SURVIVAL

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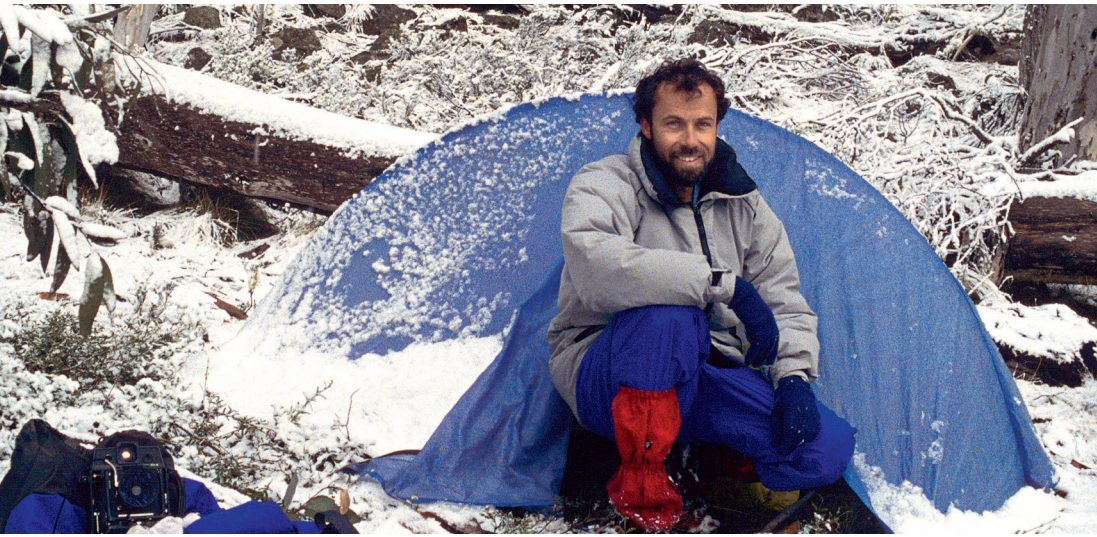


This chapter is a general discussion on survival issues you will potentially face in the Australian landscape should your venture there meet with problems that threaten you in many different ways. It covers issues that might occur anywhere in Australia but many relate directly to the climate, terrain and weather of the Australian Alps.

There are many excellent books on the subject of survival. A lot of them emphasize the problems encountered over a long survival period of five days or more. Suggestions on how to live off the land using plant and animal life for food are discussed in great detail. In long survival situations, these recommendations are useful. However, an analysis of the durations of survival situations has found that one day is about the average length, with weather being the greatest danger to life. In fact, it is the first six hours after the emergency situation develops that are the most critical. Sometimes the critical period is much shorter. There is a saying that is worth remembering: A person can survive for 3 minutes without air, 3 days without water and 3 weeks without food. Decisions made in this initial period usually decide the outcome of the experience. It is with this in mind that the following guidelines have been written. Many first aid procedures are continually updated so it is important to consult the latest views on first aid procedures.

The problems of survival in wilderness can be divided into two categories—physical problems and psychological problems. Physical factors include heat, cold, thirst, hunger, injury and sleep deprivation. The psychological factors include fear, pain, boredom, loneliness, and isolation. Advice on avoiding or minimizing

ABOVE: I was camped in the Victorian Alps when an unexpected snow storm developed.

physical problems is fairly straight forward but, of course, it is not always easy to implement this advice in the field. Suggestions for the relief of psychological problems are far more difficult to give. A lot can be achieved by realizing that you are suffering from a disturbed state. By acknowledging this, you are well on the way to overcoming the problem. Being able to recognize these factors in others also helps ensure survival for the group as a whole.

Two general considerations are worthy of note. In the short term, comfort should be sacrificed for safety and survival. In the longer term, it is important to look out for passive resignation in yourself and others. This general indifference to your predicament can gradually envelop your whole group, finally resulting in your party not being able to organize or implement a survival strategy. This passive resignation can be brought on by both mental exhaustion and physical factors (fatigue, dehydration, illness). It can be avoided by keeping up morale within the group by actively planning and organizing for survival as a group effort.

What follows is the identification of, and possible solutions to, the psychological and physical problems which may be encountered in a wilderness survival situation. The suggestions are aimed at overcoming, or at least minimizing, these problems, so that you and your party stand a better chance of surviving them.

FEAR

A major obstacle to overcome in most survival situations is not so much a natural one as a mental one. Before embarking on any trip you should prepare yourself with the fact that it can happen to you. Realizing this beforehand and mentally preparing yourself for it over many trips is an excellent way of ensuring you stand every chance of survival in an emergency. When you discover, or it slowly dawns upon you, that you are sliding off the thin edge, that your control over the situation is fast slipping from your grasp, the first response is to try to quickly rectify the problem. Often, by this very panic, the situation can be compounded and made even more desperate for you. As long as the present predicament isn't deteriorating too quickly, the wisest first move is to do nothing but stop and think and weigh up the situation. Put your brain to work to make up for any deficiencies you may have in your present situation. A quick discussion amongst party members usually results in a very rational appraisal of the circumstances. Fear of the unknown and fear of your own ability to cope with it, are two obstacles to overcome. Fear of the unknown or hostile environment can be overcome easily by gaining knowledge of how to handle the environment. Fear of your own weaknesses is harder to overcome. Self-confidence can, unfortunately, only be gained by considerable experience and previous exposure to difficult situations. Besides yourself, there are also the other members of your group to take into account. How they react to difficult situations can affect the survival prospects of the entire group so overall it is important to consider:

1. How you react to certain situations
2. What reactions, expressions, feelings in yourself and others mean
3. What your tolerance limit is
4. How to effectively use your skills and your companion's skills to resist, endure and control yourself and others.

Fear occurs on a conscious level as a result of recognition of an imminent disaster and on an unconscious level by creating uneasiness, worry and depression. Unconscious fear can be termed anxiety. This tends to exist at a lower level than fear but can also be dangerous and unpredictable because it tends to persist over longer periods of time. Fear has a much shorter duration but is a lot more intense. Inability to cope with or handle the unknown is a common cause of fear and knowledge and experience of survival techniques is the best way to combat it. Uncontrolled fear leads to panic along with an obvious increase in the seriousness of the situation. In order to control fear, it is necessary to constantly monitor your own behaviour.

