- Linear Scale
  Usually located at the bottom centre of the map

Conventional signs or legend

The map maker tries to show the objects on the ground in the clearest possible way. These objects are not shown as they appear because they would be too small to recognise. Instead, simply symbols, referred to as conventional signs are used to indicate the objects. It is important to note that the centre base of the particular sign indicates the position of the object on the map.

Scale

The scale of a map is the relationship of the distance between two points on the map and the distance between the same two points on the ground.

Other types of maps

The information contained in this manual refers mainly to topographical maps. These maps present a complete and accurate picture of the ground by showing as much detail as their scale allows. It may be that accurate topographical maps are not available for a particular area and in this case an alternate map such as a road map, orthophotomap or air photograph will have to be used.

NAVIGATION ROUTE PLAN

This can be a pre-prepared card or data written in a note book. It is important that everybody in the group has the same information including -

- Who the group is and the names of all group members.
- Whether any members of the group have any limiting medical conditions.
- Map details and scale.
- Route number.
- From - Waypoint/Landmark description and six figure grid reference.
- To - Waypoint/Landmark description and six figure grid reference.
- Distance to be covered, expressed in metres and paces.
- Magnetic bearing to be walked.
- Description of going, including terrain and density of vegetation.
- Estimated times.
- Escape routes and safety procedures.

GRID REFERENCES

Superimposed over the entire map are vertical and horizontal lines. These lines are known as grid lines and are numbered at each end. To assist the user when giving grid references these grid lines are defined as eastings and northings.

Eastings

The vertical grid lines that run from bottom to top [or south to north] and divide the map from west to east, are commonly known as eastings. They are numbered from west to east.

Northings

The horizontal grid lines, which run from left to right [or west to east] and divide the map from south to north, are known as northings. They are numbered from south to north. The squares that are formed where eastings and northings cross are known as grid squares.

Obtaining a 6 Figure Grid Reference

To obtain a 6 Figure Grid Reference of a position on a map with a scale of 1:25,000 or 1:50,000 use the relevant roamer scale located on the compass base plate. Grid references should always begin with the letters GR to show that they are grid references and nothing else.

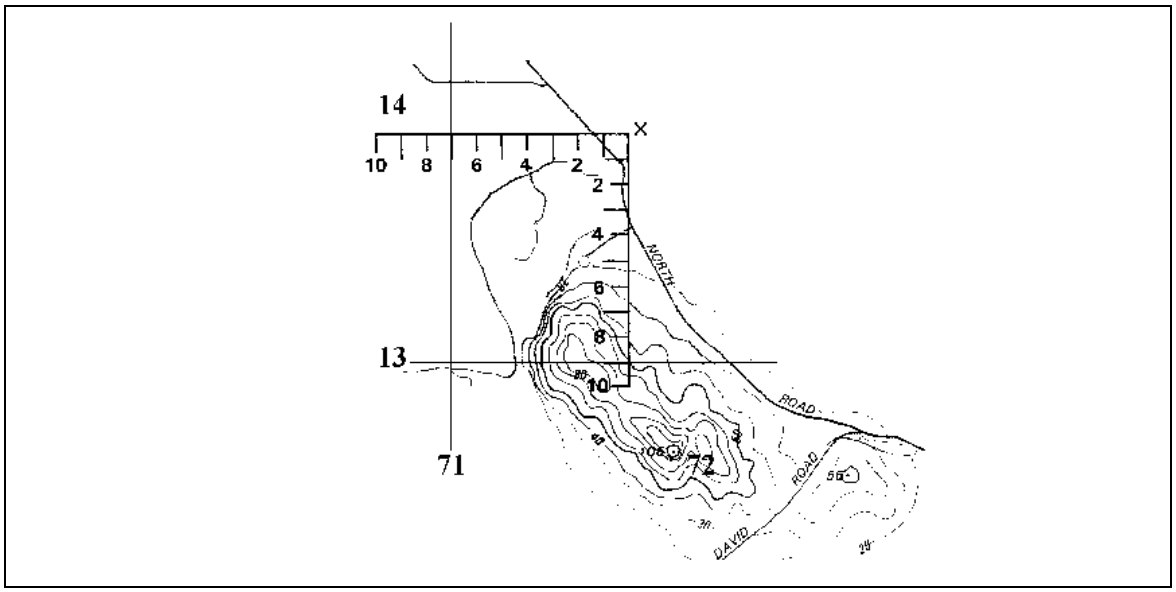


Figure 23 - Six figure grid reference [GR 717139]

MEASURING DISTANCES ON A MAP

To measure the distance in a straight line between two points on a map, lay the straight edge of a piece of paper against the two points and mark the distance on the paper. Next lay the paper along the linear scale and with the right hand mark against one of the primary divisions and the left hand mark against the secondary divisions to the left of the zero point on the scale. The total distance is the distance to the right of zero, plus the distance to the left of zero.

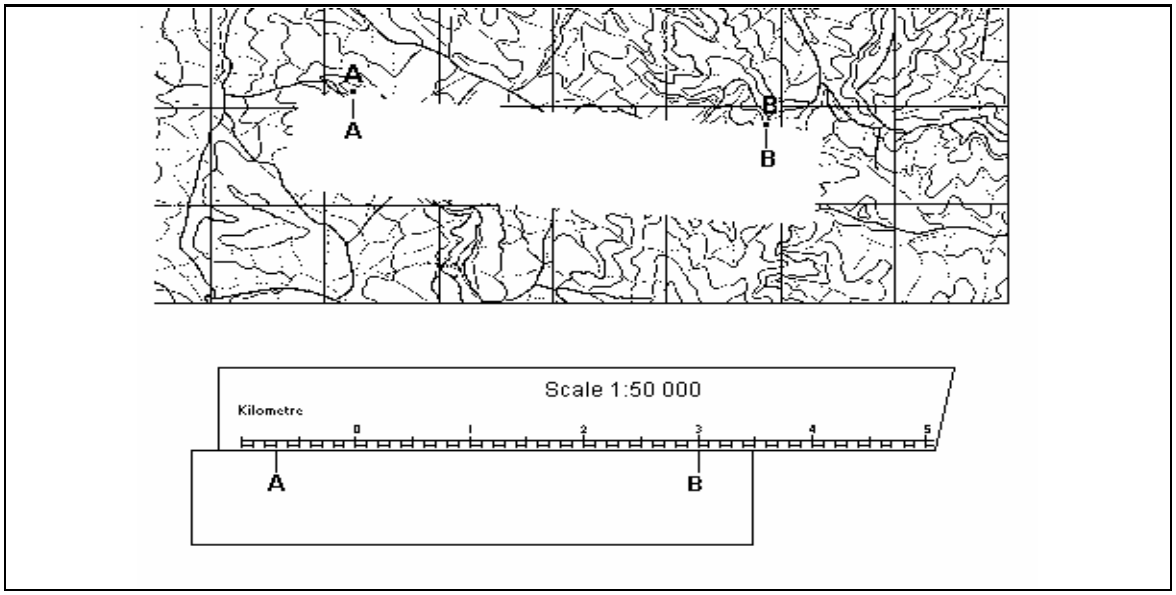


Figure 24 - Measuring distance [3.7 km or 3700 m]

PACING

When it is important that you locate a particular feature and you need to know accurately how far you have travelled it will be necessary to pace the distance. This is done by counting the number of double paces, left foot to left foot, or right foot to right foot. You will need to work out exactly how many paces you walk over one hundred metres.

