

SURVIVAL and RECOVERY

This is a "civilianized" version of the United States Army, Marine Corps, Navy, and Air Force's 1999 document, *SURVIVAL, EVASION, AND RECOVERY – Multiservice Procedures for Survival, Evasion, and Recovery*.

The only changes that have been made are the removal of two chapters, *Evasion* and *Induced Conditions (Nuclear, Biological, and Chemical)*, and the removal of items specific to combat situations. Chapters and items have been renumbered as a result of these removals, but the order of all items, and the wording and illustrations, remain unchanged (some illustrations have had their captions redone because the originals were nearly illegible).

The intent of this version of this document is to provide the general aviation pilot (or anyone who could potentially find themselves stranded in the wilderness) with a concise survival manual.

The original is marked, "approved for public release; distribution is unlimited", and that statement applies to this version as well.

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Chapter I – Navigation

1. Stay or Move Considerations

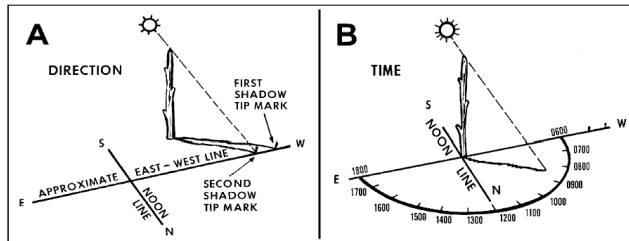
- A. Generally, stay with the aircraft.
- B. Leave only when:
 - i. There is some danger.
 - ii. Are certain of your location, have a known destination, and have the ability to get there.
 - iii. Can reach water, food, shelter, and/or help.
 - iv. Convinced rescue is not coming.
- C. Consider the following if you decide to travel:
 - i. Determine which direction to travel and why.
 - ii. Decide what equipment to take or cache.
- D. Leave information at your starting point that includes:
 - i. Destination.
 - ii. Route of travel.
 - iii. Personal condition.
 - iv. Supplies available.

2. Navigation and Position Determination

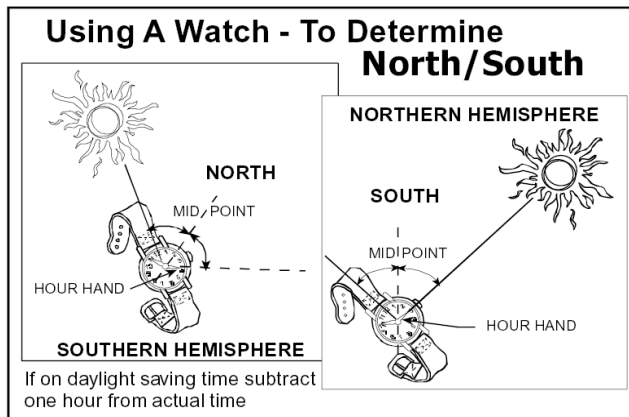
- A. Determine your general location by:
 - i. Developing a working knowledge of the operational area.
 - a. Geographic checkpoints.
 - b. Man-made checkpoints.
 - c. Previous knowledge of operational area.
 - ii. Using the ***Rate x Time = Distance*** formula.
 - iii. Using information provided in the map legend.
 - iv. Using prominent landmarks.
 - v. Visualizing map to determine position.
- B. Determine cardinal directions (north, south, east, and west) by:
 - i. Using compass.

<p>CAUTION: The following methods are NOT highly accurate and give only general cardinal direction.</p>
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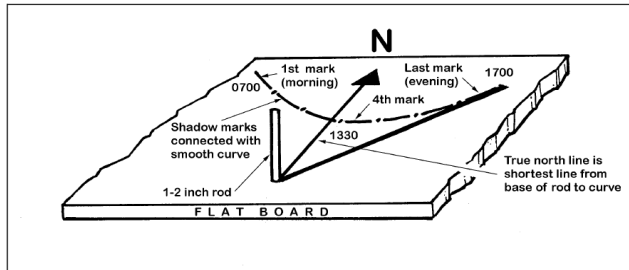
- ii. Using stick and shadow method to determine a true north-south line (Figure I-1).



- iii. Remembering the sunrise/moonrise is in the east and sunset/moonset is in the west.
- iv. Using a watch to determine general cardinal direction (Figure I-2).



- a. Digital watches. Visualize a clock face on the watch.
- b. Northern Hemisphere. Point hour hand at the sun. South is halfway between the hour hand and 12 o'clock position.
- c. Southern Hemisphere. Point the 12 o'clock position on your watch at the sun. North is halfway between the 12 o'clock position and the hour hand.
- v. Using a pocket navigator (Figure I-3).



- a. Gather the following necessary materials:
 - Flat writing material (such as an MRE box).
 - 1–2 inch shadow tip device (a twig, nail, or match).
 - Pen or pencil.

- b. Start construction at sunup; end construction at sundown. Do the following:

- Attach shadow tip device in center of paper.
- Secure navigator on flat surface (DO NOT move during set up period).
- Mark tip of shadow every 30 minutes annotating the time.
- Connect marks to form an arc.
- Indicate north with a drawn arrow.

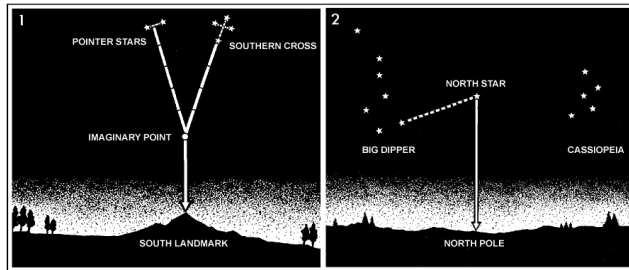
Note: The shortest line between base of shadow tip device and curved line is a north–south line.

- c. Do the following during travel:

- Hold navigator so the shadow aligns with mark of present time (drawn arrow now points to true north).

- d. Remember the navigator is current for approximately 1 week.

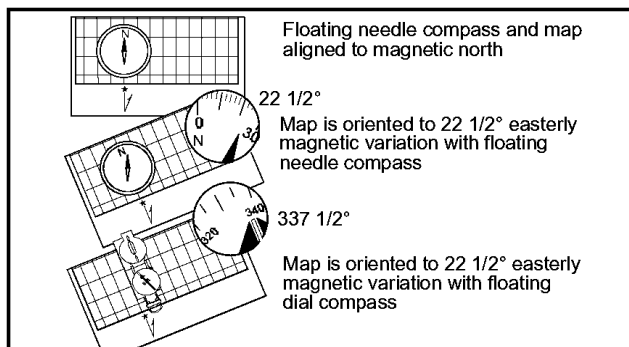
- vi. Using the stars (Figure I–4):



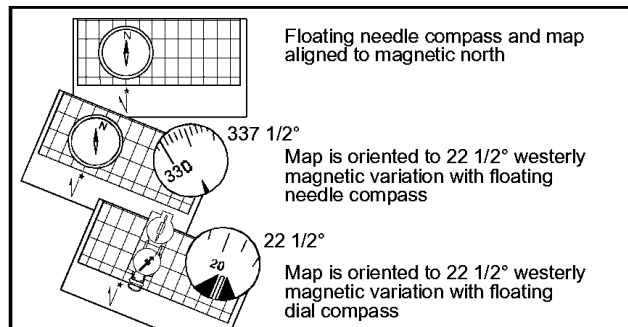
- a. North Star is used to locate true north–south line.
- b. Southern Cross is used to locate true south–north line.

C. Orient the map by:

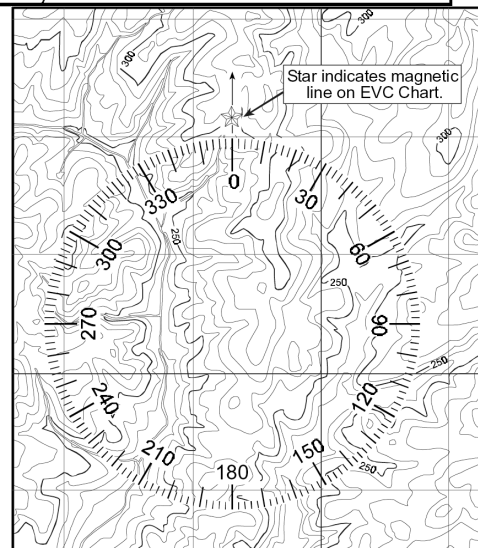
- i. Using a true north–south line (Figure I–5).



- a. Unfold map and place on a firm, flat, level nonmetallic surface.
- b. Align the compass on a true north–south line.
- c. Rotate map and compass until stationary index line aligns with the magnetic variation indicated in marginal information.
 - Easterly (subtract variation from 360°).
 - Westerly (add variation to 360°).

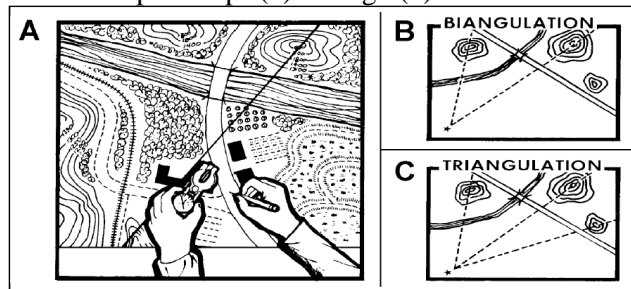


ii. Using a compass rose (Figure I-6).

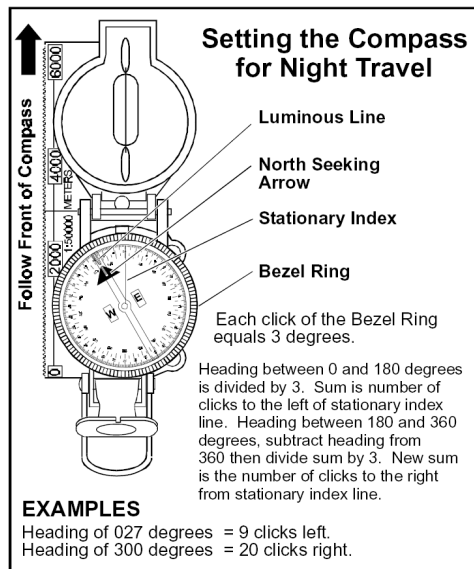


- a. Place edge of the lensatic compass on magnetic north line of the compass rose closest to your location.
- b. Rotate map and compass until compass reads 360°.
- iii. If there is NO compass, orient map using cardinal direction obtained by the stick and shadow method or the celestial aids (stars) method.
- D. Determine specific location.
 - i. Global Positioning System (GPS).
 - a. DO NOT use GPS for primary navigation.
 - b. Use GPS to confirm your position ONLY.
 - c. Select area providing maximum satellite

- reception.
- d. Conserve GPS battery life.
- ii. Triangulation (resection) with a compass (Figure I-7).
 - a. Try to use 3 or more azimuths.
 - b. Positively identify a major land feature and determine a line of position (LOP).
 - c. Check map orientation each time compass is used.
 - d. Plot the LOP using a pencil.
 - e. Repeat steps (b) through (d) for other LOPs.



- E. Use the compass for night navigation by:
 - i. Setting up compass for night navigation (Figure I-8).



ii. Aligning north-seeking arrow with luminous line and follow front of compass.

iii. Using point-to-point navigation.

F. Route selection techniques follow:

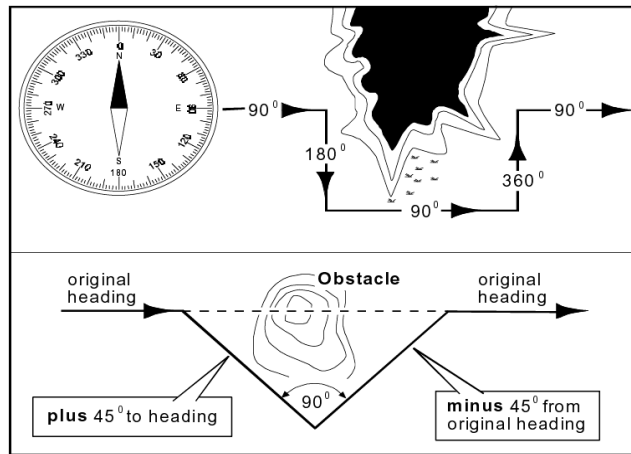
i. Circumnavigation.

a. Find a prominent landmark on the opposite side of the obstacle.

b. Contour around obstacle to landmark.

c. Resume your route of travel.

ii. Dogleg and 90° offset (Figure I-9).



iii. Straight-line heading as follows:

a. Maintain heading until reaching destination.

b. Measure distance by counting the number of paces in a given course and convert to map units.