Physically, fear can manifest itself as a quickening of the pulse, trembling, perspiration of the hands and feet, dryness in the mouth, fast and heightened speech, and a feeling of faintness and sickness. In others, it is overtly displayed by psychological symptoms which include irritability, confusion, inability to

concentrate, talkativeness or speechlessness, flight and panic. Overcoming fear is a matter of controlling it and there is no limit to this control of fear if your will is strong enough. Methods include:

1. Recognize fear and accept it. Know what your reactions to it are likely to be.
2. Under the stress of fear, learn how to think and act logically.
3. Keep informed. Determine what dangers could threaten and have a plan prepared to deal with them should they arise.
4. Keep physically fit and know how to use your equipment.
5. Know how your companions react to stress and know how to work with them under difficult conditions.

Controlling fear in others presupposes you are able to control it in yourself. It therefore can put a tremendous burden on the leader of a party caught in an emergency. Encourage teamwork but also use your leadership position, not in a dictatorial manner, but more as an example of strength. Exhibit direction of purpose and maintain a sense of discipline within the group. Calm behaviour of the leader is contagious. Use this fact to inspire courage and reduce fear within the group. Fear is a natural reaction to danger. It is a defence mechanism designed to make you strive harder in a survival situation, but there is no doubt that in some circumstances fear can increase the seriousness of the situation. By controlling fear, the odds of survival are greatly stacked in your favour.

BOREDOM AND ISOLATION

At the other end of the spectrum to fear are those feelings which slowly grow with time, rather than instantly rise in response to danger. Boredom should not be confused with fatigue. Boredom often occurs when you find there is no relief in sight so you become frustrated. It can be relieved through diversification, changing chores often and having rest breaks. Overcoming isolation, and the loneliness it may bring, is only possible by prolonged practice of doing things yourself. Gaining self-confidence this way is good insurance against the feelings of loneliness, helplessness and despair. Some people learn to manipulate and control their environment, and use their imagination to adapt to changing circumstances. Others, without this ability, tend to depend on routines and more confident companions to ward off feelings of despair. Being self-sufficient is not necessarily a given trait. It can be learned by anyone willing to explore new situations in everyday life. By making your own decisions and depending on your own judgement in day to day events helps build self-confidence and self-sufficiency. Developing self-sufficiency is a major factor in survival because all counter-measures you may take in a disaster require that you be able to firstly control yourself.

PAIN

Pain is a warning sign which directs our attention to some part of the body that is injured. It works by firstly encouraging us not to get injured but, failing this, by forcing us to shelter or protect the injured part. Pain can be controlled or ignored if necessary and, in an emergency, it is a subordinate problem if others warrant more immediate attention. It is often far more important to move on and make shelter or do some other essential chore first. Pain is merely a discomfort which can usually wait. It can be relieved by understanding its source and nature and concentrating on other essential things.

INJURY

There are times, of course, when immediate action should be given to those who are injured. The ABC of first aid is to attend to the Airways, Bleeding, and Circulation, in that order. Restoration of breathing is of critical concern if it has stopped. Normal signs of oxygen depletion in the blood include blue lips and face, no breathing, a weak or very rapid pulse or unconsciousness. Four to five minutes after breathing stops, the heart will normally stop and from this moment you have only a few minutes to restart both the heart and lungs before possible brain damage begins. It is essential to commence CPR immediately (see below) This can best be learnt by attending a special ambulance course, but a brief summary

of the procedure is given below.

CPR (Cardiopulmonary Resuscitation)
This is required if the victim is not breathing. Clear the person's mouth of vomit or any other obstruction. Lay them on their back with their head tilted well back, placing one hand on the forehead and the other on the chin. Loosen the clothing around the neck and chest. Pinch the nose together sealing off the nostrils, inhale deeply yourself and blow with some degree of force into the victim's mouth, making sure a good seal is made with your own lips. Consider the size of the victim's lungs compared to your own when administering a lung ventilation. Turn your head to see that their chest falls during exhaling. This ensures that air is getting into the lungs and not the stomach. Repeat at about fifteen breaths per minute until breathing is restored. Roll the person over onto their side, head to one side, and legs bent up into a relaxed position for recovery.

Do not commence chest compressions unless you are sure the heart has actually stopped, as injury may result. Check the neck or groin pulse because the arm pulse can be an unreliable measure. With chest injuries, broken ribs could possibly puncture the heart, so take care.

To carry out a chest compression, lay the person on their back and locate the lower half of the breast bone. With the heels of your hands, one on top of the other, press the bone down about fifty millimetres (two inches), eighty times a minute. If breathing has also stopped, it will be necessary to do both lung ventilation and chest compressions together. If you are the only rescuer, alternate two lung inflations with fifteen chest compressions. If there are two rescuers, alternate one lung inflation with five chest compressions. These techniques are quite difficult to do well and it really is essential to be shown by an expert the exact approach to take. As well, the medical opinion for the recommended rates of both lung ventilation and chest compression for both adults and children vary so this information should be checked regularly. Be prepared to perform CPR for several hours if necessary.

Blood Loss
Attend to bleeding injuries as soon as practicable. Loss of blood occurs quickly, so as soon as it is clear the patient is breathing, action should be taken to halt the flow. Apply direct pressure to the wound. Use a dressing if possible but in emergencies simply use your hand. If the wound occurs at the extremities of the limbs, blood pressure can be reduced in that limb by raising it above the rest of the body. Large wounds may need pressure for in excess of fifteen minutes before the bleeding ceases.

If there is pain associated with an injury, it can often be relieved with warmth. Elevation can also help throbbing pain and cold can relieve strains and sprains. Water is the best medium for applying either heat or cold due to its relatively high specific heat.

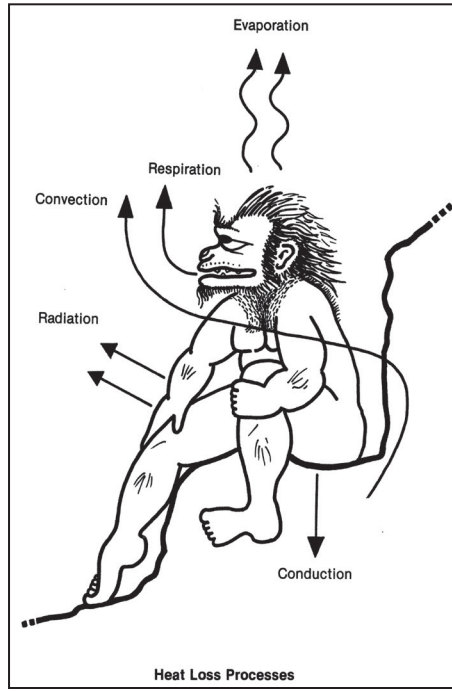
Shock normally follows an injury and is often the most serious and life-threatening consequence. Shock is the body's reaction to physical damage or emotional distress and is due to a disturbance in the normal blood circulation. It is best to treat anyone suffering from injury for shock as well, even if it does not manifest itself immediately. A person in shock has a weak pulse, shallow, rapid or irregular breathing and pale and moist skin. The person may be frightened, anxious and restless. In deeper shock, the injured person may be very quiet or even unconscious and the face may turn grey. This is distinct from respiratory distress where the face turns blue. The person should be made as comfortable as possible, preferably with the head low to ensure a good supply of blood to the brain (unless there are bleeding head injuries in which case it would be better to keep the head raised). Keep the person warm enough to prevent shivering but not hot. Keep them calm and do not administer drinks. Treatment for fainting is similar to that of shock. Bone fractures are generally treated in the bush by immobilization of that part of the body. Splints can be formed from branches and strapped to the broken limb to immobilize it. To prevent discomfort make sure the splint is padded. In limb fractures, traction is recommended to correct the overlapping bone fragments but if help is not too far away, it is best not to try to attempt this procedure as it could cause internal haemorrhaging and increased shock.

