

WILDERNESS

A Survival Adventure



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Acknowledgments

Dr. Wesley Huntress, project manager for *Wilderness*, developed Pangraphics™ and created the SmallDOS code, the *Wilderness* operating system, and the simulation code. Mr. Charles Kohlhase was responsible for simulation design and system engineering, algorithm development, and the information contained in this manual. Mr. Peter Farson created the digitized topographic map generator.

The authors would like to extend special thanks to: Dr. James Palen, M.D., St. Francis Medical Center, Cape Girardeau, Mo., for the medical algorithms; Prof. John Kingsbury, Cornell University, for the information on toxic wild plants; Dr. Lanny Miller, Jet Propulsion Laboratory, for the thermal models; Mr. Kimball Garrett, Los Angeles County Museum of Natural History, for the information on wildlife habitats; Dr. Robert Wolff, Jet Propulsion Laboratory, for selected database research; Mr. David Mullich, Electric Transit, Inc., for the wildlife and shelter graphics; and Ms. Pam Pollack, Electric Transit, Inc., for the final form of this manual.

INTRODUCTION

You're alone, miles from civilization, with no hope of rescue. A dusting of snow covers the trees and surrounding mountains. You shiver with cold and wonder how you're going to make it to safety. A ranger outpost is plainly marked on the topographic map you managed to pull from the wreckage of your airplane. But the map covers an area twice the size of the state of Delaware, and your crash-site could be anywhere. Survival depends on determining your location, and then hiking to the safety of the outpost, or . . .

You're an adventurous archeologist determined to establish yourself in the professional community. A long-forgotten map and several obscure bits of evidence have sent you in search of the Lost City of Gold, rumored to contain the riches of Croesus and a priceless statue. Discovering the City will be an astounding find; one that will secure your fame and fortune. You are airlifted to a remote ranger outpost. From there you must trek deep into the wilderness, obtain the statue, and return to the outpost, alive!

Your journey will be arduous, made difficult by rough terrain, dangerous wildlife, inhospitable weather, and your own lack of experience. In the end, your life may depend on common sense, quick wits, and a little luck. And even then, you may not make it.

Wilderness: A Survival Adventure is a unique adventure simulation. It features Pangraphics™, a three-dimensional graphics generating system; infinite dynamic, perilous environments in which to journey; and a series of expert systems, scientifically accurate models of daily weather patterns, and the human body's responses to exposure, injury, and illness. Experts in the fields of toxic wild plants, human physiology, navigation, wilderness lore, thermal models, wildlife habitats, meteorology, and terrain models have pooled their knowledge to create a precisely detailed environment.

Wilderness uses a 300-word vocabulary with which to negotiate the two adventure scenarios. All vocabulary words are clearly identified in uppercase bold type throughout this manual; keystrokes appear in bracketed, boldface type. Phrase sequences that appear as **(USE KNIFE)/MAKE GEAR/USE BAIT/USE GEAR/CATCH FISH** represent a series of responses. Type in the first phrase, press **[RETURN]** and wait for a response from the program. When you see a flashing square (the cursor), type in the next phrase. Phrases in parentheses are optional; they are not required steps in accomplishing a task. Occasionally, you'll hear a "beep". This signals a message that will be revealed when you press **[RETURN]**.

Both the plane crash and the archeological expedition take place in the Sierra Nevada mountain range; your journey can be experienced at ten levels of difficulty. You can extend the boundaries of your expeditions to five additional geographic locations—Bolivia, British Columbia, Burma, Chile, and New Guinea—by purchasing supplemental disks. (See the order form enclosed in this package.)

In this adventure simulation, each day is a challenge. You must cope with basic needs—food, water, shelter; you must deal with life-threatening situations—dangerous wildlife, tropical diseases, the harshness of the elements. To assist you in your struggle to survive, *Wilderness* has six information screens built into its design. These screens are your link to the environment and your physical condition, as well as your most important sources of information. They are:

VIEW	a three-dimensional panorama of the surrounding terrain
TOPO	a topographic (topo) map, complete with latitude, magnetic declination, scale, and major geographic features such as woods or jungles, mountains, rivers, and lakes
STATUS	an up-to-the-minute report on current weather conditions, your physical state, and your progress in reaching your goal
INVENTORY	an itemized list of available supplies
HELP	a list of the most important pieces of survival advice specific to your location and situation
CLUE	a series of hints about the location of the Lost City of Gold (available only for the archeological expedition)

A solo trek in the wilds can be dangerous, exhausting, and time-consuming. A *Wilderness* experience can take several hours and, very likely, will not be completed in one session. So that you can resume your journey exactly where you left off, *Wilderness* allows you to save an ongoing adventure. In fact, you can save as many as five adventures on a blank disk.

As you become an advanced explorer, you can create new environments in which to test your survival skills. *Wilderness* contains all the information necessary for you to construct an infinite number of geographically specific and accurate landscapes. Generated in the form of original topo maps, five new 90×67-mile areas from any of the six world regions can be stored on a blank disk.

Because *Wilderness* is the closest thing to actually being on your own in the wilds, it provides you with an opportunity to experience challenging situations and to explore places that might otherwise be inaccessible. This accurate adventure simulation can help foster problem-solving skills that are not part of traditional classroom instruction; encourage investigation into what makes systems work; make learning an active process by letting you manipulate “reality”; and bridge the gap between theoretical knowledge and practical application. *Wilderness* is equipped with a research mode that transforms the adventure into an interactive atlas. The trials of survival are removed; you can investigate weather patterns, watch the cycle of the sun, study terrain, read

maps, sharpen navigation techniques, and broaden your knowledge of animals and plants.

The information you carry with you is perhaps your most important line of defense in unknown territory. This manual is indeed a survival manual; it contains a large part of the training manual used by the United States Air Force Survival School. Much of the information is necessary for staying alive in *Wilderness*, though sections related to survival techniques not used in this simulation are also included. These sections appear as shaded blocks. The manual is organized so that it begins at the outset of your journey, and then presents you with information for dealing with situations as you encounter them. This *Wilderness* manual also contains several appendixes with additional survival information and an extensive glossary.

For those adventurers anxious to start their journey before reading this manual, *Wilderness* includes a Travel Pass that will drop you right into the unknown. The reverse side of the pass contains a listing of the vocabulary you need to survive your journey. If you get stuck, refer to the detailed information contained in the following pages.

YOUR ADVENTURE BEGINS

Wilderness, like real life, is made up of many interwoven and interrelated systems. Decisions you make about one facet of your journey can have far-reaching and extreme effects on other aspects of the adventure. Take advantage of the information contained in these pages. There is a lot to learn before you can successfully survive a solo trip into the wilderness (literally or electronically).

Use your first *Wilderness* adventure as an exploratory journey; make its purpose one of experimenting and experiencing. It is an opportunity to gather the information and knowledge you will need on future adventures. We suggest that you consider the following instructions as a passport into the possibilities *Wilderness* contains; they afford you the best means of fully appreciating and experiencing this adventure simulation.

Entering the Wilds

Insert the Sierra Nevada side of your *Wilderness* Disk into the disk drive and turn on your computer and monitor. (Do not put a write-protect tab on any *Wilderness* disk.) After a few moments the title page appears. Press [RETURN] and you see the *Wilderness* Main Menu. This menu contains seven options:

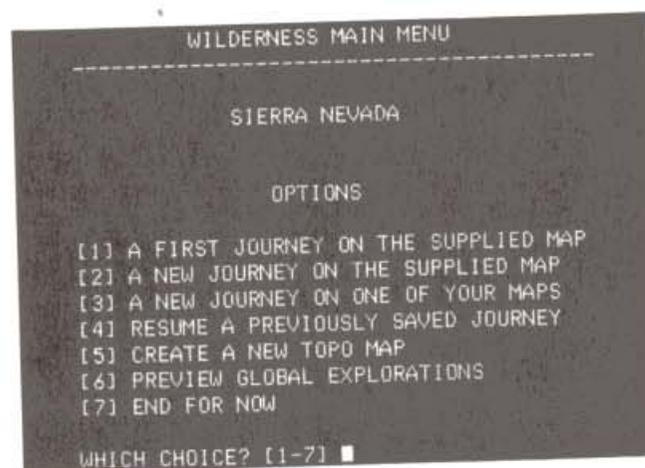


Figure 1: Main Menu

Since you are a novice adventurer, select [1] **A FIRST JOURNEY ON THE SUPPLIED MAP** and press [RETURN]. This first journey option lets you get right into your adventure. We have answered the 11 setup questions (discussed on pages 75 through 77), packed your supplies (discussed on page 18), and created optimum conditions for a successful trek. The next screen you see, YOUR FIRST JOURNEY, asks you to insert the Journey Disk and press [RETURN]. Your Journey Disk is on the reverse side of your Sierra Nevada Disk. If this is the first time you are using a Country Disk, you are asked to reinsert the Country Disk, press [RETURN], reinsert the Journey side, and press [RETURN] again. Each disk carries a serial number; your Journey side is checking the number on your Country side.

After substituting the Journey side for the Country side, you are presented with an introduction to your first adventure in *Wilderness*. (The other Main Menu options are discussed in detail in Chapter 8.)

Carefully read the two-page introduction that appears on your screen. It contains important facts about your location, physical condition, and possible local hazards. You'll need this information when you make decisions about what supplies to take with you. It also will come in handy in your determining the direction your journey will take. You may want to jot down the facts for future reference. Once you have read the introduction and pressed [RETURN], you are transported to a remote location somewhere in the Sierra Nevadas. We suggest you use a color monitor or television to more vividly recreate nature. Make sure the tint is adjusted so that the sky is blue and the world appears in its proper hues.

You are looking at a panorama of the area surrounding your crash site. The shattered fuselage of your airplane is in the foreground. There may be mountains off in the distance; some of the higher peaks may be snow-capped. You might see rivers or lakes, and trees. What you are looking at, in *Wilderness* terminology, is the **VIEW** screen. It is one of the six information screens built into this adventure simulation.

Each screen, and its function, is discussed in detail in this chapter. Before embarking on your adventure, you should be completely familiar with all six screens. They may, in some life-threatening situation, hold the information that keeps you alive.

The VIEW Screen

This is the primary play screen; it is a three-dimensional, color representation of the terrain in which your adventure takes place. You see the world as you do in real life, from your own point of view. Your peripheral vision extends 45 degrees to your left and right, giving you a 90-degree field of view.

Take some time to observe the details of the scenery. Note the location of mountains. Are they nearby or in the distance? Can you see any rivers, streams, or bodies of water from your observation point? We set up your journey to begin at 7 AM. Can you see the sun? Poor weather, fog, rain, or snow can limit your vision and obscure the sun. What are the weather conditions on this May day? (We selected the fifth month for your journey date.) Continue to

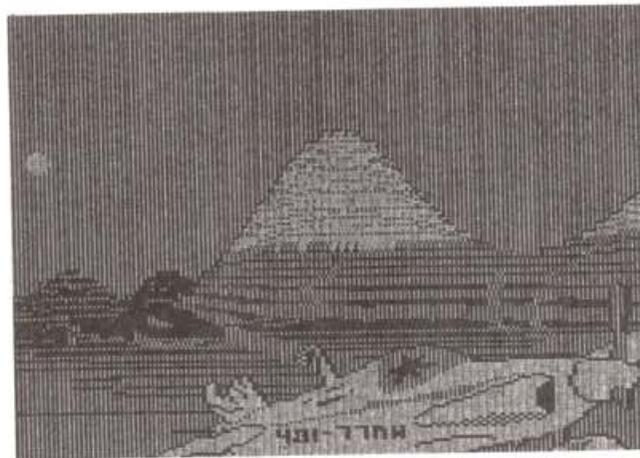


Figure 2: VIEW Screen

inspect the area until you have a feel for your surroundings. When you have completed this "first look", type **TOPO** and then press [RETURN].

The TOPO Map Screen

You are presented with a topo map of a 90×67-mile area somewhere in the Sierra Nevada mountain range. The map is one of your most important sources of information; it is one of the things you will need to get you to the safety of the ranger outpost. Remember, you can't read the map in the dark unless you use some kind of artificial light (a flashlight, a match, or your campfire). The information contained in the map includes:



Figure 3: TOPO Map Screen

REGION NAME: Sierras USA In future journeys, you can elect to adventure beyond US borders with supplemental Country Disks; one of five other area names can appear here. They are Bolivia, British Columbia, Burma, Chile, and New Guinea. More detailed information about each geographic region appears in Appendix C: Atlas.

LATITUDE (LAT): +38 (+ or - DEGREES) The distance of a point on the earth's surface north or south of the equator, measured on the meridian of that point. Latitude affects seasons, weather and its severity, and the transit of the sun in the sky.

MAGNETIC DECLINATION (MAG D): +17 (+ or - DEGREES) The difference between magnetic north, given by a compass, and true north. If the magnetic declination is + (positive), then magnetic north is east of true north. If the magnetic declination is - (negative), then magnetic north is west of true north.

CONTOUR LINES: Altitude or elevation is the height above sea level of a given point. A contour line connects all points of a specific geographic feature with the same elevation. You can use this information to determine the shape, size, and slope of mountains and valleys. The contour lines on your topo map appear in increments of 400 feet. (To increase your journey's challenge, the number of degrees of all slopes have been increased four times what is actually indicated on the topo map.)

RIVERS and LAKES: The position and arrangement of rivers, lakes, and streams can be used as landmarks with which to orient yourself. Water courses also can be vital to your survival; they are sources of food and drinking water, and a means of rapid transport.

SCALE: This topo map, unlike one printed on paper, is dynamic. You can see a magnification of part of the map. The normal scale is 90x67 miles. Press [S]. Now you are looking at an area of 50x32 miles. Notice that the elements on the map are larger. In Research Mode, you can get help in finding your present location by pressing [L] when looking at the magnified map. It appears as a small white dot. Press [S] again. You're back to normal scale.

Increase the magnification again (press [S]). You can see geographic details that are not visible on the larger-scale map. You can move around on *Wilderness'* topographic map when the scale is magnified. Press [K]. You've moved to the right. Press [K] several times. You continue to move to the right across the map until you come to its border. Now press [J]. This key moves you to the left. To move up, press [I]. To move down, press [M]. Take some time to wander around on the map. You'll come across various geographic details such as mountains, rivers, lakes, and woods (stands of trees appear as shaded areas). Do you see a large white dot? That dot represents the ranger outpost. When you are comfortable with moving to different map locations, press [S] again.

You're back to normal scale. Experiment with the scale feature; go back and forth between normal scale and magnified scale. Move to a new location on the map and then bring the scale back to normal. The relationship between the two scales will become clear and the value of having magnification available will be apparent. After you have practiced with these topo map features, press [V].

You've returned to the **VIEW** screen with its three-dimensional panorama of the Sierra Nevadas. Your location in the mountain range is somewhere on the

map you have been investigating. The map is your first navigation aid. To get to the safety of the ranger outpost, you must understand the relationship between where you are in the **VIEW** screen and where that location is on the topo map.

To get your bearings, you must look around you. Type **LOOK RIGHT**. Your field of view changes; you are seeing the landscape that is 90 degrees to the right of your original view. Your peripheral vision still encompasses 45 degrees to the right and left (a 90-degree arc). Type **LOOK RIGHT** again. This view is directly behind (180 degrees from) your original vantage point. Make another quarter turn (type **LOOK RIGHT** again). You are looking at the area 90 degrees to the left (270 degrees) of your original view. Turn right again (type **LOOK RIGHT**) and you have completed a circle; you have looked at the complete 360 degrees around you. What you see now is your original view of the Sierra Nevadas.

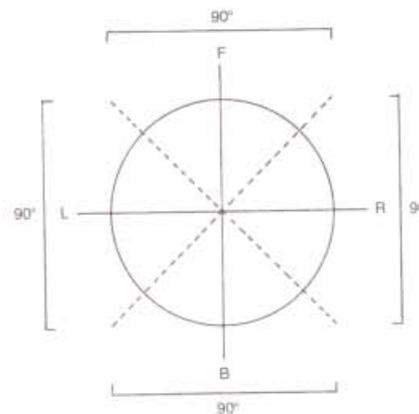


Figure 4: Field of View Diagram

Try typing **LOOK LEFT**. Inspect the landscape and then complete the same 360-degree survey you took by turning to your right.

You can change your view by 45-degree increments (instead of 90-degree units) by typing **LOOK HALF RIGHT** or **LOOK HALF LEFT**. Using these phrases, scan the area.

You can use five other directional words with **LOOK** to view your surroundings. They are:

- | | |
|----------------|---|
| BACK | 180 degrees behind you |
| UP | 45 degrees above horizontal |
| DOWN | 45 degrees below horizontal |
| FORWARD | straight horizontal; used to reestablish a straight-ahead view, after looking up or down. |
| SUN | places the sun in the center of your field of view. It must be a clear day in order to use this direction finder. |

Experiment with these words; see what happens when you use them in vari-

ous combinations. Once you are adept at looking around, get back to your original view. Now type **PAN RIGHT**.

The screen changes in a way different from its response to **LOOK**. **PAN**, in effect, turns your head slowly in the direction you indicate (in this case, to the right). You can **PAN** a full 360 degrees. To stop turning your head (panning), press any character key on the keyboard. Type **PAN LEFT** and you begin turning your head to the left. Practice panning; you'll discover how useful it is in fine-tuning your view.