- One pace is the distance covered each time the same foot touches the ground.
- Distances measured by paces are approximate (example in open terrain, 900 paces per kilometer [average], or example in rough terrain, 1200 paces per kilometer [average]).

c. Use pace count in conjunction with terrain evaluation and heading to determine location. An individual's pace varies because of factors

such as steep terrain, day/night travel, or injured/uninjured condition. Adjust estimation of distance traveled against these factors to get relative accuracy when using a pace count.

iv. Deliberate offset is:

- a. Used when finding a point on a linear feature (that is, road or river).
- b. Intentionally navigated to left or right of target so you know which way to turn at the linear feature.

v. Point-to-point is same as straight line.

- a. Pick out landmarks on the heading and walk the trail of least resistance to a point.
- b. On reaching a point, establish another landmark and continue.

3. Travel Considerations

- A. Pick the easiest and safest route.
- B. Maintain a realistic pace; take rest stops when needed.
- C. Avoid overdressing and overheating.
- D. Consider food and water requirements.
- E. Take special care of feet (change socks regularly).
- F. Pack equipment to prevent loss, damage, pack imbalance, and personal safety.
- G. Go around obstacles, not over or through them.
- H. Travel on trails whenever possible.
- I. Travel in forested areas if possible.
- J. Avoid creek bottoms and ravines with NO escape in the event of heavy rains.
- K. Consider the following for swamps, lakes, and unfordable rivers:
 - i. Circumnavigate swamps, lakes, and bogs if needed.
 - ii. Travel downstream to find people and slower water.
 - iii. Travel upstream to find narrower and shallow water.

4. River Travel

River travel may be faster and save energy when hypothermia is not a factor. It may be a primary mode of travel in a tropical environment.

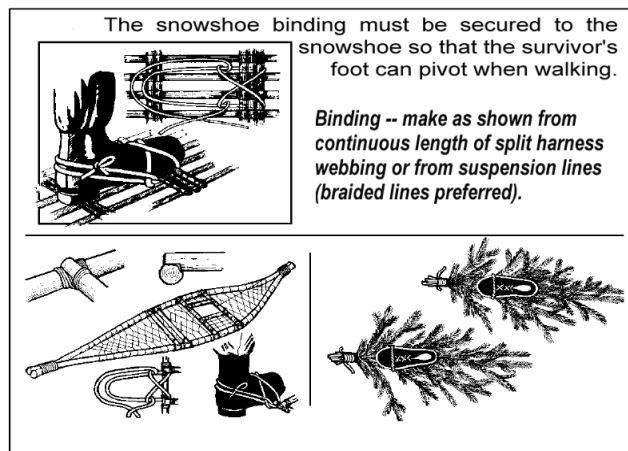
- A. Use flotation device (raft, log, bamboo, etc.).
- B. Use a pole to move the raft in shallow water.

- C. Use an oar in deep water.
- D. Stay near inside edge of river bends (current speed is less).
- E. Keep near shore.
- F. Watch for the following DANGERS:
 - i. Snags.
 - ii. Sweepers (overhanging limbs and trees).
 - iii. Rapids (DO NOT attempt to shoot the rapids).
 - iv. Waterfalls.
 - v. Hazardous animals.
- G. Consider using a flotation device when crossing rivers or large/deep streams.

5. Ice and Snow Travel

Travel should be limited to areas free of hazards.

- A. DO NOT travel in:
 - i. Blizzards.
 - ii. Bitterly cold winds.
 - iii. Poor visibility.
- B. Obstacles to winter travel follow:
 - i. Reduced daylight hours (BE AWARE).
 - ii. Deep soft snow (if movement is necessary, make snowshoes [Figure I-10]). Travel is easier in early morning or late afternoon near dusk when snow is frozen or crusted.



- iii. Avalanche prone areas to avoid:

- a. Slopes 30°–45° or greater.
 - b. Trees without uphill branches (identifies prior avalanches).
 - c. Heavy snow loading on ridge tops.
- iv. If caught in an avalanche, do the following:
 - a. Backstroke to decrease burial depth.
 - b. Move hand around face to create air pocket as moving snow slows.
- v. Frozen water crossings.
 - a. Weak ice should be expected where:
 - Rivers are straight.
 - Objects protrude through ice.
 - Snow banks extend over the ice.
 - Rivers or streams come together.
 - Water vapor rising indicates open or warm areas.
 - b. Air pockets form when a frozen river loses volume.
 - c. When crossing frozen water, distribute your weight by laying flat, belly crawling, or using snowshoes.
- C. Glacier travel is hazardous and should be avoided.

6. Mountain Hazards

- A. Lightning. Avoid ridge tops during thunderstorms.
- B. Avalanche. Avoid areas prone to avalanches.
- C. Flash floods. Avoid low areas.

7. Summer Hazards

(see paragraph 3, *Travel Considerations*, items h through k.)

- A. Dense brush.
 - i. Travel on trails when possible.
 - ii. Travel in forested areas if possible.
 - iii. Avoid creek bottoms and ravines with no escape in the event of heavy rains.
- B. Swamps, lakes, and unfordable rivers.
 - i. Circumnavigate swamps, lakes, and bogs if needed.
 - ii. Travel downstream to find people and slower water.
 - iii. Travel upstream to find narrower and shallow water.

8. Dry Climates

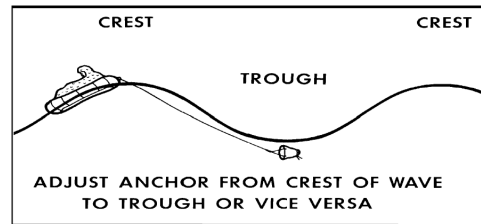
- A. DO NOT travel unless certain of reaching the destination using the water supply available.
- B. Travel at dawn or dusk on hot days.
- C. Follow the easiest trail possible, avoiding:
 - i. Deep sandy dune areas.
 - ii. Rough terrain.
- D. In sand dune areas:
 - i. Follow hard valley floor between dunes.
 - ii. Travel on the windward side of dune ridges.
- E. If a sandstorm occurs:
 - i. Mark your direction of travel.
 - ii. Sit or lie down in direction of travel.
 - iii. Try to get to the downwind side of natural shelter.
 - iv. Cover the mouth and nose with a piece of cloth.
 - v. Protect the eyes.
 - vi. Remain stationary until the storm is over.

9. Tropical Climates

- A. Travel only when it is light.
- B. Avoid obstacles like thickets and swamps.
- C. Part the vegetation to pass through. Avoid grabbing vegetation; it may have spines or thorns (use gloves if possible).
- D. DO NOT climb over logs if you can go around them.
- E. Find trails:
 - i. Where 2 streams meet.
 - ii. Where a low pass goes over a range of hills.
- F. While traveling trails:
 - i. Watch for disturbed areas on game trails; they may indicate a pitfall or trap.
 - ii. Use a walking stick to probe for pitfalls or traps.
 - iii. DO NOT sleep on the trail.

10. Open Seas

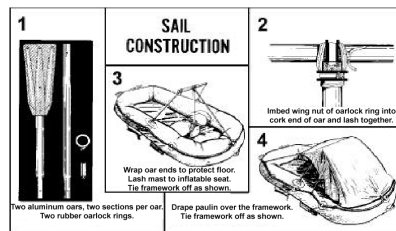
A. Using currents:



- i. Deploy sea anchor (Figure I-11). Sea anchor may be adjusted to make use of existing currents.
- ii. Sit low in the raft.
- iii. Deflate the raft slightly so it rides lower in the water.

B. Using winds:

- i. Pull in sea anchor.
- ii. Inflate raft so it rides higher.
- iii. Sit up in raft so body catches the wind.
- iv. Construct a shade cover/sail (Figure I-12). (Sail aids in making landfall.)



C. Making landfall. Indications of land are:

- i. Fixed cumulus clouds in a clear sky or in a cloudy sky where all other clouds are moving.
- ii. Greenish tint in the sky (in the tropics).
- iii. Lighter colored reflection on clouds (open water causes dark gray reflections) (in the arctic).
- iv. Lighter colored water (indicates shallow water).
- v. The odors and sounds.
 - a. Odors from swamps and smoke.
 - b. Roar of surf/bird cries coming from one direction.
- vi. Directional flights of birds at dawn and at dusk.

D. Swimming ashore:

- i. Consider physical condition.
- ii. Use a flotation aid.

- iii. Secure all gear to body before reaching landfall.
- iv. Remain in raft as long as possible.
- v. Use the sidestroke or breaststroke to conserve strength if thrown from raft.
- vi. Wear footgear and at least 1 layer of clothing.
- vii. Try to make landfall during the lull between the sets of waves (waves are generally in sets of 7, from smallest to largest).
- viii. In moderate surf.
 - a. Swim forward on the back of a wave.
 - b. Make a shallow dive just before the wave breaks to end the ride.
- ix. In high surf.
 - a. Swim shoreward in the trough between waves.
 - b. When the seaward wave approaches, face it and submerge.
 - c. After it passes, work shoreward in the next trough.
- x. If caught in the undertow of a large wave:
 - a. Remain calm and swim to the surface.
 - b. Lie as close to the surface as possible.
 - c. Parallel shoreline and attempt landfall at a point further down shore.
- xi. Select a landing point.
 - a. Avoid places where waves explode upon rocks.
 - b. Find a place where waves smoothly rush onto the rocks.
- xii. After selecting a landing site:
 - a. Face shoreward.
 - b. Assume a sitting position with feet 2 or 3 feet lower than head to absorb the shock of hitting submerged objects.

E. Rafting ashore:

- i. Select landing point carefully.
- ii. Use caution landing when the sun is low and straight in front of you causing poor visibility.
- iii. Land on the lee (downwind) side of islands or point of land if possible.
- iv. Head for gaps in the surf line.

- v. Penetrate surf by:
 - a. Taking down most shade/sails.
 - b. Using paddles to maintain control.
 - c. Deploying a sea anchor for stability.

CAUTION: DO NOT deploy a sea anchor if traveling through coral.

- F. Making sea ice landings on large stable ice flows. Icebergs, small flows, and disintegrating flows are dangerous (ice can cut a raft).
 - i. Use paddles to avoid sharp edges.
 - ii. Store raft away from the ice edge.
 - iii. Keep raft inflated and ready for use.
 - iv. Weight down/secure raft so it does not blow away.

Chapter II – Radio Communications and Signaling

Inventory and review the operating instructions of all communications and signaling equipment.

1. Radio Communications (Voice and Data)

A. General.

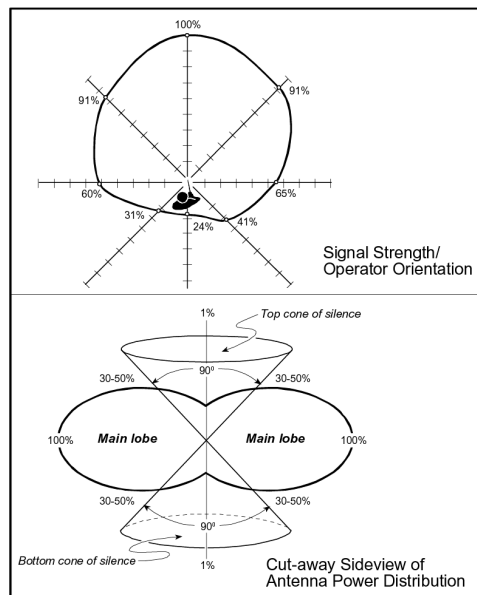
- i. Ensure locator beacon is operational.
- ii. Follow standing plans for on/off operations to conserve battery use.

B. Make initial contact as soon as possible.

C. Locate spare radio and batteries (keep warm and dry).

D. Transmissions.

- i. Use sites that optimize line of site (LOS).
- ii. Face recovery asset.
- iii. Keep antenna perpendicular to intended receiver (Figure II-1).