Don't underestimate the usefulness of gaffer tape—the tough, black and wide sticky tape that can be bought at any hardware store. This tape can be used to stop bleeding in large wounds and even has been used to close sucking wounds in the chest caused by a spike injury. It can also be used to strap a splint to a broken leg.

COLD

Cold is one of the most serious of survival stresses. Lowering the body temperature by as little as one or two degrees drastically affects its efficiency. Extreme cold numbs the body to such a degree that the person's actions are reduced to the over-riding desire to get warm. We feel cold for the simple reason that our body temperature is dropping below what it should be.

This lowering of temperature is due to a flux of heat from our warmer body to the colder environment and the body reacts to this in several ways. The blood vessels near the skin contract, limiting blood flow to the surface of the body and so reducing heat losses from the blood to the atmosphere. However, this withdrawal of blood from the extremities of the body means that hands and feet will begin to get quite cold, and the desire to exercise and rub the limbs usually follows. If cooling continues to occur, involuntary shivering begins. This generates heat in the muscles to warm the body, but shivering can only be continued for a short time. It is a last-ditch effort before the onset of hypothermia. If the inner core temperature begins to drop, it does so at an ever-increasing rate. Unconsciousness can occur quite quickly if conditions are harsh.



Heat Loss Processes

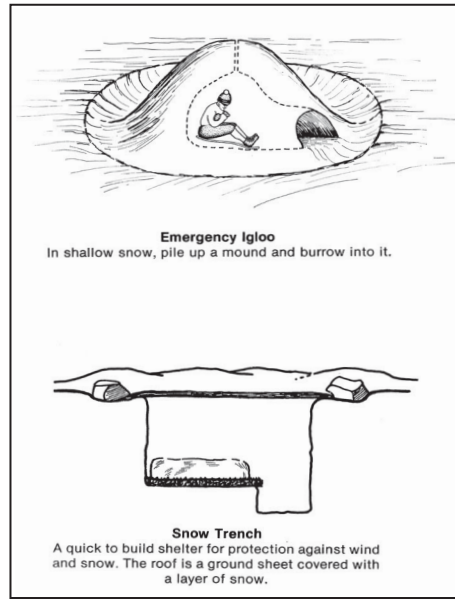
Heat Loss Processes

In order to rectify a heat loss, it is necessary to know how the heat is being lost. Here we are concerned with five basic processes—

conduction, radiation, convection, evaporation and respiration. In all these processes, heat travels from a high temperature area to a low temperature area. Heat conduction occurs through the body being in contact with solid material such as the ground. Very small amounts of heat are also lost by conduction along the fibres in your clothing or sleeping bag. The loss of heat directly from the body to the surrounding environment, due to the temperature of the body, is termed radiation. Radiation travels in straight lines and is the type of heat we receive directly from the sun or from an electric radiator. Loss of body heat through radiation is minimal. Convective losses of heat can also occur at a surface of a body and are caused by a cooler fluid (say air or water) continually passing the body. The convective process is a major factor in body heat losses. For perspiration or other moisture to leave the skin, heat must be provided to raise its temperature. This heat comes from the blood vessels just below the skin's surface. Heat loss in this way is termed evaporative heat loss and it is also a major factor in total body heat losses. Respiratory heat loss occurs when we breathe out warm air which has just been heated by valuable body heat in the lungs.

There are three major factors which normally contribute to cold stress. Firstly, a low atmospheric temperature will increase the convective heat losses from the body. Secondly, if your outer clothes become wet, body heat

is readily conducted to the outer layers of clothing from where it can easily escape through the process of evaporative cooling. Thirdly, if there is a wind blowing, the evaporation process is tremendously enhanced resulting in even more heat losses. Wind is a very serious factor in heat loss because even a slight breeze will induce a very large increase in heat losses through evaporation—the so-called wind chill factor.



Emergency Igloo
In shallow snow, pile up a mound and burrow into it.

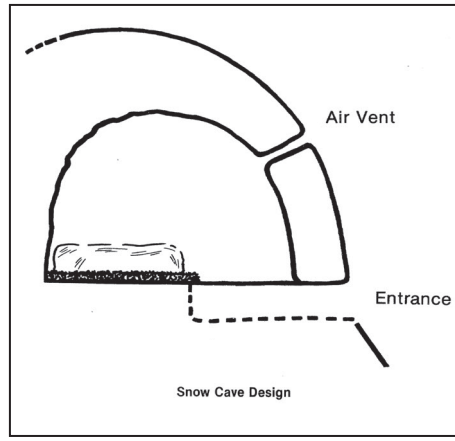
Snow Trench
A quick to build shelter for protection against wind and snow. The roof is a ground sheet covered with a layer of snow.

Clothing and Shelter

Covering the body is the best remedy for feeling cold. This covering refers to both close-contact clothing and the enclosure used for shelter. Clothing can be considered a portable shelter. The criteria for choosing protective clothing is similar to that used in shelter design. Clothing keeps us warm by trapping an insulating zone of air around the body and a tent does the same.

It is not the material which provides warmth. It is how well that cloth traps the air in small pockets that determines its effectiveness. Heat is actually lost along the fibres of the material through the conduction process. Aim to use bulky clothing which has plenty of scope for creating air pockets. Several thin layers are better than one thick one as air is not only trapped in the material but also in the space between garments. The idea is to thwart the convection process which transfers heat across the air pockets

In very cold conditions it is essential to have a wind-proof outer layer to prevent the warm air in the outer air-pockets of your garment from continuously being replaced with colder air. The type of fabric also dictates the warmth. Taking weight into account, cloth made from good synthetic fibres and down are the best. Wool is heavier but still effective. Synthetic fibre material and wool all function as insulators to some extent when wet but down and also cotton lose nearly all their insulation. What water does is replace the air in the spaces of the material, and without these air pockets the cloth can provide no warmth.