Note:

Most people on flat ground average 130 paces per 100 metres.

THE POINTS OF A COMPASS

North, East, South and West are the four cardinal points of the compass. There are, in all, 32 points of the compass, but only sixteen are normally used in map reading. These are the four cardinal points and twelve intermediate points.

The degree system

The points of the compass give an approximate indication of direction only, for greater accuracy the circle is divided into 360 degrees [O or 360 being the north point]. The four quadrants of the circle are each 90 degrees and therefore the East, South and West points are at 90, 180 and 270 degrees respectively. Each degree is subdivided into 60 minutes and each minute into 60 seconds. Degrees are marked ^{o} minutes ' and seconds ". When the compass is being used, the subdivisions of a degree are too small for practical use and readings to one degree are generally sufficient.

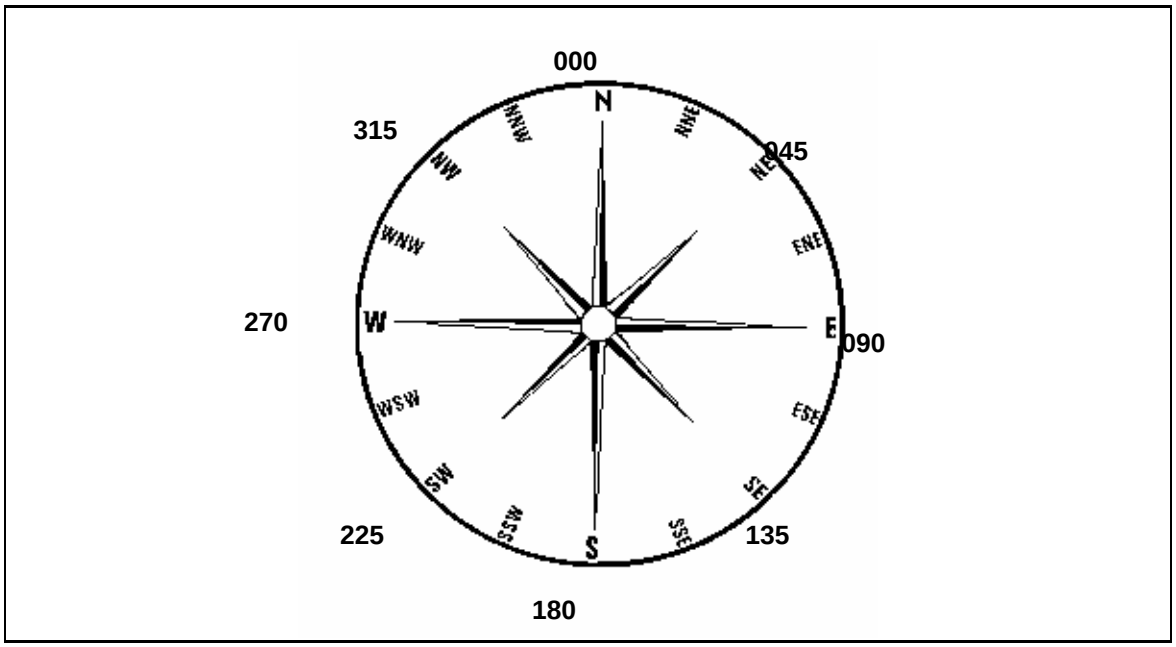


Figure 25 - Points of a compass

Note:

Some organisations measure angles in mils [6,400 mils = 360 °].

Bearings

The purpose of a bearing is to give an accurate indication of the direction of one point from another. A bearing is the angle, measured clockwise, that a line makes with a fixed zero line. The zero line is always taken to be north.

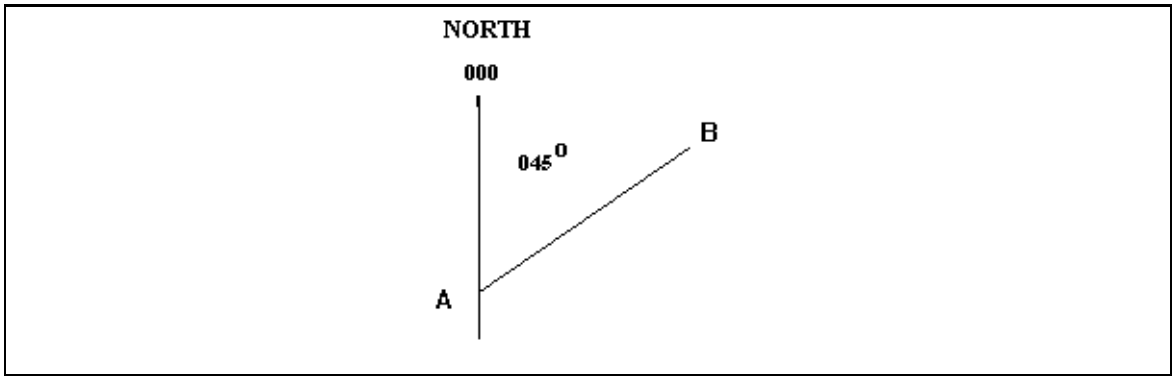


Figure 26 - Measuring bearings in degrees [A - B = 045 degrees]

NORTH POINTS

In map reading, reference is made to three north points and each is detailed below:

True North

The earth spins on an axis that passes through the north and south poles. The north pole is geographical north, or true north. Lines drawn from the north pole to the south pole are true north - south lines. True north is therefore the direction from any point on the earth's surface to the north pole.

Magnetic North

To say that a compass points north is only relatively true because a compass needle does not point to the north pole. It points to a place in the far north of Canada known as the magnetic pole. The direction a compass needle points is known as magnetic north.

Grid North

The grid lines on a map do not lie true north and south, except along one standard meridian; elsewhere on the map they make an angle with the true north south line. Since the grid lines are parallel and are drawn on the map it is very convenient to use them for drawing or measuring bearings. The direction of the north-south grid lines [eastings] is therefore known as grid north.

THE SILVA COMPASS

The Silva orienteering compass was developed in the 1930's and the compasses are now used widely throughout the world by armed forces and many other organisations as a general purpose compass.