- iv. DO NOT ground antenna (that is finger on antenna or attaching bolt, space blanket, vegetation, etc.).

- v. If transmitting in the blind, ensure a clear LOS towards the equator.

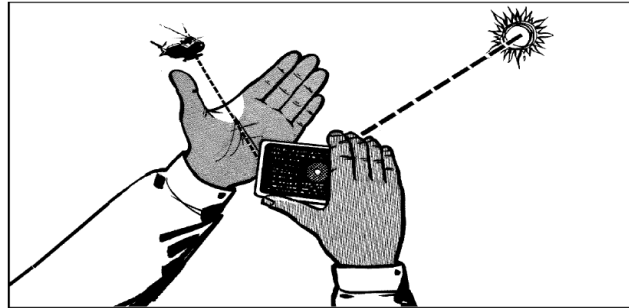
E. Listening (use reception times as directed by recovery forces).

2. Signaling

A. Pyrotechnic signals.

- i. Prepare early (weather permitting).
- ii. Use as directed by recovery forces.
- iii. Extend over raft's edge before activating.

B. Signal mirror (Figure II-2).



- i. Use as directed by recovery forces.
- ii. Cover when not in use.

Note: Make a mirror from any shiny metal or glass.

C. Strobe/IR lights.

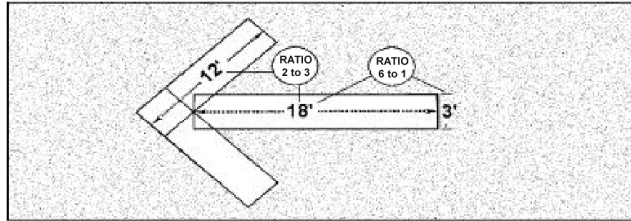
- i. Prepare early, consider filters and shields.
- ii. Use as directed by recovery forces.
- iii. Conserve battery life.

Note: May produce one residual flash when turned off.

D. Pattern signals.

- i. Materials:
 - a. Manmade (space blanket, signal paulin, parachute).
 - b. Natural use materials that contrast the color and/or texture of the signaling area (rocks, brush, branches, stomped grass).
- ii. Location.
 - a. Maximize visibility from above.

- b. Provide concealment from ground observation.
- iii. Size (large as possible) and ratio (Figure II-3).
- iv. Shape (maintain straight lines and sharp corners).
- v. Contrast (use color and shadows).



- vi. Pattern signals (Figure II-4; numbers 6 to 9 are for use in Canada only).

NO.	MESSAGE	SYMBOL
1	REQUIRE ASSISTANCE	V
2	REQUIRE MEDICAL ASSISTANCE	X
3	NO or NEGATIVE	N
4	YES or AFFIRMATIVE	Y
5	PROCEEDING IN THE DIRECTION	→
6	ALL IS WELL	LL
7	REQUIRE FOOD AND WATER	F
8	REQUIRE FUEL AND OIL	L
9	NEED REPAIRS	W

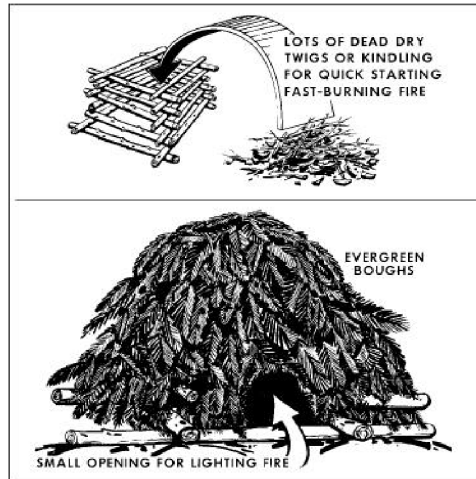
E. Sea dye marker.

- i. DO NOT waste in rough seas or fast moving water.
- ii. Conserve unused dye by rewrapping.
- iii. May be used to color snow.

F. Considerations:

- i. Use a fire at night.
- ii. Use smoke for day (tires or petroleum products for dark

smoke and green vegetation for light smoke). (Figure II-5)



- iii. Use signal mirror to sweep horizon.
- iv. Use audio signals (that is, voice and whistle).

Chapter III – Recovery

1. Responsibilities

- A. Establish radio contact with recovery forces (if possible).
- B. Maintain communication with recovery forces until recovered.
- C. Follow recovery force instructions, be prepared to report:
 - i. Recovery site characteristics (slope, obstacles, size, etc.).
 - ii. Number in party/medical situation.
 - iii. Signal devices available.
- D. If no radio, a ground-to-air signal may be your only means to effect recovery.

2. Site Selection

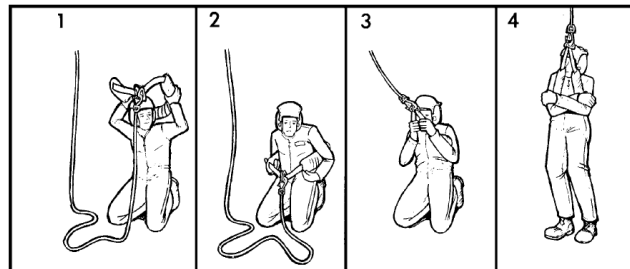
- A. Locate area for landing pick-up, if practical (approximately 150 feet diameter, free of obstructions, flat and level).

3. Site Preparation

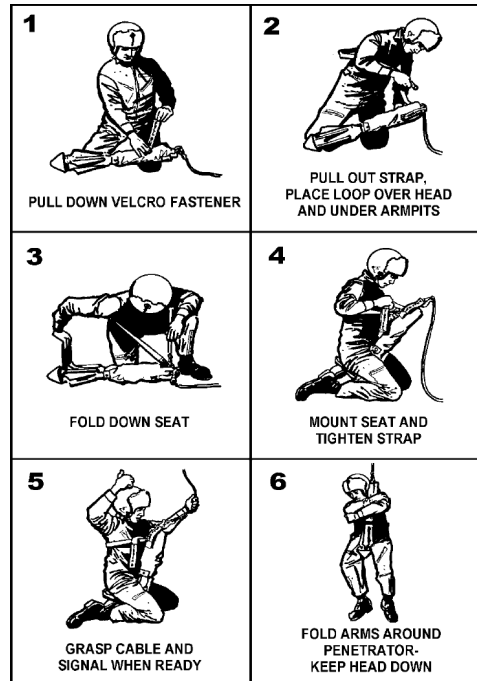
- A. Pack and secure all equipment.
- B. Prepare signaling devices (use as directed or as briefed).
- C. Mentally review recovery methods (aircraft, ground, boat, etc.).

4. Recovery Procedures

- A. Assist recovery force in identifying your position.
- B. For a landing/ground recovery:
 - i. DO NOT approach recovery vehicle until instructed.
 - ii. Beware of rotors/propellers when approaching recovery vehicle, especially on sloping or uneven terrain. Secure loose equipment that could be caught in rotors/propellers.
- C. For hoist recovery devices (Figures III-1 and III-2).

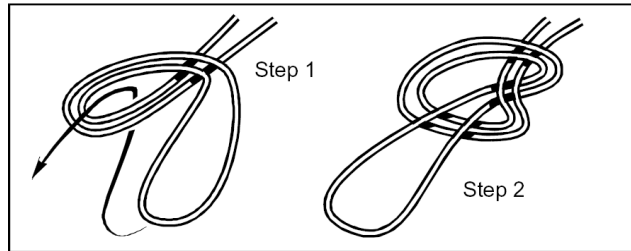


- i. Use eye protection, if available (glasses or helmet visor).
- ii. Allow metal on device to contact the surface before touching to avoid injury from static discharge.
- iii. Sit or kneel for stability while donning device.
- iv. Put safety strap under armpits.
- v. Ensure cable is in front of you.
- vi. Keep hands clear of all hardware and connectors.
- vii. DO NOT become entangled in cable.
- viii. Use a thumbs up, vigorous cable shake, or radio call to signal you are ready.
- ix. Drag feet on the ground to decrease oscillation.
- x. DO NOT assist during hoist or when pulled into the rescue vehicle. Follow crewmember instructions.



D. For nonhoist recovery (rope or unfamiliar equipment):

- i. Create a "fixed loop" big enough to place under armpits (Figure III-3).



ii. Follow the procedures in paragraph C above.

Chapter IV – Medical

WARNING: These emergency medical procedures are for survival situations. Obtain professional medical treatment as soon as possible.

1. Immediate First Aid Actions

Remember the ABCs of Emergency Care:
Airway **B**reathing **C**irculation

A. Determine responsiveness as follows:

- i. If unconscious, arouse by shaking gently and shouting.
- ii. If no response:

- a. Keep head and neck aligned with body.
- b. Roll victims onto their backs.
- c. Open the airway by lifting the chin (Figure IV–1).



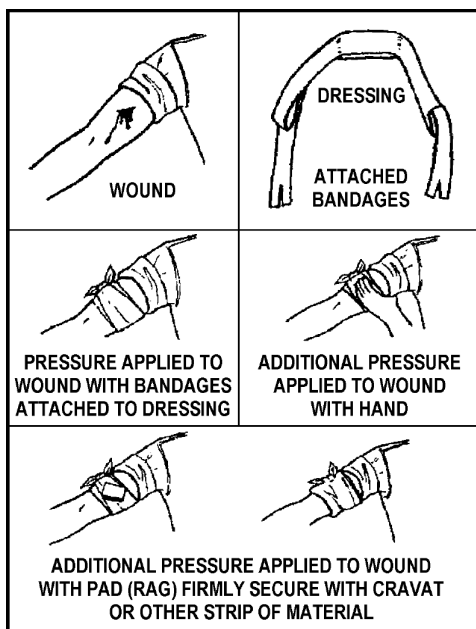
- d. Look, listen, and feel for air exchange.
- iii. If victim is not breathing:
 - a. Check for a clear airway; remove any blockage.
 - b. Cover victim's mouth with your own.
 - c. Pinch victim's nostrils closed.
 - d. Fill victim's lungs with 2 slow breaths.
 - e. If breaths are blocked, reposition airway; try again.
 - f. If breaths still blocked, give 5 abdominal thrusts:
 - Straddle the victim.
 - Place a fist between breastbone and belly button.
 - Thrust upward to expel air from stomach.
 - g. Sweep with finger to clear mouth.
 - h. Try 2 slow breaths again.
 - i. If the airway is still blocked, continue (c) through (f) until successful or exhausted.

- j. With open airway, start mouth to mouth breathing:
 - Give 1 breath every 5 seconds.
 - Check for chest rise each time.
- iv. If victim is unconscious, but breathing:
 - a. Keep head and neck aligned with body.
 - b. Roll victim on side (drains the mouth and prevents the tongue from blocking airway).
- v. If breathing difficulty is caused by chest trauma, refer to paragraph 1D, *Treat Chest Injuries*.

CAUTION: DO NOT remove an impaled object unless it interferes with the airway. You may cause more tissue damage and increase bleeding. For travel, you may shorten and secure the object.

B. Control bleeding as follows:

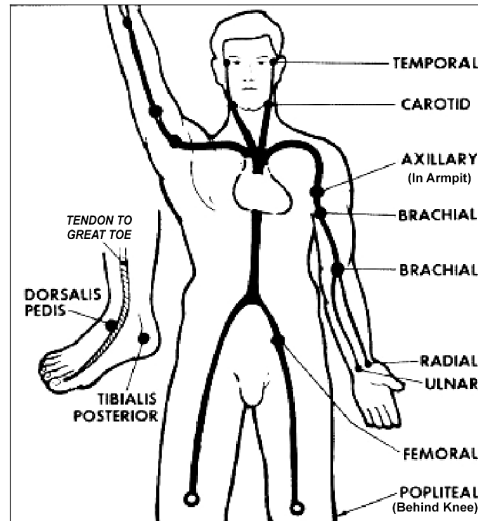
- i. Apply a pressure dressing (Figure IV-2).



- ii. If STILL bleeding:
 - a. Use direct pressure over the wound.
 - b. Elevate the wounded area above the heart.

iii. If STILL bleeding:

- a. Use a pressure point between the injury and the heart (Figure IV-3).