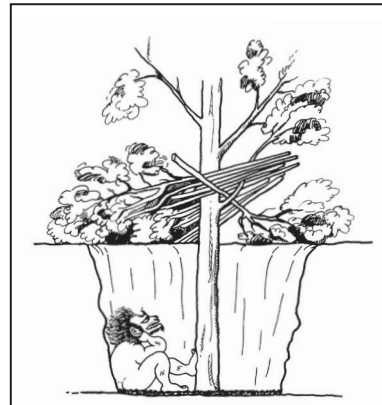


Snow Cave Design

Heat losses occur if the clothing is too tight or if there are large openings at the neck, sleeves or around the waist. This allows convective air currents to circulate. Body movement also pumps air in and out of the garment so it is possible to stay warmer by simply keeping still! This allows a stable barrier of warm air to build up around the body.

In an emergency where poor weather is a major factor, safe shelter against the wind and rain is the first consideration. Although a fire is a good source of heat, lighting one in harsh conditions is

often impossible. It makes more sense to build a shelter to isolate yourself from the elements and increase your heat retention still further with clothing and sleeping bags. If available, generate internal body heat by eating energy foods. The body can be considered the primary source of heat. Secondary sources, such as a fire, can certainly help make the situation more comfortable but in most survival situations they are a luxury. It is better to concentrate on maintaining the primary source of heat using insulation and generating heat from within by eating. In a group situation, huddle close together. Try to keep your sleeping bag dry. In snow country, the snow-cave is the optimum survival shelter. These can be easily dug in and under snow drifts. Make the entrance low down so the lighter warm air which is exhaled, is rising and thus trapped inside. To avoid death by suffocation, a small venthole dug through the top is essential and will provide ample air circulation by allowing some of the warm air to escape so drawing fresh air in through the partly open door.



A Natural Snow Depression Shelter
Natural depressions can be found around trees. When enlarged and covered, these depressions make excellent emergency shelters.

Never burn a gas stove inside a snow cave or tent in order to keep warm. Stoves produce carbon monoxide gas which is deadly. People have died doing this. Always cook outside in a well-ventilated area. If the snow depth is insufficient for burrowing, pile it up into a dome about two metres high. Allow this to set for about an hour and then tunnel in. Use a mat to insulate against conductive heat losses through the floor. A snow trench is another alternative. Dig a trench and cover the top with a snow-covered groundsheet or with blocks of snow. Below the tree-line, it may be possible to enlarge the natural pit in the snow surrounding large trees. The roof can be made of snow, a groundsheet or bark. Amongst the trees it may be possible to light a fire.

Areas free of snow can still be very cold. Seek shelter in dense forests rather than open fields. Thick foliage retains heat and also restricts air currents. It can hold pockets of insulating air in a similar way to clothing. Often the area under a fallen log provides good shelter. Use bark and branches to model an enclosure but for ease of construction make the shelter only as large as necessary. With all shelters try to minimize air circulation by plugging the holes and keeping any ventilation openings cross-wind or on the lee side. This prevents them being draughty.

Hypothermia

Even if there is no immediate emergency, watch out for signs of hypothermia or exposure in yourself and other members of the group. Symptoms include stumbling and poor limb control, carelessness, confusion, decreased attention span, uncontrolled and prolonged shivering, and general weakness. Treatment calls for immediate action to first halt any further heat loss and then to add heat to re-warm the person's body. Place them out of the elements in a sheltered spot and exchange any wet clothing for dry. Although the thermal capacity of a sleeping bag is low, briefly prewarm a sleeping bag with someone else's body heat first and then place the person inside. Insulate them well from the ground. Additional heat can be supplied by putting another person in the bag with the victim. If the bag is not big enough to do this, have other people lie either side. Administer hot drinks and light a fire.

Prevention of exposure is preferable to cure. Hypothermia can be avoided by being fit, dressing for cold, wind, or rain, eating well, especially high energy foods, bivouacing early enough in bad weather to ensure a safe campsite can be organized, and by carrying emergency gear such as a body-size plastic bivouac bag

on day trips. In an emergency, use it like a sleeping bag and leave only a small hole open for breathing.

Frostbite

Frostbite, or freezing of the flesh, can also occur in cold conditions. It is not necessarily associated with exposure and can happen at any time. Usually it occurs at the extremities of the limbs where blood supplies may have already been reduced by the body as a response to cold conditions. The capillaries of the skin contract to reduce heat loss and to send the blood to more vital areas of the body. Often frostbite occurs without the knowledge of the victim. Cold limbs have little feeling to start with so you do not realize they are slowly freezing. A grey or yellowish appearance in the skin is a sure sign of frostbite. A quick treatment is to place the affected parts under the armpits or on the stomach under clothing. Immersing in water warmed to about 42'C is also very effective. Once thawed, do not allow the flesh to refreeze, but if this is a possibility, it is best not to thaw the affected parts until safety is reached.

HEAT

There are two aspects to bushwalking in a hot region. The first is to avoid absorbing the heat from the environment. The second is where your body is overheating due to hard physical exercise or dehydration and the heat generated by your body cannot be lost quickly enough to the surrounding environment. Avoiding absorbing heat from the environment means shielding yourself from the direct rays of the sun or the reflected rays from bright surfaces such as sand or rock faces. Find a place in the dense shade where there is a good breeze. In very hot conditions you may have to restrict your walking times to the very early hours before and just after sunrise, or in the evening. In the second situation where the body has overheated from exercise, the solution is often quite simple. Stop and rest in a shady, breezy spot and drink plenty of water. The most efficient way for the body to lose excessive heat is through the evaporation of perspiration, and a breeze improves the effectiveness of this process tremendously. Sitting in a shady spot reduces the heat absorbed from direct radiation and choosing a breezy place means evaporative losses are increased. You'll soon cool down. Keep activity to a minimum to prevent additional internal heat being generated in the muscles. A factor which will limit the rate of evaporative heat loss is the relative humidity of the atmosphere. If the air is already quite humid, that is contains a lot of water vapour, then it is difficult to make it accept anymore. Perspiration will build up on the skin, instead of evaporating and so be ineffective. In this case you have to rely on only the convective heat losses to the circulating air. This is a much less effective process especially when the atmospheric temperature approaches the body temperature (38'C). High humidity is mainly a problem in the tropical north of Australia.