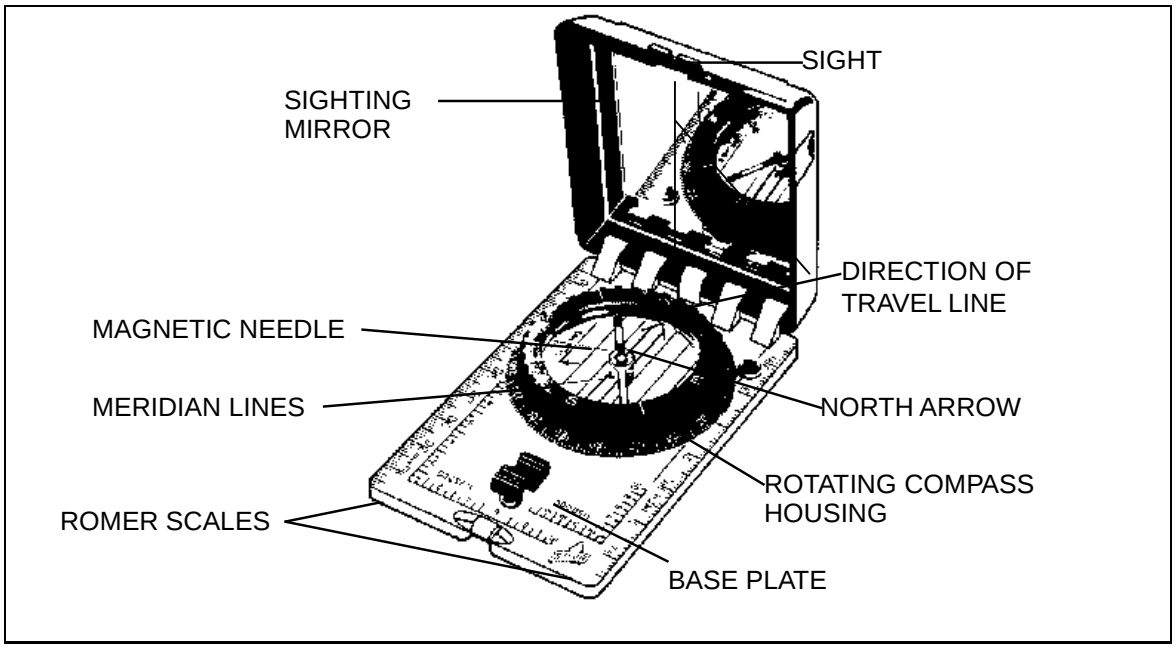


Figure 27 - The silva compass [Type 15T]

Use of the compass

Because of its unique design, the Silva orienteering compass is very simple to use.

To take a grid bearing from a map

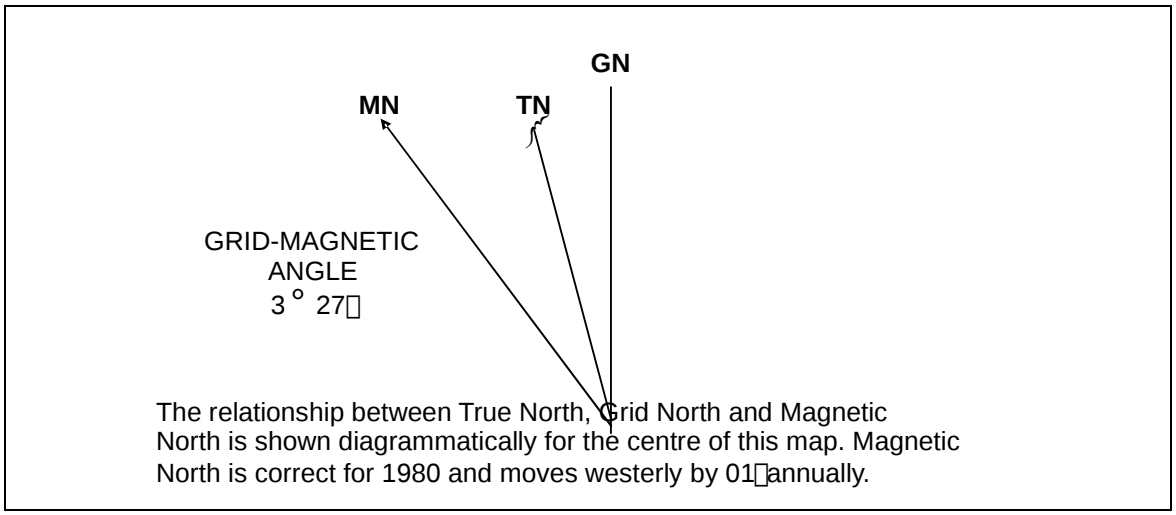
The procedure for calculating a grid bearing from a map is as follows:

1. Place the long edge of the compass plate along the desired bearing making sure that the direction of travel line on the compass plate points in the direction you wish to travel [if your compass has a sighting mirror at the front remember this coincides with the direction of travel line].
2. Turn the compass housing so that the meridian lines are parallel with the grid lines [eastings] on the map.
3. Read the grid bearing on the housing where the index line intersects it.

MAGNETIC VARIATION

The angle between the magnetic north line and the grid north line plus the annual change is known as magnetic variation or the grid-magnetic angle.

The position of the magnetic pole is not fixed, it moves slightly from year to year. As a consequence, the direction of magnetic north, and therefore the magnetic variation also changes by a small amount each year. Though this change is not constant it can be forecast with sufficient accuracy over a number of years and details of the annual change are given in the marginal information as illustrated in the diagram.



The relationship between True North, Grid North and Magnetic North is shown diagrammatically for the centre of this map. Magnetic North is correct for 1980 and moves westerly by 01′ annually.

Figure 28 - Magnetic variation diagram

Lines joining places with equal magnetic variation are known as isogonals. They do not, as is sometimes supposed, themselves point in the direction of magnetic north. It might be expected that isogonals would follow a regular pattern but the earth's magnetic field at any point is affected by the land and mountain masses and the presence of metallic ores. Therefore, the isogonals are pulled out of shape and follow no regular pattern.

Adjusting grid bearings for variation

When the compass is used with a map or in conjunction with map bearings, an adjustment should be made to allow for the variation. This is especially important if there is considerable variation in your area or if accuracy is important. With one turn of the dial you can make the proper allowance of any variation. You must do this every time you wish to apply a variation to a bearing. Here is how:

Find out the amount of variation in your area and then simply Turn the dial as per the following rule-

From grid to magnetic

- If the variation works out to be west, then you will need to leave the compass on the map and turn the dial west the required number of degrees.
- If the variation is east then turn the dial east.

From magnetic to grid

- Simply reverse the step.

CONTOURS

The usual way of showing the shape of the ground on modern maps is by contour lines. Contour lines make no attempt to give any visual illusion of relief and it is the failure to recognise this that causes difficulty to some people, in understanding them. The idea of a contour is very simple. It is an imaginary line drawn on a map, joining all places of equal height above sea level.

Height of Contours

On the map each contour is drawn at a specific height above sea level and the vertical distance between each is the same. The difference in height between contours is called the Vertical Interval and is shown in the marginal information on the map. It is from the height and spacing of the contours that the shape of the ground is deduced and if necessary it can be calculated accurately. Some contour lines have the height above sea level printed at intervals along their length. Another simple starting point in determining the general topography of an area is to use the flow of streams in conjunction with contours.

Contour Patterns

Each topographical feature such as a spur or a knoll is represented by its own particular contour pattern.

