

MOUNTAIN CLIMBING SCHOOL MANUAL

A FREE AND PUBLIC DOMAIN
INTRODUCTION TO MOUNTAINEERING TECHNIQUE
FROM THE SANTIAM ALPINE CLUB
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QUICK QUIZ

A CARABINER IS:

- ⇒ A PERSON WHO LIVES IN THE CARIBBEAN
- ⇒ AN OBLONG METAL RING WITH A SPRING CLIP

FIND THE ANSWER ON A FOLLOWING PAGE.

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CLIMBING SAFETY DEPENDS ON YOU

MOUNTAINEERING TECHNIQUES DEVELOP AND VARY FROM A FEW FUNDAMENTAL TECHNIQUES. AS AN INTRODUCTORY TEXT, THE MOUNTAIN CLIMBING SCHOOL MANUAL PRESENTS BASIC TECHNIQUES. READERS WILL DEVELOP THEIR OWN VARIATIONS OF THE TECHNIQUES AS THEY GAIN EXPERIENCE.

BESIDES ADVANCED TECHNIQUES, WIDER ASPECTS OF MOUNTAINEERING SAFETY ARE NOT COVERED LIKE THE MOST COMMON WAY TO DIE IN THE WILDERNESS, HYPOTHERMIA. THE MOUNTAIN CLIMBING SCHOOL MANUAL INTRODUCES ONLY A SINGLE ASPECT OF CLIMBING SAFETY, MOUNTAINEERING TECHNIQUES. PROSPECTIVE MOUNTAINEERS SHOULD EXPECT YEARS OF LEARNING SUBJECTS LIKE ALPINE WEATHER, SNOW AND ROCK CONDITIONS, ROUTE FINDING AND FIRST AID.

ACCIDENTS RESULTING IN INJURY AND DEATH DO OCCUR IN OUTDOOR ACTIVITIES. MOUNTAINEERING, HIKING AND OTHER OUTDOOR ACTIVITIES ARE DANGEROUS. RESPONSIBLE CLIMBERS ACCEPT THE RISK OF SUCH ACTIVITIES AND UNDERTAKE THEM ON THEIR OWN RESPONSIBILITY.

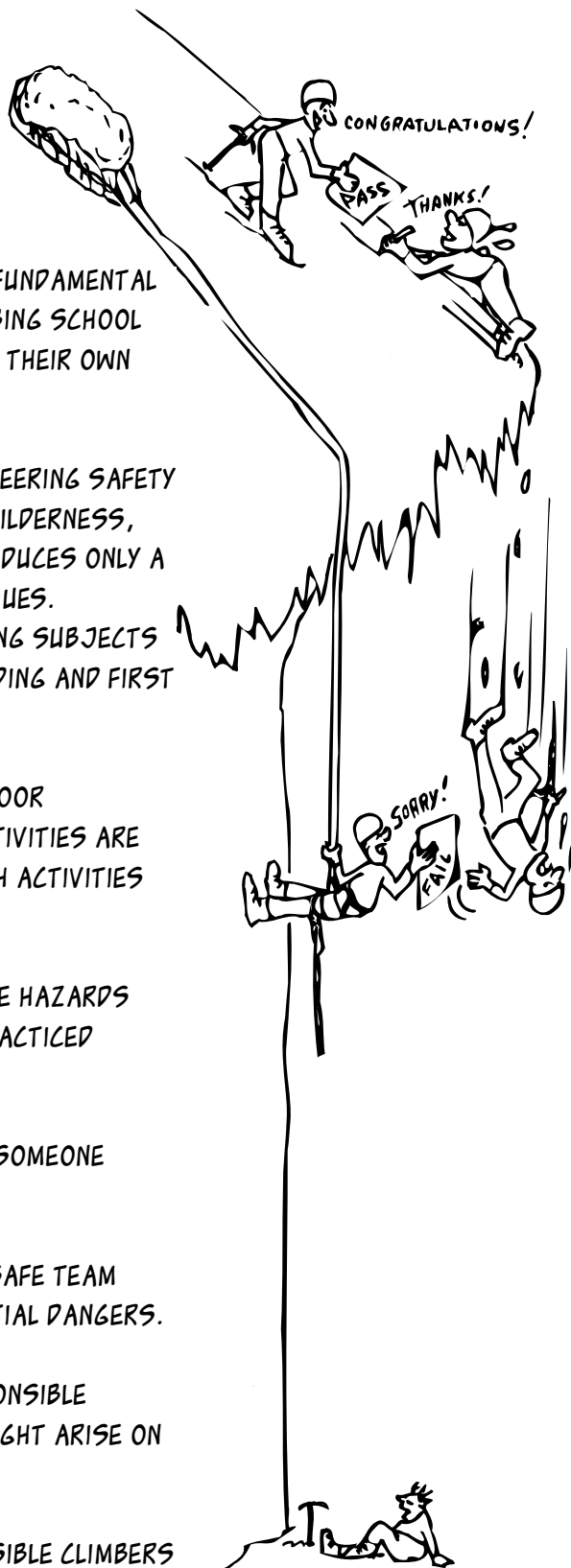
BEFORE JOINING AN ACTIVITY, RESPONSIBLE CLIMBERS KNOW THE HAZARDS AND JUDGE FOR THEMSELVES IF THEY HAVE THE KNOWLEDGE, PRACTICED SKILLS AND PHYSICAL CONDITION TO PARTICIPATE SAFELY.

BEFORE LEAVING FOR AN ACTIVITY, RESPONSIBLE CLIMBERS LET SOMEONE KNOW THEIR PLANNED DESTINATION, ROUTE AND RETURN TIME.

DURING AN ACTIVITY, RESPONSIBLE CLIMBERS PARTICIPATE AS SAFE TEAM MEMBERS BY REMAINING ALERT FOR, AND VOCAL ABOUT, POTENTIAL DANGERS.

IN REGARD FOR THE BENEFITS OF CLIMBING WITH OTHERS, RESPONSIBLE CLIMBERS RELEASE OTHER PARTICIPANTS FROM CLAIMS THAT MIGHT ARISE ON ACCOUNT OF A NEGLIGENT ACT OR FAILURE TO ACT.

IN CASE OF ACCIDENT, ILLNESS OR OTHER INCAPACITY, RESPONSIBLE CLIMBERS UNDERSTAND THEY WILL PAY THEIR OWN EVACUATION AND MEDICAL EXPENSES, WHETHER OR NOT AUTHORIZED BY THEMSELVES.