Heat Exhaustion

Heat exhaustion will occur if measures are not taken to cool down. It occurs when too much of the body's blood is directed to the surface blood vessels for cooling and away from the important internal body organs. Signs of heat exhaustion include nervous tension, general fatigue, weakness, headache, indigestion and vomiting. Heat cramps occur after excessive sweating as a result of a depletion of body salts.

Treatment for heat exhaustion is immediate rest in a cool shady spot. Give plenty of water. The patient often feels cold so keep him warm and even administer hot drinks. Heat stroke is a more serious condition with the body's temperature rising to over 40'C. The body's temperature regulating mechanism has failed and treatment involves cooling the victim by any means. Heat stroke is usually easy to diagnose. The victim, suffering from dehydration, stops sweating (dry armpits), and the skin turns a flush pink or even purple. Administering water is an essential part of treating any heat related affliction. Unfortunately hot areas and dry areas often go together.

THIRST

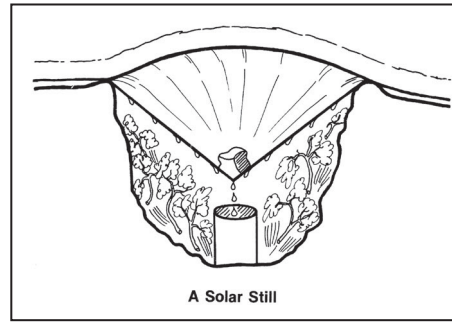
It is possible to rank survival factors depending on the need to take evasive action against them. After cold, dehydration is one of the most serious problems of survival. Water is the third

requirement for life, superseded only by the need for air and shelter. Without water in a hot climate you will probably die within three days. In comparison, a person will survive for at least three weeks without food if he is reasonably fit. Often the feeling of thirst you get from not drinking for some time is not a good indicator of how much water you really need. Thirst is initially quenched quite easily with just a few mouthfuls but if you get thirsty again shortly after, then you really didn't drink enough the first time. If conditions are dry and hot, drink as much as you can whenever you can find it. If the survival situation is such that you must remain in one place till found, it is best to base yourself near a water supply. The intake of water necessary to maintain the body can be minimized by observing several rules:

1. Find cool shady shelter away from the sun
2. Move as little as possible during the hot part of the day
3. Keep light clothing on
4. Keep your mouth closed
5.There is no point rationing water. Even if you observe the above rules you must still drink when you are thirsty.

Finding Water

Finding water will be a major concern if the survival situation is over a prolonged time. Descend from mountain peaks into vegetated gullies and follow these down. Often isolated rock pools can be found. Small springs often occur high on a mountain shoulder, but further below, this water may disappear underground again. If you are high on a mountain, it is a good idea, then, to follow streambeds all the way from their source. Permanent animal trails often lead to water, and green vegetation is sometimes a sign that moisture or even water is near. If you discover only a minute amount of dripping water, say, from the bottom of an over-hanging cliffline, this can be a lifesaver. It is only a matter of time before this drip will fill a billy or water bottle placed under it. If there are many drips, collect them all together into a groundsheet carefully laid out below. Digging for water around lush vegetation is not always profitable. Trees often have roots over five to ten metres deep, and this may be where the water is. Dig only a metre down in the most likely location. If it doesn't look promising, give up. Exertion like this is a good way to lose valuable body fluid through perspiration. A metre-long piece of nylon tubing or thin hose is invaluable for sucking water from deep crevices which would otherwise be inaccessible. Water from springs and waterholes is normally quite safe to drink as long as there is no obvious odour. Use sterilizing tablets or boil it when in doubt. Be wary of pools with no green growth around the edges or no animal tracks leading to it. Freshwater on beaches is usually found by digging deep with an appropriate implement. Dig above the high water mark, near the base of the dune. Allow water to seep into the hole but if this tastes salty, dig another well further back. Don't be tempted to drink sea water. It is far too salty even for cooking.



A Solar Still

Solar Distillation

In arid regions with some vegetation, a solar still can be improvised. Dig a hole about a metre deep with the same size diameter. Place a billy in the centre at the bottom and surround it with green leafy branches and grasses. Cover the hole with a plastic groundsheet held down around the rim with soil. It is important that the seal be good so that water vapour cannot escape. Weight the centre of the sheet with a stone so that it forms an inverted cone over the billy. In about three hours the still will begin to vaporize moisture from the vegetation. This moisture condenses on the underside of the plastic film, runs down it and drips off the cone's apex into the billy.

It is best to set the still up in the morning, rest in the shade, and collect the water in the afternoon. It takes six hours to produce a litre of water under good conditions. A simpler but still viable method is to seal leafy branches inside clear plastic bags and leave them out in the sun. Avoid using vegetation with a white milky sap.

HUNGER

Control of hunger is one of the easier problems associated with survival. As long as you adjust to the discomfort of not eating, survival for two to three weeks without eating is quite possible as long as physical activity is limited. Most survival situations last a day or two and no longer. Lack of food is not a problem in these cases. Your only concern is trying to live with hunger pangs and fatigue caused by low blood sugar levels. If food supplies have run out then you are going to start feeling hungry in a very short time. This is not necessarily a sign that you are also becoming weak and that death is just around the corner. The biggest problem with hunger is a psychological one. Feeling hungry creates a certain amount of frustration which can only be relieved by occupying your time with more necessary survival duties. Spend your time maintaining a shelter or obtaining water.

If you are skilled at trapping animals then this may be a worthwhile pursuit but if you are not experienced, more energy will be expended trying to catch food than actually obtained in eating it. Edible vegetable material such as roots, leaves and some berries is a possible alternative. Again, previous experience is essential as it is important to know what is edible and what is not. Although the food value of many plants may be quite low, finding them and collecting them will help pass the time if you are forced to remain in one place until found. Food is of little importance in survival because normally there are more important factors to attend to. Unless someone is injured or very ill, or the weather a limiting factor, there is no reason for you to stay in one place, unless people are searching for you. Your time should be spent actively in navigating yourself and party back to civilization. If the survival situation involves merely being lost, which it often does, navigation becomes your main concern. In many frequently visited areas of Australia, civilization is no more than a day away if you walk in the right direction. Your time should be spent seeking out this escape route, rather than searching for food.

FATIGUE AND SLEEP

Fatigue is the inevitable result of work and exertion. It is important to recognize the onset of fatigue and to take necessary action to relieve it. Rest is important in any survival situation. You can never be sure when you may be called to action in the event of your situation deteriorating, so make rest periods long enough to allow for complete recovery.