Important Points

The most important points to remember about contour patterns are

- Contour lines close together indicate steep slopes
- Contour lines far apart indicate gentle slopes
- Evenly spaced contour lines indicate uniform slopes
- When the spacing of contour lines, reading from high to low, decreases, the slope is convex
- When the spacing of contour lines, reading from high to low, increases, the slope is concave

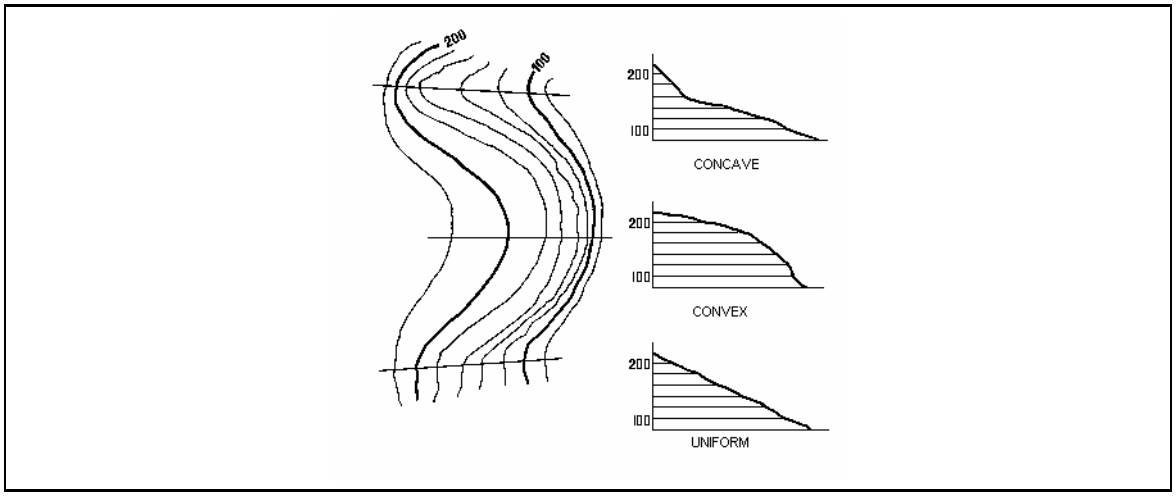


Figure 29 - Contour patterns

DRAWING A SECTION

To draw a section between two points on a map lay the edge of a piece of paper between the two points, mark it at these two points and again where the contours on the map cut this edge. Parallel to the edge of the paper draw lines representing heights of contours from highest to lowest on the route to be followed.

From each mark you have made on the edge of the paper drop a line to the corresponding height line and join these points to complete a section.

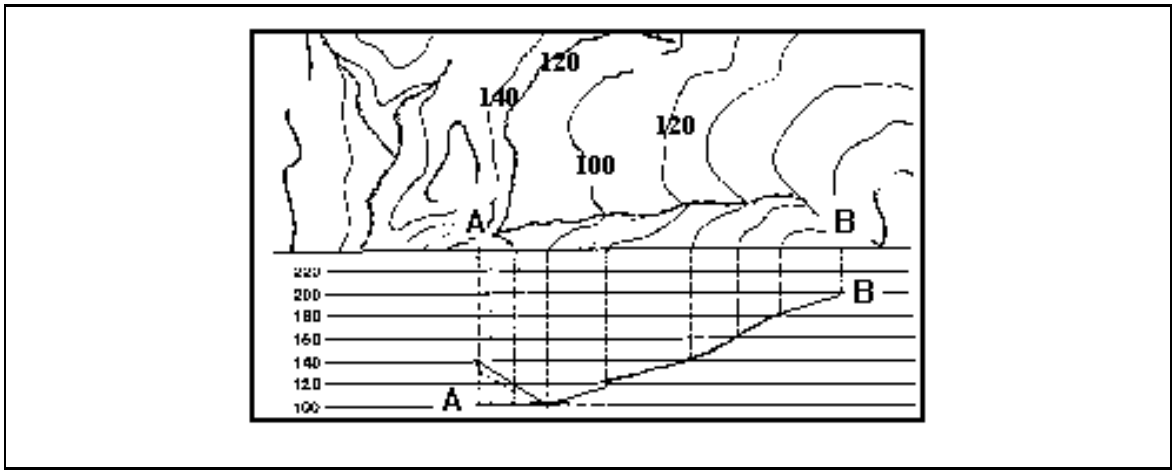


Figure 30 - Drawing a section

PREDICTING WALKING TIME

The following method known as **Naismith's Rule** is a general rule for calculating trip times for an average walker with a medium weight pack -

Allow 1 hour for every -
5000 m Easy Going, 3000 m Scrambling or 1500 m Rough Going

Add 1 hour for every -
450 m Ascent, 900 m Descent and for every 5 Hours walking to cope with fatigue

SETTING THE COMPASS TO WALK ON A MAGNETIC BEARING

Set the magnetic bearing on the compass by rotating the compass housing until the required bearing is in line with the index line on the compass plate.

Holding the compass flat in the palm of the hand turn around until the red end of the compass needle points to the north mark on the compass housing and is parallel to the meridian lines.

The direction arrow now points along the required magnetic bearing.

TO TAKE A MAGNETIC BEARING

The procedure for taking magnetic bearings to an object is detailed below -

1. Hold the compass with the direction arrow pointing to the object.
2. Rotate the compass housing until the red arrow of the meridian lines is directly beneath the red [north] end of the compass needle.
3. Read the magnetic bearing on the housing where the index line intersects it.

BACK BEARINGS

Unlike most other types of compasses there is no requirement to calculate back bearings with the orienteering compass. Simply turn around to face approximately the direction travelled along and reverse the compass so that the direction arrow is towards the user. Orient the compass by turning the whole body until the red end of the compass needle points to the north point on the housing and travel in the direction in which the rear of the compass plate faces.

ALTERING DIRECTION TO AVOID AN OBSTACLE

There may be occasions when it will be necessary to alter the direction of travel to avoid a major obstacle. This is best done by travelling around the obstacle using a series of right angles. With the orienteering compass this can be done without any alterations to the original compass setting simply by taking advantage of the right angles of the compass plate.

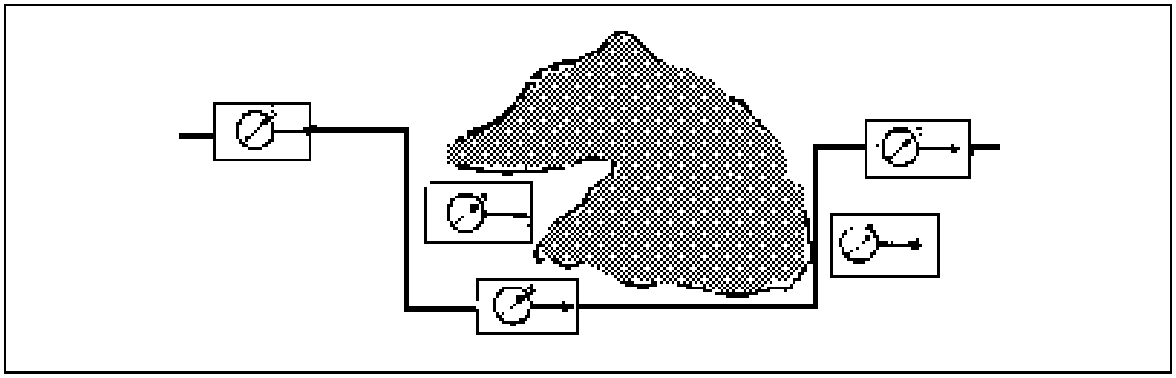


Figure 31 - Altering direction using the base plate of a compass

COMPASS ERRORS

When using a magnetic compass, the user should be aware of the two main causes of variation in compass readings:

Individual Compass Error

Each compass has its individual variation, that is it does not point exactly to magnetic north, the compass needle itself may not be quite true with the markings on the card and slight divergences may be caused in other ways. The error may be negligible or comparatively large and therefore it is important to have compasses checked regularly. Any known error should be noted on the compass and when readings are taken allowance must be made for the individual variation.