All these commands can be used to gather information about your location. When used in combination with the topo map, they become your means of orienting yourself. Use any of the **LOOK** directions to find some significant geographic landmark such as a river, lake, or mountain peak. Then refer to your map (type **TOPO** or press **[T]**). Can you find that landmark on the map? You may have to use the scale (**[S]**) and move around until you can locate your landmark. Shift back and forth between the panorama in the **VIEW** screen (**[V]**) and the **TOPO** map (**[T]**) until you have a good idea of your location.

Weather

Another type of information available to you in the **VIEW** screen concerns weather conditions. As in the real world, the weather in *Wilderness* cycles through day and night. The seasons turn from summer through autumn, winter, and spring. Storms gather, pelting the landscape with rain. Fog rolls in, obscuring the distant mountain peaks. In winter months, snow covers the ground, making navigation difficult and travel slow.

The movement of the sun, in the 24-hour (daily) cycle and in the 12-month (yearly) cycle, has some important effects on your journey. On a clear day you can see as far as 50 miles in every direction, providing that your view isn't obstructed by forests or mountains. During bad weather (fog, rain, and snow) or lack of sunlight (night, dusk, and dawn), your viewing distance can be greatly reduced. Poor visibility also affects your rate of travel and the speed at which you can accomplish tasks. You cannot move quickly over unfamiliar terrain if you cannot see where you are going. Temperature fluctuates with changes in the time of day, weather conditions, and seasons; rainstorms may produce a slight increase in air temperature because of humidity.

Each of these variables affects not only your progress through *Wilderness*, but your physical condition as well. Snow can cause snow blindness; extreme heat, hyperthermia and dehydration; and extreme cold, frostbite and hypothermia. You must consider the weather when you make decisions about clothing, equipment, and shelter.

To get a summary of current weather conditions and other important information about the surrounding terrain and your physical state, type **STATUS**.

The STATUS Screen

This is the third of the six information screens in *Wilderness*. You might think of it as an up-to-the-minute news report about you and the surrounding area. It

is always available to you simply by your typing **STATUS**. The details of the state of your environment and your physical condition are given in specific measurements, if you have the proper instruments; or in relative terms, if the measuring devices are not available. The information contained in the **STATUS** screen includes:

```
ENVIRONMENTAL STATUS:
-----
DATE  MAVS      TIME  7:00A    TEMP  42DEG
SKY   CLEAR      WIND  7MPH     TREND NO CHG
ALT   5000FT     GRND  CLEAR    SLOPE 0/0

PLAYER STATUS:  OKAY          GOAL=100%
                SHIVERING     HEALTH=100%

ENRG  GREAT     HNGR  OKAY      THRST  OKAY
TEMP  98.6F     FOOD  440 OZ   WATER 128 OZ

INJ   NONE          ILL   NONE
```

Figure 5: STATUS Screen

Environmental Status

DATE: The month and day. Use this information to keep track of the length of time you have been traveling. If the month is one in which a transition of seasons occurs, you can anticipate, in a general way, future weather conditions.

SKY: This broad category gives you the general condition of the sky. You will see either **CLEAR**, **CLOUDY**, **RAIN**, or **SNOW**.

ALTITUDE (ALT): Altitude is the height of a given point above sea level. If you have an altimeter (an instrument that measures altitude), altitude is given to within 200 ft. If you didn't bring this piece of equipment along, you'll see **HIGH** (over 10,000 ft), **MEDIUM** (3,000 ft to 10,000 ft), or **LOW** (under 3,000 feet).

Altitude affects air temperature, local vegetation and wildlife, terrain, prevailing wind and weather, and physiology. Altitude sickness is a potential problem above elevations of 10,000 feet, unless you are physically well-conditioned or you have an oxygen tank with you.

TIME: The time of day. If you have a watch, time is given in hours and minutes (0:00A or 0:00 P) to within 10 minutes. If you're not wearing a watch, you'll see **DAWN**, **AM**, **PM**, **DUSK**, or **NIGHT**. Time of day influences air temperature, visibility, and your chances of encountering small game or wildlife.

WIND: Wind speed is given in miles per hour (xx MPH). High winds can increase the dangers of travel, especially in rugged terrain. When combined with rain or snow, it can reduce visibility. In extreme cold, the wind magnifies the effect of low temperatures (wind chill factor) and increases the dangers of exposure.

GROUND (GRND): The type of terrain within a 0.2 mile radius of your position. The possible ground types include **CLEAR** (walkable terrain with no ma-

for geographic characteristics), WOODS, JUNGLE, LAKESHORE (bank of a still body of water), LAKE, RIVERSHORE (bank of a moving body of water), RIVER, FROZEN LAKE (lake frozen to a thickness that will support a person's weight), SCRUB (low-growing vegetation), or ROCKY (rugged terrain broken by ridges, gorges, or cliffs).

TEMPERATURE (TEMP): Air temperature. If you packed a thermometer, temperature is given in degrees Fahrenheit. If you neglected to pack one, you'll see FREEZE, COLD, NICE, WARM, or HOT.

Air temperature has a profound effect on the human body. Hypothermia, a drop in body temperature due to exposure to very cold weather, can cause death. Hyperthermia, a rise in body temperature due to overexertion in very hot climates, also can put an end to your adventure. Food spoils more quickly in high temperatures; natural food sources, like game and edible plants, are less abundant during cold weather. Fluid lost during exertion must be replaced more frequently when sweating is excessive; frostbite is a danger when the body is exposed to extreme cold.

TREND: An indication of the stability of present weather conditions. You will see either BETTER, NO CHG (no change), or WORSE. You can use this information to anticipate weather conditions.

SLOPE: A measure of the angle (in degrees from horizontal) of the terrain. The first number represents the slope of the ground in the direction in which you are looking; the second, the overall slope of the area in which you are standing. Positive slope indicates uphill; negative (-) slope indicates downhill. In both cases, the higher the number, the steeper the angle.

For example, if you were standing on the side of a steep mountain and you were looking uphill at the mountain face, the **STATUS** screen might read 30/30. If you were to look behind you and then call up the **STATUS** screen, slope might read -30/30. The first number depends on the angle of your view. The second number represents the absolute incline of the overall area (this does not change when you alter your angle of the view).

Player Information

If you are using Research Mode in which your physical condition does not change, this portion of the **STATUS** screen will read RESEARCH MODE. Otherwise, you will see:

PLAYER STATUS: An overall measure of your physical and psychological condition. Measurement terms include FANTASTIC, GOOD, OKAY, POOR, MISERABLE. Below one of these measures, you may be notified of some change in your physical condition. SWEATING indicates rising body temperature; SHIVERING indicates falling body temperature.

GOAL: A measure of your success in reaching your destination is given as a percentage (with 100% as your starting point). The time and the route you take to reach your destination, as well as the number of times you ask for HELP or CLUE, affect your goal percentage.

HEALTH: A measure of your current physical condition (the presence or absence of illness or injury) given as a percentage of your starting condition. This indicator can alert you to an oncoming illness or the impact of a sustained injury. Each illness and injury decreases your health percentage; the effects

are cumulative. For example, if frostbite reduces your health to 90% and a broken arm separately decreases health to 80%, then the total effect of both maladies brings your health to 72%. Death occurs when your health deteriorates below 3%.

ENERGY (ENRG): A relative description of your need for sleep. Measurement terms are GREAT, OKAY, TIRED, and BEAT. Lack of sleep can lead to exhaustion.

TEMPERATURE (TEMP): Body temperature. If you have a thermometer, your temperature is given in degrees Fahrenheit. (Normal is 98.6.) If you didn't bring a thermometer with you, you'll see a relative term: FREEZE, COLD, NICE, WARM, or HOT. This measurement can be useful in detecting the symptoms of frostbite, hypothermia, hyperthermia, and a variety of other ailments. It is also an indicator for action. Do you need treatment for a specific illness? Should you put on or take off some clothing to accommodate climate?

HUNGER (HNGR): Indicates your general nutrition requirements at that particular moment. Relative measurements are FILLED, OKAY, SO-SO, and VERY. Unattended hunger can lead to starvation.

FOOD: Quantity of available food (from all sources in your vicinity) listed in ounces (XX OZ).

THIRST (THRST): Indicates your general fluid requirement at that particular moment. Relative measurements are the same as for HUNGER. Thirst, when it becomes an extreme condition, results in dehydration.

WATER: Quantity of available water (from all sources in your vicinity) listed in ounces (XX OZ).

INJURY (INJ): This information appears when you have sustained a physical trauma, such as a broken arm or leg. An injury is not listed until the full impact of the trauma is felt. However, you may experience symptoms (reduced vision, falling body temperature) as your condition deteriorates. See Chapter 6 for a complete list of injuries, and their causes and treatments.

ILLNESS (ILL): This information appears when you contract a disease or if you are suffering from an illness. See Chapter 6 for a complete list of diseases, and their causes and cures.

As is obvious from the information above, the **STATUS** screen is your link to *Wilderness'* environment. Consult this screen often; use it to keep on top of your physical condition, as well as the conditions around you. You'll notice that the information on the **STATUS** screen changes as your journey becomes more arduous, as time passes, and as you travel across different kinds of terrain.

Being able to anticipate what you might have to do next is an important skill; one that could save your life. Before you can begin your *Wilderness* trek, you must pack some supplies. Type **INVENTORY** (or **INV**).

The INVENTORY Screen

The best time to begin anticipating your survival needs is before you set off into *Wilderness*. You start every adventure with a specific number and type of

supplies available to you. At easier (lower) levels, the supplies are abundant; at more difficult (higher) levels, the available supplies are spartan. A complete list of all the supplies, along with weight, volume, and uses, appears in Appendix A: Full Inventory List.



Figure 6: INVENTORY Screen

Read through the inventory list that appears on your screen. If a flashing cursor appears next to the last item on the list, it means that more items are available. Use [SPACE BAR] to see additional items. The list includes the name of the item (**JERSEY, SHORTS, CANDYBARS**, etc.), where it is located at the moment (WEAR—means that you're wearing it; GND—means that it's on the ground; -G 16 OZ means that 16 ounces is on the ground; PACK means it's packed in the backpack; CARRY means that you're carrying it.)

The terms for supply locations used in the Inventory List are:

- GND Item is on the ground
- G Quantity of item is on the ground
- WEAR Item is on your body
- PACK Item is in the backpack
- P Quantity of item is packed in the backpack
- CARRY Item is in your hands, arms, or pockets, or on your person
- C Quantity of item is being carried
- CAN Quantity of water is in the canteen

Items with limited numbers of uses, such as the **FLASHLIGHT** and the **QUININE**, are listed with the number of uses available. Multiple items, like **MATCHES**, are listed with number of units available. How much you take with you is restricted, as in real life, by your build. Remember that the more weight you carry with you, the slower your rate of progress.

Below the Inventory List is the information about Remaining Available Quantities, the weight and volume of supplies you can add. As you carry, pack,

or wear items, these numbers decrease by the weight and volume of the item added or put on. For example, if you **PACK 32 OZ** of **APPLES**, **APPLES-G** (apples on the ground) decreases by 32 OZ, **APPLES-P** (apples packed) 32 OZ appears in the list, and the additional weight you still can carry decreases by 32 OZ. Remaining **PACK VOL** (IN3 means cubic inches) is decreased by the volume of apples you packed. When you carry or wear additional items, **CARRY VOL** or **WEAR VOL**, as well as **WEIGHT**, decreases. You cannot take an item with you that takes the remaining volume or weight below zero.

As you scan the Inventory List, notice the supplies we have packed for you. They are:

- | | | |
|----------------------|--------------------------|-----------------------|
| DOWN PARKA | MATCHES—24 | EGGS—16 OZ |
| RAINCOAT | SNAKEBIT KIT | POTATOES—32 OZ |
| ROPE | REPELLENT—10 USES | BOLOGNA—16 OZ |
| FISHING GEAR | AXE | BEANS—32 OZ |
| UTENSILS | FLASHLIGHT—6 USES | WATER—64 OZ |
| CHEESE—32 OZ | TENT | FUEL—8 OZ |
| RAISINS—16 OZ | COMPASS | SUNGLASSES |
| TUNA—16 OZ | ALTIMETER | FLAGYL—12 USES |
| APPLES—32 OZ | THERMOMETER | KNIFE |

You begin your journey wearing:

- | | | |
|-------------------|------------------|----------------|
| WOOL PANTS | SWEATER | MITTENS |
| WOOL SOCKS | BALACLAVA | WATCH |
| | BOOTS | JERSEY |

and you are carrying:

- | | |
|----------------------|-----------------|
| TOPO MAP | BACKPACK |
| 2 QT. CANTEEN | |

The items left on the ground that you might want to take with you are:

- | | | |
|------------------------|-------------------------|------------------------|
| ENSOL PAD | WATER—64 OZ | BACON—16 OZ |
| JEANS | SUNSCREEN—7 USES | CHEESE—16 OZ |
| COTTON SOCKS | OXYGEN—17 USES | POTATOES—48 OZ |
| GLOVES | TRINKETS—6 USES | BOLOGNA—32 OZ |
| SNOWSHOES | GND COVER | APPLES—48 OZ |
| RAFT | SHORTS | MAGNF GLASS |
| CANDYBARS—16 OZ | HAT | SALT TAB—12 |
| CARROTS—16 OZ | PITONS/CARB | QUININE—14 USES |
| RAISINS—8 OZ | TRAP | ROCK |
| BEANS—48 OZ | | |

Before you can begin to assemble your supplies, the cursor (a flashing square) must appear next to the question mark at the bottom of the screen. Press [RETURN] to move the cursor from the list to the question mark. Each

time you select an item from the Inventory, the list is updated. You may have to move the cursor so that it appears next to the question mark. Press **[RETURN]** to position the cursor.

To pack an item, type **PACK** and the item's name. You'll be asked to indicate the number of ounces if the item is food or water. Notice that the weight of that item in the inventory list decreases by the amount you packed. To put on a piece of clothing, type **WEAR** and the name of the item. To carry an item, type **CARRY** (or **GET**) and the name of the item. As you choose your supplies, you'll see the weight and volume that you still can add to your provisions. Unless you discard some provisions, you cannot take items with you once you have reached your weight and volume limits.

Don't be impatient to pack up your backpack and take off into the unknown. The decisions you make here will have an enormous impact on your ability to stay alive. You might want to go back to some of the previous information screens and review the basic facts about the environment in which you will be traveling.

To consult the **INVENTORY** screen during your journey, simply type **INVENTORY** (or **INV**). If you have made an item from raw materials (such as a spear or trap) and have **PACKED** it after use, it will be included in your list of available supplies. As you eat and drink, the quantities of the food and water you brought with you diminish. If, over time, some of your food supplies go bad, their quantities are no longer listed in ounces; the legend says **SPOILED**. The **INVENTORY** screen used during your adventure is a dynamic display. It gives you a list of what you have with you at a particular moment.

If your **BACKPACK** is on the ground (GND), it stays there until you **CARRY** it. If you leave the area and forget to repack your gear, it is no longer available to you unless you return to your previous location to retrieve it. It's a good idea to inspect your inventory before leaving your campsite. You don't want to head off into the unknown without your supplies.

Other vocabulary words that come in handy when sorting out your supplies are **DROP** (to discard an object), or **GET** (to retrieve an object).

Think about the following questions before selecting your supplies:

1. What is the time of year? Will it be cold or warm, wet or dry? Are weather conditions severe? Will I need a ready-made shelter or can I count on finding or making a shelter?
2. What kind of terrain will I have to traverse? Do I need special climbing gear? Are there forests and water sources that ensure the presence of game and wild foods?
3. How long do I think I'll be traveling? Do I need food and water for a few days? a month?
4. What kinds of wildlife am I likely to encounter? What are the most dangerous species in the area? What weapons are most effective against these animals?
5. What supplies are necessities; what can I make or improvise along the way?

6. What kinds of illnesses or injuries am I most likely to contract or sustain?

If you are confused about what you should take with you, type **HELP**.

The HELP Screen

At any point in your adventure, you can get advice about what to do next simply by typing **HELP**. You are presented with a list of up to ten of the most important pieces of survival information for your particular situation. The advice is listed from highest to lowest priority. The **HELP** screen can be very useful and the information in it can get you out of a dangerous situation, but don't be too casual about using it. Your goal and final performance are each reduced by about two percentage points every time you call for help.

If you are conducting an archeological expedition (the Lost City scenario), another information screen is available. Type **CLUE**. Unfortunately, you don't get any clues in the plane crash scenario.

The CLUE Screen

If you want some assistance in finding the Lost City, you can get up to seven clues to its location simply by typing **CLUE**. Some of these hints are permanent, and remain on the screen when you ask for additional clues. (A **CLUE** screen can contain up to six permanent clues.) Other pieces of information are temporary. They change depending on your location and its relationship to the Lost City.

Don't ask for a clue unless you really need one. Though valuable pieces of the puzzle may be revealed, fame and fortune are not easily acquired. Your goal and final performance are each reduced by one to two percentage points (depending on the value of the clue) each time you get a clue.

At this point, you have set up your adventure, become familiar with *Wilderness*' six information screens, decided on a course of action to get you to the safety of the ranger outpost, and packed your supplies. Now it is time to head off into the wilds.

NAVIGATING AND TRAVELING

Navigation skills play a vital role in wilderness survival. Pick up any reputable outdoor guide and you will find at least one lengthy chapter devoted to the subject.

You learn to navigate in everyday life by using local landmarks, street names, and freeway signs. Nature provides similar direction markers, but you must be trained first to see them and then to interpret them. *Wilderness* uses several different navigation techniques; each should be used in the same general order:

- Use visual clues from your surroundings (mountain peak, lake, forest, etc) or use a navigation technique to estimate your present location on the topo map.
- Chart a course that will take you in the general direction of your destination. Consider the "shortest route vs. safest route" equation. Your goal is to reach the destination alive.
- Travel along the course you have chosen, frequently checking your progress, and verifying your direction with the topo map and other navigation aids.