EQUIPMENT

MANY TECHNIQUES DEPEND ON A FEW PIECES OF CORE EQUIPMENT IN COMBINATION WITH A CLIMBING ROPE:

- ⇒ ONE LOCKING CARABINER
- ⇒ TWO REGULAR CARABINERS
- ⇒ TWO PRUSIK SLINGS OR LOOPS, ONE LONG ENOUGH TO REACH FROM YOUR WAIST TO THE GROUND, THE SECOND SLING HALF AS LONG AS THE FIRST SLING
- ⇒ A WAIST HARNESS, EITHER A MANUFACTURED HARNESS OR ONE YOU MADE YOURSELF FROM ABOUT 20' OF 1" OR LARGER TUBULAR WEBBING

DOUBLED CARABINERS



GATES OPPOSED



GATES REVERSED

FOR ANY SITUATION WHERE YOU COULD FALL OR WHERE ROCK OR ICE COULD FALL ON YOU:

- ⇒ A HELMET WITH A CHIN STRAP

FOR SNOW AND ICE CLIMBS:

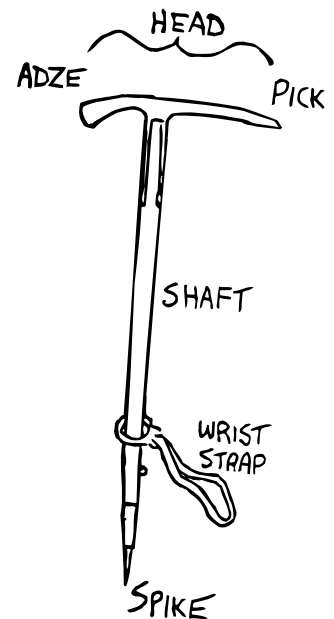
- ⇒ AN ICE AX

FOR ANY SITUATION, WHETHER ON ROCK OR FIRM SNOW, WHERE THE EDGE OF THE BOOT WILL BE USED TO SUPPORT YOUR WEIGHT:

- ⇒ STURDY, WATERPROOF BOOTS

FOR ICE AND HARD SNOW CLIMBS:

- ⇒ CRAMPONS (FITTED TO THE BOOTS BEFORE THE CLIMB)



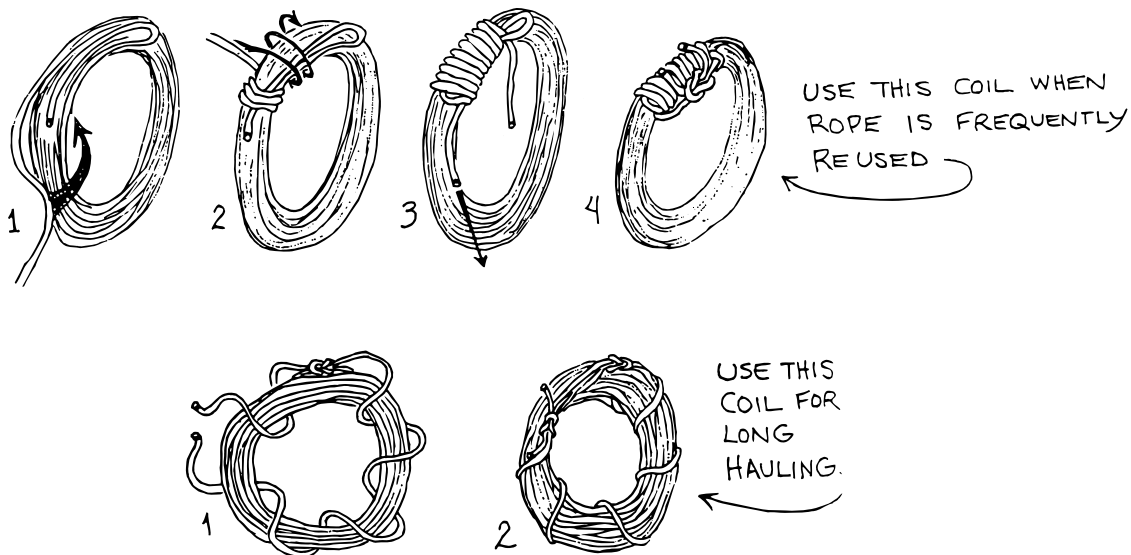
AND THEN THERE IS EQUIPMENT THAT SHOULD BE ON ANY TRIP INTO THE WILDERNESS, SOMETIMES CALLED THE TEN ESSENTIALS, ALTHOUGH BOTH THE EXACT NUMBER AND THE ITEMS THEMSELVES VARY:

- ⇒ FOR AN UNEXPECTED STAY OVERNIGHT, RAIN GEAR, EXTRA CLOTHES, EXTRA FOOD, WATERPROOF MATCHES, FIRE STARTER AND PERHAPS A CELL OR SATELLITE PHONE TO KEEP OTHERS INFORMED
- ⇒ FOR FINDING YOUR WAY IN LOW VISIBILITY OR AFTER DARK, A FLASHLIGHT, MAP AND COMPASS, PERHAPS A GPS (GLOBAL POSITIONING SYSTEM)
- ⇒ FOR SUN PROTECTION, SUN GLASSES, SUNSCREEN AND APPROPRIATE CLOTHING

ROPE CARE

CLIMBERS DEPEND ON ROPES FOR SAFETY. KNOW SOME ROPE DO'S AND DON'TS.

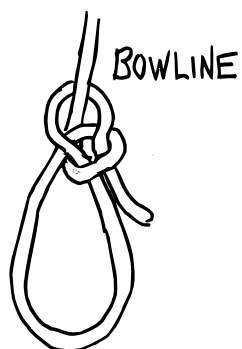
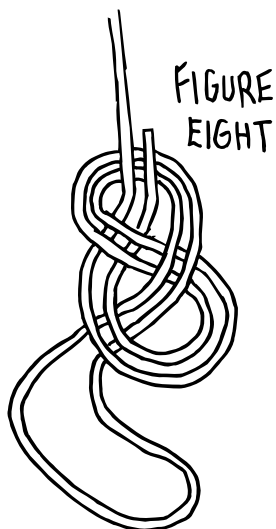
- ⇒ DO NOT WALK ON OR STAND ON THE ROPE, ESPECIALLY WHEN WEARING CRAMPONS.
- ⇒ DO NOT USE ROPES FOR PURPOSES OTHER THAN CLIMBING.
- ⇒ DO NOT SUBJECT ROPES TO UNDUE STRAIN OR WEAR, LIKE BOUNCING ON A RAPPEL ROPE OR POSITIONING THE ROPE OVER A SHARP EDGE WHEN A LESS SHARP POSITION IS NEARBY.
- ⇒ DO NOT USE A ROPE IN A SITUATION IT IS NOT DESIGNED TO HANDLE. LARGE DIAMETER ROPES, 10.5 MM AND LARGER, ARE FOR ROCK AND ICE CLIMBS. SMALLER DIAMETER ROPES ARE FOR SNOW CLIMBS. SMALL DIAMETER ROPES CAN BE DOUBLED TO USE THEM WHERE LARGE DIAMETER ROPES ARE REQUIRED.
- ⇒ DO KNOW THE HISTORY OF A ROPE'S USE. DISCONTINUE USE OF ROPES THAT ARE WORN OR ARE KNOWN TO HAVE TAKEN A NUMBER OF HARD FALLS.
- ⇒ DO LOOSELY COIL ROPES FOR STORAGE AND HANG THEM IN A DRY PLACE. DO NOT STORE ROPES ON A POTENTIALLY DAMP SURFACE, LIKE CEMENT. DO NOT LEAVE ROPES TIGHTLY COILED. DO KEEP ROPES AWAY FROM SOLVENTS, OILS, STOVES, FIRE AND HEAT. DO WASH SOILED ROPES AND HANG THEM TO DRY.