Local Magnetic Attraction

Local magnetic attraction is due to the presence of any iron ore nearby. The compass is a delicate instrument and quite small quantities of iron have a surprisingly large effect on its behaviour. A wrist watch or steel framed spectacles will affect the compass reading.

Take the precaution of seeing that all iron or steel objects are at a safe distance before using the compass. Small articles will be safe in a trouser pocket but larger articles should be placed two or three metres away.

Note:

Remember to keep away from power lines, wire fences, vehicles and railway lines when using a magnetic compass.

COMPASS RESECTIONS

The following procedure can be used to fix your position when you can recognise features on the ground and on the map but are unable to fix your exact map position.

1. Select 2 or 3 prominent, widely spaced features that you can recognise on the map and on the ground.
2. Using the compass, take a magnetic bearing to the first feature.
3. Convert the magnetic bearing to a grid bearing.
4. Convert the grid bearing to a back bearing and plot this bearing with a thin line from the feature on the map.

Carry out the above procedure until you have plotted the back bearings on the map from each of the features you have selected, your position is that point where the back bearings intersect. Should they form a small triangle then your position is the centre of the triangle, however, there should be sufficient detail on the ground and the map to confirm this.

BUSHWALKING

The rise in popularity of outdoor recreation has led to a vast increase in the number of bushwalkers and expedition groups visiting national parks and wilderness areas. It is important to remember that as well as recreational bushwalking in small groups there is much interest in the more institutional 'expedition skills training'. This aspect of bushwalking is generally oriented toward youth groups and educational institutions.

THE ROLE OF EXPEDITIONS

Expedition training presents an exciting challenge to groups, it requires them to train for and carry out expeditions or explorations with a specific purpose in unfamiliar country.

Prior planning & preparation

Organising, planning, training for and completing any expedition requires a high level of teamwork, self reliance and co-operation between group members. Emphasis should be on a preliminary training program designed to develop specific skills related to the particular type of expedition. Ideally the expedition should aim at encouraging group members to gain confidence in meeting new challenges and to develop a spirit of adventure through personal accomplishment.

Expedition purpose

All expeditions should have a clearly defined pre-conceived purpose and all members of the group should have been involved in the planning process and be aware of the purpose of the expedition.

EXPEDITION LEADERSHIP

Organisers of expeditions must be aware of their responsibility under duty-of-care legislation and any appointed leaders should accept responsibility for the safety of the group on expedition.

Duty of expedition leaders

The duty owed by an expedition leader to a group can best be described as the duty of a reasonably prudent leader or supervisor who has a duty to take reasonable care to avoid exposing the group to unnecessary risk of injury and although there may be no consideration of remuneration there is nevertheless a relationship whereby the group may be expected to submit to a course of instruction which at times will require them to undertake training and perform tasks in what may prove to be dangerous situations.

The expedition leader is required to provide a safe system for the group and give adequate instruction. There is seen to be an element of dependence upon the leader by the group.

Note:

The expedition organiser is required to guard against a risk of harmful event and injury that is reasonably foreseeable.

Qualifying expeditions

Organisers should be satisfied that the group has completed an appropriate course of instruction for the proposed expedition. Where the requirements for a qualifying expedition state the group must act independently and not be accompanied they should ensure the group are capable of conducting the planned expedition. Under normal circumstances and if the age of the group requires it the group should be accompanied on the expedition . If they are accompanied on any qualifying venture the leader must ensure that all decisions affecting the outcome of the expedition are made by the group members themselves. Leaders acting in a supervisory capacity and not accompanying the group must remain in close proximity. The supervisor should be in contact with the group throughout the day and for reasons of safety be available at night.

Note:

The supervisor should have good oversight of the group throughout and accept responsibility for their plans and safety.

PRE-WALK CONSIDERATIONS

To walk with the least impact on the environment the right equipment is needed and all expeditions should be well planned with environmental impact a consideration.

Expedition members

All group members should have completed a preliminary expedition skills training programme applicable to the level of the expedition.

Notifications

Before you leave let someone know where you will be walking, where you will camp, when you are due back and what equipment the group is carrying.

Group size

Go in a small party [6-10] rather than a large one. Large parties usually have more impact on the environment and are socially more unwieldy. Should your group be larger split up and meet at meal times and at campsites suitable for large groups.

Land owners

As a courtesy ensure that landowners have been contacted before entering their property. If traversing aboriginal land make sure you have the necessary permits, etc.

Environmental impact

In some national parks walking tracks have been upgraded to offset the impact of increasing foot traffic. You can help limit damage by staying on the track and walking through rough and muddy sections rather than widening the damage by walking on track edges. Also avoid cutting corners on steep 'zigzag' tracks. Both these practices increase erosion and visual scarring as well as causing confusion for future walkers. Sensitive vegetation is easily destroyed by trampling so stay on rocks and hard ground wherever possible. Choose your footwear for the terrain. Solid lightweight walking boots can be used on most tracks. Wear joggers around the campsite rather than thongs or bare feet.

PRACTICAL BUSHWALKING

For members of a group to walk a long way with packs on their backs is as much about mental attitude, self discipline and teamwork as about physical effort.

Setting off

The first step is to agree on a time of departure and for all to be ready to depart on time. This means all packs properly packed, being suitably dressed for the weather and taking a last look over the campsite to make sure nothing has been left behind. The first leg of the route should be appraised and maps should be ready.

Walking rhythm

After making a note of the time on your route plan set off, walking at a slow, steady, deliberate pace. Establish a walking rhythm and be aware of it.

Observations

Keep checking the landmarks and terrain with the map as you reach them. After you have been walking for fifteen or twenty minutes it may be necessary to remove or adjust clothing. It is vital to avoid clothing being soaked in perspiration.

Coping with steep terrain

When the trail becomes steep shorten your stride but try to maintain the same steady rhythm. If the route should become steeper it will be necessary to zigzag to reduce the steepness of the climb. This enables the heel of the foot to be placed on the ground as it places a great strain on the leg muscles if you only walk on the front of the foot.

Walking down steep terrain may not be exhausting but it can be uncomfortable and more slips and falls occur while descending than while climbing. When you walk on flat ground you automatically lean forward to maintain balance, when walking down-hill there is often a tendency to lean back, away from the slope, which can have upsetting results. Make sure that you bend the knees to avoid jarring the joints and zigzag downhill in the same fashion as walking up hill. By doing this rhythm can be maintained and the whole of the foot can be placed firmly on the ground to improve grip and reduce the chance of slipping. Never run downhill and always be careful never to dislodge stones that may injure anyone below.

Wet weather routine

If it should start to rain the whole group should decide to stop together and put waterproofs on for it is as important to prevent clothing being soaked with rain as it is with perspiration.

Schedules

If the group is falling behind time it may be necessary to reduce some of the breaks or meal stops to catch up with the schedule. It is a good idea to build in an amount of recovery time into a route plan to cope with unforeseen circumstances.

Action at waypoints

Once you have completed each leg note the time and attend to all needs during the break by adjusting clothing and packs, checking the route plan, studying the map and visualising the next route before noting the time and resuming your journey.