- b. Maintain pressure for 6 to 10 minutes before checking to see if bleeding has stopped.

iv. If a limb wound is STILL bleeding:

CAUTION: Use of a tourniquet is a LAST RESORT measure. Use ONLY when severe, uncontrolled bleeding will cause loss of life. Recognize that long-term use of a tourniquet may cause loss of limb.

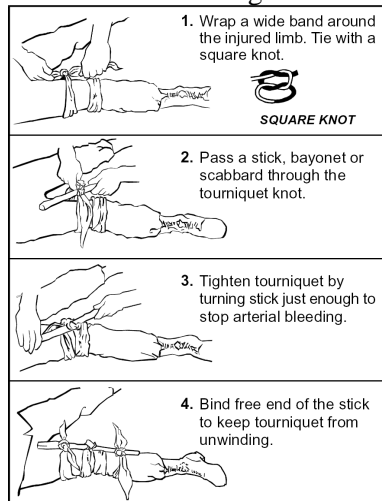
- a. Apply tourniquet (TK) band just above bleeding site on limb. A band at least 3 inches (7.5 cm) or wider is best.
- b. Follow steps illustrated in Figure IV-4.
- c. Use a stick at least 6 inches (15 cm) long.
- d. Tighten only enough to stop arterial bleeding.
- e. Mark a TK on the forehead with the time applied.
- f. DO NOT cover the tourniquet.

CAUTION: The following directions apply ONLY in survival situations where rescue is

UNLIKELY and NO medical aid is available.

g. If rescue or medical aid is not available for over 2 hours, an attempt to **SLOWLY** loosen the tourniquet may be made 20 minutes after application. Before loosening:

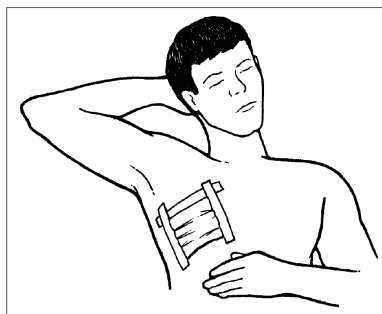
- Ensure pressure dressing is in place.
- Ensure bleeding has stopped
- Loosen tourniquet **SLOWLY** to restore circulation.
- Leave loosened tourniquet in position in case bleeding resumes.



C. Treat shock. (Shock is difficult to identify or treat under field conditions. It may be present with or without visible injury.)

- Identify by one or more of the following:
 - Pale, cool, and sweaty skin.
 - Fast breathing and a weak, fast pulse.
 - Anxiety or mental confusion.
 - Decreased urine output.
- Maintain circulation.
- Treat underlying injury.
- Maintain normal body temperature.
 - Remove wet clothing.
 - Give warm fluids.
 - **DO NOT** give fluids to an unconscious victim.

- DO NOT give fluids if they cause victim to gag.
 - c. Insulate from ground.
 - d. Shelter from the elements.
 - v. Place conscious victim on back.
 - vi. Place very weak or unconscious victim on side, this will:
 - a. Allow mouth to drain.
 - b. Prevent tongue from blocking airway.
- D. Treat chest injuries.
- i. Sucking chest wound. This occurs when chest wall is penetrated; may cause victim to gasp for breath; may cause sucking sound; may create bloody froth as air escapes the chest.
 - a. Immediately seal wound with hand or airtight material.
 - b. Tape airtight material over wound on 3 sides only (Figure IV-5) to allow air to escape from the wound but not to enter.
 - ii. Flail chest. Results from blunt trauma when 3 or more ribs are broken in 2 or more places. The flail segment is the broken area that moves in a direction opposite to the rest of chest during breathing.
 - a. Stabilize the flail segment as follows:
 - Place rolled-up clothing or bulky pad over site.
 - Tape pad to site
 - DO NOT wrap tape around chest.
 - b. Have victim keep segment still with hand pressure.
 - c. Roll victim onto side of flail segment injury (as



other injuries allow).

iii. Fractured ribs.

- a. Encourage deep breathing (painful, but necessary to prevent the possible development of pneumonia).
- b. DO NOT constrict breathing by taping ribs.

E. Treat fractures, sprains, and dislocations.

- i. Control bleeding.
- ii. Remove watches, jewelry, and constrictive clothing.
- iii. If fracture penetrates the skin:
 - a. Clean wound by gentle irrigation with water.
 - b. Apply dressing over wound.
- iv. Position limb as normally as possible.
- v. Splint in position found (if unable to straighten limb).
- vi. Improvise a splint with available materials:
 - a. Sticks or straight, stiff materials from equipment.
 - b. Body parts (for example, opposite leg, arm-to-chest).
- vii. Attach with strips of cloth, parachute cord, etc.
- viii. Keep the fractured bones from moving by immobilizing the joints on both sides of the fracture. If fracture is in a joint, immobilize the bones on both sides of the joint.

<p>CAUTION: Splint fingers in a slightly flexed position, NOT in straight position. Hand should look like it is grasping an apple.</p>

ix. Use *RICES* treatment for 72 hours.

- a. *Rest*.
- b. *Ice*.
- c. *Compression*.
- d. *Elevation*.
- e. *Stabilization*.
- x. Apply cold to acute injuries.
- xi. Use 15 to 20 minute periods of cold application.
 - a. DO NOT use continuous cold therapy.
 - b. Repeat 3 to 4 times per day.
 - c. Avoid cooling that can cause frostbite or hypothermia.

- xii. Wrap with a compression bandage after cold therapy.
- xiii. Elevate injured area above heart level to reduce swelling.
- xiv. Check periodically for a pulse beyond the injury site.
- xv. Loosen bandage or reapply splint if no pulse is felt or if swelling occurs because bandage is too tight.

2. Common Injuries and Illnesses

A. Burns.

- i. Cool the burned area with water.
 - a. Use immersion or cool compresses.
 - b. Avoid aggressive cooling with ice or frigid water.
- ii. Remove watches, jewelry, constrictive clothing.
- iii. DO NOT remove embedded, charred material that will cause burned areas to bleed.
- iv. Cover with sterile dressings.
- v. DO NOT use lotion or grease.
- vi. Avoid moving or rubbing the burned part.
- vii. Drink extra water to compensate for increased fluid loss from burns. (Add 1/4 teaspoon of salt [if available] to each quart of water.)
- viii. Change dressings when soaked or dirty.

B. Eye injuries.

- i. Sun/snow blindness (gritty, burning sensation, and possible reduction in vision caused by sun exposure).
 - a. Prevent with improvised goggles. (See Chapter V, Figure V-2.)
 - b. Treat by patching affected eye(s).
 - Check after 12 hours.
 - Replace patch for another 12 hours if not healed.
 - c. Use cool compresses to reduce pain.
- ii. Foreign body in eye.
 - a. Irrigate with clean water from the inside to the outside corner of the eye.
 - b. If foreign body is not removed by irrigation, improvise a small swab. Moisten and wipe gently over the affected area.

- c. If foreign body is STILL not removed, patch eye for 24 hours and then reattempt removal using steps (a) and (b).

C. Heat injury.

- i. Heat cramps (cramps in legs or abdomen).
 - a. Rest.
 - b. Drink water. Add 1/4 teaspoon of salt per quart.
- ii. Heat exhaustion (pale, sweating, moist, cool skin).
 - a. Rest in shade.
 - b. Drink water.
 - c. Protect from further heat exposure.
- iii. Heat stroke (victim disoriented or unconscious, skin is hot and flushed [sweating may or may not occur], fast pulse).

CAUTION: Handle heat stroke victim gently. Shock, seizures, and cardiac arrest can occur.

- a. Cool as rapidly as possible (saturate clothing with water and fan the victim). Remember to cool the groin and armpit areas. (Avoid overcooling.)
- b. Maintain airway, breathing, and circulation.

D. Cold injuries:

- i. Frostnip and frostbite:
 - a. Are progressive injuries.
 - Ears, nose, fingers, and toes are affected first.
 - Areas will feel cold and may tingle leading to:
 - Numbness that progresses to:
 - Waxy appearance with stiff skin that cannot glide freely over a joint.
 - b. Frostnipped areas rewarm with body heat. If body heat WILL NOT rewarm area in 15 to 20 minutes, then frostbite is present.
 - c. Frostbitten areas are deeply frozen and require medical treatment.

CAUTION: In frostbite, repeated freezing and thawing causes severe pain and increases damage to the tissue. DO NOT rub frozen tissue. DO NOT thaw frozen tissue.

ii. Hypothermia:

- a. Is a progressive injury.
 - Intense shivering with impaired ability to perform complex tasks leads to:
 - Violent shivering, difficulty speaking, sluggish thinking go to:
 - Muscular rigidity with blue, puffy skin; jerky movements go to:
 - Coma, respiratory and cardiac failure.
- b. Protect victim from the environment as follows:
 - Remove wet clothing.
 - Put on dry clothing (if available).
 - Prevent further heat loss.
 - ◆ Cover top of head.
 - ◆ Insulate from above and below.
 - Warm with blankets, sleeping bags, or shelter.
 - Warm central areas before extremities.
 - ◆ Place heat packs in groin, armpits, and around neck.
 - ◆ Avoid causing burns to skin.

CAUTION: Handle hypothermia victim gently. Avoid overly rapid rewarming which may cause cardiac arrest. Rewarming of victim with skin-to-skin contact by volunteer(s) inside of a sleeping bag is a survival technique but can cause internal temperatures of all to drop.

E. Skin tissue damage.

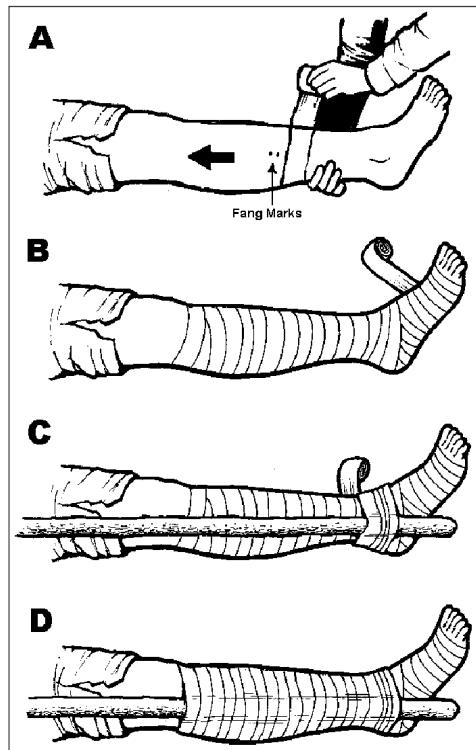
- i. Immersion injuries. Skin becomes wrinkled as in dishpan hands.
 - a. Avoid walking on affected feet.
 - b. Pat dry; DO NOT rub. Skin tissue will be sensitive.
 - c. Dry socks and shoes. Keep feet protected.

- d. Loosen boots, cuffs, etc., to improve circulation.
- e. Keep area dry, warm, and open to air.
- f. DO NOT apply creams or ointments.
- ii. Saltwater sores.
 - a. Change body positions frequently.
 - b. Keep sores dry.
 - c. Use antiseptic (if available).
 - d. DO NOT open or squeeze sores.

F. Snakebite.

CAUTION: This snakebite treatment recommendation is for situations where medical aid and specialized equipment are not available.

- i. Nonpoisonous. Clean and bandage wound.
- ii. Poisonous.
 - a. Remove constricting items.
 - b. Minimize activity.
 - c. DO NOT cut the bite site; DO NOT use your mouth to create suction.
 - d. Clean bite with soap and water; cover with a dressing.
 - e. Overwrap the bite site with a tight (elastic) bandage (Figure IV–6). The intent is to slow capillary and venous blood flow but not arterial flow. Check for pulse below the overwrap.



- f. Splint bitten extremity to prevent motion.
- g. Treat for shock (paragraph 1C).
- h. Position extremity below level of heart.
- i. Construct shelter if necessary (let the victim rest).
- j. For conscious victims, force fluids.

G. Marine life.

i. Stings.

- a. Flush wound with salt water (fresh water stimulates toxin release).
- b. Remove jewelry and watches.
- c. Remove tentacles and gently scrape or shave skin.
- d. Apply a steroid cream (if available).
- e. DO NOT rub area with sand.
- f. Treat for shock (paragraph 1C); artificial respiration may be required (paragraph 1A).
- g. DO NOT use urine to flush or treat wounds.