When wandering over terrain in *Wilderness*, it is important to remember that you travel in the direction you are **LOOKing**. Therefore, if you are **LOOKing NORTH** and type **WALK**, you walk north. To change your travel direction, you must first change the direction in which you are **LOOKing**. **PANning** is a good way to fine tune the direction. You have already read about various relative directions in Chapter 2. To review, they are:

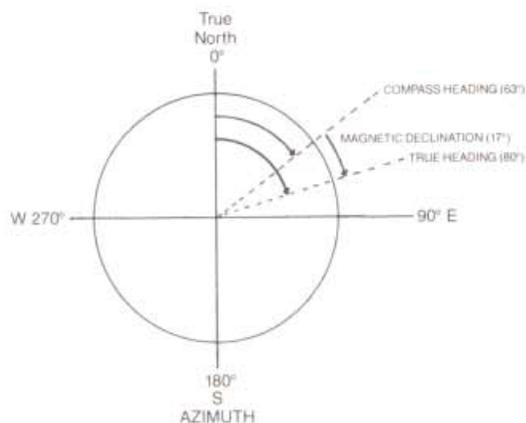
LEFT	90 degrees to the left of your current view
RIGHT	90 degrees to the right of your current view
HALF LEFT	45 degrees to the left of your current view
HALF RIGHT	45 degrees to the right of your current view
BACK	180 degrees (behind) from your current view
UP	45 degrees above horizontal
DOWN	45 degrees below horizontal
FORWARD	straight, horizontal view
SUN	in the horizontal center of your field of view

In addition to these directions, you can find and use compass point directions (north, south, east, west) and specific azimuth directions. Several methods can be used. (Other navigation techniques can be used in real-life journeys; these appear in shaded blocks.) *Wilderness* navigation techniques include:

COMPASS: You can use the following methods only if you have a compass in your inventory list. The compass is a standard magnetic type with luminous needle and dial. (You don't need a flashlight to read the compass at night.) Because a compass points to magnetic north (not true north), you must adjust your calculations to compensate for magnetic declination. Magnetic declination is given on your topo map. If magnetic declination is + (positive), magnetic north is east of true north. If magnetic declination is - (negative), magnetic north is west of true north.

The most direct method of using your compass is to find the azimuth you are presently facing. Azimuth is an arc of the horizon measured between true north and the center of an object (your position) clockwise from north through 360 degrees. The phrase **LOOK COMPASS** gives you the azimuth with respect to magnetic north. To find true north, you must compensate for magnetic declination. For example, if **LOOK COMPASS** gives you a heading of 63 degrees, and magnetic declination is +17, then you are facing a true azimuth of 80 degrees (63 + 17).

Figure 7: Azimuth Diagram



Another simple compass method orients you to one of the compass points. This method is also affected by magnetic declination, as described in the first compass technique. Use the phrase sequence **USE COMPASS/LOOK** [compass point].

A third compass method orients you to a new azimuth. For example, if the magnetic declination is +15 degrees and you want to travel along a true heading of 210 degrees, the number of degrees you would indicate in the phrase sequence is 195. The complete phrase sequence is **USE COMPASS/LOOK AZIMUTH** (or **AZ**)/195.

VERTICAL STICK SHADOW: This method is most accurate near midday. The shadow from a vertical stick moves from west to east. The sequence of phrases you need in this navigation method are:

USE SHADOW (this sets up the stick in a vertical position on level ground. Then . . .) **LOOK** [compass point] (or **LOOK AZIMUTH**)

Answer the questions that appear at the bottom of the screen. If you answer the first question correctly, you will be facing in the direction you indicated. If your answer is not correct, you will be facing in the opposite direction.

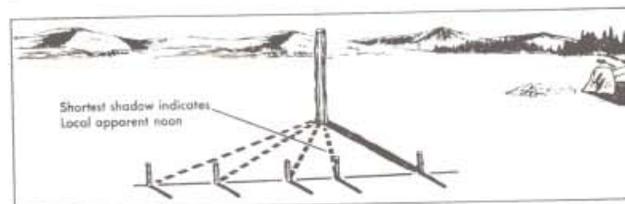


Figure 8: Stick and Shadow Method to Determine Local Noon

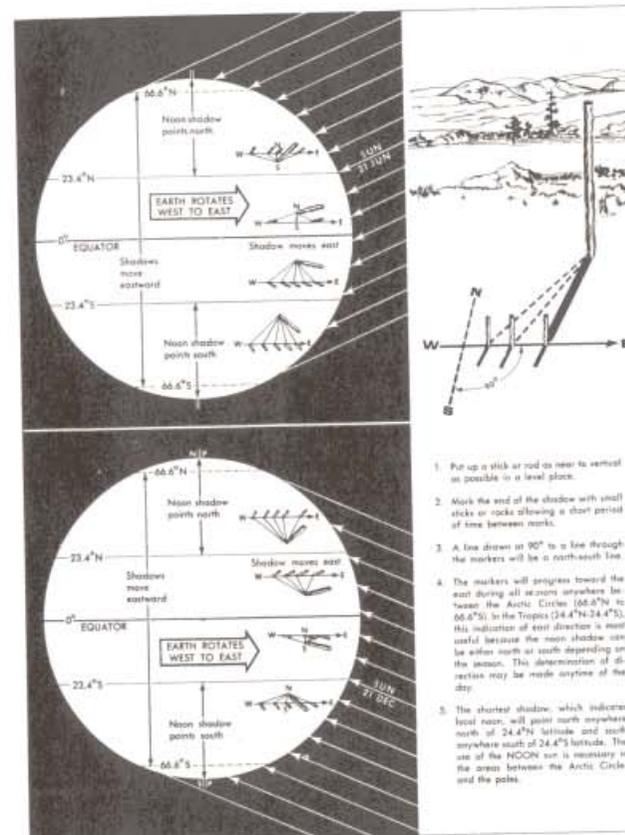


Figure 9: Stick and Shadow Method to Determine Direction

WATCH: If you're **WEARING** a **WATCH**, you can use it as a direction-finding instrument. The watch is a standard analog model, accurate to within 10 minutes. The noon, or 12 PM, reading is when the sun is at its maximum elevation on your North-South meridian. You can establish an approximate North-South line by noting the "watch time" difference, from noon, in hours. Since the sun travels at about 15 degrees an hour, multiply the time difference by 15.

DATE	Angle to North from the rising or setting sun (level terrain)													
	LATITUDE													
	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	
JANUARY	1	113	113	113	114	115	116	117	118	121	124	127	133	141
	6	112	113	113	113	114	115	116	118	120	123	127	132	140
	11	112	112	112	112	113	113	113	114	117	119	122	125	130
	16	111	111	111	111	112	112	113	114	116	118	120	124	129
FEBRUARY	1	107	107	108	108	108	109	110	111	113	115	119	121	123
	6	106	106	106	106	107	107	108	109	111	113	115	118	123
	11	104	104	105	105	105	106	107	108	109	110	112	116	120
	16	103	103	103	103	103	104	105	106	107	108	110	112	116
MARCH	1	99	98	98	98	99	99	99	100	100	101	102	104	106
	6	98	98	98	98	99	99	99	100	100	101	102	104	106
	11	94	94	94	94	94	94	95	95	95	96	96	97	99
	16	92	92	92	92	92	92	92	92	93	93	93	93	94
APRIL	1	86	86	86	86	85	85	85	84	84	83	82	81	81
	6	84	84	84	83	83	83	83	82	81	80	79	77	77
	11	82	82	82	82	81	81	81	80	80	79	77	76	74
	16	80	80	80	80	79	79	78	78	77	76	74	72	70
MAY	1	75	75	75	74	74	73	73	72	70	69	66	63	59
	6	74	74	73	73	73	72	71	70	68	67	64	61	56
	11	72	72	72	72	71	70	69	68	67	66	62	58	52
	16	71	71	71	70	70	69	68	67	65	63	60	55	49
JUNE	1	68	68	67	67	66	66	64	63	61	58	54	49	41
	6	67	67	67	67	66	65	64	62	60	57	53	48	40
	11	67	67	67	67	66	65	64	63	62	59	55	47	39
	16	67	67	67	66	65	64	63	62	59	56	53	47	39
JULY	1	67	67	67	66	65	64	63	62	59	56	53	47	39
	6	67	67	67	66	65	64	63	62	60	57	53	48	40
	11	66	66	66	66	65	64	63	61	58	54	49	41	41
	16	65	65	65	65	64	63	62	60	57	53	48	40	43
AUGUST	1	65	65	65	64	63	62	61	59	56	52	47	39	39
	6	65	65	65	64	63	62	61	59	56	52	47	39	39
	11	65	65	65	64	63	62	61	59	56	52	47	39	39
	16	65	65	65	64	63	62	61	59	56	52	47	39	39
SEPTEMBER	1	65	65	65	64	63	62	61	59	56	52	47	39	39
	6	65	65	65	64	63	62	61	59	56	52	47	39	39
	11	65	65	65	64	63	62	61	59	56	52	47	39	39
	16	65	65	65	64	63	62	61	59	56	52	47	39	39
OCTOBER	1	65	65	65	64	63	62	61	59	56	52	47	39	39
	6	65	65	65	64	63	62	61	59	56	52	47	39	39
	11	65	65	65	64	63	62	61	59	56	52	47	39	39
	16	65	65	65	64	63	62	61	59	56	52	47	39	39
NOVEMBER	1	65	65	65	64	63	62	61	59	56	52	47	39	39
	6	65	65	65	64	63	62	61	59	56	52	47	39	39
	11	65	65	65	64	63	62	61	59	56	52	47	39	39
	16	65	65	65	64	63	62	61	59	56	52	47	39	39
DECEMBER	1	65	65	65	64	63	62	61	59	56	52	47	39	39
	6	65	65	65	64	63	62	61	59	56	52	47	39	39
	11	65	65	65	64	63	62	61	59	56	52	47	39	39
	16	65	65	65	64	63	62	61	59	56	52	47	39	39

NOTE: When the sun is rising, the angle is reckoned from East to North.
When the sun is setting, the angle is reckoned from West to North.

Figure 10: Azimuth of Rising and Setting Sun

For example, if the time is 9 AM, the sun would be 3 hours from noon and therefore 45 degrees (3 × 15) from its highest point. Measure the resulting angle along the sun's path, projecting where the sun will be at noon (or where it was, if the hour is past noon). This navigation technique also uses azimuth.

The appropriate phrase sequence is **STATUS** (note the time)/**LOOK SUN**. Now project the position of the sun at noon (either left or right of your present position). **PAN (LEFT or RIGHT)** until you are facing in the projected position. If you are at a latitude above 23.4 degrees north, you are facing south (an

azimuth of 180 degrees). If you are at a latitude below 23.4 degrees south, you are facing north (an azimuth of 0 degrees). For tropical latitudes, consult the chart on page 26.

You can use your watch as a navigation instrument in another way. This method is not reliable during the hours near sunrise or sunset, so use it only between 9 AM and 3 PM. Hold the watch level to the ground and align the hour hand with the sun. If you are at a latitude above 23.4 degrees north, the direction midway between the hour hand and 12 is approximately south (or an azimuth of 180 degrees). If you are at a latitude below 23.4 degrees south, align the 12 with the sun. The direction midway between the hour hand and 12 is approximately north (or an azimuth of 0 degree). The appropriate phrase sequence is **USE WATCH/LOOK AZIMUTH** (or **AZ**) or **LOOK** (compass point)/[N] (answer no)/(type in degrees). For tropical latitudes, consult the chart on page 26.

SUN: You can use the sun's direction at sunrise or sunset to establish your position if you know your approximate latitude (displayed on the topo map) and the date (use the table on page 26). This method requires no time calculations and is quite accurate. For example, if you are at a 40-degree North latitude and the month is October, the sun's azimuth at sunrise varies from 94 degrees (at the beginning of the month) to 106 degrees (at the end of the month). These values are correct for a 40-degree south latitude as well, though the time of sunrise will be different.

ALTIMETER: To use the altimeter, you must have it among your supplies. The altimeter measures altitude above sea level and is accurate to within 200 feet. You cannot calibrate this altimeter (as would be necessary in an actual wilderness journey). By itself, an altimeter is not a particularly effective navigation instrument. It can indicate that you are somewhere along one of the constant-altitude contour lines on the topo map, but these lines can run for many miles. Therefore, you must use the altitude reading in conjunction with other directional or visual clues to locate your present position. To employ this navigation technique, type **STATUS** to get the **STATUS** screen and find your altitude. Correlate your position with the contour lines on the topo map.

Navigating by the Stars

Direction From Polaris. In the Northern Hemisphere, one star, Polaris (the Pole Star), is never more than approximately 1 degree from the Celestial North Pole. In other words, the line from any observer in the Northern Hemisphere to the Pole Star is never more than 1 degree away from the true north. Find the Pole Star by locating the Big Dipper or Cassiopeia (Little Dipper), two groups of stars that are close to the Celestial North Pole. The two stars on the outer edge of the Big Dipper bowl are called pointers, since they point almost directly to Polaris, the bright star at the handle tip of the Little Dipper. Polaris is five times the distance between these pointer stars, measured on a straight line connecting the pointers and extended toward the Little Dipper. If the pointers are obscured by clouds, Polaris also can be identified by its relationship to the constellation Cassiopeia. Figure 11 indicates the relation between the Big Dipper, Polaris, and Cassiopeia.

Figure 11: Relationship of Polaris to the Big Dipper and Cassiopeia

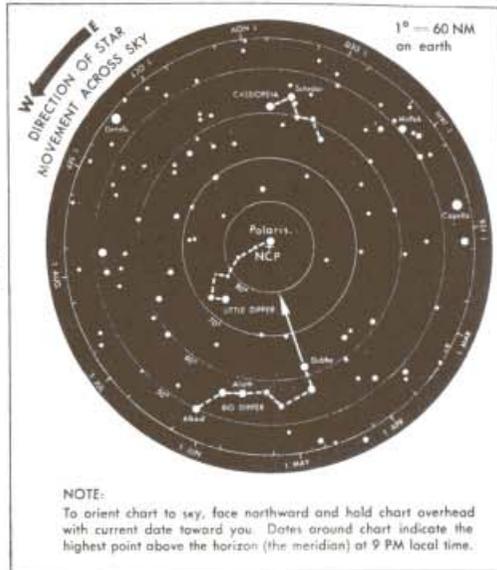
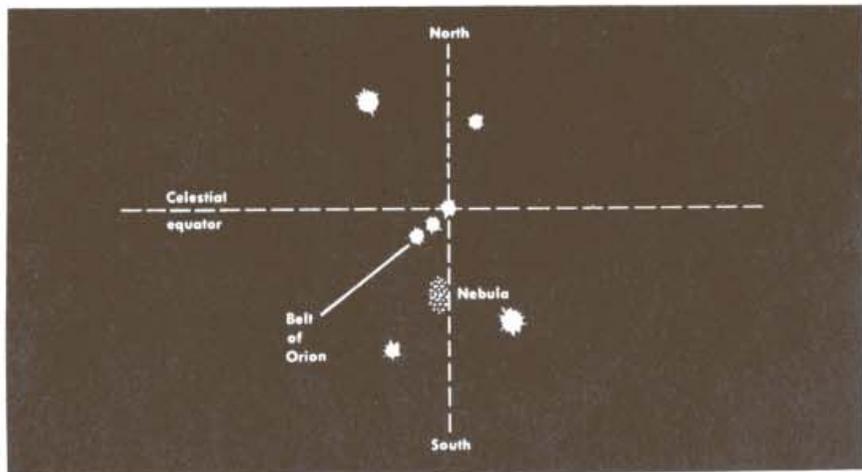


Figure 12: Seven Stars in Orion



Direction From Orion. The constellation of Orion consists of seven stars. The three close together are called the Belt of Orion. The star through which the north-south line on the diagram in figure 12 passes is exactly on the Celestial Equator. No matter where on earth you are, this star rises due east of you and sets due west.

Direction from the Southern Cross. In the Southern Hemisphere, Polaris is not visible. There the Southern Cross is the most distinctive constellation. An imaginary line through the long axis of the Southern Cross, or True Cross, points toward the South Pole. The True Cross should not be confused with a larger

cross nearby known as the False Cross, which is less bright and more widely spaced. Two of the stars in the True Cross are among the brightest stars in the heavens; they are the stars on the southern and eastern arms. The stars on the northern and western arms are not as conspicuous, but they are bright.

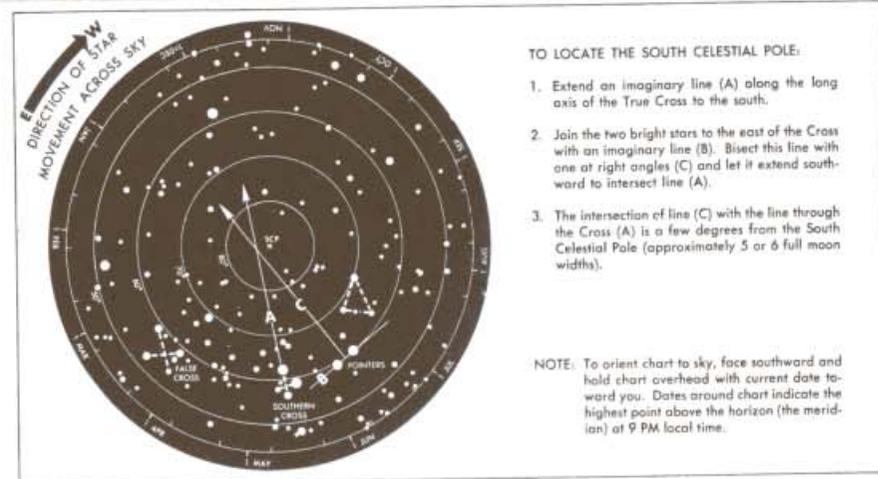


Figure 13: Southern Cross

There is no conspicuous star above the South Pole to correspond to Polaris above the North Pole. In fact, the point where such a star would be, if one existed, lies in a region devoid of stars. This point is so dark in comparison with the rest of the sky that it is known as the Coal Sack.