WEATHER

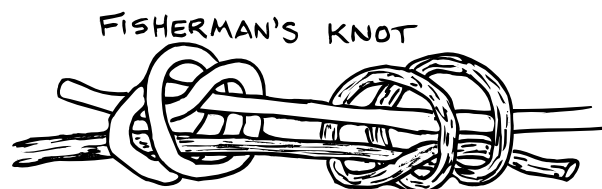
MOUNTAINS MAKE THEIR OWN WEATHER, SO CONDITIONS CAN CHANGE RAPIDLY AND BE SEVERE. IF YOU DO NOT LIKE THE WEATHER WHEN CLIMBING, THEN WAIT TEN MINUTES. IF YOU ARE STILL NOT INJURED AS A RESULT OF THE WEATHER, THEN THINGS ARE GOING GREAT, RIGHT?

KNOTS

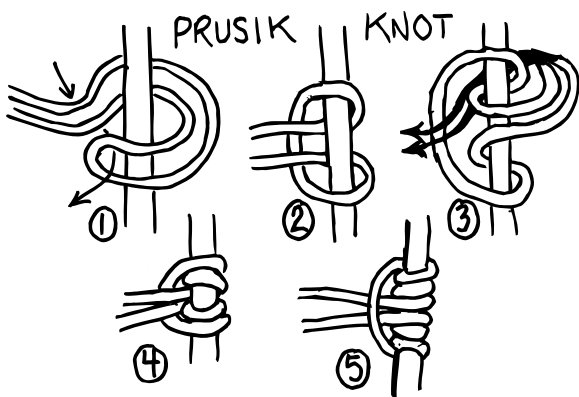


THE FIGURE-EIGHT AND THE BOWLINE ARE USED FOR THE SAME PURPOSES, FOR EXAMPLE, TO TIE THE MAIN ROPE INTO THE HARNESS. THE BOWLINE IS RARELY USED BECAUSE THE FIGURE-EIGHT IS EASIER FOR MOST PEOPLE TO INSPECT VISUALLY TO VERIFY IT IS TIED CORRECTLY.

THE FISHERMAN'S KNOT IS USED TO TIE SMALL ROPES, LIKE A PRUSIK ROPE, INTO A LOOP. A SIMPLE OVERHAND KNOT IS PREFERRED TO THE FISHERMAN'S KNOT WHEN TYING LARGE ROPES TOGETHER, FOR EXAMPLE, TO



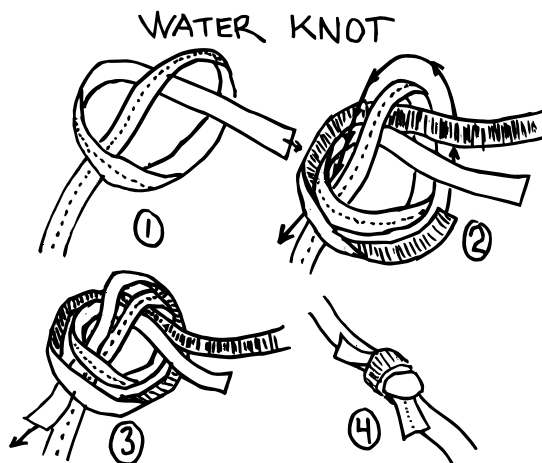
CREATE A LONG RAPPEL ROPE.



THE PRUSIK KNOT IS USED TO TIE A PRUSIK LOOP TO THE MAIN ROPE. WHEN TIGHT THE PRUSIK KNOT WILL NOT SLIDE ON THE MAIN ROPE. WHEN LOOSE IT WILL SLIDE. FOR THIS REASON THE PRUSIK IS USED TO CREATE A MOVABLE ANCHOR POINT ON THE MAIN ROPE. BE AWARE THE PRUSIK KNOT IS NOT SELF-TIGHTENING. THE PRUSIK ROPE WILL BURN THROUGH QUICKLY IF ALLOWED TO SLIDE ON THE

MAIN ROPE WHILE LOADED WITH WEIGHT.

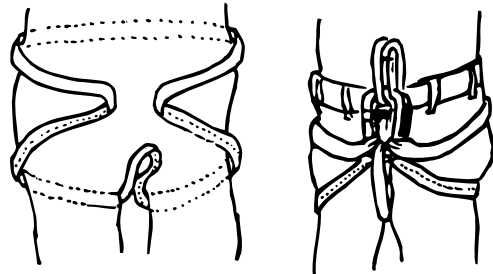
THE WATER KNOT IS USED TO TIE TUBULAR WEBBING INTO LOOPS. THE WATER KNOT LOOKS LIKE AN OVERHAND KNOT EXCEPT THAT THE SECOND END OF WEBBING IS TRACED BACKWARDS THROUGH THE FIRST OVERHAND KNOT.