- ii. Punctures.
 - a. Immerse affected part in hot water or apply hot compresses for 30–60 minutes (as hot as victim can tolerate).
 - b. Cover with clean dressing.
 - c. Treat for shock as needed.
- H. Skin irritants (includes poison oak and poison ivy).
 - i. Wash with large amounts of water. Use soap (if available).
 - ii. Keep covered to prevent scratching.
- I. Infection.
 - i. Keep wound clean.
 - ii. Use iodine tablet solution or diluted betadine to prevent or treat infection.
 - iii. Change bandages as needed.
- J. Dysentery and diarrhea.
 - i. Drink extra water.
 - ii. Use a liquid diet.
 - iii. Eat charcoal. Make a paste by mixing fine charcoal particles with water. (It may relieve symptoms by absorbing toxins.)
- K. Constipation (can be expected in survival situations).
 - i. DO NOT take laxatives.
 - ii. Exercise.
 - iii. Drink extra water.

3. Plant Medicine

- A. Tannin.
 - i. Medical uses. Burns, diarrhea, dysentery, skin problems, and parasites. Tannin solution prevents infection and aids healing.
 - ii. Sources. Found in the outer bark of all trees, acorns, banana plants, common plantain, strawberry leaves, and blackberry stems.
 - iii. Preparation.
 - a. Place crushed outer bark, acorns, or leaves in water.
 - b. Leach out the tannin by soaking or boiling.
 - Increase tannin content by longer

soaking time.

- Replace depleted material with fresh bark/plants.

iv. Treatments.

a. Burns.

- Moisten bandage with cooled tannin tea.
- Apply compress to burned area.
- Pour cooled tea on burned areas to ease pain.

b. Diarrhea, dysentery, and worms. Drink strong tea solution (may promote voiding of worms).

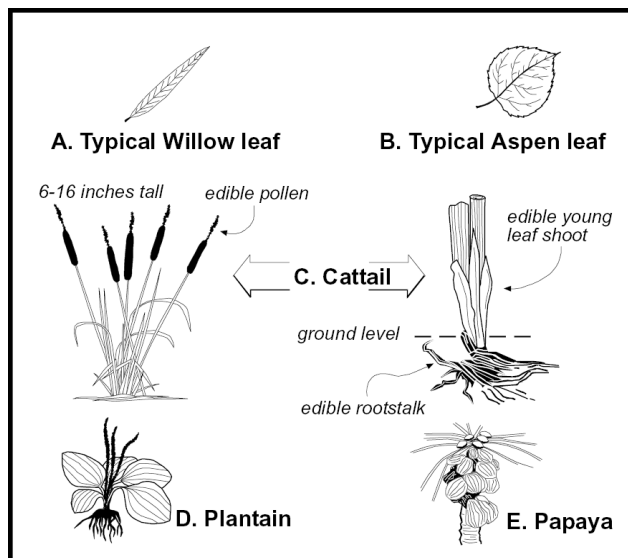
c. Skin problems (dry rashes and fungal infections). Apply cool compresses or soak affected part to relieve itching and promote healing.

d. Lice and insect bites. Wash affected areas with tea to ease itching.

B. Salicin/salicylic acid.

i. Medical uses. Aches, colds, fever, inflammation, pain, sprains, and sore throat (aspirin-like qualities).

ii. Sources. Willow and aspen trees (Figure IV-7).



iii. Preparation.

- a. Gather twigs, buds, or cambium layer (soft, moist layer between the outer bark and the wood) of willow or aspen.
 - b. Prepare tea as described in paragraph 3A(iii).
 - c. Make poultice.
 - Crush the plant or stems.
 - Make a pulpy mass.
 - iv. Treatments.
 - a. Chew on twigs, buds, or cambium for symptom relief.
 - b. Drink tea for colds and sore throat.
 - c. Use warm, moist poultice for aches and sprains.
 - Apply pulpy mass over injury.
 - Hold in place with a dressing.
- C. Common plantain.
- i. Medical uses. Itching, wounds, abrasions, stings, diarrhea, and dysentery.
 - ii. Source. There are over 200 plantain species with similar medicinal properties. The common plantain is shown in Figure IV–7.
 - iii. Preparation.
 - a. Brew tea from seeds.
 - b. Brew tea from leaves.
 - c. Make poultice of leaves.
 - iv. Treatments.
 - a. Drink tea made from seeds for diarrhea or dysentery.
 - b. Drink tea made from leaves for vitamin and minerals.
 - c. Use poultice to treat cuts, sores, burns, and stings.
- D. Papain.
- i. Medical uses. Digestive aid, meat tenderizer, and a food source.
 - ii. Source. Fruit of the papaya tree (Figure IV–7).
 - iii. Preparation.
 - a. Make cuts in unripe fruit.
 - b. Gather milky white sap for its papain content.
 - c. Avoid getting sap in eyes or wounds.

iv. Treatments.

- a. Use sap to tenderize tough meat.
- b. Eat ripe fruit for food, vitamins, and minerals.

E. Common Cattail.

- i. Medical uses. Wounds, sores, boils, inflammations, burns, and an excellent food source.
- ii. Source. Cattail plant found in marshes (Figure IV–7).
- iii. Preparation.
 - a. Pound roots into a pulpy mass for a poultice.
 - b. Cook and eat green bloom spikes.
 - c. Collect yellow pollen for flour substitute.
 - d. Peel and eat tender shoots (raw or cooked).

iv. Treatments.

- a. Apply poultice to affected area.
- b. Use plant for food, vitamins, and minerals.

4. Health and Hygiene

A. Stay clean (daily regimen).

- i. Minimize infection by washing. (Use white ashes, sand, or loamy soil as soap substitutes.)
- ii. Comb and clean debris from hair.
- iii. Cleanse mouth and brush teeth.
 - a. Use hardwood twig as toothbrush (fray it by chewing on one end then use as brush).
 - b. Use single strand of an inner core string from parachute cord for dental floss.
 - c. Use clean finger to stimulate gum tissues by rubbing.
 - d. Gargle with salt water to help prevent sore throat and aid in cleaning teeth and gums.

iv. Clean and protect feet.

- a. Change and wash socks
- b. Wash, dry, and massage.
- c. Check frequently for blisters and red areas.
- d. Use adhesive tape/mole skin to prevent damage.

B. Exercise daily.

C. Prevent and control parasites.

- i. Check body for lice, fleas, ticks, etc.
 - a. Check body regularly.

- b. Pick off insects and eggs (DO NOT crush).
- ii. Wash clothing and use repellents.
- iii. Use smoke to fumigate clothing and equipment.

5. Rules for Avoiding Illness

- A. Purify all water obtained from natural sources by using iodine tablets, bleach, or boiling for 5 minutes.
- B. Locate latrines 200 feet from water and away from shelter.
- C. Wash hands before preparing food or water.
- D. Clean all eating utensils after each meal.
- E. Prevent insect bites by using repellent, netting, and clothing.
- F. Dry wet clothing as soon as possible.
- G. Eat varied diet.
- H. Try to get 7–8 hours sleep per day.

Chapter V – Personal Protection

1. Priorities

- A. Evaluate available resources and situation, then accomplish individual tasks accordingly.
- B. First 24 hours in order of situational needs:
 - i. Construct survival shelter according to selection criteria.
 - ii. Procure water.
 - iii. Establish multiple survival signals.
 - iv. Build Fire.
- C. Second 24 hours in order of situational needs:
 - i. Construct necessary tools.
 - ii. Procure food.

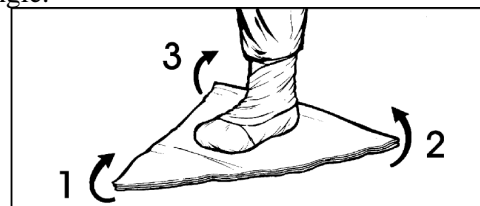
2. Care and Use of Clothing

- A. Never discard clothing.
- B. Wear loose and layered clothing.
 - i. Tight clothing restricts blood flow regulating body temperature.
 - ii. Layers create more dead air space.
- C. Keep entire body covered to prevent sunburn and dehydration in hot climates. When fully clothed, the majority of body heat escapes through the head and neck areas.
- D. Avoid overheating.
 - i. Remove layers of clothing before strenuous activities.
 - ii. Use a hat to regulate body heat.
 - iii. Wear a hat when in direct sunlight (in hot environment).
- E. Dampen clothing when on the ocean in hot weather.
 - i. Use salt water, NOT drinking water.
 - ii. Dry clothing before dark to prevent hypothermia.
- F. Keep clothing dry to maintain its insulation qualities (dry damp clothing in the sun or by a fire).
- G. If you fall into the water in the winter:
 - i. Build fire.
 - ii. Remove wet clothing and rewarm by fire.
 - iii. Finish drying clothing by fire.
- H. If no fire is available:
 - i. Remove clothing and get into sleeping bag (if available).
 - ii. Allow wet clothes to freeze.

- iii. Break ice out of clothing.
- I. Keep clothing clean (dirt reduces its insulation qualities).
Examine clothing frequently for damage.
 - i. DO NOT sit or lie directly on the ground.
 - ii. Wash clothing whenever possible.
 - iii. Repair when necessary by using:
 - a. Needle and thread.
 - b. Safety pins.
 - c. Tape.

J. Improvised foot protection (Figure V-1).

- i. Cut 2 to 4 layers of cloth into a 30-inch square.
- ii. Fold into a triangle.
- iii. Center foot on triangle with toes toward corner.



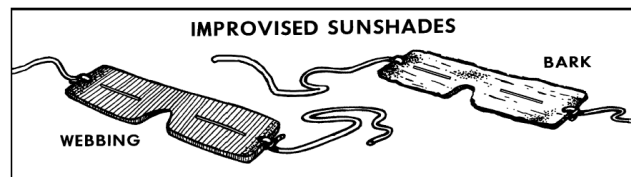
- iv. Fold front over the toes.
- v. Fold side corners, one at a time, over the instep.
- vi. Secure by rope, vines, tape, etc., or tuck into other layers of material.

3. Other Protective Equipment

A. Sleeping bag.

- i. Fluff before use, especially at foot of bag.
- ii. Air and dry daily to remove body moisture.
- iii. Improvise with available material, dry grass, leaves, dry moss, etc.

B. Sun and snow goggles (Figure V-2).



- i. Wear in bright sun or snow conditions.
- ii. Improvise by cutting small horizontal slits in webbing, bark, or similar materials.

C. Gaiters (Figure V-3).

Used to protect from sand, snow, insects, and scratches (wrap material around lower leg and top of boots).