Personal fitness

Much of the slow progress and unduly prolonged journey times associated with expeditions lasting a few days are due to a lack of physical fitness. This is especially apparent when faced with carrying a loaded pack. Any physical exercise or training that will increase stamina will therefore be beneficial before undertaking an extended bushwalking expedition.

JOURNAL WRITING

Journals can help to measure the process and task orientation of an expedition by providing expedition members with a vehicle to focus in a rational way and then reflect on the processes involved in the expedition. They can also be a source of enjoyment and interest for recreational bushwalkers. Interest can be heightened by the inclusion of sketches, maps and photographs.

Journal writing guidelines

The following are general guidelines to what might be written in a journal -

- Feelings on commencing the expedition.
- Understanding of the processes involved and what it is like to be involved.
- Performance as a group member.
- Feelings as a leader when [and if] required to lead.
- Ability and willingness to achieve the set objectives.
- Identifiable behaviour both of self and others.
- Any obvious areas of concern.
- Comments on planning, clothing, equipment and food.
- Any plan for future change not only for physical resources but also behaviours.

SAFETY CONSIDERATIONS

Before any trip the leader and the group should discuss and set their trip objectives. It is important that these should be within the capabilities of the entire group.

Responsibilities of organisers

Organisers should realise the scope of their responsibilities and the duty of care questions that may be asked by authorities should any form of disaster overtake an expedition they have organised or sanctioned.

Planning

A brainstorming session with leaders and group members is a good idea in the planning stages of an expedition.

Route plans

All members of the group should have a copy of the route plan and should be aware of any hazardous sections and ensure all maps are current and accurate

Leaders

If there is a leader appointed they should be competent in all skills required for the trip. Assistant leaders must be experienced enough to safely care for the party should something unforeseen happen to the leader. Leaders and assistant leaders should be conversant with the area.

Medical limitations

Any medical condition suffered by any member of the group or any limiting personal factors must be known to the leader.

Actions-on

In the interests of safety **actions-on** should be set for all foreseeable emergency situations and all members of the group should know the agreed emergency procedures [an individual emergency procedure card can be printed and issued].

Escape routes should be set prior to departure and must be known to all members of the group.

Notifications

Notifications need to be posted prior to departure [cancel on return] and Police in the area of the walk notified [it is a good practice to discuss your plans with them].

Note:

If a walker or group is lost the nearest police should be notified immediately.

PRINCIPLES OF MINIMUM IMPACT CAMPING

With the rise in popularity of outdoor recreation has come an increasing risk of damage to the natural environment. Fortunately along with the increasing number of walkers a new bushwalking ethic has also developed. The minimum impact philosophy is now being widely adopted for of bushwalking and expeditioning in Western Australia.

Campsites

Look for low impact camp-sites, sandy or hard surfaces are better than boggy or vegetated areas. Where possible camp at an existing camp-site rather than creating a new one. If a campsite does not exist camp at least 50 metres away from watercourses and the track. Spend only one or two nights at such a camp-site. With modern camping equipment you should leave a campsite looking as if you have never been there.

Fireplaces

Use only existing [and safe] fireplaces and remember that compared to campfires fuel stoves are faster, cleaner and a lot easier to use in wet weather. If you need to use a fire for cooking or warmth use an existing fireplace. Collect only deadwood and keep the fire small.

Note:

Be aware of fire bans and restrictions and how they relate to the use of stoves.

Washing-up

Remember detergents, tooth paste and soap [even biodegradable types] harm fish and water life. Wash 50 metres away from lakes and streams and scatter the wash water so that it will filter through the soil before returning to the stream. Avoid putting food scraps into streams or lakes. Do not wash-up directly under the tap of a rainwater tank. Under no circumstances wash in stock troughs on pastoral properties.

Rubbish disposal

Pack to minimise rubbish and avoid carrying potential rubbish such as bottles, cans and excess wrappings. Do not burn, bash or bury rubbish as this disturbs the soil and the rubbish is likely to be dug up and scattered by animals. Carry out **all** your rubbish.

Note:

If you come across other people's rubbish pick that up too.

Toilets

Where there is a toilet please use it, in areas without toilets bury your faecal waste. Choose a spot at least 100 metres away from camp-sites and watercourses and dig a hole 15 cm deep within the soil's organic layer [a hand trowel is useful for this] and bury all faecal waste.

FOOD AND COOKING

The need for a balanced diet becomes increasingly important as the length of an expedition increases. For journeys lasting up to four or five days following normal eating habits will ensure that the diet is adequately balanced. Probably too much thought is given to achieving variety in the menu instead of paying more attention to the need to maintain an adequate intake of liquids, especially in hot weather. Considerably more energy than usual will be expended during a camping expedition, and so more food will need to be eaten.

Planning menus for bushwalking expeditions

When planning a menu a balance needs to be achieved where you will need to remember that since the food will have to be carried too much will add unnecessary weight to the load. If too little food is taken then the group will go hungry and the efficiency of the group may be impaired. The prime need is to pack as much energy into the smallest possible weight and volume. This is usually achieved by increasing the amount of carbohydrates and fats and by using dehydrated or freeze dried foods rather than canned food.
Supermarkets carry an endless variety of dehydrated foods and meals so there is no need to carry canned food. The packaging of such products is good, they are quick to prepare and usually only require the addition of water. Check how long the food takes to cook and wherever possible choose those which cook in the shortest possible time. Only carry the foods that you like and enjoy and keep all meals uncomplicated and simple to prepare, meals such as soups, stews, casseroles and pasta dishes are ideal.

To ensure that you drink sufficiently especially in hot weather always carry more tea, coffee, milk and sugar than you think you will need. Fruit flavoured drink powders and cordials are also useful.

Breakfast

Bushwalking diet is very much a matter of individual preference and the most important consideration is to make it right for you. Most bushwalkers begin the day with a substantial breakfast and no day would be complete without it. Others prefer to do without washing up greasy pans and prefer cereals or muesli that only requires the addition of hot or cold milk followed by biscuits or bread and jam.

Lunch

Lunches do not usually play an important part in most bushwalkers dietary routine and a little and often is the rule. Cheese and biscuits or biscuits with some spread such as jam or peanut butter are popular as are nuts and dried fruit supplemented with chocolate or sweets. These are a concentrated form of energy and can be eaten on the move. Others prefer sandwiches and fresh fruit.

Dinner

The evening meal is usually the main meal of the day and even when limited to one stove and two or three pans it is possible with a little practice to prepare a hot, filling three course meal in a very short time. A typical meal might consist of a soup, stew, casserole or pasta dish followed by dessert [hot or cold] or cheese with biscuits and coffee. A visit to the local supermarket will reveal a great variety of dehydrated meats, soy bean, potato, peas and other vegetables, pre-cooked rice, noodles and various pastas and instant soups. There are whips and mousses that require the addition of cold water or milk, and preparations that only require boiling milk to turn them into hot nourishing desserts.

Note:

Plan your menu ahead, experiment with different foods and try them out at home.

Preparing a meal

When the tent has been pitched and you are ready to prepare your meal, lay out all the ingredients and allocate the pans in which they are to be cooked. Some prefer to cook a course, eat it while it is hot and then prepare the next course. Others prepare the whole meal and then eat it. Whichever you choose it is essential to economise on the use of fuel and this can be done by planning the order in which the food is cooked and eaten. After the preparation of the main course water can be boiled for washing up and for coffee. After the meal the experienced camper will wash up, tidy up, and pack away gear which will not be needed during the night.