Figure 13 shows the True Cross and, to the west of it, the False Cross. For realism, hold the page above your head and note two very bright stars just to the east of the True Cross. With them and the True Cross as guides, you can locate, within the Coal Sack, the spot that is above the South Pole.

First, extend an imaginary line along the long axis of the True Cross to the south. Join the two bright stars to the east of the Cross with an imaginary line. Bisect this line with a line at right angles. The intersection of this line with the line through the Cross is near the point above the South Pole.

Armed with this information on finding direction, you are ready to begin your travels. Before heading off into the wilds, check your campsite. Make sure that you have packed all your supplies. Don't forget to **CARRY BACKPACK**, or the backpack and everything in it will be left behind. Remember that you travel in the direction in which you are facing and that your rate of travel is affected by many things, including the weight you are carrying, the slope of the ground, your health and energy, and terrain.

This last factor influences the equipment you need and the vocabulary you use when traversing the *Wilderness* environment. You must contend with five varieties of terrain; each can be identified from information on the **VIEW** screen, the topo map, and the **STATUS** screen.

Moderate Terrain: Fairly level ground requiring no special equipment for average progress. The following vocabulary words are appropriate to use in these conditions. (Indicate your travel time in hours or parts of an hour when the prompt appears at the bottom of the screen.)

WALK: travel at about 2 to 3 mph. **WALK** also can be used on frozen lakes.

RUN: travel at about 6 to 10 mph. Speed depends on your physical condition, the weight you are carrying, the slope and type of terrain, and weather conditions.

CRAWL: travel at less than 1 mph. If you have a broken leg and no splint, crawl is the only way you can move.

WAIT: causes (the indicated) time to pass. The movement of the sun, changing weather conditions, hunger, thirst, and all other things affected by time take place. **WAITING** is useful in situations such as estimating time from the passage of the sun, sitting out severe storms, and avoiding encounters with dangerous wildlife.

Snow: During heavy snowstorms or in high-altitude alpine locations, making progress over soft, deep snow can be difficult. Snowshoes can improve your rate of travel. To make use of this special equipment, type **USE SNOWSHOES/WALK**.

Rocky or Icy Slopes: To speed your progress up or down dangerous mountain faces and to lessen the dangers of hazardous conditions, **CLIMB** with the aid of several kinds of climbing gear. Using a **FLASHLIGHT** at night lets you travel more quickly.

AXE: standard ice axe used for winter mountain climbing. Use the phrase sequence **USE AXE/CLIMB**.

CRAMPONS: metal claws that attach to boots or shoes for more secure footing in packed snow or ice. Use the phrase sequence **USE CRAMPONS/CLIMB**.

ROPE: a 50-foot length of nylon climbing rope. If a rope was not available in the original inventory list, or if you neglected to pack one, you can make a rope out of available materials with the phrase **MAKE ROPE**. Once you have the rope, you can use it by typing **USE ROPE/CLIMB**.

PITONS (and carabiners): metal spikes with eyes through which oblong rings (carabiners) are fitted to carry a rope. You must have a **ROPE** in order to use these climbing aids. Use the phrase sequence **USE PITONS/USE ROPE/CLIMB**.

Shorelines: Unlike other *Wilderness* terrains, shore travel follows the course of the lake or river, not a straight line. If you find yourself at the edge of a body of water (you can hear running water if you are within 0.6 mile of a river), orient your field of view so that you are **LOOKING** along the banks, parallel to the water course. You can use any of the vocabulary words appropriate for travel over moderate terrain.

Lakes and Rivers: If you want to cross a lake or river, you can **SWIM** or **ROW** across in a **RAFT** instead of traveling along its banks. You can have brought the

raft with you, or you can build it from raw materials. Since you always move in the direction in which you are facing, orient your field of view so that you are **LOOKING** across the river to its opposite bank. To accomplish the crossing you can:

SWIM: travel through water at about 1 mph. You can swim downriver at the speed of the current by replying **YES ([Y])** to the appropriate prompt.

ROW: travel over water at about 1 to 1.5 mph. Before you can row, you need a **RAFT**. If you have a commercial one, an inflatable rubber raft that can support 350 lbs, type **USE RAFT/ROW**. If you didn't take a raft with you build one from heavy logs and rope by typing **(USE AXE)/MAKE RAFT**. If you don't have an axe, you might take up to 8 hours to build a raft. Now you can type **USE RAFT/ROW**. Your makeshift raft is too heavy to carry; you cannot take it with you on your journey.

Constructing a means of traveling across water may seem like unnecessary work, but it does afford some protection from dangerous water creatures (crocodiles and poisonous snakes) and treacherous conditions. Some locations are unnavigable and should be avoided when looking for a place to ford a river. Drowning is a real danger.

Following every travel command, you are asked to indicate the number of hours to be traveled. Travel time can be expressed in tenths or hundredths of an hour (eg, 2, 1.4, 5.25). Your journey continues for the amount of time you indicate unless something occurs to stop you. You can be interrupted by several different categories of events in *Wilderness*. They include:

Fire: You cannot leave your campsite until you have extinguished your campfire. Type **DOUSE FIRE**.

Wild Food Sources: During your journey, you are notified of the presence of possible sources of nourishment. These can be **NUTS, LEAFY PLANTS, CACTI, SMALL GAME, FISH, INSECTS, MUSHROOMS, or FRUIT**. All are useful in supplementing the food you packed from the inventory list. You should be cautious when considering any of these foods. Check for signs of possible toxins and spoilage by **TASTEING**.

If you do not want to be stopped for investigating these sources of nutrition, type **IGNORE FOOD** before you set out. To again be alerted to the presence of food sources, type **FIND FOOD**.

Changes in Weather Conditions: Your journey is stopped at the onset of rain, snowstorms, or fog. Use the information to consider the situation and take the appropriate action. You might want to take shelter from a heavy downpour, or break out the snowshoes during a snowstorm. If weather conditions make travel hazardous, your best bet may be to **WAIT** it out in a nearby shelter. By typing **NATURE**, you can change the frequency of storms during a journey.

Changes in Terrain: You are notified whenever you move into new terrain. Each kind of landscape holds advantages and disadvantages for the solo traveler. You should be prepared for:

WOODS or JUNGLE: these appear as shaded areas on the topo map with scale magnification. Though surrounding trees limit your viewing distance, woods and jungles are excellent places for finding small game, wild plants, and insects for food; water for washing, cooking, and drinking;

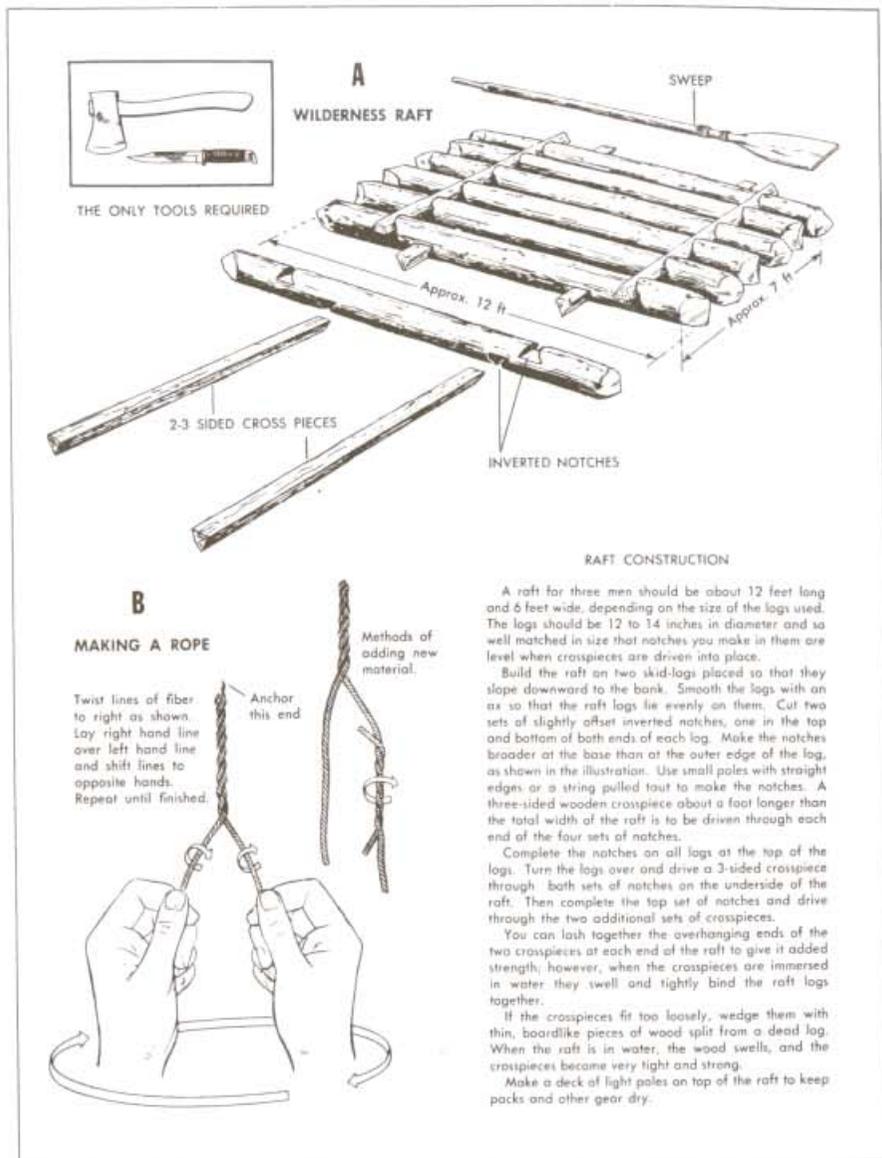
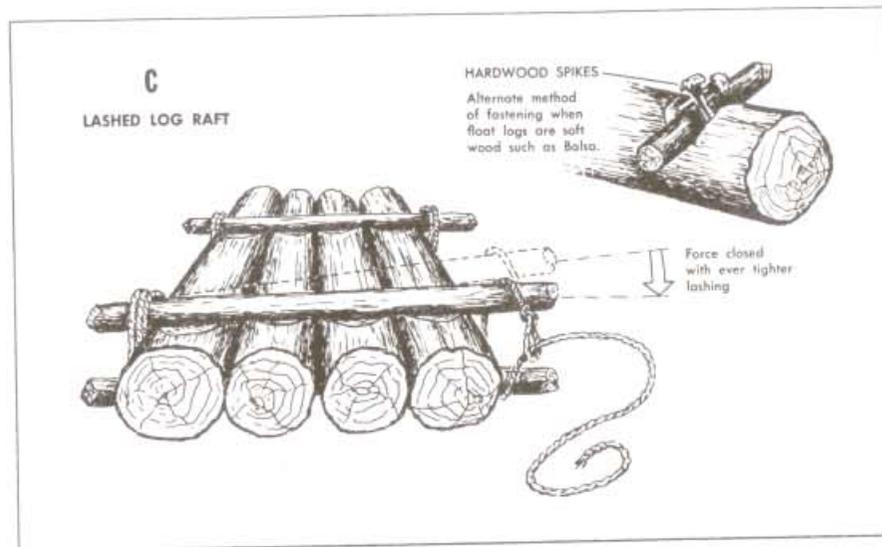


Figure 14 and 15 (next page): Constructing a Raft

wood for making fires; natural shelters; and raw materials for improvising needed implements. Unfortunately, they are also hospitable locations for potentially dangerous wildlife, and breeding grounds for disease-carrying insects.



RIVERS and LAKES: these require some ingenuity if you are to travel by water or are to cross with your supplies and your life. Some shore locations are unnavigable; attempting a crossing could result in being drowned. Bodies of water contain dangerous wildlife (crocodiles, water pythons, and anacondas). Notwithstanding the dangers, water courses are a swift means of travel if you make use of the current, and they obviously provide water for washing, cooking, and drinking. Fish, a superior protein-rich food, abound; and small game and vegetation often provide food sources.

SCRUB: these are areas covered with low-growing trees or shrubs, typical of temperate regions at altitudes above 11,000 ft and of tropical regions at altitudes above 5,000 ft. This inhospitable terrain may be the home of potentially dangerous animals including grizzly bears, cougars, timber wolves, and pumas. However, the high elevation affords a good vantage point from which to view the surrounding area for long distances.

ROCKY: this is difficult, hazardous mountain terrain. Unless you are an expert mountaineer, it's best to avoid travel on this type of ground.

Changes in Health: As you travel through *Wilderness*, you may be notified of some alteration or deterioration in your physical condition. Your journey is not automatically stopped, but you can press [ESC] to stop traveling in order to diagnose the problem. Use this information to take the appropriate actions, which could include putting on or taking off clothes, attending to the symptoms of an injury or illness, taking medication for a disease, resting to regain energy, or eating or drinking to regain lost nutrients and fluid.

Discarded Items: During your journey, you may leave some of your supplies at a campsite, discard some equipment or clothing, or forget to pack a tool or weapon. These objects remain where you leave them. If you return to a pre-

vious location (whether intentionally or accidentally), you are notified that **THERE IS A PREVIOUSLY DROPPED ITEM HERE**. Use your **INVENTORY** screen to identify the object you have stumbled on.

Wildlife Encounters: Depending on the geographic area in which you are traveling, you might come across several different species of wildlife. These can be dangerous if you do not use the proper tactics in dealing with them. Some animals can be seen only when you are looking down. When you encounter one of these, your view automatically shifts to 45 degrees below horizontal. Wildlife habitats, feeding patterns, size and weight statistics, and other helpful information appear in detail in Chapter 7, and in Appendix B: Vocabulary. By typing **NATURE**, you can change the frequency of encounters with wildlife during a journey.

Available Shelters: Five varieties of ready-made shelters are available in *Wilderness*. You are alerted to their presence when you are within 0.2 mile of their location. These shelters include the plane wreckage, the Lost City, the ranger outpost, and two natural shelters. For a description and building instructions regarding manmade shelters, see Chapter 4.

Artifacts (Archeological Expedition): As you search for the Lost City of Gold, you may stumble upon the artifacts of an ancient civilization. These archeological finds include a skeleton, a few shards of pottery, and a burial ground.

Nearing a Structure: You are alerted when you are within 0.6 mile of the ranger outpost, the Lost City, or the airplane. When notified that one of these structures is in your vicinity, **PAN** until the structure is in the center of your field of view before heading towards it.

Reaching Your Destination: When you reach your destination (having traveled from the crash site to the ranger outpost, or have returned to the outpost with the statue found in the Lost City of Gold), you receive a final performance evaluation.

Your final score of _____ points makes you a _____.

The evaluation is made up of a point score and a rating. Scores range from zero to a perfect 1,000; ratings include MERE TENDERFOOT, WEEKEND HIKER, GOOD SCOUT, SUPERB RANGER, and EXPERT EXPLORER. You do not receive an evaluation in Research Mode.

Edge of Map: Though a real wilderness area has only civilization as its boundaries, the area in which you can travel in *Wilderness* is restricted to a 90 × 67 mile rectangle. You are notified when you have come to one of the area edges.

Time Restrictions: *Wilderness* travel is in 0.4-mile increments. If you cannot travel 0.2 mile (halfway through the next segment) in the travel time you specified, your travel time is cut short. For example, if your original travel time was 1 hour and you have been traveling for 55 minutes, you are stopped if another 0.2 mile cannot be traveled in the next 5 minutes.

SETTING UP CAMP

To avoid exhaustion and maintain maximum fitness, you should make camp at appropriate intervals in your journey. The kind of shelter you make depends on whether you need protection from rain, cold, heat, sun, or insects; whether you plan on staying in one location for a single day or for an extended period; and whether manmade or natural materials are available in your area. Practical shelters for all conditions are shown in figures 16 and 17.

Select your campsite location carefully. Avoid the base of steep slopes or areas in which you run the risk of avalanches, floods, rockfalls, or punishing winds. In mountain areas during the summer, you'll need protection from rain and insects. Choose a site near water and timber but on high, dry ground. A good location is a ridge top or lake shore. If you find yourself in the tropics, select a knoll or high ground away from swamps for your campsite. You'll be bothered less by mosquitoes, the ground will be drier, and there will be more chance of a breeze.

Once you've chosen a location for your camp, you must make a shelter for protection against the elements. Don't forget to **DROP BACKPACK** before you begin working. The weight of the backpack and its contents will make activities more difficult. Six kinds of shelters can be used in *Wilderness*: one that is often supplied in the inventory list, five that can be constructed or that occur naturally, and three that serve other purposes in the adventure. They are:

Tent: A commercial waterproof nylon tent protects against rain, snow, high winds, and cold. To use the tent, simply type **MAKE CAMP**. This phrase sets up your tent, arranges your supplies (this takes 30 minutes of the indicated time) and lets you sleep for the rest of the time period indicated. For example, if you typed **MAKE CAMP** and then indicated 3 as the number of hours, you would benefit from 2½ hours of rest. If you don't have a tent, **MAKE CAMP** puts you in any empty shelter within 0.2 of a mile from your location.