Fatigue can be lessened by reducing the rate at which work is being performed. Energy-wise, a slow walk is more economical than a sizzling pace. Conserve energy by assuming a natural rhythm appropriate to the task. Sleep is the best method of recovery from fatigue. Through sleep, both the body and the mind are rested and recharged again for the next day but sometimes it will be necessary to deprive yourself of sleep in order to guard your situation against further deterioration, or to watch someone who is seriously injured. If you are in good physical condition it is possible to forego sleep for several days even though your efficiency will decline towards the end of that period. Try to get short naps whenever the situation allows but if you must stay awake, keep active, move around, eat, drink and talk with others.

WHEN DISASTER STRIKES

Surviving an emergency requires the right decisions to be made. Your initial acknowledgement to yourself and others that something has gone wrong is of prime importance. Realizing that you do have a problem and cancelling any further blundering along under worsening conditions, are the first steps towards surviving the situation. What happens next will decide the final outcome of the emergency.

Correct decisions must be made and these can only be arrived at through your and your companion’s previous training and experience.

Depending on the emergency, you must decide whether to carry on or stay in one place and seek shelter. The decision-making must be disciplined and intelligent. The pros and cons of the alternatives should be discussed and weighed up. Do not move unless you have the means to survive during travel. Leaving shelter during very bad weather just to meet a deadline is very foolhardy. Consider your requirements of shelter, water and food, as well as your physical condition, before deciding to stay or move on. Once having made a decision it is necessary to consider a back-up plan should the first one fail. As an example, you may have decided to sit out a raging blizzard in your tent. Having decided this, a contingency plan must be formulated to handle the possibility of the tent being ripped apart by the blizzard. This stand-by plan should be ready to implement the moment it becomes necessary. You will need your outdoor clothes ready, if not already on. A digging implement for constructing a snow cave should be in easy reach. If possible, devise a back-up plan for the first back-up plan. Hopefully these strategies will never need to be brought into action but it is better to overkill on the precautions while you are relatively comfortable than to try to make decisions after your tent has blown away.

Remember that just after the disaster has struck it will be difficult to make rational plans. You and your companions will be suffering a certain amount of emotional upset and shock. If it is safe to do so, remain in one spot for a short while to recover mentally and physically. Then evaluate the situation.

FOREST FIRES

There are several ways in which people have died in fires—the body's heat regulation mechanism fails, the body is burnt, the lungs are burnt by hot gases, the person dies of oxygen deprivation, smoke inhalation or the person is poisoned by toxic gases. Of all these the most common cause of death in forest fires is the first one—the body's heat regulation mechanism fails. The person does not die from being burnt by the flames. The victim is nearly always dead before the flames reach them. Death is from heat stroke caused by excessive overheating of the body from radiation or by breathing in hot smoke and gases.

This is a very important point and one that offers a solution for escaping the dangers of a forest fire. Most heat in a bushfire is radiant heat—heat that travels in straight lines from its source, normally from the glowing coals. To avoid this heat it is necessary to intercept or block the radiation. Lie in a ditch, in wheel ruts, creeks and creek beds, between rocks, and cover yourself with earth, sand or blankets. If your car is nearby then crouch under the dashboard with a covering blanket. Do not worry about the petrol tank exploding. Apparently, it rarely does unless the car is parked over long grass. If there are ponds or creeks nearby, shelter in them and cover yourself with a wet blanket. Retreating to raised water tanks, however, is dangerous. With flames nearby the water in the tank quickly warms to above body temperature with fatal results. If it becomes necessary to confront the flames, select an area with the least amount of combustible material and try to dig in. Do not run uphill to escape the flames as fires and their heat can move very fast in that direction. Move across the slope away from the fire-head, towards the back of the flames. If these flames are small and you can see clear burnt ground on the far side, then jump through them. Remember that the fire-head passes through an area in just a few minutes. In order to survive, you only need to shield yourself from direct radiation for this short duration, and buildings are often the safest places in which to take refuge while the flames pass. They may eventually catch fire and burn down but this is usually well after the peak of the fire has moved on. The trick is to leave the shelter after the peak has passed and before the building begins to burn with intensity. There are other cases where the size of the fire is just too great and where it consumes all available oxygen in the area. Suffocation is possible. As well, a big fire is so hot that it will ignite any buildings well before the fire front reaches the building. Survival will become difficult.

LIGHTNING

Many people die each year from lightning strikes so it is best to avoid putting yourself in a vulnerable position. It can be assumed that the light of lightning travels instantaneously from

one point to another compared to the much slower speed of the sound of thunder, so the gap in time between the lightning striking and the sound it makes is the time taken for the sound of the thunder to reach you. Sound travels very roughly at 1 kilometre every 3 seconds. So, for example, with an interval of 12 seconds between lightning and thunder it is easily calculated that the strike was 4 kilometres away.

In an electrical storm, seek shelter indoors or if that is not possible head for low points in the terrain such as a steep valley. Crouch down and make yourself small. Stay away from water bodies and trees which have high water content. Avoid mountain tops. If in a group, spread out so that the lightning strikes only one. Once the strikes are 10 kilometres or further away it is reasonably safe to emerge from whatever shelter you could find. Be prepared to perform CPR on anyone who is hit by lightning.

RIVERS

Dry river and creek beds often seem to offer a flat clear spot for camping. Don't be deceived. After heavy rain a dry creek bed can become a raging torrent metres deep and, if it is a flash flood which rises quickly, you and your tent can be washed away with tragic consequences. Observe the state of the banks. If there are signs of past water flows high up the banks then you know the area is not suitable for camping. Note the rainfall forecast and realize the rainfall may be a long way away in the headwaters of the creek so you have no warning of the impending flood until it is upon you. Know where and how large the catchment is.

AVALANCHES and CORNICES

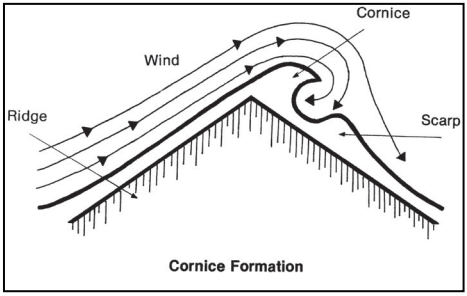
Avalanches

Avalanches seldom occur in Australia but they do happen and lives have been lost. The main peaks of the Australian Alps are the chief sources. Be careful crossing steep slopes particularly if they are bulging or have a steepness of 30 to 45 degrees (or a gradient of 60 to 100%). After rain a snow slope can become saturated, heavy and loose particularly if the temperature warms up. These types of slopes are unstable and prone to avalanche. Steep slopes without trees are also prone to avalanche as there is little to support the snow slope which can easily slip away. Treed slopes are much more stable as the trunks and branches help retain the snow. After a heavy snow fall slopes can avalanche before the new snow has time to anchor itself to the older snow underneath.