HARNESSES

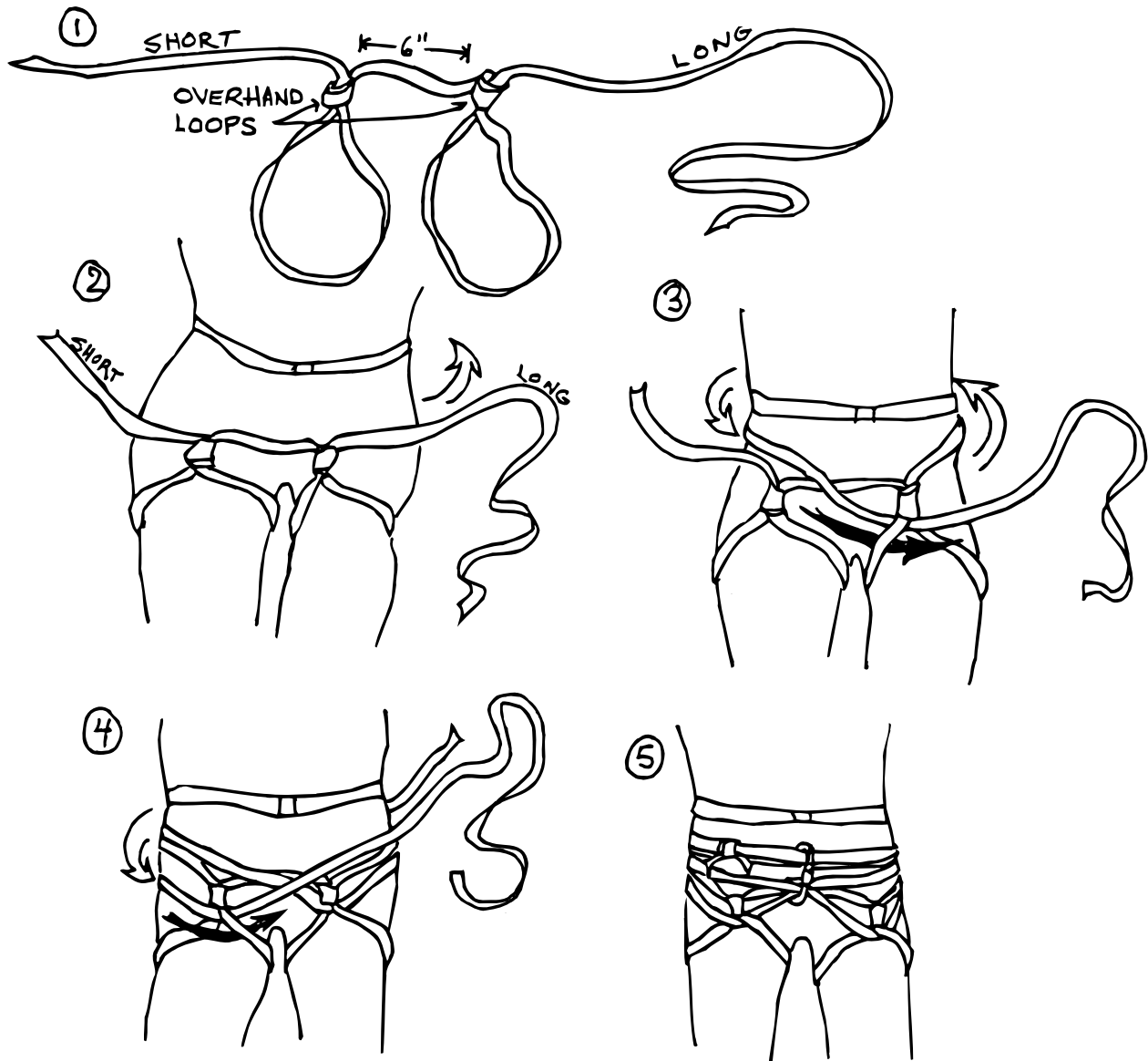
ALTHOUGH SEAT HARNESSES ARE COMMERCIALLY AVAILABLE, SOMETIMES IT IS IMPORTANT TO KNOW HOW TO MAKE A HARNESS FROM 1" OR LARGER TUBULAR WEBBING. TWO VARIATIONS ON SEAT HARNESSES ARE SHOWN HERE. CHEST HARNESSES ARE ALSO COMMONLY USED FOR GLACIER TRAVEL. IN A RESCUE SITUATION THE RESCUER MIGHT NEED TO CREATE HARNESSES FOR THE BACK, NECK AND HEAD.

DIAPER SLING

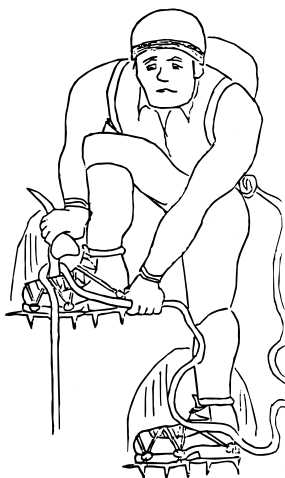


1-INCH WEBBING TIED IN A LOOP WITH A WATER KNOT.

CLIPPED TOGETHER WITH CARABINERS.

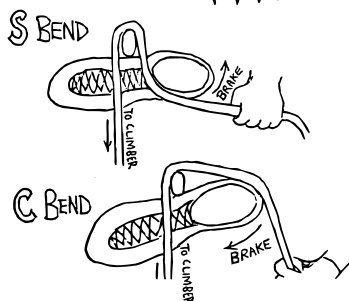


BELAY



BELAY LEVERAGES AN ANCHOR TO PROTECT A CLIMBER AGAINST A FALL. THE CLIMBER CONTROLS THE BELAYER THROUGH STANDARDIZED BELAY COMMANDS.

CLIMBER: ON BELAY?	BELAYER: BELAY IS ON
CLIMBER: CLIMBING	BELAYER: CLIMB
CLIMBER: UP ROPE	BELAYER: NO VERBAL RESPONSE
CLIMBER: TENSION	BELAYER: NO VERBAL RESPONSE
CLIMBER: SLACK	BELAYER: NO VERBAL RESPONSE
CLIMBER: FALL	BELAYER: NO VERBAL RESPONSE
CLIMBER: OFF BELAY	BELAYER: BELAY IS OFF

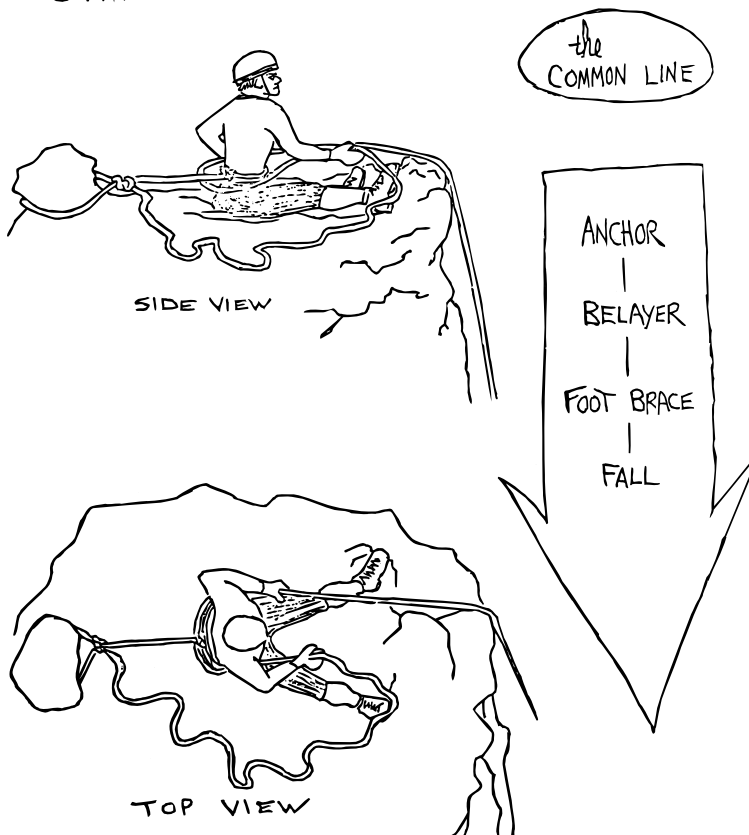


FOR MANY COMMANDS THE BELAYER DOES NOT GIVE A VERBAL RESPONSE. COMPLIANCE WITH THE COMMAND IS OBVIOUS TO THE CLIMBER WHEN THE ROPE IS TAKEN UP, MADE TIGHT OR GIVEN SLACK AS DIRECTED.