Trench: This is the simplest of outdoor shelters, warm and relatively waterproof. Construction requires that you dig a "trench grave" and then cover it with branches or waterproof gear such as the ground **COVER** or **RAINCOAT** (both available in the starting inventory). You can make a trench in less time if you use an axe in daylight or a flashlight at night. Use the phrase sequence (**USE AXE**)/(**USE FLASHLIGHT**)/**MAKE TRENCH**/**DROP RAINCOAT** (or **COVER** or **PAD**)/**ENTER** (or **USE**) **TRENCH**.

Hut: This crude wooden shelter provides protection from wet and cold weather. For construction of a hut, trees, branches, and grasses must be avail-

able in the immediate area. You can make a hut more quickly if you use an axe during daylight or a flashlight at night. Use the phrase sequence **(USE AXE)/ (USE FLASHLIGHT)/ MAKE HUT/ ENTER** (or **USE**) **HUT**.

Igloo: This shelter takes time to construct, although use of an axe during daylight or a flashlight at night hastens the task. The igloo provides excellent protection from cold, wind, and snow and is probably the best shelter in alpine or arctic conditions. The temperature inside an igloo can be several degrees above freezing, regardless of the outside temperature. To construct an igloo, use the phrase sequence **(USE AXE)/ (USE FLASHLIGHT)/ MAKE IGLOO/ ENTER** (or **USE**) **IGLOO**.

Rock Shelter: This is a natural shelter found in rocky terrain, affording protection from the elements. You are alerted to the presence of a rock shelter when you are within 0.2 of a mile from one. To make use of this shelter, type **ENTER** (or **USE**) **SHELTER**.

Wood Shelter: This is a natural shelter found in forests or jungles providing some protection from weather and sun. You are notified that you are near a wood shelter when you are within 0.2 of a mile from one. To make use of this shelter, type **ENTER** (or **USE**) **SHELTER**.

Airplane: the wreckage at the crash site can be used as shelter. Make your fire outside and at a safe distance from the airplane to prevent carbon monoxide poisoning. To use the plane as shelter, type **ENTER** (or **USE**) **AIRPLANE**.

Ranger Outpost: If you are within 0.2 mile from the outpost, you can use the structure as shelter from the elements. Type **ENTER** (or **USE**) **OUTPOST**.

City: If circumstances require that you seek shelter when you are near (within 0.2 mile) the Lost City of Gold, you can use it by typing **ENTER** (or **USE**) **CITY**.

A tepee made from your parachute is a fine shelter for drizzly weather and protection against insects. In it, you can cook, eat, sleep, dress, and make signals—all without going outdoors. Use six panels of parachute for a two-man shelter; twelve to fourteen panels for a three-man shelter. The method of construction is shown in figure 16. This shelter is worth building if you decide to stay in one place for some time.

In timbered country, a lean-to is a good winter shelter. A three-man type is shown in figure 16. Lay the covering boughs shingle fashion, starting from the bottom. If you have a canvas, use it for the roof. Close the ends with fabric or boughs. Note the arrangement of the fire.

Keep the front openings of all shelters crosswind. A windbreak of snow or ice blocks set close to the shelter is helpful. In making shelters, remember that snow is a good insulator. In timberless country, make a simple snow cave or burrow by digging into the side of a snowdrift and lining the hole with grass, brush, or a tarpaulin. Snow caves must be ventilated. If the snow isn't deep enough to support a roof, dig a trench in a drift and roof it with snow blocks, a tarpaulin, or other materials.

Don't build a shelter under large trees or under trees with dead limbs. They can fall and wreck your camp or hurt you. Don't sleep or build a shelter under a coconut tree.

You can make a good rain shelter by covering an A-framework with a good thickness of palm or other broad leaves, pieces of bark, or mats of grass. Lay

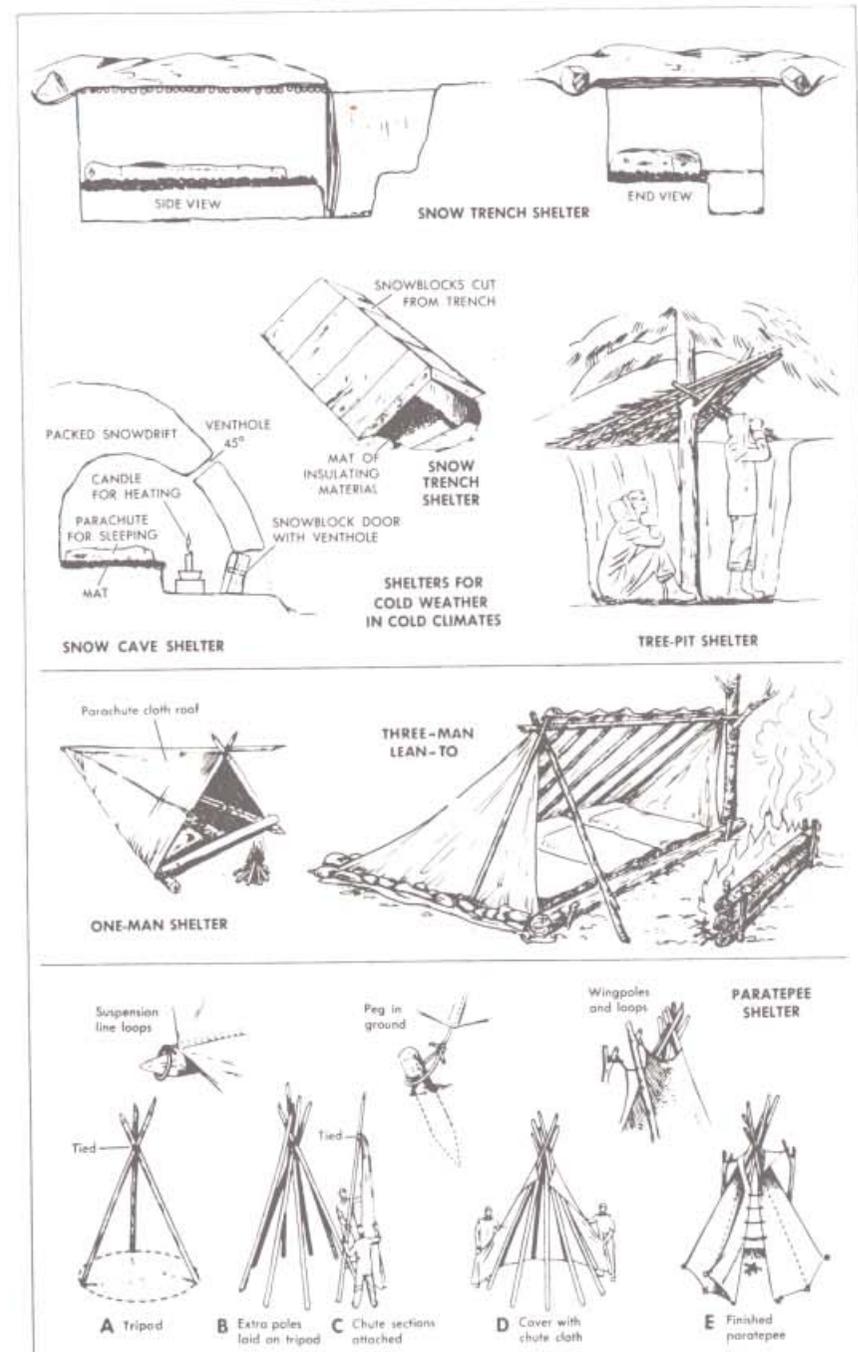


Figure 16: Arctic Shelters

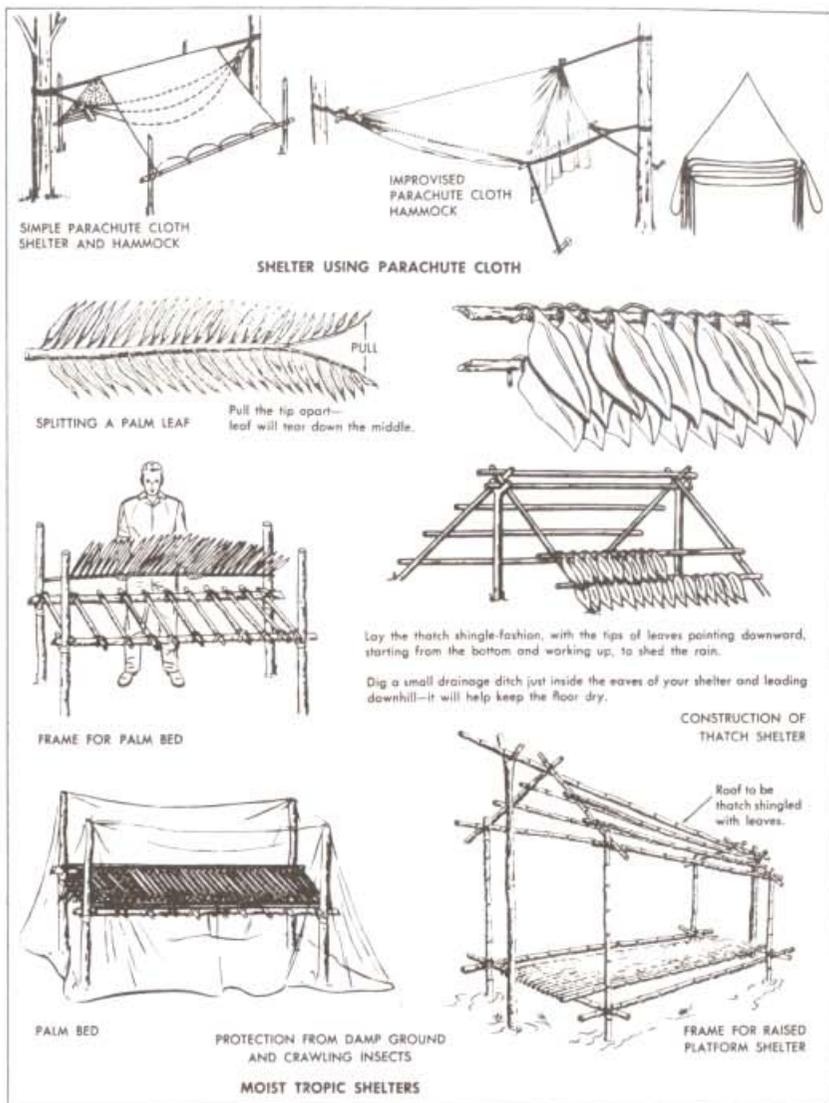


Figure 17: Tropic Shelters

the thatch shingle-fashion, with the tips of the leaves pointing downward, starting from the bottom and working up, so it will shed rain.

Once you have found or constructed a shelter, you can set up your campsite for warmth, cooking, and sleeping. If you have a sleeping **BAG** with you, unroll it by typing **DROP BAG**. Avoid sleeping directly on the bare ground, especially in wet or snow-covered areas. To provide some insulation, place your plastic

ground **COVER**, the **RAINCOAT**, or ensol **PAD** between the ground and your sleeping **BAG** by using the phrase sequence **DROP COVER** (or **RAINCOAT** or **PAD**) / **DROP BAG**. When you're ready for sleep, type **ENTER** (or **USE**) **BAG**.

Keep your sleeping bag clean, dry, and fluffed up to give maximum warmth. To dry the bag, turn it inside out, beat out frost, and warm it in front of the fire. Be careful not to burn it. Wear only dry clothes to bed. Keep them loose. Turn over, rather than in, the sleeping bag.

The human body requires 6 to 8 hours of sleep in a 24-hour period to maintain fitness and an acceptable energy level. You should check the **STATUS** screen at regular intervals to keep track of your physical condition. Guard against exhaustion by **SLEEPing** or **RESTing** when you need it.

Your equipment and supplies can be your lifeline in many situations. Take care of them. If you are in a wooded area, it's a good idea to **HANG FOOD** to keep it out of the reach of small game and wildlife.



Figure 18: Using an Axe

Your cutting tools are important aids to survival in any environment. For best results, use them and care for them properly. When you use an axe, don't try to cut through a tree with one blow. Rhythm and aim are more important than force. Too much power behind a swing interferes with your aim. When the axe is swung properly, its weight will provide all the power you need. Before chopping, clear away all obstructions. A branch, vine, or bush can deflect an axe onto your foot or leg. Remember—an axe can be a wicked weapon. Figure 18 shows you how to use it safely.

A typical phrase sequence that encompasses all the activities that are part of setting up a campsite is:

DROP BACKPACK
HANG FOOD
USE FLASHLIGHT
USE AXE
MAKE HUT (or other shelter)
ENTER HUT (or other shelter)
DROP PAD (or **RAINCOAT** or **COVER**)
DROP BAG
ENTER BAG
SLEEP

Once you have made yourself at home inside a shelter of any sort, you cannot **LOOK** or **PAN**. Don't forget to **LEAVE** sleeping **BAG**, then your shelter, before trying to break camp.

When you're alone in the wilderness, you can forget about basic daily personal maintenance. Be sure to establish a routine that will help prevent infection and physical deterioration, and protect you from all forms of exposure to the weather.

General Survival Tips

Keeping well is especially important when you are stranded on your own. Your physical condition will have a lot to do with your coming out safely. Protecting yourself against heat and cold, and knowing how to find water and food are important to your health. But you should follow some basic rules:

1. Drink enough water to avoid dehydration. If water is scarce or hard to get, avoid excessive dehydration from sweating.
2. Save your strength. Avoid fatigue. Get enough sleep.
3. Take care of your feet. Your feet are important, especially if you are going to walk to safety. Examine your feet when you first stop to see if there are any red spots or blisters. Apply adhesive tape smoothly on your skin where shoes rub.
4. Guard against skin infection. Your skin is the first line of defense against infection. Use an antiseptic on even the smallest scratch, cut, or insect bite; these are apt to get seriously infected, especially in the tropics.
5. Guard against intestinal sickness, which can be caused by change of water and food, contaminated water or spoiled food, excess fatigue, overeating in hot weather, or using dirty dishes. Purify all water used for drinking, either by iodine tablets or by boiling. Cook the plants you eat, or wash them carefully with purified water. Make a habit of personal cleanliness; wash your hands with soap and water, if possible, before eating.
6. In mountain areas, the chief danger is freezing. Snowblindness and carbon monoxide poisoning are secondary dangers. Keep your face, ears, nose, wrists, hands, and feet warm and dry. Good circulation is important; don't restrict it by tight clothing. Avoid sweating, it can lead to freezing. Keep out of the wind. Don't touch cold metal with your bare skin; you'll freeze to the metal and tear away the skin. Tape tool handles, gun triggers, and metal parts of eyeglasses.

Wear clothing properly to keep warm and dry. Insulation combined with body heat is the secret of warmth. Insulation is largely determined by the combined thickness of all the garments worn. Your outer clothing should be windproof.

When exerting yourself, reduce sweating by opening your clothes at the neck and wrists, and by loosening it at the waist. If you're still warm, slow down or take off a layer or two of outer clothing. When you stop work, put your clothes on again to prevent chilling.

Think twice before you discard any clothing. Clothing used properly can keep you cool as well as warm. It protects you against sunburn, insects, pests, and scratches. Try to keep your clothing clean and in repair. Clean clothes insulate better than dirty clothes and they last longer. Try to keep your clothing and shoes dry; use a drying rack in front of a fire. If trees are in your area, you can **HANG** your wet clothing up to dry. Don't put your wet shoes too close to the fire or they will stiffen and crack.

7. In the arctic, you can get badly sunburned, even on foggy or overcast days. Cover up in bright sunlight. Use sunscreen.
8. In the tropics, keep your body covered to prevent malaria-carrying mosquitoes and other pests from biting you; protect your skin against infections caused by scratches from thorns or sharp grasses; prevent sunburn in open country. Wear long pants, and shirts with sleeves rolled down. Bind pant legs snugly around boot tops, or tuck your pants in the tops of your socks and tie them securely. Wear a mosquito headnet or tie an undershirt or tee shirt around your head, especially at dawn and dusk. In open country or in high-grass country, wear a neckcloth or an improvised head covering for protection from sunburn and dust (figure 19). Move carefully through high grass; some sharp-edged grasses can cut your clothing to shreds.

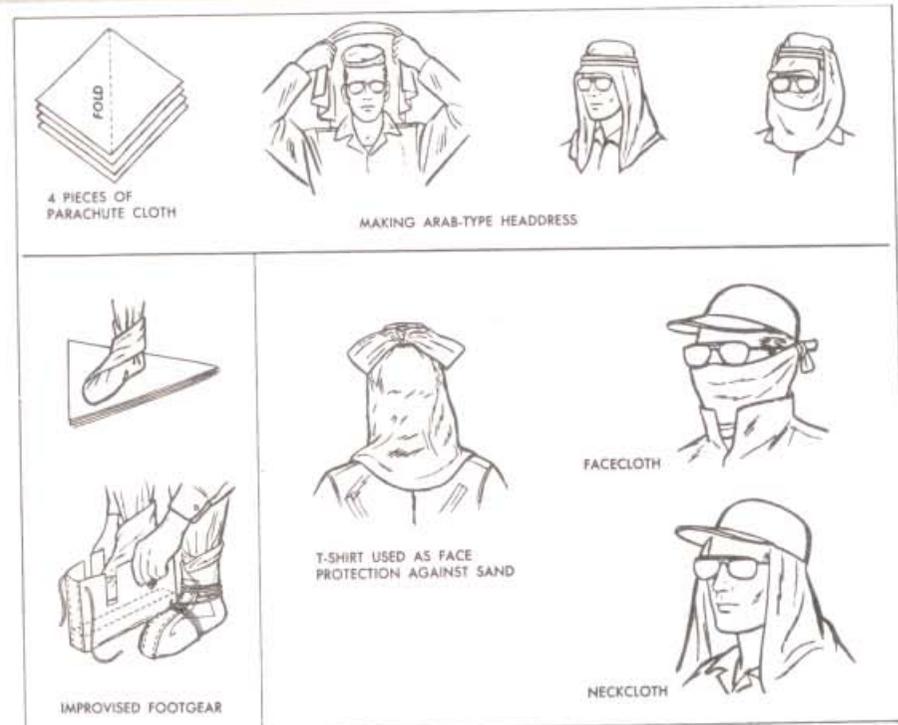


Figure 19: Making an Arab-style Headdress

Building a Fire

Building a fire is a survival technique that must be practiced with care and attention to detail. You need a fire for warmth, for keeping dry, for cooking, and for purifying water and detoxifying potentially poisonous wild plants.