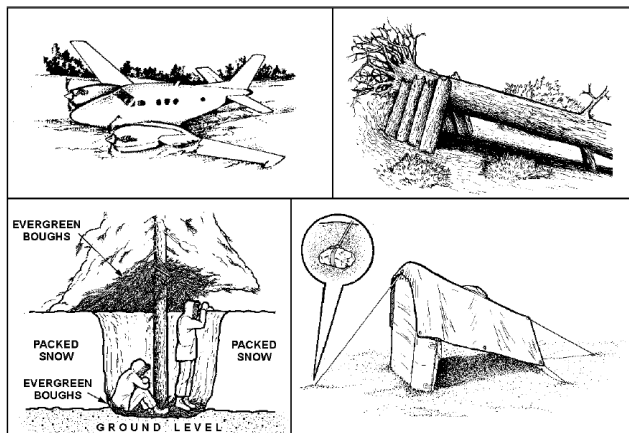
4. Shelters

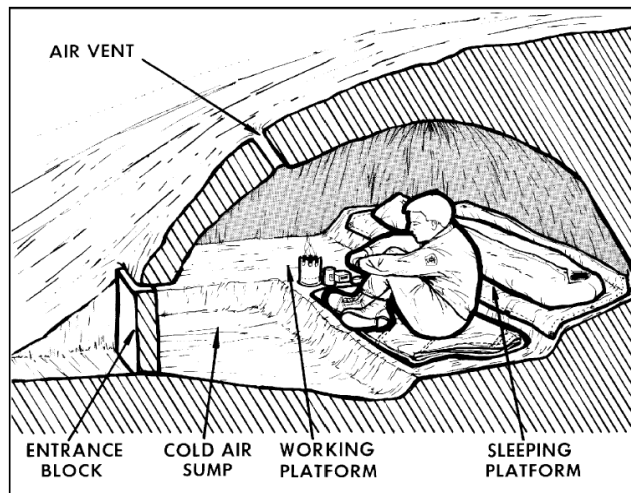
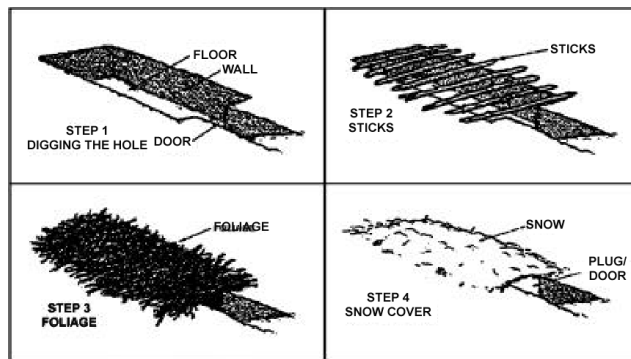
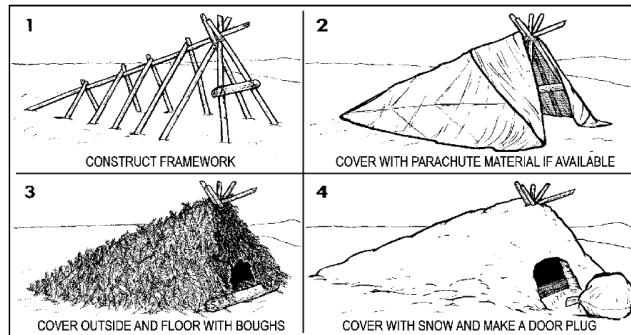
A. Site selection.

- i. Near signal and recovery site.
- ii. Available food and water.
- iii. Avoid natural hazards:
 - a. Dead standing trees.
 - b. Drainage and dry river beds.
 - c. Avalanche areas.
- iv. Location large and level enough to lie down in.

B. Types.

- i. Immediate shelters. Find shelter needing minimal improvements (Figure V-4).
- ii. General shelter. Temperate climates require any shelter that gives protection from wind and rain.



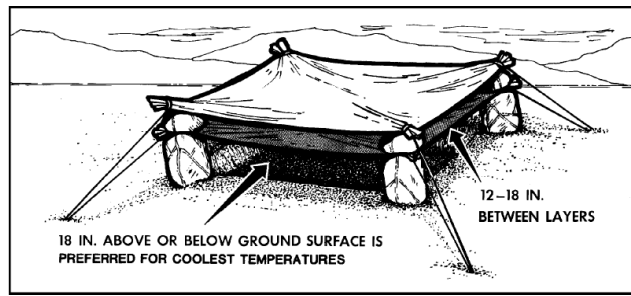


- iii. Thermal A Frame, Snow Trench, Snow Cave. (Figures V-5 through V-7). Cold climates require an enclosed, insulated shelter.
- a. Snow is the most abundant insulating material.

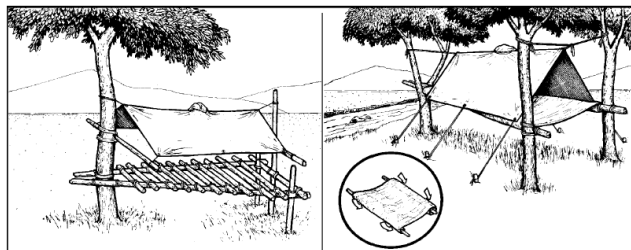
- b. Air vent is required to prevent carbon monoxide poisoning when using an open flame inside enclosed shelters.

Note: As a general rule, unless you can see your breath, your snow shelter is too warm and should be cooled down to preclude melting and dripping.

- iv. Shade shelter. Hot climates require a shade shelter to protect from ultraviolet rays (Figure V-8).

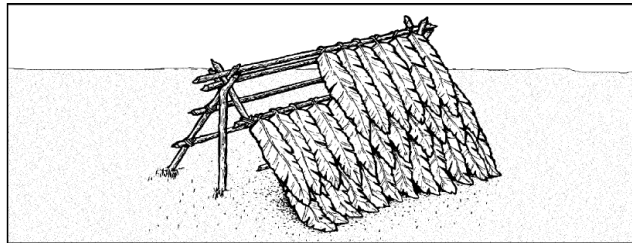


- a. To reduce the surface temperature, the shelter floor should be elevated or dug down (approximately 18 inches).
 - b. For thermal protection, a minimum of 2 layers of material suspended 12-18 inches above the head is required. White is the best color to reflect heat (inner most layer should be of darker material).
- v. Elevated platform shelter (Figure V-9). Tropical/wet climates require enclosed, elevated shelter for protection from dampness and insects.



C. Shelter construction.

- i. Have entrance 45° – 90° from prevailing wind.
- ii. Cover with available material.
 - a. If natural materials are used, arrange them in layers starting at the bottom with each layer overlapping the previous one. See Figure V–10 for an example.



- b. If using porous material like parachute, blankets, etc.:

- Stretch as tight as possible
- Use a 40° – 60° slope.
- Use additional layers in heavy rain.

D. Shelter construction materials:

- i. Raft and raft parts.
- ii. Vehicle or aircraft parts.
- iii. Blankets, poncho, or parachute material.
- iv. Sheet of plastic or plastic bag.
- v. Bark peeled off dead trees.
- vi. Boughs, broad leaves, dry moss.
- vii. Grass and sod.
- viii. Snow.
- ix. Sand and rocks.

E. Bed construction. Construct a bed to protect from cold, damp, ground using:

- i. Raft or foam rubber from vehicle seats.
- ii. Boughs, leaves, or dry moss.

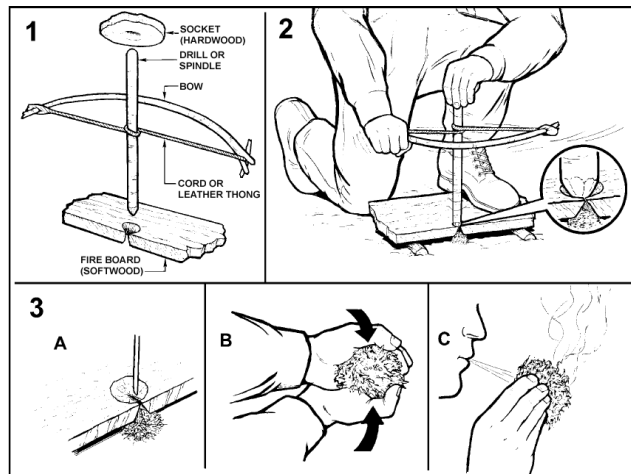
5. Fires

A. Fire building. The 3 essential elements for starting a fire are heat, fuel, and oxygen.

- i. Heat sources:

Note: If possible, carry a fire-starting device with you.

- a. Matches or lighter.
- b. Flint and steel (experiment with various rocks and metals until a good spark is produced).
- c. Sparks from batteries.
- d. Concentrated sunlight (use magnifying glass or flashlight reflectors).
- e. Pyrotechnics, such as flares (last resort), etc.
- f. Friction method (Figure V-11). Without prior training, this method is difficult to master and requires a lot of time to build the device.



- ii. Fuel is divided into 3 categories: tinder, kindling, and fuel. (Gather large amounts of each category before igniting the fire.)
 - a. **Tinder.** Tinder must be very finely shaved or shredded to provide a low combustion point and fluffed to allow oxygen to flow through. (To get tinder to burn hotter and longer, saturate with Vaseline, Chapstick, insect repellent, aircraft fuel, etc.) Examples of tinder include:
 - Cotton.
 - Candle (shred the wick, not the wax).
 - Plastic spoon, fork, or knife.
 - Foam rubber.
 - Dry bark.

- Dry grasses.
- Gun powder.
- Pitch.
- Petroleum products.

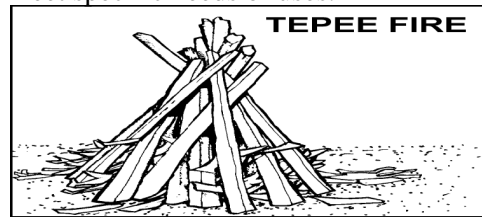
b. **Kindling.** Kindling must be small enough to ignite from the small flame of the tinder. Gradually add larger kindling until arriving at the size of fuel to burn.

c. **Fuel.** Examples of fuel include:

- Dry hardwood (removing bark reduces smoke).
- Bamboo (open chambers to prevent explosion).
- Dry dung.

B. Types. Fires are built to meet specific needs or uses.

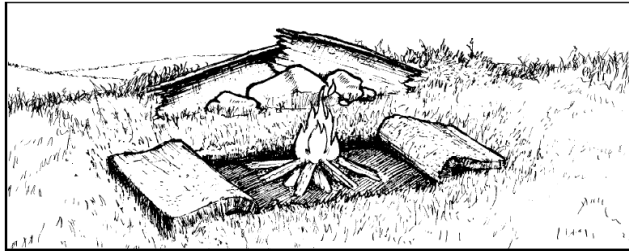
i. Tepee fire
(Figure V–12).
Use the tepee fire to produce a concentrated heat source for cooking, lighting, or signaling.



ii. Log cabin fire
(Figure V–13).
Use the log cabin fire to produce large amounts of light and heat, to dry out wet wood, and provide coals for cooking, etc.

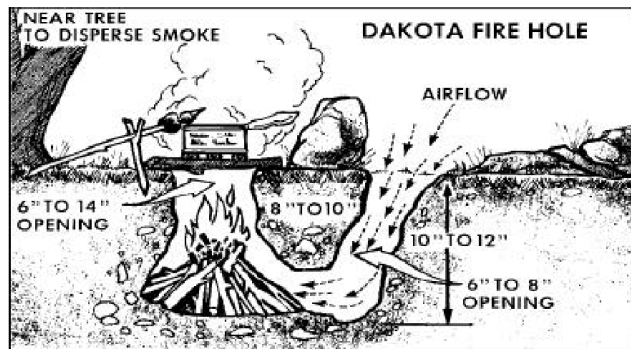


iii. Sod fire and reflector (Figure V–14). Use fire reflectors to get the most warmth from a fire. Build fires against rocks or logs.

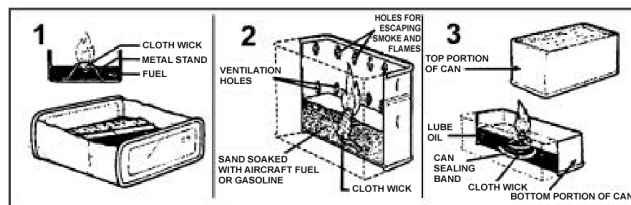


CAUTION: DO NOT use porous rocks or riverbed rock—they may explode when heated.

iv. Dakota fire hole (Figure V-15). Use for high winds.



v. Improved stoves (Figure V-16). These are very efficient.



Chapter VI – Water

1. Water Requirements

Drink extra water. Minimum 2 quarts per day to maintain fluid level. Exertion, heat, injury, or an illness increases water loss.

Note: Pale yellow urine indicates adequate hydration.

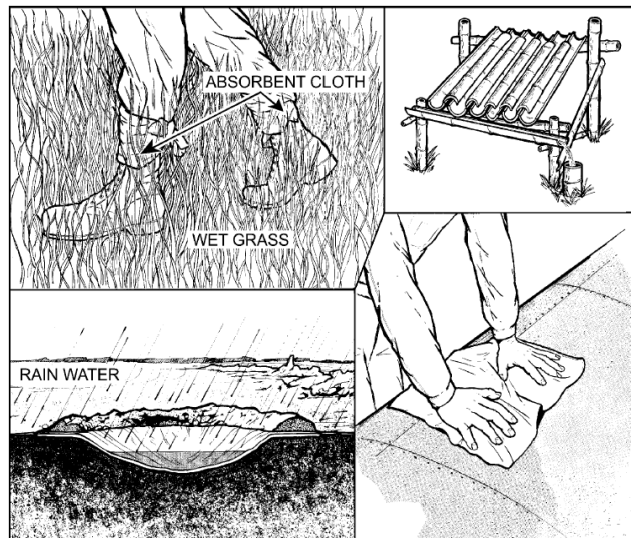
2. Water Procurement

A. DO NOT drink:

- i. Urine.
- ii. Fish juices.
- iii. Blood.
- iv. Sea water.
- v. Alcohol.
- vi. Melted water from new sea ice.