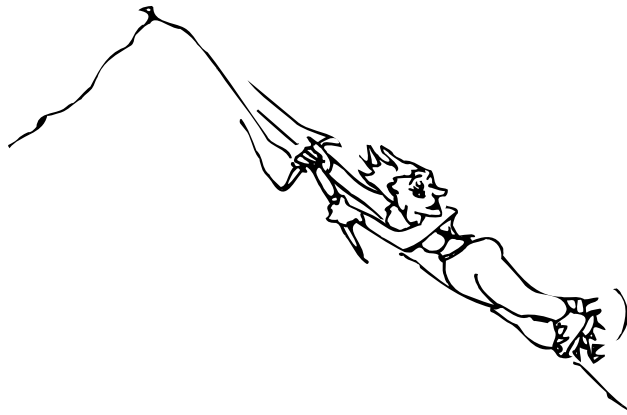
STATIC BELAY, MOSTLY USED ON ROCK AND VERTICAL ICE, IS WHEN THE BRAKE IS HELD FAST AGAINST A FALL.

DYNAMIC BELAY, MOSTLY USED ON SNOW AND ICE SLOPES, IS WHEN SOME ROPE IS ALLOWED TO SLIDE AS THE BRAKE IS GRADUALLY APPLIED TO BRING THE FALLEN CLIMBER TO A STOP.

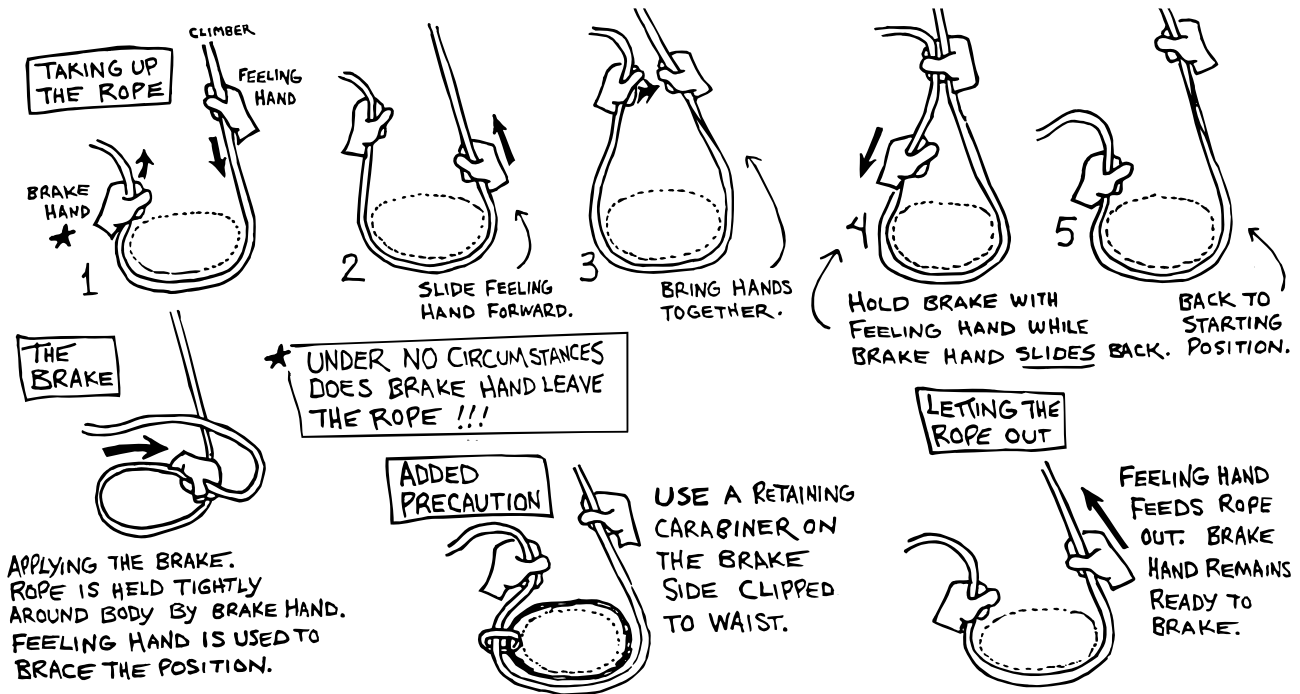
SITTING HIP BELAY



BELAY OPERATION



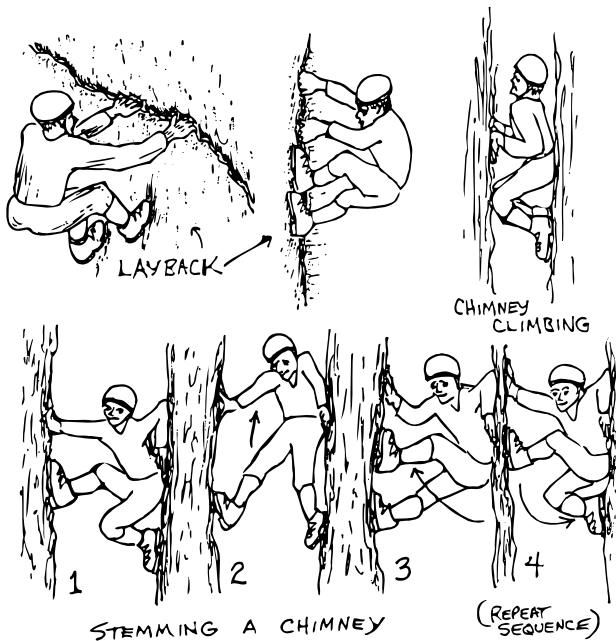
THE ONLY WAY TO LEARN AND STAY PROFICIENT AT BELAY OPERATION IS TO PRACTICE AND, WHEN OUT OF PRACTICE, PRACTICE MORE. OPERATING A BELAY IS ILLUSTRATED HERE FOR THE SITTING-HIP BELAY. THE FIRST MEASURE OF TRUST AMONG CLIMBERS IS, "IS THIS A PERSON I WOULD TRUST TO BELAY ME?"



A TALE OF TWO GENDERS

THREE CLIMBERS, TWO MEN AND A WOMAN, WERE HIKING THE APPROACH TO A MOUNTAIN WHEN THEY CAME UPON A STREAM. THE FIRST MAN PRAYED, "GOD, GIVE ME THE STRENGTH TO CROSS THE STREAM." THE MAN'S ARMS BULGED OUT. HIS LEGS BULGED OUT. AFTER ADMIRING HIS IMPROVED MUSCLES THE MAN JUMPED IN AND SWAM ACROSS THE STREAM. THE SECOND MAN THOUGHT HE COULD BETTER THE FIRST. HE PRAYED, "GOD, GIVE ME THE TOOLS TO CROSS THE STREAM." A SMALL BOAT AND OARS APPEARED. AFTER A CONSIDERABLE TIME EXAMINING THE EXCELLENT TOOLS, THE FINE BOAT AND OARS, THE MAN SET OFF AND ROWED TO THE OTHER SIDE. THE WOMAN, UNIMPRESSED AS USUAL, PRAYED, "GOD, GIVE ME THE INTELLIGENCE TO CROSS THE STREAM." A MAP APPEARED ON A NEARBY BOULDER. AFTER EXAMINING THE MAP, THE WOMAN HIKED UPSTREAM A COUPLE HUNDRED YARDS AND CROSSED ON THE FOOT BRIDGE.