To build a fire in *Wilderness*, you can use either **MATCHES** or a camp **STOVE** and **FUEL**. Use the phrase sequence **USE MATCHES/MAKE FIRE** or **USE FUEL/USE MATCHES/USE STOVE**. In dry, fair weather, you usually need only one match to start a fire. In wet or windy weather, you might need more than one match. To conserve this precious commodity, you may want to **USE FUEL** before trying to **USE MATCHES** to ensure a flame.

If you neglected to pack matches from the original inventory, you can start a fire by **MAKING** fire **STICKS** and rubbing them together (friction) to create a spark. Since this is very difficult to master, you should practice doing it before you need it. Use the phrase sequence **(USE KNIFE)/MAKE STICKS/USE STICKS/MAKE FIRE**. You can also **USE** a magnifying **GLASS** to start a fire when the sky is clear and the sun is above a 30-degree angle of elevation. Use the phrase sequence **USE GLASS/MAKE FIRE**. Type **USE FIRE** to warm yourself. Once your fire is going, you can use it for warmth, for cooking, and for boiling water until you **DOUSE FIRE**. You don't have to type **USE FIRE** for each activity.

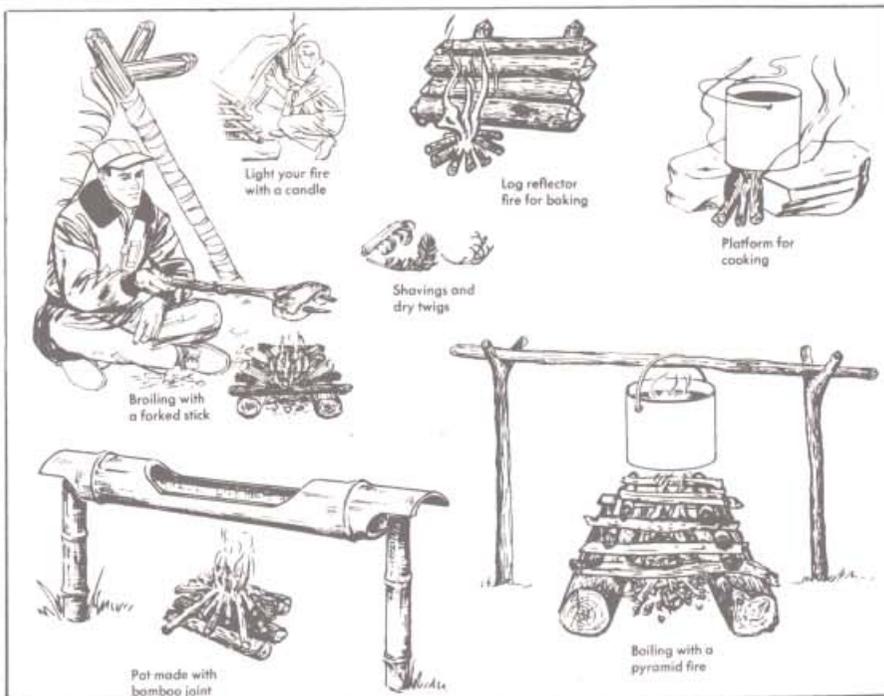


Figure 20: Types of Fires

Fire-Building Tips

1. Don't waste matches trying to start a poorly prepared fire. Don't use matches for lighting cigarettes; get a light from your fire or use a magnifying glass. Don't build unnecessary fires; save your fuel. Before all your matches are gone, practice primitive methods of making fires.
2. Carry dry tinder with you in a waterproof container. Expose it to the sun on dry days. Add a little powdered charcoal to improve it. Collect good tinder wherever you find it.
3. Collect kindling along the trail before you make camp. Keep firewood dry under a shelter. Dry damp wood near your fire so that you can use it later. Save some of your best kindling and fuel for quick fire-making in the morning.
4. To split logs, whittle hardwood wedges and drive them into cracks in the logs with a rock or club; split wood burns more easily.
5. To make a fire last overnight, place large logs over it so that the fire will burn into the heart of the logs. When a good bed of coals has been formed, cover it lightly with ashes and then dry earth. In the morning, the fire will still be smoldering.
6. Don't waste fire-making materials. Use only what is necessary to start a fire and keep it going for the purpose at hand. Put out the fire when you leave your campsite.
7. In mountain areas, don't build a fire under a snow-covered tree; snow can fall and put out the fire. Low, dead, needle-bearing branches of standing spruce trees are good fuel. On the tundra, wood is scarce; look for woody bushes or shrubs and burn the roots as well as the stems. Look for dry grasses or for dry twigs in willow thickets. On coastlines, look for driftwood.
8. To discourage mosquitoes, throw green leaves on a fire to make a smudge.
9. Keep spare wood dry by stowing it in your shelter. Dry out wet kindling and fuel near your fire for future use.

FOOD AND WATER

If you are stranded in a remote area, you must maintain health and stamina; it can make the difference between coping with arduous circumstances and succumbing to the perils of the wilds. Therefore, nutrition and the food sources that supply basic nutritional requirements are particularly important.

Wilderness assumes that peak performance requires at least 2,000 calories a day. If you consume much less than this amount, you eventually feel the effects of starvation. Though lack of food will not lead to death within a month, your physical condition will deteriorate and your stamina will diminish. Both result in slowed reflexes, weakness, and slower travel time.

Several food sources are available during your journey. They fall into three general categories: foods available from the original inventory list; wild plants; and game (including insects, fish, and wildlife). Below is a complete list of all possible commercial foods contained in the initial inventory. Each is listed with its maximum weight, maximum volume, calorie count, water content, and spoilage rate. To ensure a balanced diet, consult the Food Requirements information in this chapter, page 58.

FOOD	WT (OZ)	VOLUME (in 3)	CAL/OZ	WATER CONTENT	SPOILAGE AT 65°
APPLES	80	160	13	HIGH	7 DAYS
BACÓN*	16	16	125	NONE	NONE
BEANS	80	160	35	MED	36 HOURS
BOLOGNA	48	48	80	MED	24 HOURS
BREAD	32	96	70	LOW	3 DAYS
CANDY BARS	16	16	141	LOW	21 DAYS
CARROTS*	16	16	100	NONE	NONE
CHEESE	48	96	110	LOW	3 DAYS
EGGS*	16	16	168	NONE	NONE
NUTS**	48	48	160	NONE	NONE
PEAS*	32	32	93	NONE	NONE
POTATOES	80	160	100	LOW	10 DAYS
RAISINS	24	24	81	LOW	NONE
RICE	48	96	110	NONE	NONE
TUNA (canned)	16	32	47	HIGH	12 HOURS (exposed)

*freeze dried

**wild or commercial

If you have been in the wilderness for a long time or if you failed to pack an adequate supply of food, you can supplement your diet by living off the land.

It's a good idea to take advantage of wild food sources and conserve your supplies for emergencies.

Learn to overcome your prejudices; foods that may not look appetizing to you are often part of the natives' regular diet. Wild foods are most often high in vitamin and mineral content. Fleshy-leaved plants make good salad greens; fresh fruits provide fluid when water supplies are low.

You should be able to find something to eat wherever you are. One of the best hunting grounds for survival food is along the seacoast, between the high and low water marks. Other likely spots are the area between the beach and a coral reef; marshes, mud flats, or mangrove swamps where rivers flow into the ocean or into a larger river; river banks, meadows, and protected mountain slopes. The poorest of nature's pantries are high mountain tops and dry ridges.

Wild plant foods available in *Wilderness* include:

FOOD	CAL/ OZ	WATER CONTENT	SPOILAGE AT 65°	COMMENTS
CACTI	25	HIGH	4 days	Generally safe, but check for bitter taste
FRUIT	30	HIGH	3 days	Includes berries; could be toxic
MUSHROOMS	25	HIGH	2 days	Risky and difficult to distinguish toxic from non-toxic
NUTS	160	NONE	NONE	Generally safe, but check for bitter taste
PLANTS	10	HIGH	5 days	Beware of milky sap, silky windborne seeds, unpleasant taste

Whenever you are in the vicinity of wild plants or game, you are told that they are nearby (unless you have eliminated the notification by typing **IGNORE FOOD**). It's a good idea to **TASTE** local flora before consuming large quantities. A bitter taste, like that of bitter almonds, is a good indicator of toxicity. Mushrooms can be deadly. Therefore, unless no other food is available and the symptoms of starvation are extreme, you're better off avoiding them.

Some plant toxins (identified by a bitter taste) can be made harmless by cooking; others (which produce a sharp stinging sensation) cannot. You can accomplish detoxification by typing **COOK PLANTS**. Cooking is also useful in delaying spoilage of wild foods. See page 42 for instructions on fire building, and on food preparation.

Plant Foods

At least 300,000 different kinds of wild plants are available throughout the world. A large number of them are potentially edible, although some are more tasty and palatable than others. Under survival conditions, your diet will be changed or controlled by the kinds of wild plants and animals available for food. Since plants are more plentiful than animals, use them all you can.

You should have some practical knowledge of where wild plants, edible and poisonous, grow, and how you can use them. Very few are deadly when eaten in small quantities (see edibility rules below). Complete descriptions of all the

wild food plants are beyond the scope of this manual; therefore, the information here is limited to a general discussion of classes of food plants, with illustrations of several representative types.

Edibility Rules

1. Never eat large quantities of a strange plant food without first testing it. A disagreeable taste in an item that is otherwise safe to eat, can sometimes be removed by pouring cold or hot water through the chopped, crushed, or ground material, or by cooking it.
2. In general, it is safe to try foods that you see being eaten by birds and mammals, but there are some exceptions. Foods eaten by rodents, monkeys, baboons, bears, raccoons, and various other omnivorous animals usually are safe.
3. Cook all plant foods when in doubt about their edibility. Some poisons can be removed by cooking. Most kinds of wild taro root, for instance, are poisonous when raw, but are perfectly safe after they are cooked.
4. Avoid eating untested plants with milky juice or letting the milk get on your skin. (Exceptions are the numerous kinds of wild figs, breadfruit, and papaya, which are safe despite the milky juice.) Avoid eating plants that taste disagreeable (bitterness is a guide).

Although some plants are completely edible, most have only certain edible parts. These include the root, the fruit, the leaves, or pods. Perhaps only the nuts will be edible.

In many plants, large quantities of edible starch are stored in underground parts. Tubers of the wild potato (mostly tropical American), with foliage similar to the cultivated varieties, are edible. Tubers of other plants, such as the tropical yam (figure 23) and water lily (figure 21), are abundant in the tropics.

Thousands of plants have rootstalks, but only two examples of widely distributed types are illustrated; the fern (figure 24) and the cattail (figure 22). Also, in the tropics, many of the most common vegetables, such as the taro, manioc, and canna, come from rootstalks.

Bulbs are produced most commonly by members of the lily family, such as the true lily, onion, tulip, and daffodil. Many kinds of bulbs are edible. Tubers, rootstalks, and bulbs are a fine source of food because, in most regions, they are usually available throughout the year. In cold climates, these underground storage organs can be found by digging where the dried plant stalks remain.

Fruits of the green banana (table), the plantain (cooking banana), and the breadfruit, all tropical, contain plenty of starch.

Poisonous fungi cannot be detected by unpleasant taste or disagreeable odor. Some mushrooms and other fungi are edible, but, since they contribute little food value and are easily confused with poisonous types, they should be disregarded as food sources.

Edible nuts (figure 25), are the most sustaining of all raw forest foods and are found throughout the world. Many American nut trees, such as oaks, hickories, hazelnuts, and bechnuts, are widely distributed throughout the North Temperate Zone. Others, such as the coconut and cashew, occur widely in the tropics.