If caught in an avalanche, your chances of survival are not great. Initially, try to get off it quickly before it gathers too much speed. If that is not possible and you survive the fall, you will probably be buried under several metres of snow which is fast setting hard. During the fall, try to stay on top of the avalanche and on your back so that your face may be near the surface when it stops. You must try to dig yourself out immediately before the snow hardens. Make an air pocket around your face and breathe in deeply to expand the region around your chest. There will be a lack of air to breathe and it will be dark and difficult to know which way is up but dropping something should indicate which direction is down. If you have survived this far

ABOVE: Thunder storms can be exciting but also terrifying and life-threatening.
OPPOSITE: A partially frozen Lake Cootapatamba with Mt Kosciuszko behind. Walking on any frozen lake's surface is dangerous. If you break through, it is nearly impossible to climb back out.

begin digging up to the surface.



Cornice Formation

Cornices

These overhanging flows of snow form on the lee side at the top of ridges due to strong winds blowing incessantly from one direction. If climbiig up the windward side of a ridge you will be unaware of the cornice on the lee side until you are on it and it snaps off. It is always best to stand well back from the edge until you determine whether a cornice has formed or not. Mount Feathertop most years has a classic summit cornice.

FROZEN LAKES

There is no reason to venture out on any frozen lake in the Australian Alps. No route to anywhere requires you to do this. So don't be tempted to explore any of the lakes by walking out on their frozen surface. The ice may be thick enough to support your weight initially but the thickness and strength of the ice might vary across the lake, making it more than likely you will break through. If this happens you are in big trouble. If the ice was weak enough to allow you to break through then it is weak enough to stop you from climbing back out and on to it. Each attempt to climb back up will result in another piece of ice breaking off and landing you back into freezing water. You will be frozen to death in a matter of minutes. Try to get out by using the spikes on your ski poles to dig into and grip the ice so that you can haul yourself out lying on your stomach. Try to climb out at the same spot you fell in as you know the ice is thick enough there. You may be able to use your pack as a flotation device.

SIGNALLING

If it is not possible to move or send someone for help in an emergency, then you must wait until the rescuers find you. This waiting time can be reduced if you make your presence known to the searching planes and helicopters. Move to sparsely timbered ridges and creeks or to generally open areas where you can be easily seen. The most obvious method of signalling is a smoky fire. Create smoke which contrasts with its background. Against a dark green rainforest or heavy overcast sky, white smoke will show up best. In snow, black smoke is clearly seen. Your ability to choose a smoke colour, however, will be limited by what you have to burn. Prepare the fire in advance, wait for a search aircraft to enter your area and light the fire as the craft approaches.

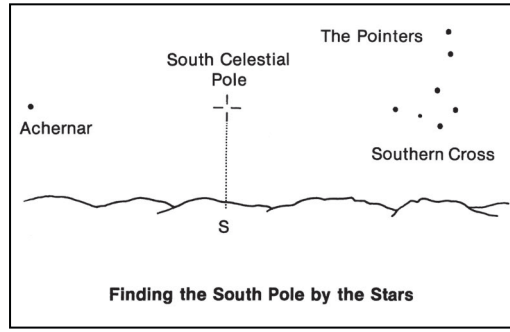
It is possible to signal with a mirror or shiny object but aiming the flash directly at approaching craft is difficult. With the mirror held near one eye, sight the aircraft through two forked fingers held at arm's length. The bright

reflected rays appearing on these two fingers is evidence that rays are passing between the fingers in the direction of the aircraft. In featureless snow country, shadow casting may be your only means of signalling your position. Build up snow blocks which will cast a dark shadow in an otherwise white landscape. Spreading out brightly coloured objects such as tents and sleeping bags will also help advertise your position.

Sending out an SOS by morse code is still a valid means of asking for help. In morse code, SOS is the help sign and in dots and dashes language this is three short flashes (for S) followed by three long flashes (for O) and then another three short flashes for the second S. This signal can be sent out during the day by blocking and unblocking the light from a flare with an opaque object or by night by flashing a torch along a line of sight to nearby rescuers.

NAVIGATION

If two members of the party each take a traditional magnetic compass, then it is unlikely that both will get lost or broken. If however they do, then it will be necessary to find your bearings by other means. Most smart phones have a compass app installed which also provides you with the coordinates of your position so your location on a map can be easily determined. If however your phone is also inoperative then traditional means of navigation need to be employed.



Finding the South Pole by the Stars

In a familiar area, local features will give a rough indication of direction from your memory of how the landscape fits together. You might know the direction of a linear feature such as a stream or mountain range. If the day is clear and you have a good view, then it's possible to orientate the map by observing the position of prominent features but it may be necessary to climb a hill or rock outcrop to do this. Other methods involve observing the sun by day or the stars by night. Since a rough indication of direction is all that is needed, it suffices to note that the sun rises in the east and sets in the west. South of the Tropic of Capricorn, the sun is always north of these bearings, more so in winter. Around midday, the sun will be in the north, but this will be difficult to gauge unless the season is winter and the sun is far to the north. North of the Tropic, the sun will be in the southern half of the sky for some time during the warmer seasons and allowance should be made for this. The shadow of a vertical stick placed in the ground can help determine the direction of the sun.

At night, the south pole can be determined by first finding the south celestial pole. A point on the horizon directly below this is the direction of south. The south celestial pole is found by identifying the southern cross and pointers formation. If a line is extrapolated from the bottom of the cross for four and a half cross lengths, you will arrive at the south celestial pole. A vertical line dropped down from here to the horizon will indicate the true south pole. Alternatively, draw an imaginary line from the bottom of the cross until you arrive at a very bright star, Achernar. Halfway between this star and the Southern Cross is the pole. Achernar is below the horizon for part of the year. Note that by using these methods, what you are finding is true south, not magnetic south.

BEING LOST

The most important decision you can make to prevent yourself from being completely lost is to stop once you feel you are lost. Do not proceed any further in a blind panic hoping to find the route again. Instead, attempt to retrace your steps back to the last place you recognize. If you can do this, then you are no longer lost.

If you have a compass use it to orientate the map or simply orientate the map by aligning it with the surrounding features. Keep your rucksack on. Don't leave it temporarily behind in the hope of travelling lighter and faster. You may lose it as well. A smart phone will give you the coordinates of your current position on a map making your job a lot easier.