ROCK CLIMBING

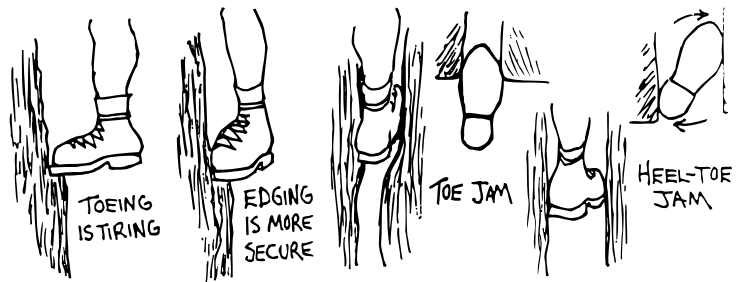


MANY PACIFIC NORTHWEST MOUNTAINS REQUIRE ROCK CLIMBING COMPETENCE. BOOTS OR EVEN SNEAKERS ARE SUFFICIENT FOR MANY ROUTES. MORE DIFFICULT ROUTES REQUIRE TIGHT-FITTING SPECIALIZED CLIMBING SHOES WITH STICKY RUBBER SOLES.

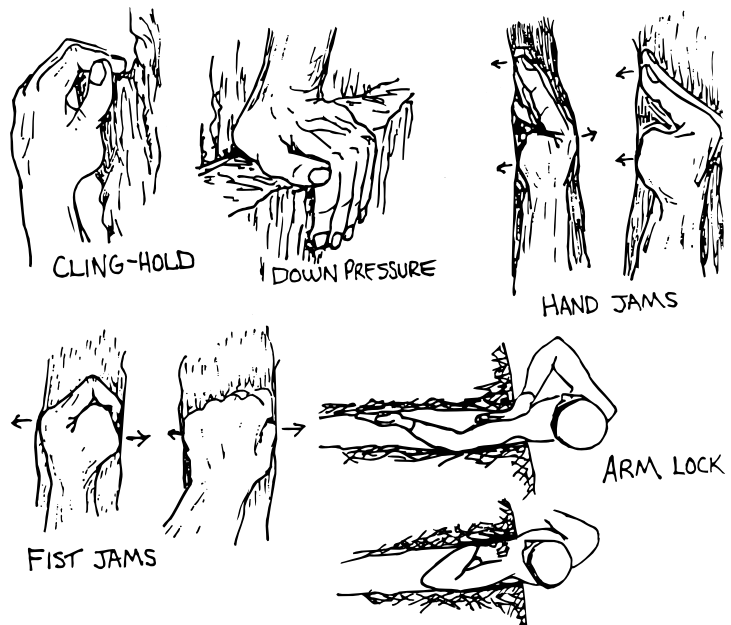
LEGS ARE STRONGER THAN ARMS. USE LEGS FOR UPWARD MOTION AND ARMS PRIMARILY FOR BALANCE. FOR SECURITY, KEEP THREE POINTS ON THE ROCK AT ALL TIMES, FOR EXAMPLE, TWO FEET AND ONE HAND OR TWO HANDS AND ONE FOOT.

USE AS MANY FINGERS AS POSSIBLE, WHICH MIGHT REQUIRE FINGER STACKING. USE AN UNDERCLING GRIP ON OVERHANGING FEATURES. IF THE ROCK HAS CRACKS WIDE ENOUGH TO ACCEPT A HAND OR FIST, THEN USE JAMS WHERE A HAND IS INSERTED AND THEN FLEXED OR TWISTED TO SECURE THE HOLD THROUGH OUTWARD PRESSURE ON THE ROCK.

USE THE FRICTION OF THE BOOT'S SOLE WHENEVER POSSIBLE, A TECHNIQUE CALLED SMEARING. SMEARING INVOLVES GETTING AS MUCH OF THE SURFACE AREA AS POSSIBLE AGAINST THE ROCK TO MAXIMIZE FRICTION. USE THE SIDE OF THE FOOT OR THE EDGE OF THE BOOT TO EDGE ON HOLDS AND ROCK FEATURES. IN LARGER CRACKS, FOOT JAMS ARE SOMETIMES USED, EITHER SINGLY OR IN COMBINATIONS.



DYNAMIC OPPOSITION IS THE APPLICATION OF OPPOSING FORCES TO STAY IN PLACE. THE UNDERCLING HAND TECHNIQUE WORKS BECAUSE THE LEGS AND FEET ARE PUSHING UPWARDS. PRESSING LEGS OUTWARD AGAINST ROCK FEATURES IS CALLED STEMMING OR BRIDGING. A LAYBACK INVOLVES PULLING ON HANDHOLDS IN A CRACK WHILE PUSHING AGAINST AN ADJACENT ROCK WALL WITH THE FEET. VARIOUS CHIMNEY CLIMBING TECHNIQUES ALL INVOLVE PRESSING OUTWARD ON BOTH CHIMNEY WALLS TO MAINTAIN POSITION AND MOVE UPWARDS.



RAPPELLING

RAPPELLING USES FRICTION AGAINST A ROPE TO DESCEND FASTER THAN COULD BE DONE BY CLIMBING DOWN. UNLIKE IN THE MOVIES, IN THE MOUNTAINS CLIMBERS SLOWLY WALK DOWN A PITCH WITHOUT BOUNCING. AN ARM RAPPEL WORKS WELL ON SLOPES (NOT VERTICALS) WHEN THE CLIMBER HAS ON MULTIPLE LAYERS OF CLOTHES. THERE ARE MANY RAPPELLING DEVICES IN ADDITION TO THE FIGURE-EIGHT SHOWN.