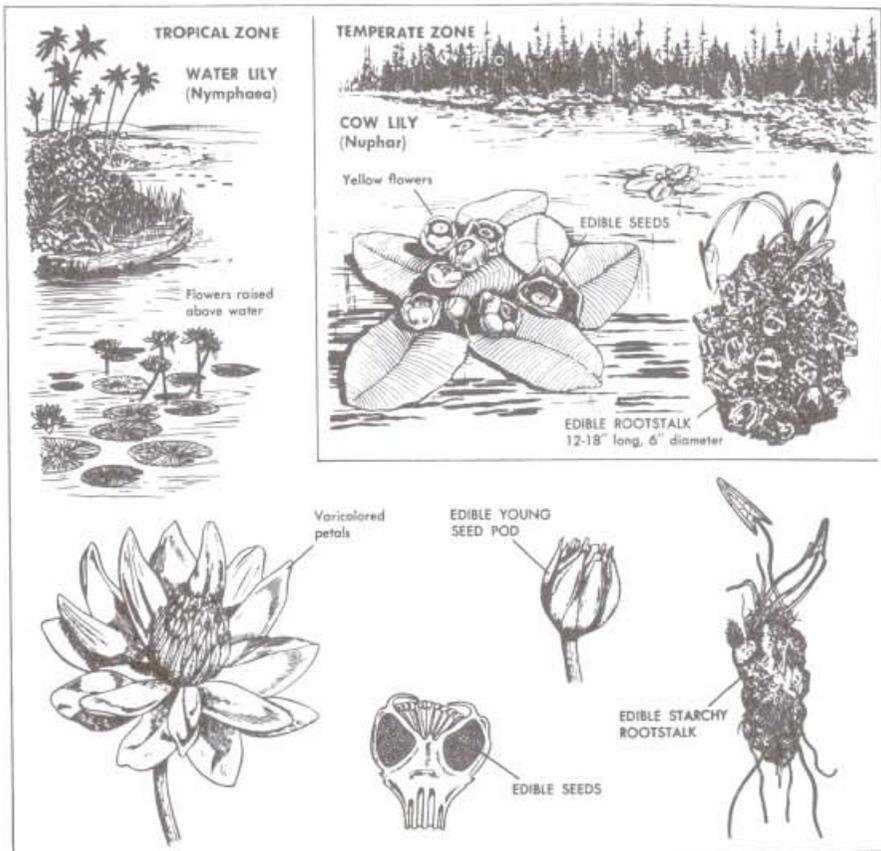


Figure 21 and 22: Water Lilies ↑, Cattails ↓

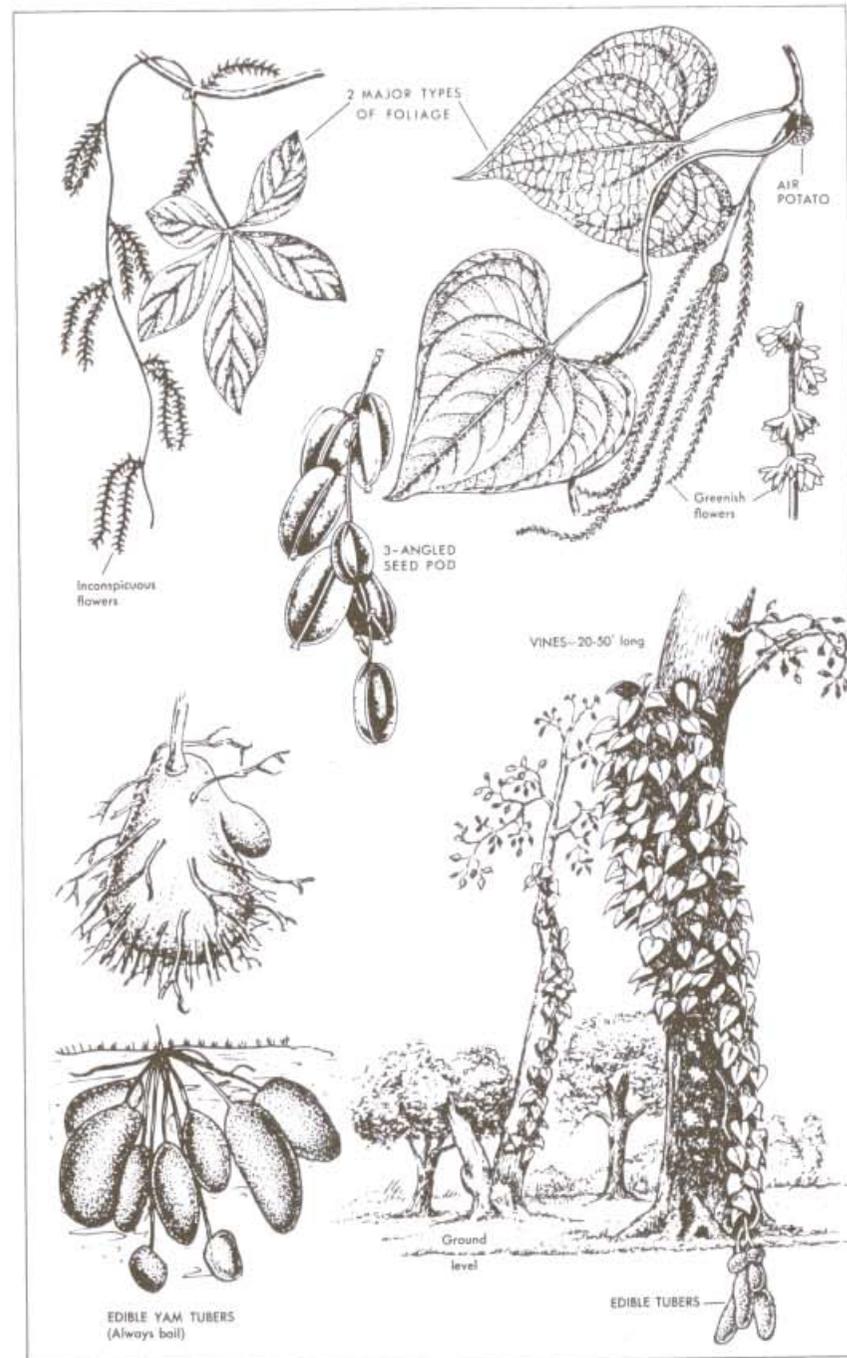
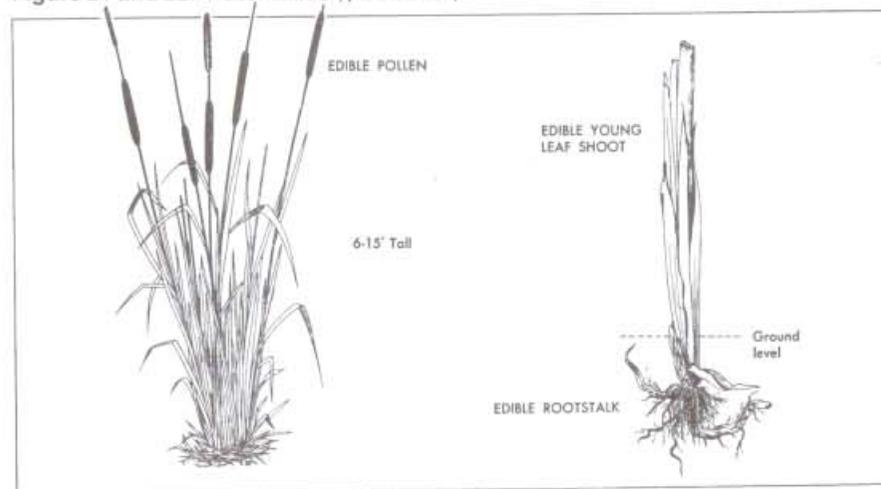


Figure 23: Yams

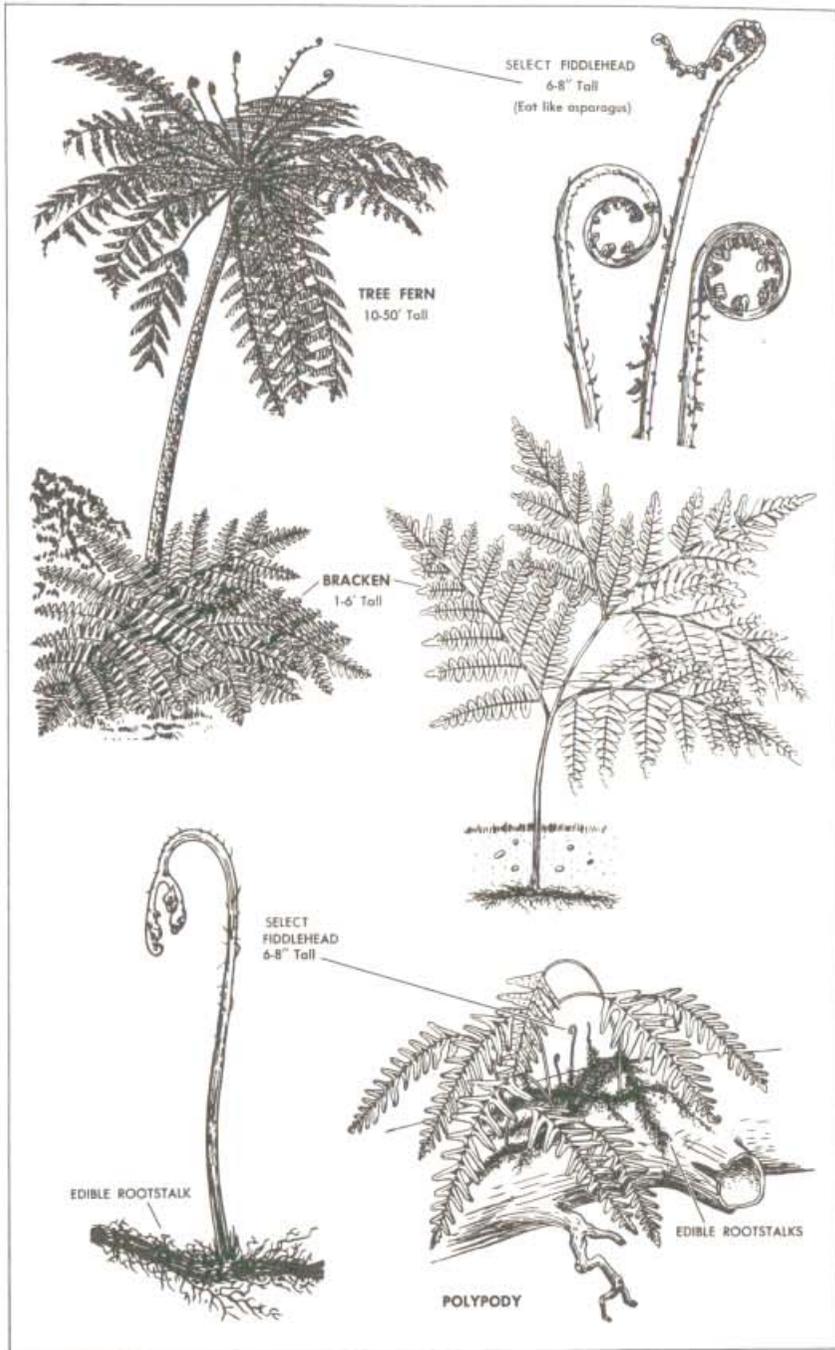


Figure 24: Edible Ferns

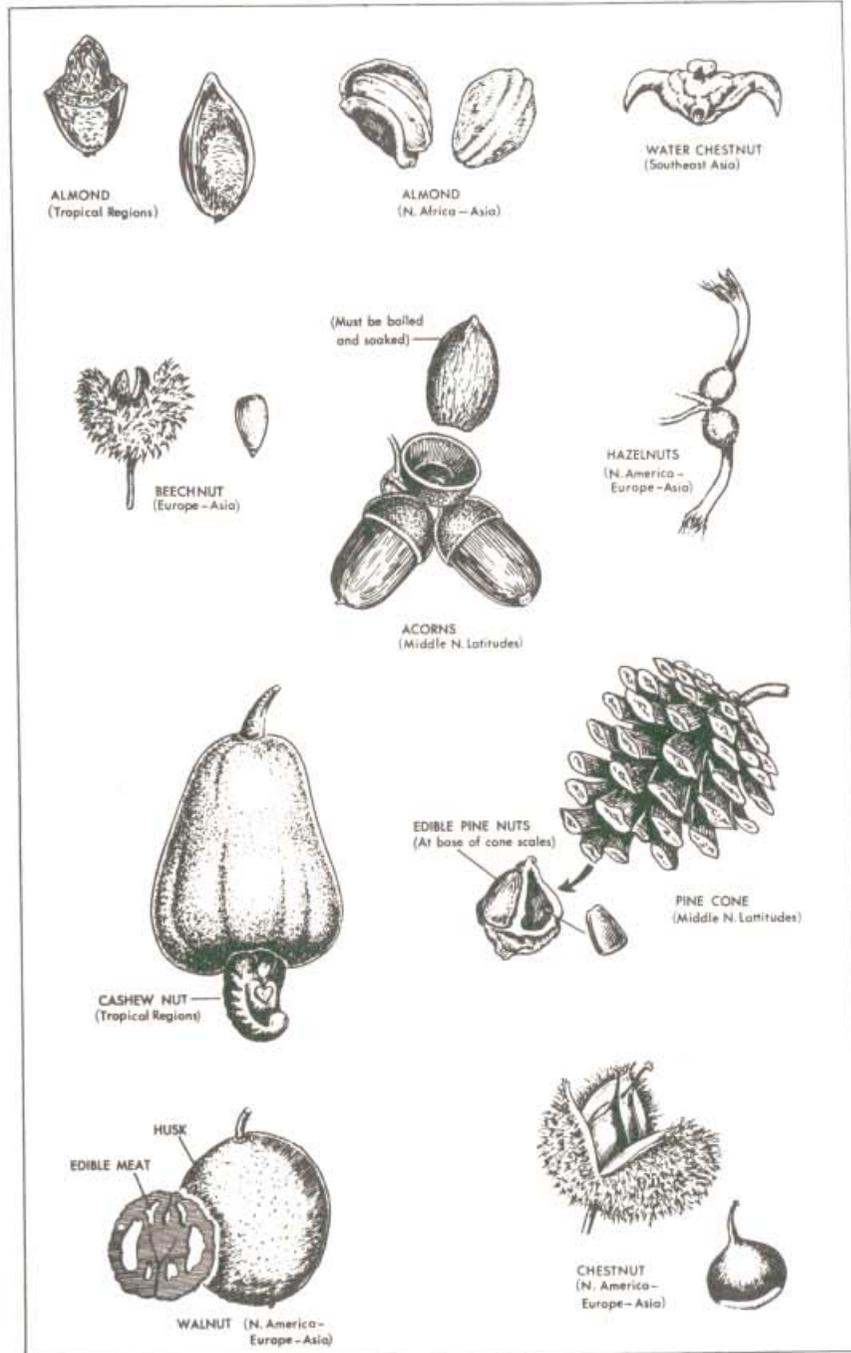


Figure 25: Edible Nuts

Animal Foods

Wilderness also contains protein sources in the form of animal life. You'll be made aware of their presence as you travel. If you don't want to be notified of either plant or animal life for food, simply type **IGNORE FOOD**. To reactivate the notification, type **FIND FOOD**. The kinds of edible animal life in your area can include:

FOOD	CAL/ OZ	WATER CONTENT	SPOILAGE AT 65° F	COMMENTS
FISH	40	HIGH	6 hours	Beware of odd-looking fish with sunken eyes, no scales, and easily dented flesh.
GAME	75	MED	18 hours	
INSECTS	40	MED	6 hours	
WILDLIFE	75	MED	24 hours	Includes mammals and reptiles

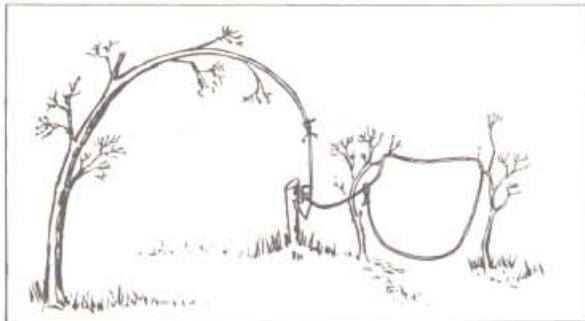
To use animals as food, you must trap or catch them, then kill them. If you have a commercial trap with you from the original inventory, type **USE BAIT/USE TRAP/CATCH GAME** when you are notified of game in your area. If you did not pack a trap, you can make one from raw materials; type **MAKE TRAP**. Remember that construction time is shortened if you use a knife or axe.

Trapping Tips

If you have no firearms, snaring small game is useful during periods of food shortages. Set your snares in game trails or in frequently used runways, which you can recognize by fresh tracks and droppings.

All snares and traps should be simply constructed, and built after camp is completed but before darkness. Any spot used as a butchering place attracts other animals; it is a good place to watch for game during the 24 hours following a butchering. Use entrails for bait.

Figure 26: Hanging Snare



Place your traps where the trail is narrow. Arrange pickets, brush, or obstacles in such a manner as to force the animal to pass through the snare. Be sure that the loop is large enough for the head to pass through but not so large that the body will go through. Disturb natural surroundings as little as possible.

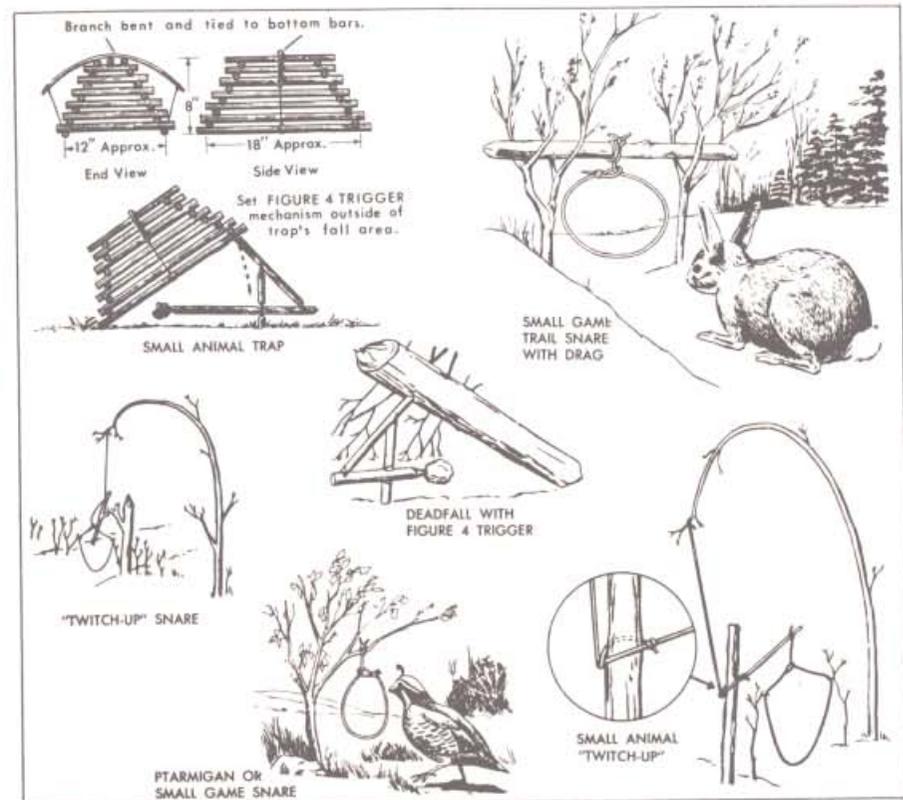
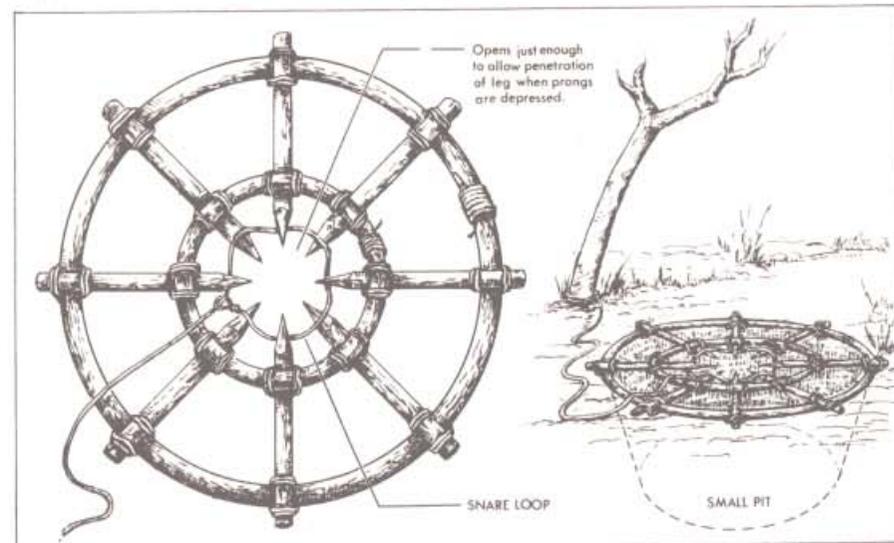


Figure 27 and 28: Small Game Snares ↑, Apache Foot Snare ↓



The twitch-up-snare—a noose attached to a sapling—jerks the animal up into the air, kills him promptly, and keeps his carcass out of reach of other animals. This type of snare is not recommended for very cold climates, since the bent sapling may freeze in position and will not spring up when it is released.

Medium-to-large animals can be captured in deadfalls, but this type of trap is recommended only where big game exists in such quantities as to justify the time and effort spent in construction. Build your deadfall close to a game trail, beside a stream, or on a ridge. Make sure that the fall log slides smoothly between the upright guideposts and that the bait is placed far enough from the bottom log to ensure that the fall log can fall before the animal can withdraw its head. In a trip-string deadfall, no bait is used; the animal trips it by touching a trip string set across the trail.

An unattended noose or deadfall is preferred, since it leaves you free for other duties. Check traps early in the morning and late afternoon.