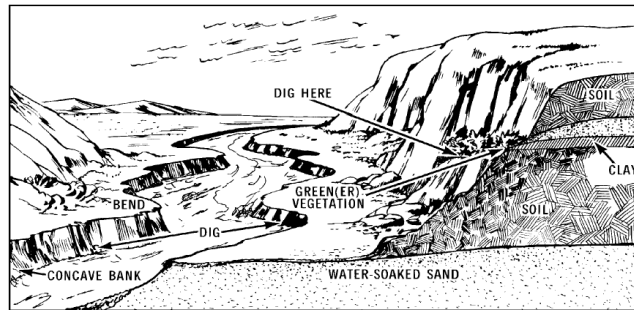
B. Water sources:

- i. Surface water (streams, lakes, and springs).
- ii. Precipitation (rain, snow, dew, sleet) (Figure VI-1).

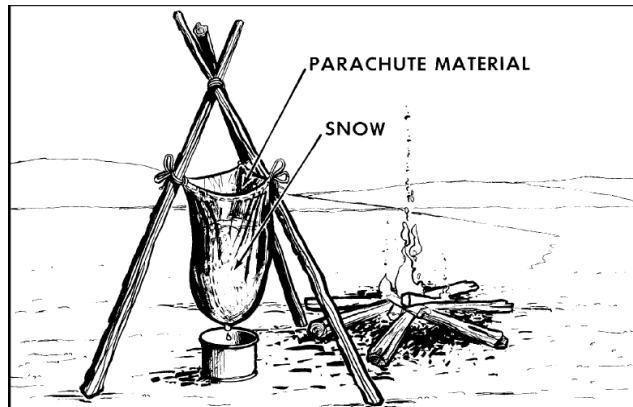


- iii. Subsurface (wells and cisterns).
- iv. Ground water (when no surface water is available) (Figure VI-2).
 - a. Abundance of lush green vegetation.

- b. Drainages and low-lying areas.
- c. "V" intersecting game trails often point to water.
- d. Presence of swarming insects indicates water is near.
- e. Bird flight in the early morning or late afternoon might indicate the direction to water.



- v. Snow or ice.
 - a. DO NOT eat ice or snow.
 - Lowers body temperature.
 - Induces dehydration.
 - Causes minor cold injury to lips and mouth.
 - b. Melt with fire.
 - Stir frequently to prevent damaging container.
 - Speed the process by adding hot rocks or water.
 - c. Melt with body heat.
 - Use waterproof container.
 - Place between layers of clothing.
 - DO NOT place next to the skin.
 - d. Use a water generator (Figure VI-3).



vi. Open seas.

a. Water available in survival kits.

b. Precipitation.

- Drink as much as possible.
- Catch rain in spray shields and life raft covers.
- Collect dew off raft.

c. Old sea ice or icebergs.

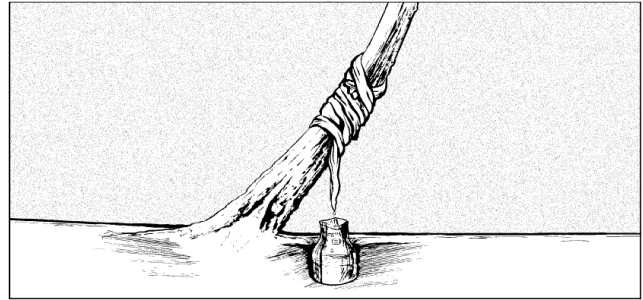
OLD SEA ICE	NEW SEA ICE
Bluish or blackish	Milky or grey
Shatters easily	Does not break easily
Rounded corners	Sharp edges
Tastes relatively salt-free	Tastes extremely salty

vii. Tropical areas.

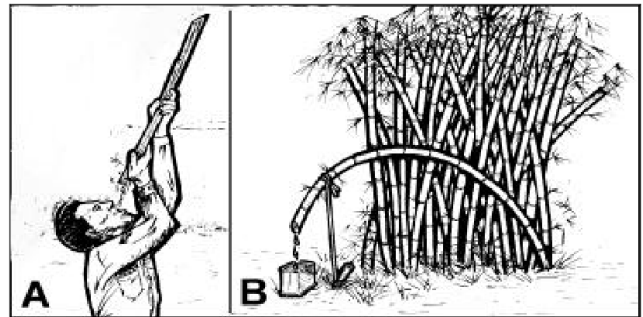
a. All open sources previously mentioned.

b. Vegetation.

- Plants with hollow sections can collect moisture.
- Leaning Tree. Cloth absorbs rain running down tree and drips into container (Figure VI-4).



- Banana plants.
- Water trees (avoid milky sap).
 - ◆ Tap before dark. Let sap stop running and harden during the daytime.
 - ◆ Produce most water at night.
- Vines (Figure VI–5A).

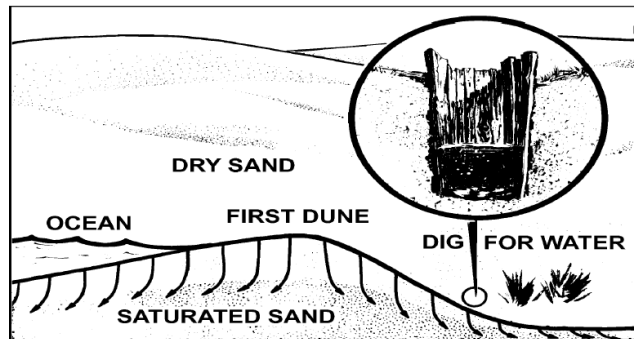


- ◆ Cut bark (DO NOT use milky sap).
- ◆ If juice is clear and water like, cut as large a piece of vine as possible (cut the top first).
- ◆ Pour into hand to check smell, color, and taste to determine if drinkable.
- ◆ DO NOT touch vine to lips.
- ◆ When water flow stops, cut off 6 inches of opposite end, water will flow again.
- Old bamboo.

- ◆ Shake and listen for water.
- ◆ Bore hole at bottom of section to obtain water.
- ◆ Cut out entire section to carry with you.
- ◆ Filter and purify.
- Green bamboo (Figure VI-5B).

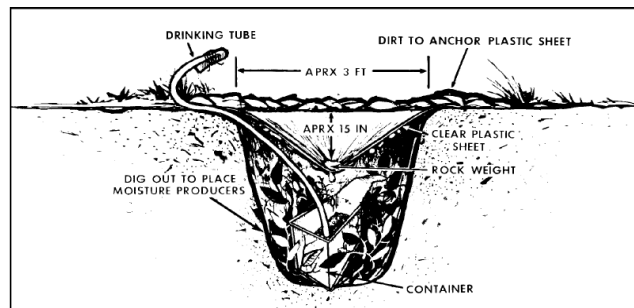
CAUTION: Liquid contained in green coconuts (ripe coconuts) may cause diarrhea.

- c. Beach well. Along the coast, obtain water by digging a beach well (Figure VI-6).

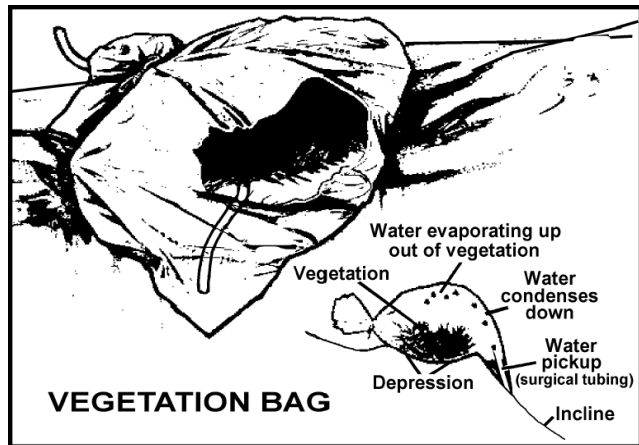


- viii. Dry areas.

- a. Solar still (Figure VI-7).



- b. Vegetation bag (Figure VI-8).



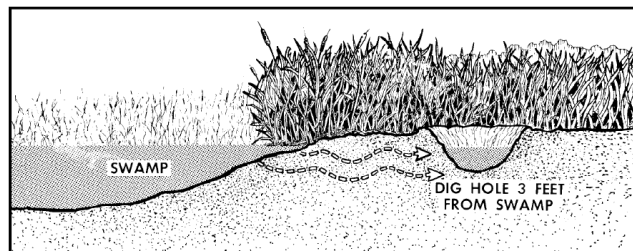
c. Transpiration bag (Figure VI-9).

- Water bag must be clear.
- Water will taste like the plant smells.



CAUTION: DO NOT use poisonous/toxic plants in vegetation/transpiration bags.

d. Seepage basin (Figure VI-10).



3. Water Preparation and Storage

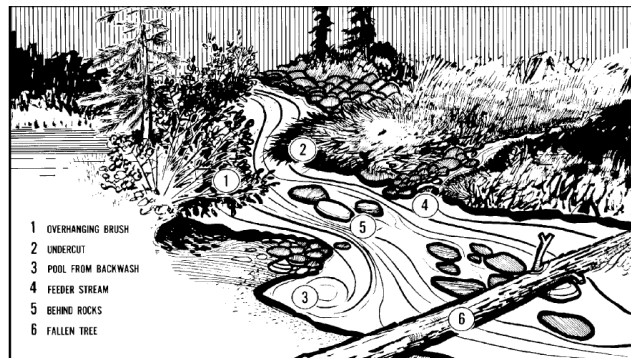
- A. Filtration. Filter through porous material (sand/charcoal).
- B. Purification.
 - i. Water from live plants requires no further treatment.
 - ii. Purify all other water.
 - a. Boil at least 1 minute.
 - b. Pour from one container to another to improve taste to aerate.
 - c. Water purification tablets. Follow instructions on package.
- C. Potable Water.
 - i. If water cannot be purified, obtain water from a clear, cold, clean, and fast running source (if possible).
 - ii. Put in clear container and expose to the sun's ultraviolet rays to kill bacteria.
- D. Storage. To prevent contamination, use a clean, covered or sealed container.
 - i. Trash bag.
 - ii. Prophylactic.
 - iii. Section of bamboo.
 - iv. Flotation gear.

Chapter VII – Food

1. Food Procurement

A. Sources and location.

- i. Mammals can be found where:
 - a. Trails lead to watering, feeding, and bedding areas.
 - b. Droppings or tracks look fresh.
- ii. Birds can be found by:
 - a. Observing the direction of flight in the early morning and late afternoon (leads to feeding, watering, and roosting areas).
 - b. Listening for bird noises (indication of nesting areas)
- iii. Fish and other marine life locations (Figure VII–1).



- iv. Reptiles and amphibians are found almost worldwide.
- v. Insects are found:
 - a. In dead logs and stumps.
 - b. At ant and termite mounds.
 - c. On ponds, lakes, and slow moving streams.

B. Procurement techniques.



i. Snares:

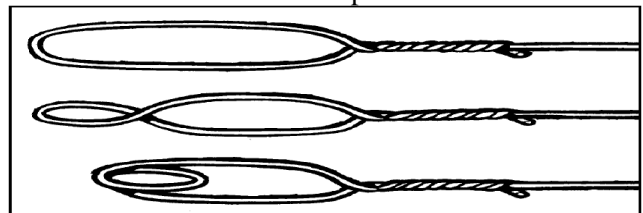
a. Work while unattended.

b. Location:

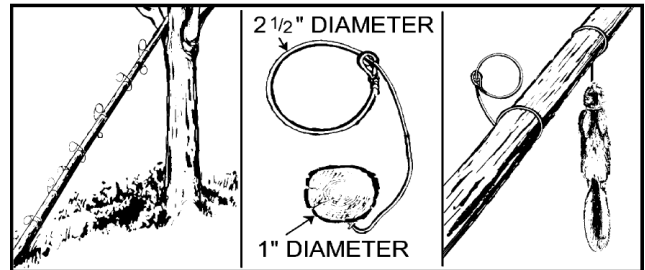
- Trails leading to water, feeding, and bedding areas.
- Mouth of dens (Figure VII-2).

c. Construction of simple loop snare.