CARABINER RAPPEL

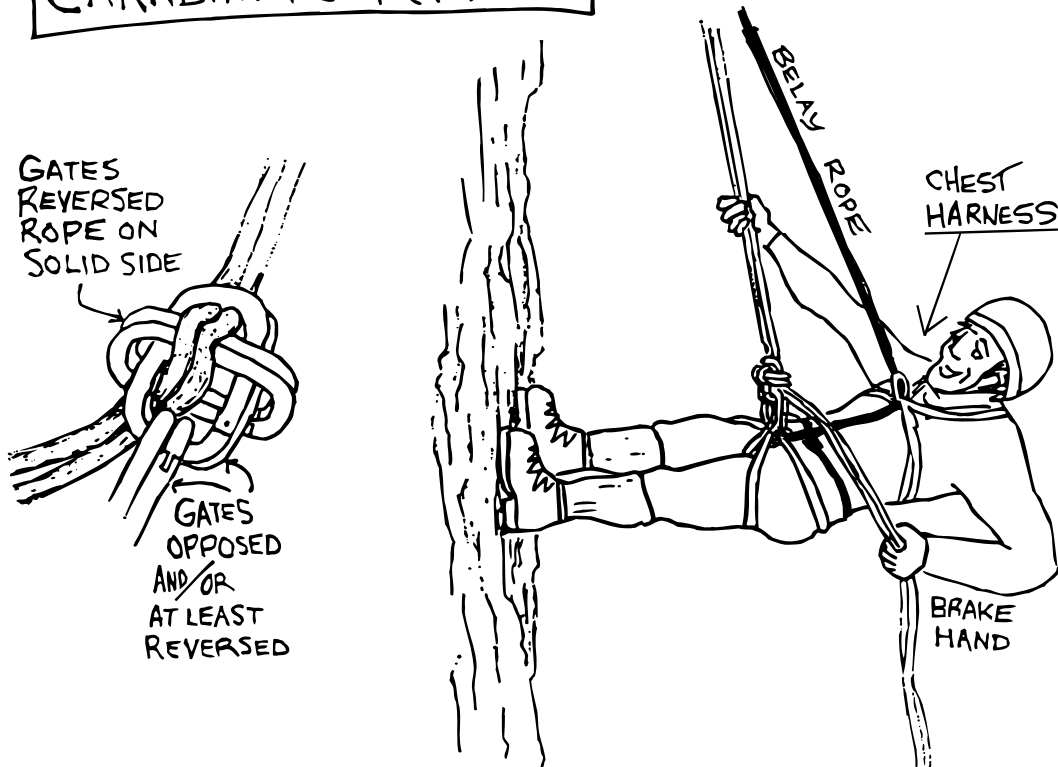
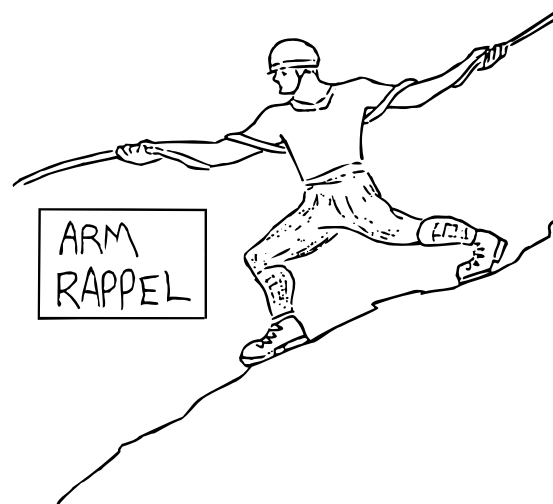
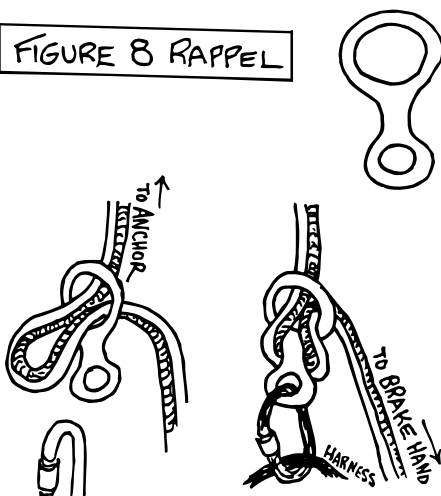
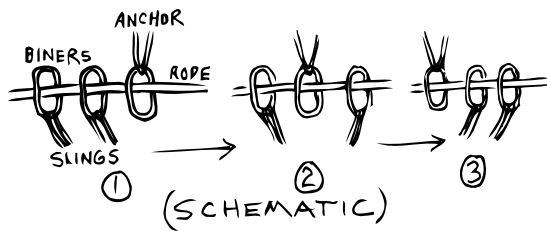


FIGURE 8 RAPPEL



PROTECTING ROPE

BY-PASSING AN ANCHOR ON A FIXED ROPE



KEEP TWO POINTS OF HAND OR SLING CONTACT AT ALL TIMES. MOVE SLINGS ONE AT A TIME PAST THE ANCHOR WITH ONE HAND WHILE THE OTHER HAND IS HOLDING



A FIXED LINE AND A RUNNING BELAY ARE TWO SIMILAR METHODS FOR PROTECTING A ROPE.

IN A FIXED LINE BOTH THE ROPE AND ANCHORS REMAIN STATIONARY WHILE THE CLIMBERS TRAVEL THE LENGTH OF THE ROPE.

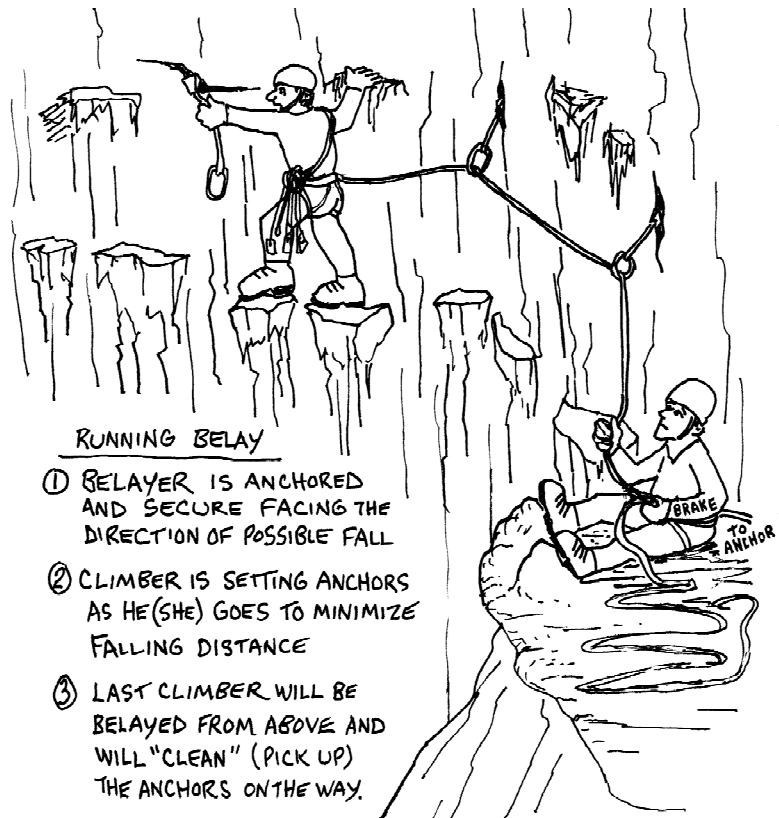
IN A RUNNING BELAY ONLY THE ANCHORS REMAIN STATIONARY WHILE THE ROPE AND CLIMBERS TRAVEL.

WITH A FIXED LINE ALL THE CLIMBERS MUST HAVE TWO PRUSIK SLINGS TO PASS ANCHORS WITHOUT DISCONNECTING.