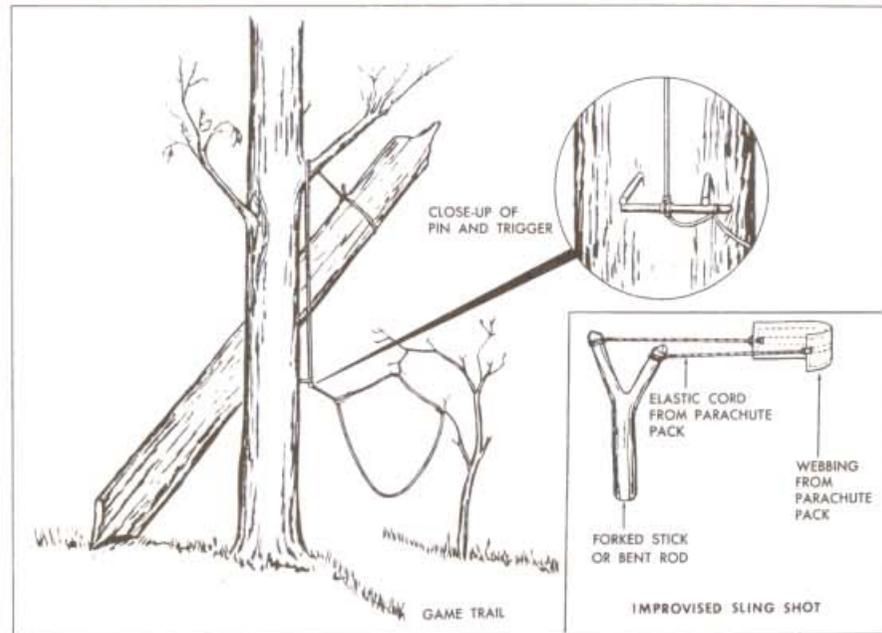


Figure 29: Combination Deadfall and Dragsnare

Fishing Tips

You can fish for your dinner if you brought fishing gear with you, or if you **MAKE** fishing **GEAR** from the branch of a tree, some kind of line, and anything that will serve as a hook. Both are available from the sewing kit or as natural materials in the surrounding area. To fish in *Wilderness'* rivers or lakes, type **USE BAIT/USE GEAR/CATCH FISH**, then indicate in hours how long you want to fish.

Use insects, shellfish, worms, or meat for bait. Try to see what the fish are eating. Artificial lures can be made from pieces of brightly colored cloth, feathers, or bits of bright metal. A length of wire between the line and the hook will prevent a fish from biting the line in two. If you have no hooks, improvise them from wire or insignia pins, or carve them out of bone or hard wood. Make a line by unraveling a parachute suspension line or by twisting threads from cloth or plant fibers. If the fish won't take bait, try to hook them in the stomach as they swim by.

In rivers, fishing is best in the deepest parts. In shallow streams, it is best in pools below falls, at the foot of rapids, or behind rocks. The best times are usually early morning or late evening, or sometimes at night, if you have a light to attract the fish. You can occasionally kill them with the back of a machete; or spear them with a sharpened stick. Before you give up, try fishing in all kinds and depths of water, at all times of day, and with all types of bait.

Other equipment that can help in getting a meal include **SPEAR, ROCK, BOW** (and arrows), **CLUB, GUN, KNIFE**, and **AXE**. The first four can be made from materials found in the area; the last three come from the initial inventory available at the beginning of your journey. For a more detailed description of dealing with wildlife encounters, see Chapter 7.

With a few exceptions, such as toads, all animals are edible when they are freshly killed. Never risk your life with questionable seafood—fish with slimy gills, sunken eyes, flabby flesh or skin, or an unpleasant odor. If the flesh remains dented when you press your thumb against it, the fish is probably stale. For poisonous and venomous fish, see figures 30 and 31.

Animals give the most food value per pound. Anything that creeps, crawls, swims, or flies is a possible source of food. People eat grasshoppers, hairless caterpillars, wood-boring beetle larvae and pupae, ant eggs, and termites. Such insects are high in fat. You have probably eaten insects in contaminated flour, cornmeal, rice, beans, fruits, and greens in the course of your everyday life.

Food Preparation

COOKING can delay spoilage of commercial and natural food by 48 hours and nullify the toxic effects of potentially poisonous wild plants. Use the phrase sequence **USE FIRE/COOK** (food). **BOILING**, which requires the use of utensils and water, can nullify the toxic effects of microbes such as *Giardia*, and can purify water gathered from questionable sources. Use the phrase sequence **USE FIRE** (or **STOVE**)/**USE UTENSILS/USE WATER/BOIL WATER**. If you brought iodine tablets with you, type **USE IODINE TABLETS** to purify your water.

Skin large game; bleed and gut all animals. Use care in removing gall and urine bladders, and musk glands. If these are broken, the meat will be tainted. Washing helps clean the meat. Skinning small rodents removes most of their objectionable odor.

Carrion-eating birds, such as vultures, have unpleasant-tasting flesh. Fish-eating birds have a strong, fish-oil flavor. The best meat on a lizard is the hind

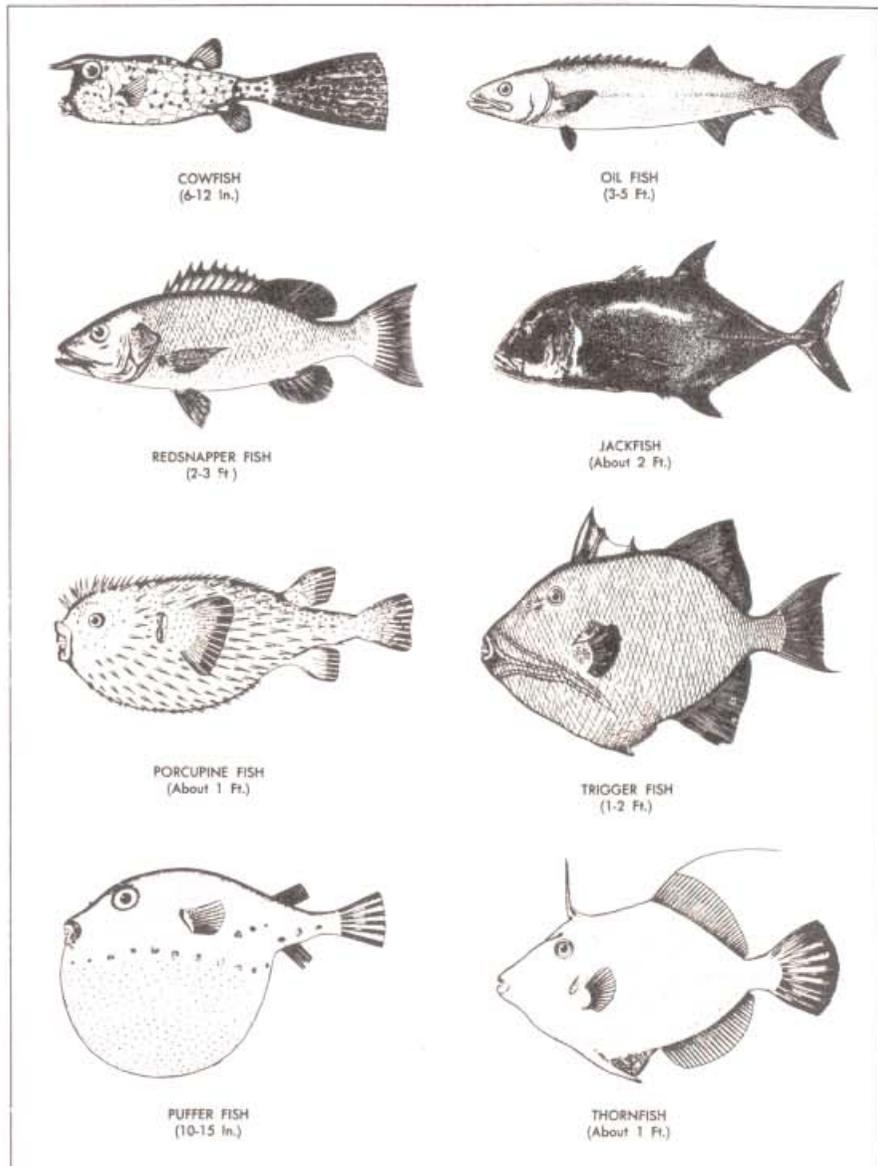


Figure 30: Dangerous Fish

quarters and tail; on a frog, the legs. Turtles have edible flesh on legs, neck, tail, and other parts of the body. Avoid tropical frogs—many have highly poisonous secretions in the skin.

Immediately after you land a fish, bleed it by cutting out the gills and large

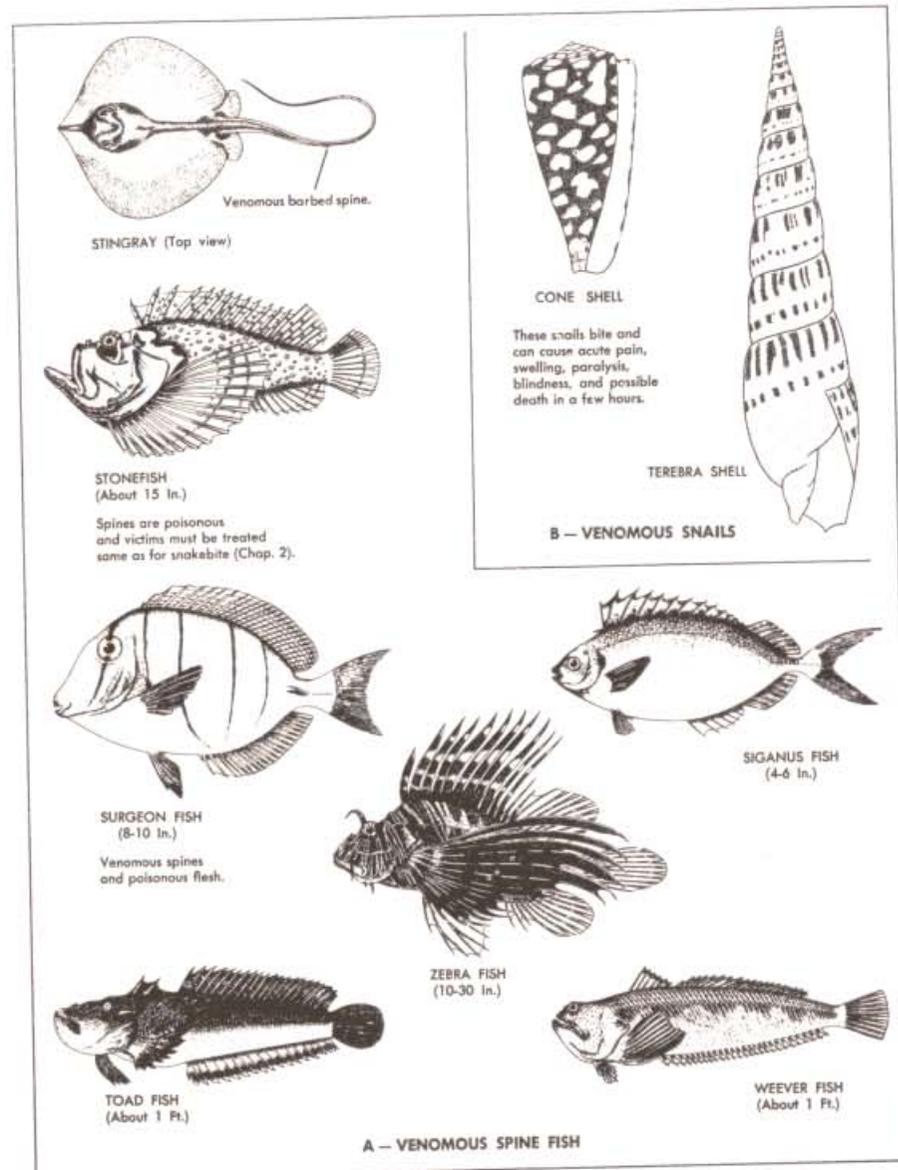


Figure 31: Venomous Shells and Poisonous Fish

blood vessels that lie next to the backbone. Scale it and wash it in clean water. You can eat small fish of the herring family without much cleaning. Their scales are loose and can be washed off; the stomach and intestines can be flipped out with the thumb. These fish are oily, highly nutritious, and good even eaten raw.

Boiling, roasting, baking, and frying—in that order of preference—are efficient ways of preparing foods. Pit cooking or clambake style (oven) is slower but requires less attention, protects food from flies and other pests, and reveals no flame at night.

Boil succulent fruits. Bake or roast large, tough, or heavy-skinned fruits. Boil green leaves, stems, and buds until tender. Change water frequently and rinse thoroughly to help eliminate bitter juices or undesirable tastes. Bake or roast roots and tubers, although you can boil them. You can eat most nuts raw, but some, such as acorns, are better cooked. Break up acorns, boil them with ashes from the fire to eliminate tannin, mould them into cakes, and bake them.

Cooking Without Utensils

Roasting (in the coals of a fire): You can coat fish, potatoes, fresh water mussels, and many large foods with a layer of mud or clay and roast them directly in the flames or coals of a fire. The coating reduces the chances of the food's being burned. You need not scale fish prepared in this way; after the fish is cooked, peel off the skin with the baked clay.

Steaming Under the Fire: Small foods, such as small bird eggs, fresh water snails, or any other shellfish, can be cooked in quantity in a pit beneath your fire. Line a small, shallow pit and fill it with food, or wrap the food in plant leaves, or cloth. Cover the pit with a ¼-to-½-inch layer of sand or soil, and build your fire directly over it. After the food is cooked, rake the fire away and remove the food.

Steaming with Heated Stones (clambake style): Heat a number of stones in a fire, then allow the fire to burn down to coals. Place such foods as fresh water mussels (in their shells) directly on and between the stones, and cover the whole with plant leaves, grass, or seaweed, and a layer of sand or soil. When they are thoroughly steamed in their own juices, clams, oysters, and mussels have opened shells when uncovered. You can eat the food without further preparation.

Stone Boiling: Fill a big container with water and food. Add clean, hot stones until the water boils. Cover for about an hour with big leaves, or until the food is well done.

Nutritional Requirements

Carbohydrates: These are mostly plant in origin—sugar, starches, cereals, and fruits. If your water supply is severely restricted, stick to these foods.

Proteins: These are mostly animal in origin—meat, fish, eggs, milk, and cheese. Proteins are valuable fuels, but are important mostly in maintaining and repairing body tissues. Your average daily need is 3 ounces, but you can subsist for a long time with none. If your water supply is limited, do not eat large amounts of protein.

Fats: These are partly plant, partly animal—olive and cottonseed oils; butter and lard. Except in very small amounts, fats are not essential for human

nutrition. Although inefficient in comparison, fats provide more than twice as many calories per unit weight as do proteins or carbohydrates. Diets very high in fats cause digestive disturbances and often produce an acid condition (ketosis) that requires added water intake for elimination.

Water

Though nutrition is important when you're coping with solo survival tasks, you can live for many days without food if you have water. When water is plentiful, drink more than your normal requirement to keep fit. If you have less than 1 to 2 quarts (32 to 64 oz) of water per day, avoid dry, starchy, and highly flavored foods and meat. Remember that eating increases thirst. The best foods to eat in short-water circumstances are high in carbohydrates, such as candy and fruit bars. Every bit of work you do requires additional food and water; the less energy you expend, the less food and water you need.

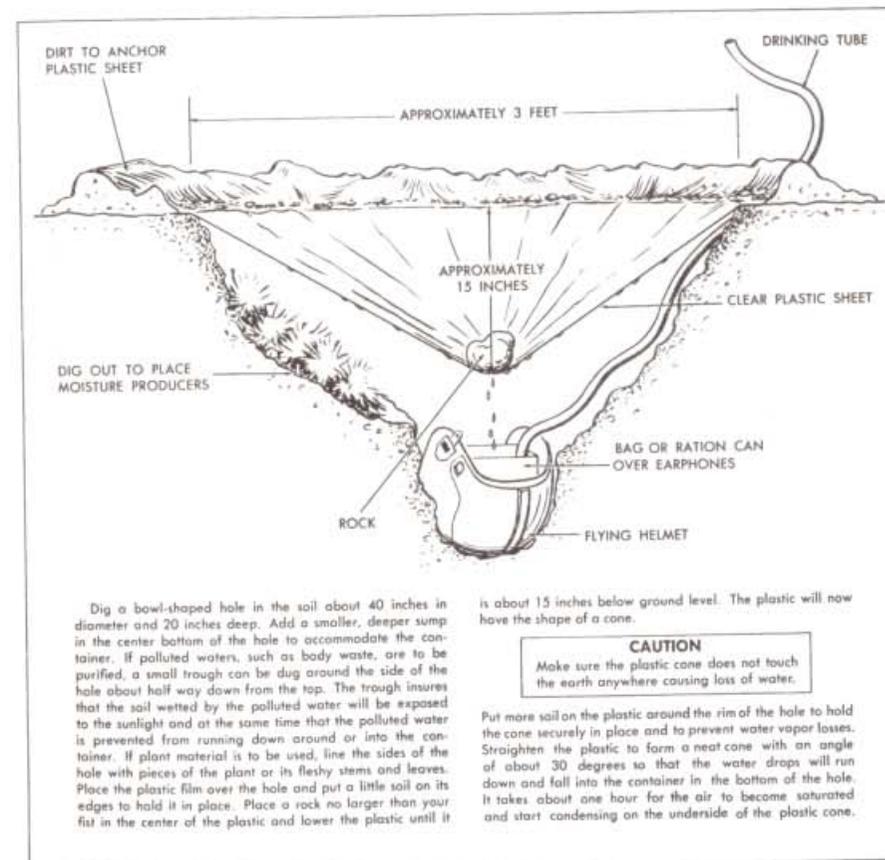


Figure 32: Cross Section of a Solar Still