CLOTHING AND EQUIPMENT

The careful selection of clothing and equipment is not only important where safety is concerned but is vital to your comfort and enjoyment. This does not mean buying the most expensive, but seeking the advice of those experienced in the outdoors and then making the right choices.

Many authorities have pools of camping equipment that may be borrowed or hired. It is a good idea to do this as it gives you an opportunity to test and gain experience of a variety of equipment before buying your own. All walkers should have their own clothing, wet weather gear, personal items and emergency equipment. It is desirable that all should eventually have their own pack and sleeping bag.

Use of check lists

Walkers should make a check list of equipment when they prepare for their first journey. This list should be kept in a note book and used to check equipment before departure on any future walks. With all the items that need to be carried it is easy to forget one item that may turn out to be vital.

The list should be made under the headings of personal clothing, personal and emergency equipment, personal camping equipment and group camping equipment.

Personal clothing

Clothing must be capable of protecting you under the worst conditions that may be encountered. The rapidly changing conditions and the unpredictability of these changes makes the problem of choosing suitable clothing all the more difficult. The solution lies in carrying extra clothing and then adding or removing layers according to the weather and the amount of physical exertion being undertaken.

Insulation is provided by the air trapped between the fibres of the cloth and between the layers of garments. Therefore two light jumpers weighing 500 grams each provide more insulation than a heavier jumper weighing a kilogram. There is also the added advantage that you can wear one only and regulate your temperature.

Clothing loses most of its insulating qualities when wet. Whether the soaking comes from rain or from perspiration it is essential to keep clothing as dry as possible. This means reducing sweating when working hard by opening or removing clothing and wearing waterproof clothing when it is raining hard. There are several materials that retain much of their insulating properties when wet, one is wool and another is synthetic fibre-pile. A mixture of wool and synthetic fibre is usually more suited to bushwalking.

Whatever fabrics are used it is customary to have an inner layer of clothing to absorb perspiration, a middle layer to provide insulation and an outer layer to keep the wind and wet weather out. Garments should be loose fitting either to trap air or allow it to circulate as the need arises. Outer layer garments should be controllable so it is possible to open them up or close air circulation down by fastenings at the cuffs, waist and neck.

Footwear

Boots should be light with flexible, cleated rubber, environmentally friendly soles thick enough to prevent sharp stones being felt and to absorb the pounding associated with bushwalking. The uppers should be made of leather, preferably in one piece with the smooth side out so that they can be polished. A sewn in tongue [bellows type] will prevent water getting in and a combination of D-rings and hooks will make it easier to put them on and take them off. When you buy boots always take the socks that you are going to use with the boots to wear when you try them on. Even light summer boots need breaking-in so wear them whenever possible and remember that liberal applications of a suitable wax preparation will help the process. Once boots are broken in regular applications of dressing after use is all that is required to keep them supple and waterproof.

Many bushwalkers wear joggers and while these are adequate they do not offer protection from water and sharp stones nor do they give ankle support. Joggers are often carried as spare footwear and are useful around camp. Thongs are **not** recommended.

Note:

Borrowing boots that have been moulded to someone else's feet is borrowing trouble.

Socks

Socks have to cushion the feet, absorb perspiration and provide insulation. Socks suited to bushwalking activities are recommended. Frequent washing is necessary for them to function properly and at least two spare pairs should be carried.

Underwear

This is largely personal preference although pure cotton is often the better choice. Thermal underwear is popular in cold conditions.

Shirts

Tee-shirts are popular but they do not have a collar to shield the neck from the sun. A polo type shirt with a collar is better. Tank tops and singlets are not suitable for bushwalking as they expose the shoulders to the sun. They also encourage chafing and rubbing from the pack. In colder conditions long sleeved flannelette or wool mixture shirts are effective and are usually good value for money. In hot conditions a cotton shirt with a collar and long sleeves is recommended.

Trousers

Trousers should be loose and cotton army-type pants are popular. Denim jeans are unsuitable as they are cut too tight, give little protection in wind and rain, become heavy when wet and take a long time to dry.

Headgear

In the warmer months some form of sun hat is essential. It must have a wide brim and as well as giving protection to the head and face it should also give some protection to the neck. In the cold much body heat is lost through the head and it is essential to protect the head to stay warm. A wool or synthetic ‘beanie’ is recommended.

Gaiters

Specially designed bushwalking gaiters help keep the feet dry in bad weather and when conditions are soggy underfoot. They also save the lower legs from being scratched, keep grass seeds out of socks and boots and give protection from snake bite.

Wet weather clothing

A waterproof jacket provides an outer shell that protects against the elements. Being waterproof, condensation is inevitable and the clothing underneath is bound to become wet through perspiration so these garments should not be worn continually but carried in the pack and only donned as required. Rain jackets made out of fabrics that 'breathe' can overcome this problem. A jacket with full zip is preferable and the zip should be protected by a storm flap. The jacket must be large enough to accommodate all the clothing you are likely to wear underneath and long enough to come well down over the hips almost to the knees. A hood, adjustable cuffs and a waist draw-cord will provide maximum control of air circulation.

Waterproof trousers should be able to be put on over boots and it is essential to ensure that they are wide enough in the leg or have zips at the ankles.

PERSONAL AND EMERGENCY EQUIPMENT

Along with the clothing that will be worn or carried in the pack there are a small number of items of emergency equipment that should always be carried by every member of the party. The amount of equipment should be kept to the barest minimum or the exercise becomes self defeating as the increased weight leads to fatigue.

Essential items

Spare clothing may range from a spare jumper, socks for a day journey to complete changes of clothing for a camping expedition. All group members should carry a small torch, spare bulb, batteries and waterproof matches. A plastic whistle should be carried with a simple high quality folding knife and pencil and notebook.

Personal survival and First-aid

Chocolate, nuts and dried fruit provide high energy and a quantity should be carried as emergency rations. A personal survival kit and personal first aid kit should also be carried.

INDIVIDUAL CAMPING EQUIPMENT

Expedition packs

Your pack should be large enough to hold all your equipment and be around 65 litre capacity. A tough cordura or canvas is suitable and you should try the pack on fully loaded paying particular attention to the waist belt, shoulder straps and harness adjustability. The shoulder straps should be wide and well padded. To take some of the weight off your shoulders a well-padded adjustable hip belt is essential. Most modern packs have adjustable back lengths and are ergonomically designed.

Sleeping bags

It is impossible for one sleeping bag to cope with all extremes and most bushwalkers settle for a 3 season bag. These have a synthetic hollow fibre filling which although bulkier and heavier than down bags are cheaper and more effective when wet. An inner bag in cotton or polyester must always be used with hired or borrowed sleeping bags and individuals with down bags should regard them as essential to keep the bag clean. An inner bag also gives you more versatility in very hot weather as you can just sleep in it on top of your sleeping bag.

Sleeping mats

A closed cell foam sleeping mat is essential and worth the extra few grams of weight. As the foam does not absorb water these can be carried on the outside of the pack.

Water

Each member of the party should carry their own water and between one and four litres will be needed depending on local conditions.

In-camp gear

A plastic mug, a steel or plastic plate and cutlery are needed by each individual and toilet gear should include soap and towel, toothbrush and toilet paper. All members of the party must carry a supply of rubbish bags.