- Use materials that will not break under the strain of holding an animal.
- Use a figure 8 (locking loop) if wire is used (Figure VII-3).
 - ◆ Once tightened, the wire locks in place, preventing reopening, and the animal's escape.



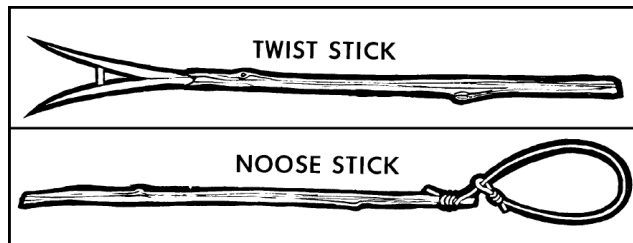
- To construct a squirrel pole (Figure VII-4) use simple loop snares.



- Make noose opening slightly larger than the animal's head (3-finger width for squirrels, fist-sized for rabbits).
- d. Placement of snares (set as many as possible).
- Avoid disturbing the area.
 - Use funneling (natural or improvised) (Figure VII-5).

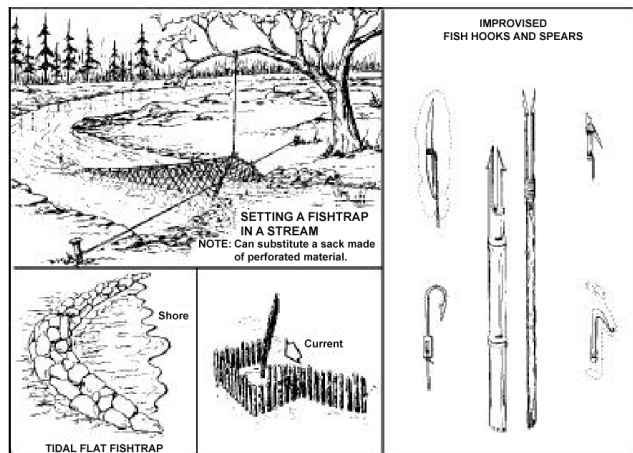


- ii. Noose stick (easier and safer to use than the hands).
- iii. Twist stick (Figure VII-6).
 - a. Insert forked stick into a den until something soft is met.
 - b. Twist the stick, binding the animal's hide in the fork.
 - c. Remove the animal from the den.
 - d. Be ready to kill the animal; it may be dangerous.



iv. Hunting and fishing devices. (See Figure VII-7 for fishing procurement methods.)

- a. Club or rock.
- b. Spear.
- c. Slingshot.
- d. Pole, line, and hook.
- e. Net.
- f. Trap.

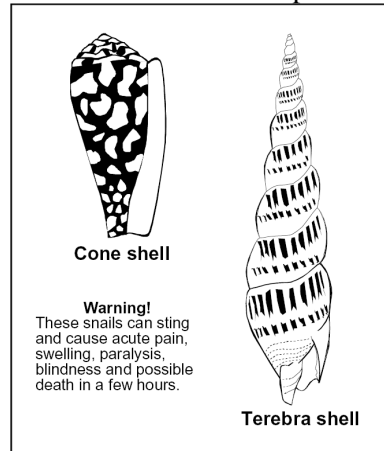


v. Precautions:

- a. Wear shoes to protect the feet when wading in water.
- b. Avoid reaching into dark holes.
- c. Kill animals before handling.
- d. DO NOT secure fishing lines to yourself or the raft.
- e. Kill fish before bringing them into the raft.
- f. DO NOT eat fish with:

- Spines.
- Unpleasant odor.
- Pale, slimy gills.
- Sunken eyes.
- Flabby skin.
- Flesh that remains dented when pressed.

g. DO NOT eat fish eggs or liver (entrails).



- h. Avoid all crustaceans above the high tide mark.
- i. Avoid cone-shaped shells (Figure VII-8).
- j. Avoid hairy insects; the hairs could cause irritation or infection.
- k. Avoid poisonous insects, for example:
 - Centipedes.
 - Scorpions.
 - Poisonous spiders.
- l. Avoid disease carrying insects, such as:
 - Flies.
 - Mosquitoes.
 - Ticks.

C. Plant Foods.

Note: If you cannot positively identify an edible plant and choose to try an unknown plant, these guidelines may help determine edibility.

- i. Selection criteria.
 - a. Before testing for edibility, ensure there are enough plants to make testing worth your time

and effort. Each part of a plant (roots, leaves, stems, bark, etc.) requires more than 24 hours to test. DO NOT waste time testing a plant that is not abundant.

- b. Test only 1 part of 1 plant at a time.
 - c. Remember that eating large portions of plant food on an empty stomach may cause diarrhea, nausea, or cramps. Two good examples are green apples and wild onions. Even after testing food and finding it safe, eat in moderation.
- ii. Avoid plants with the following characteristics:

Note: Using these guidelines in selecting plants for food may eliminate some edible plants; however, these guidelines will help prevent choosing potentially toxic plants.

- a. Milky sap (dandelion has milky sap but is safe to eat and easily recognizable).
- b. Spines, fine hairs, and thorns (skin irritants/contact dermatitis). Prickly pear and thistles are exceptions. Bracken fern fiddleheads also violate this guideline.
- c. Mushrooms and fungus.
- d. Umbrella shaped flowers (hemlock is eliminated).
- e. Bulbs (only onions smell like onions).
- f. Grain heads with pink, purplish, or black spurs.
- g. Beans, bulbs, or seeds inside pods.
- h. Old or wilted leaves.
- i. Plants with shiny leaves.
- j. White and yellow berries. (Aggregate berries such as black and dewberries are always edible, test all others before eating.)
- k. Almond scent in woody parts and leaves.

D. Test procedures.

CAUTION: Test all parts of the plant for edibility. Some plants have both edible and inedible parts. NEVER ASSUME a part that proved edible when cooked is edible raw, test the part raw

before eating. The same part or plant may produce varying reactions in different individuals.

- i. Test only 1 part of a plant at a time.
- ii. Separate the plant into its basic components (stems, roots, buds, and flowers).
- iii. Smell the food for strong acid odors. Remember, smell alone does not indicate a plant is edible or inedible.
- iv. DO NOT eat 8 hours before the test and drink only purified water.
- v. During the 8 hours you abstain from eating, test for contact poisoning by placing a piece of the plant on the inside of your elbow or wrist. The sap or juice should contact the skin. Usually 15 minutes is enough time to allow for a reaction.
- vi. During testing, take NOTHING by mouth EXCEPT purified water and the plant you are testing.
- vii. Select a small portion of a single part and prepare it the way you plan to eat it.
- viii. Before placing the prepared plant in your mouth, touch a small portion (a pinch) to the outer surface of your lip to test for burning or itching.
- ix. If after 3 minutes there is no reaction on your lip, place the plant on your tongue and hold it for 15 minutes.
- x. If there is no reaction, thoroughly chew a pinch and hold it in your mouth for 15 minutes (DO NOT SWALLOW). If any ill effects occur, rinse out your mouth with water.
- xi. If nothing abnormal occurs, swallow the food and wait 8 hours. If any ill effects occur during this period, induce vomiting and drink a water and charcoal mixture.
- xii. If no ill effects occur, eat 1/4 cup of the same plant prepared the same way. Wait another 8 hours. If no ill effects occur, the plant part as prepared is safe for eating.

CAUTION:

- Ripe tropical fruits should be peeled and eaten raw. Softness, rather than color, is the best indicator of ripeness. Cook unripe fruits and discard seeds and skin.

- Cook underground portions when possible to reduce bacterial contamination and ease digestion of their generally high starch content.

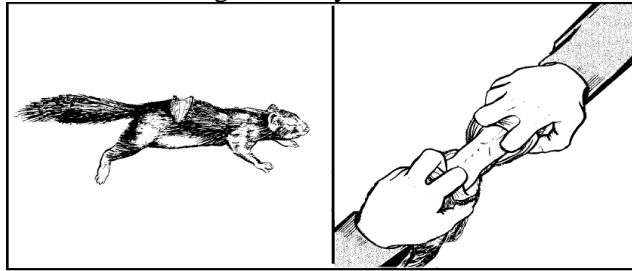
2. Food Preparation

Animal food gives the greatest food value per pound.

A. Butchering and skinning.

i. Mammals.

- Remove the skin and save for other uses.
- One cut skinning of small game (Figure VII-9).
 - Open the abdominal cavity.
 - Avoid rupturing the intestines.
 - Remove the intestines.
 - Save inner organs (heart, liver, and kidneys) and all meaty parts of the skull, brain, tongue, and eyes.



- Wash when ready to use.
 - If preserving the meat, remove it from the bones.
 - Unused or inedible organs and entrails may be used as bait for other game.
- #### ii. Frogs and snakes.
- Skin.
 - Discard skin, head with 2 inches of body, and internal organs.
- #### iii. Fish.
- Scale (if necessary) and gut fish soon after it is caught.
 - Insert knife point into anus of fish and cut open the belly.
 - Remove entrails.
 - Remove gills to prevent spoilage.

iv. Birds.

- a. Gut soon after killing.
- b. Protect from flies.
- c. Skin or pluck them.
- d. Skin scavengers and sea birds.

v. Insects.

- a. Remove all hard portions such as the legs of grasshoppers or crickets. (The rest is edible.)
- b. Recommend cooking grasshopper–size insects.

CAUTION: Dead insects spoil rapidly, DO NOT save.

vi. Fruits, berries, and most nuts can be eaten raw.

B. Cooking.

CAUTION: To kill parasites, thoroughly cook all wild game, freshwater fish, clams, mussels, snails, crawfish, and scavenger birds. Saltwater fish may be eaten raw.

i. Boiling (most nutritious method of cooking—drink the broth).

- a. Make metal cooking containers from ration cans.
- b. Drop heated rocks into containers to boil water or cook food.

ii. Baking.

- a. Wrap in leaves or pack in mud.
- b. Bury food in dirt under coals of fire.

iii. Leaching. Some nuts (acorns) must be leached to remove the bitter taste of tannin. Use one of the following leaching methods:

a. First method:

- Soaking and pouring the water off.
- Crushing and pouring water through.
Cold water should be tried first; however, boiling water is sometimes best.
- Discarding water.

b. Second method:

- Boil, pour off water, and taste the plant.
- If bitter, repeat process until palatable.

- iv. Roasting.
 - a. Shake shelled nuts in a container with hot coals.
 - b. Roast thinly sliced meat and insects over a candle.

3. Food Preservation

- A. Keeping an animal alive.
- B. Refrigerating.
 - i. Long term.
 - a. Food buried in snow maintains a temperature of approximately 0°C (32°F).
 - b. Frozen food will not decompose (freeze in meal-size portions).
 - ii. Short term.
 - a. Food wrapped in waterproof material and placed in a stream remains cool in summer months.
 - b. Earth below the surface, particularly in shady areas or along streams, is cooler than the surface.
 - c. Wrap food in absorbent material such as cotton and re-wet as the water evaporates.
- C. Drying and smoking removes moisture and preserves food.
 - i. Use salt to improve flavor and promote drying.
 - ii. Cut or pound meat into thin strips.
 - iii. Remove fat.
 - iv. DO NOT use pitch woods such as fir or pine; they produce soot giving the meat an undesirable taste.
- D. Protecting meat from animals and insects.
 - i. Wrapping food.
 - a. Use clean material.
 - b. Wrap pieces individually.
 - c. Ensure all corners of the wrapping are insect proof.
 - d. Wrap soft fruits and berries in leaves or moss.
 - ii. Hanging meat.
 - a. Hang meat in the shade.
 - b. Cover during daylight hours to protect from insects.
 - iii. Packing meat on the trail.

- a. Wrap before flies appear in the morning.
 - b. Place meat in fabric or clothing for insulation.
 - c. Place meat inside the pack for carrying. Soft material acts as insulation helping keep the meat cool.
 - d. Carry shellfish, crabs, and shrimp in wet seaweed.
- E. DO NOT store food in the shelter; it attracts unwanted animals.