To be more familiar with your surroundings look back occasionally the way you came so you know what to look for if you are retracing your steps. Looking back also allows you to make more sense of the entire landscape around you.

DANGEROUS ANIMALS

Bushwalkers in Australia are likely to be quite familiar with the habits of mosquitoes, flies, ants, leeches, possums and even magpies. These animals can be quite a nuisance but their presence is usually seldom threatening. A blood-sucking leech may be quite a visual shock, but it is little else. A dive-bombing magpie, on the other hand, creates a more serious situation. Magpies have been known to gouge at people's eyes with their claws so it is essential to protect the eyes and face when attacked by these often stealthy defenders of territory. To keep magpies at bay, wave a dead branch overhead so they cannot get near to you. Magpies often do not attack if you continue to stare at them but the moment you turn your back on them they will launch. Salt removes leeches, as does a persistent flicking with the finger if they aren't attached too securely. Mosquitoes and flies are best kept away with repellent, while your food is kept safe from hungry possums by secure storage. In addition to these animals, there are others which present more of a problem, due to their powerful venom. This group comprises snakes, spiders, scorpions, and ticks.

Snakes

Australia is well endowed with venomous snakes. On the other hand, all Australian lizards are non-poisonous, so anything which may look like a snake but also has legs, is not a problem. Snakes generally will not worry you. They are usually very timid in nature and are just as scared of you as you are of them. They will normally avoid humans unless taken by surprise or trapped with no means of escape. In the mating seasons of spring and autumn snakes can be more active and aggressive.

A lot has been written on snake bite treatment but the emphasis should be more on how to avoid being bitten in the first place. You can avoid a bite by being alert and watching where you place both hands and feet. Be wary of clusters of rocks, fallen logs and long grass. In cold areas snakes are often attracted to sunny spots. After a lengthy period of cooling rain, snakes will come out of hiding and sun themselves on rocky outcrops in order to warm up. Wear protective clothing—thick socks, long trousers, good footwear and gaitors. Walking slowly and heavily in potential snake country, warns the snake of your presence and allows it time to move away. In cold temperatures, snakes become more sluggish, so give them plenty of time.

Should you get bitten, then treatment must immediately follow. It is possible that the bite is a dry bite meaning no venom was discharged. Snakes sometimes do this as a warning or to conserve the venom. Phone 000 to arrange evacuation anyway and try to keep the patient calm and still in order to not encourage the venom to flow throughout the body due to an increased heart rate or movement. Apply a constricting pressure bandage over the bite and around the limb to restrict blood flow from the limb. Medical staff can analyse the venom on the bandage so that the correct anti-venin can be administered.

Don't chase the snake but try to remember its length, thickness, colouring and head shape (triangular or rounded). Chasing the snake can put you in danger of being bitten again. If the snake is identified by an expert, the correct specific antivenin can be administered when you get to medical help. Otherwise a less effective but still extremely useful general antivenin can be used. Apply the pressure bandage immediately with another beginning at the top of the limb and winding its way down the limb to the wound. This bandage will slow down the movement of the venom to the rest of the body through the lymphatic and blood systems. Splint the limb with anything you have such as a straight branch and strap it along the limb using gaffer tape or similar to prevent

movement and so slow the circulation in the limb. Carry the patient out on a stretcher and reassure them to help reduce shock. If breathing and heart stop it will be necessary to perform CPR until help arrives or is reached. Obviously, in the remote Australian bush, this could be a substantial time. Remember that applying a pressure bandage and immobilizing the limb with a splint are the two most important things you can do.

Spiders
The red back and the funnel web are Australia's two deadly spiders. Adults rarely die from a red back bite but the sting may kill a child. On the other hand, both adults and children have been known to die after being bitten by a funnel web. If bitten on the limb by either, apply a restricting bandage and immobilize the limb in a similar way to snake bite treatment. Monitor breathing and heartbeat, and administer resuscitation procedures if necessary until help arrives.

Scorpions
Apparently, no one in Australia has been known to die from a scorpion bite although the sting can be a very painful experience. The venom is contained in the tip of the scorpion's flexible tail. Bathing the bite in hot water and taking painkillers is the suggested treatment.

Ticks
These animals are not serious if killed soon after they attach themselves. Ticks bury their mouthparts deep into the skin and engorge themselves with your blood. Their toxic saliva causes local anaesthesia and, with some people and animals, general paralysis can occur if the tick is left to survive for some time. Medical treatment then becomes necessary. You will not be immediately aware that a tick has attached itself. Often it will not be discovered for at least a day, and then only by a slight itchy irritation. Don't pull the tick out as this only induces the animal to inject further toxins. Instead, dab it with a wad soaked in kerosene, turpentine or even methylated spirits until it is dead. At this stage it is no longer a danger. Total removal is difficult and mostly unnecessary. The tick will grow out with the skin. If using tweezers, it will be necessary to grasp the deeply embedded head if the whole tick is to be removed.

Crocodiles
Found in the northern parts of Australia, crocodiles are the ultimate killing machine. The only advice is to stay well away from any area deemed crocodile territory. In attack mode, they can lunge and run at speeds close to but less than that of humans on land. In the water, humans don't stand a chance. Stay away from swampy land and shores where crocs can camouflage themselves very well. In water they are almost invisible except for their eyes riding just above the surface. Saltwater crocodiles are the big dangerous ones and they can be found in both fresh and salt water. If approaching a suspicious water hole, throw in a small boulder first to see if there is a response. Don't rely on local advice about safe waterholes too much. If attacked, try to aim for the eyes, their most vulnerable part of the body. Gouge and punch as much as possible. They will attempt to roll their victim over and over, the so-called death roll, making your escape difficult.

SOLO WALKING

Bushwalking is usually taken to be a social activity, a group enjoying adventure together. There is also the benefit of safety in numbers when you travel this way. Should one member of the group get into difficulties, the other members can help. They know the whereabouts of the injured person, so some can stay behind while others go for assistance. Rescue work is minimized and searches on a large scale are not needed. To go walking alone seems totally irresponsible, since should anything go wrong and you are unable to return, a large-scale search must be organized. People do, however, go walking alone, and there isn't any, and nor should there be, a rule against it. To walk alone is not a matter of being irresponsible, it is more a duty to be very responsible. If you make the conscious decision to go solo, then you should take all precautions possible to ensure nothing goes wrong. In the event that it does, your itinerary and expected time of return should be left with friends who can notify rescuers and direct them to a specific search area.