GROUP CAMPING EQUIPMENT

Tents

There are dozens of lightweight tents available for the bushwalker to choose from and they come in all shapes and sizes. Many authorities have tents that they lend or hire out. Before you buy a tent borrow one of the same kind so you can examine the quality of construction and try it out for size and convenience. The tents used on expeditions usually hold two or three persons and the load is shared between the occupants. It is usual to have a breathable nylon or cotton inner with a waterproof nylon fly and a slightly heavier, waterproof nylon floor.

If a borrowed tent is to be used on an expedition always pitch it before the start of your venture to ensure that it is complete and that you know how to erect it. Always make sure you return it complete and dry.

Stoves

Modern methylated spirit stoves are by far the most popular and serve a dual function of stove and cooking set. They are light and compact to carry and not too expensive. They are simple and clean to use, stable and not unduly affected by the wind.

Note:

Methylated spirit burns with an invisible flame in sunlight and care must be taken to ensure that the flame is completely extinguished and the burner cooled before refuelling. Liquid fuel should always be carried in a metal bottle with a secure screw top.

EXPEDITION EQUIPMENT CHECK LIST

Clothing

Boots, joggers, socks, underwear, trousers, shirts, jumpers, jacket, headgear, gloves, waterproof jacket and waterproof over-pants.

Emergency equipment

Maps and map case, watch, compass, whistle, emergency rations, matches, torch with spare globe and batteries, knife, survival kit, first aid kit, note book and pencil

Personal equipment

Backpack, sleeping bag, sleeping mat, inner bag, toilet gear, toilet paper, water bottle, cup, plate, knife, fork and spoon.

Group equipment

Tent, stove with fuel, group water container, dish washing, soap pads or nylon scouring pad, trowel, cloth or tea towel and garbage bags.

PACKING AND LOAD CARRYING

Packs are rarely waterproof and experienced walkers solve this problem by using a heavy gauge plastic bag inside the pack as a waterproof liner. In addition every item of clothing carried in the pack along with the sleeping bag and the food should be protected individually by placing them inside plastic bags and sealing them.

Pack weight

If bushwalking is to be enjoyed the load should not exceed a quarter of your body weight and the nearer this load is to your centre of gravity the less strain and fatigue it will impose on your body. Modern packs are designed to do this and you can assist by placing heavy items high up in your pack and as near to the body as possible.

The weight of your pack will decide more than anything else how much you will enjoy walking, the lighter the pack the greater the enjoyment. Considerable experience is needed to keep pack weight to a minimum and to avoid anything but the essentials being carried. Inexperienced campers are often inconsistent in their attitude to weight. Packs must always be weighed before departure and it is a good idea to keep placing them on the bathroom scales while you are gathering your equipment. In this way if items have to be eliminated it will not have to be done in a hurry before setting out.

Packing is largely common sense but it is necessary to balance conflicting needs. Since the **last in - first out** rule applies, items that will be needed en route should be placed in the side pockets or at the top of the pack. Wet weather gear, spare clothes such as jumper, gloves or headgear and food that is to be eaten during the journey should be ready to hand. The sleeping bag and clothing that will not be needed during the walk and which are bulky but lightweight should go to the bottom of the pack. Heavy items or shared group equipment such as the tent and stove should be divided equally between the occupants of the tent and can go into the pack next with the rest of the gear on top.

Many problems arise from packing at the last moment and then throwing in whatever comes to hand. Forethought is required and your kit should be assembled well in advance for the expedition. Planning to do the job well always takes longer.

Note:

All gear other than sleeping mats should be carried inside the pack.

CAMPCRAFT

Camping improves with practice and the ability to provide yourself with food and shelter under all conditions is a skill worth acquiring. It will give you confidence, satisfaction and enjoyment. It will also allow you to participate in other activities.

Choosing a campsite

Choosing the right campsite is not only important for your comfort and enjoyment but can affect your well-being. Finding shelter from the wind and prevailing weather should always be uppermost in your mind when using a lightweight tent. This means seeking lower ground. Hollows or the leeside of a ridge, hill or trees can be used as a wind break between your tent and where the wind or weather is coming from. Other factors to be considered when choosing a campsite include making sure it is free from hazards such as flooding, falling rocks or tree branches. Where possible make sure it is reasonably near to water and that the ground offers the prospect of a reasonable night's comfortable sleep.

Pitching tents

The ground under the tent needs to be as clear and level as possible. If there is a slope then it is best to sleep with your feet down hill. The ground needs to be reasonably dry and soft enough to sleep on and to take tent pegs. Any object that might puncture the tent floor must be removed. Pegs on lightweight tents are intended to be driven into the ground up to the hilt at an angle of 45 degrees. Where possible the guy lines and pegs should be run out in line with the seams and heavier or larger pegs used for the main guys. If the ground is too soft then stones will need to be placed on top of the pegs. The tent should be pitched so the entrance faces away from the wind.

Note:

Remember tents should never be pitched under trees.

Living in a tent

When two or three people are living in the confines of two or three square metres of tent personal organisation and tidiness is essential. Prudent campers are always prepared for the worst with equipment no longer needed being restored to the pack. Everything else should be in its place and torches handy before turning in for the night. It is good practice to sleep with your head to the door of the tent as this allows an easy exit in an emergency.

Establishing a routine

A routine should be established between the inhabitants of a tent and the question of who does what should be sorted out on reaching the campsite. No matter how footsore and weary the group may be it is always good practice to get the tent pitched on reaching an overnight campsite.

Cooking

In dry weather cooking can take place in a sheltered place away from the tent as this will make access to the tent easier and there will be less chance of boiling pans being knocked over. In wet weather the cooking should be done outside the tent doorway under the shelter of the fly sheet or vestibule. There should never be any need to cook inside the tent. While one person, having removed boots and water-proof clothing cooks in the shelter of the doorway the others in the

group can ensure that everything needed for the meal and the washing up afterwards is within easy reach of the person doing the cooking.

Boots or outside footwear and wet clothing should not be worn inside the tent. The lightweight floor of the tent must be treated with great care. Stockinged feet should be the rule inside the tent and a cloth should be handy to wipe up any water or spills.

HYGIENE

Hygiene is an important aspect of expeditions and camp discipline and personal cleanliness needs to remain at a high level throughout the expedition. Face, hands and feet should be washed at the end of every day and teeth should be cleaned. Socks need to be washed frequently and can be dried if the weather is fine by attaching them to the outside of the pack while walking.

Water supplies must be kept clean and dirty washing up water should be poured into a hole made with a trowel in soft ground well away from the water source. Dirty or greasy water must never be thrown back into creeks or waterholes and personal washing should be done away from the source of drinking water.

Note:

Do not wash up or use soap in stock troughs. All litter including tins, bottles, paper and uneaten food ***must*** *be removed from the camp site and carried out by the group. It is no longer acceptable to bash, burn and bury rubbish. Be prepared to remove your rubbish by carrying a few plastic garbage bags with you.*

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FEEDBACK

In keeping with the mission statement of the Western Australia Police Service to work in partnership with the community to create a safer and more secure Western Australia by providing quality police services we invite comments and suggestions for possible inclusion in future editions in an endeavour to improve this publication.

Comments should be forwarded to -

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