WITH A RUNNING BELAY, ONLY THE MIDDLE CLIMBERS MUST HAVE EXTRA GEAR TO PASS ANCHORS.

ALTHOUGH ILLUSTRATED HERE FOR ROCK CLIMBING, BOTH TECHNIQUES ARE ALSO USED FOR SNOW AND ICE.

FREQUENTLY ON SNOW AND ICE SLOPES ALL CLIMBERS IN A RUNNING BELAY WILL BE IN MOTION SIMULTANEOUSLY, WHICH MAKES FOR SAFE, FAST TRAVEL.



- RUNNING BELAY**
- ① BELAYER IS ANCHORED AND SECURE FACING THE DIRECTION OF POSSIBLE FALL
 - ② CLIMBER IS SETTING ANCHORS AS HE(SHE) GOES TO MINIMIZE FALLING DISTANCE
 - ③ LAST CLIMBER WILL BE BELAYED FROM ABOVE AND WILL "CLEAN" (PICK UP) THE ANCHORS ON THE WAY.

SNOW CLIMBING

THE ICE AX IS PART OF A WAY OF WALKING ON SLOPED TERRAIN CALLED SELF-BELAY. FIRST, PLANT THE AX--THE SHAFT IN SNOW, THE PICK IN ICE--THEN MOVE EACH FOOT ONCE, THEN REPEAT. DO NOT MOVE THE ICE AX WHILE THE FEET ARE IN MOTION OR MOVE THE FEET WHILE THE AX IS IN MOTION.



QUICK QUIZ

WHEN SOMEONE ON YOUR ROPE TEAM FALLS, YOU SHOULD:

- A) THROW YOURSELF INTO SELF-ARREST
- B) RUN DOWN THE MOUNTAIN TO SEE IF YOU CAN HEAD THEM OFF
- C) STAY WHERE YOU ARE AND, IF POSSIBLE, PLANT YOUR ICE AX DEEPER

FIND THE ANSWER ON THE NEXT PAGE.

SELF-BELAY

WHEN SOMEONE ON YOUR ROPE TEAM FALLS YOU SHOULD STAY WHERE YOU ARE AND, IF POSSIBLE, PLANT YOUR ICE AX DEEPER. PROTECT THE POSITION OF THE ICE AX. IN SNOW DO NOT ALLOW THE ICE AX SHAFT TO BE PULLED PAST VERTICAL. IN ICE TRY TO HOLD THE AX PICK IN THE POSITION AS IT WAS PLANTED. IF THE AX WAS NOT PLANTED AT THE MOMENT OF THE FALL, THEN ATTEMPT TO PLANT IT QUICKLY.



STOPPING A SLIP
WITH A SELF-BELAY.

IN GENERAL THE PULL OF THE ROPE WILL BE RESISTED BEST WHILE IN A PRONE POSITION, AS ILLUSTRATED ON THIS PAGE. CLIMBERS SHOULD PRACTICE HITTING A PRONE POSITION IN RESPONSE TO A FALL. HOWEVER, THERE ARE SOME CIRCUMSTANCES WHERE KEEPING YOUR FEET WHERE THEY ARE IS THE MORE SECURE POSITION.

THE HARNESS CAN BE CONNECTED TO THE ICE AX SHAFT WITH A LOOP OF TUBULAR WEBBING OR PRUSIK ROPE TIED WITH A GIRTH HITCH. THE GIRTH HITCH WILL RIDE UP AND

DOWN THE AX SHAFT. IN THE EVENT OF A FALL, THE WEBBING WILL PROVIDE A SECURE CONNECTION FROM THE CLIMBER TO THE ICE AX. ANOTHER ALTERNATIVE IS A WRIST STRAP.

QUICK QUIZ

WHEN PULLED OFF YOUR FEET AND FALLING DOWN THE MOUNTAIN, YOU SHOULD:

- A) THROW YOURSELF INTO SELF-ARREST
- B) PRACTICE HOT-DOG STUNTS

FIND THE ANSWER ON THE NEXT PAGE.

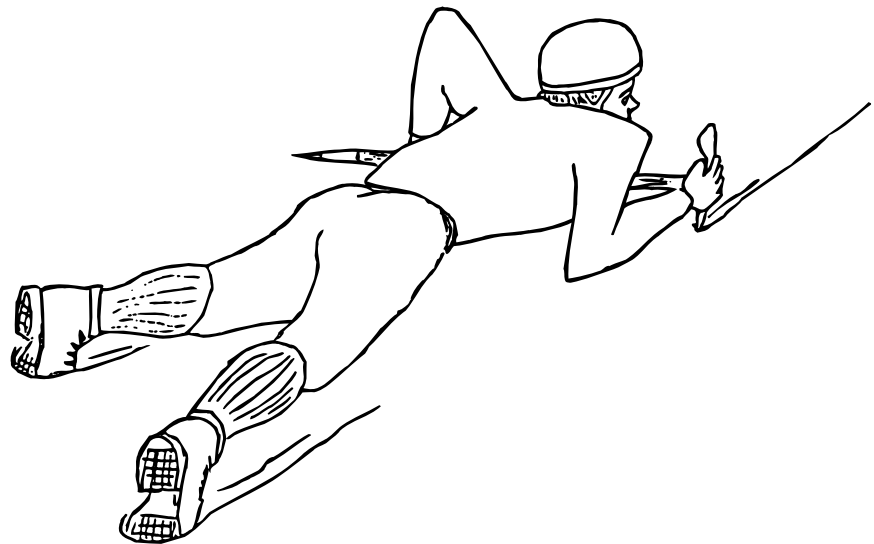
SELF-ARREST

SELF-ARREST IS THE APPROPRIATE TECHNIQUE WHEN FALLING OR WHEN PULLED OFF ONE'S FEET BY THE ROPE. HOWEVER, SELF-ARREST DOES NOT WORK WELL IN THE FOLLOWING SITUATIONS:

- ⇒ SNOW SLOPES GREATER THAN FORTY DEGREES (THE DEGREE WILL VARY WITH SNOW CONDITIONS)
- ⇒ MOST ICE SLOPES

IN CONDITIONS WHERE SELF-ARREST WILL NOT WORK THE ROPE MUST BE PROTECTED WITH ANCHORS.

THE FINAL SELF-ARREST POSITION IS ILLUSTRATED HERE, THE ICE AX DIAGONAL BENEATH THE CHEST WITH THE CHEST PUSHING DOWN THE AX HANDLE. THE FEET FORM A TRIPOD WITH THE CHEST AND PUSH WEIGHT ONTO THE CHEST AND THE AX.



AS WITH OPERATING A BELAY, INSTINCTIVELY GOING INTO SELF-ARREST WILL ONLY BE ACHIEVED BY THOSE WHO PRACTICE. CLIMBERS SHOULD PRACTICE SELF-ARRESTING FROM MULTIPLE SLIDING POSITIONS:

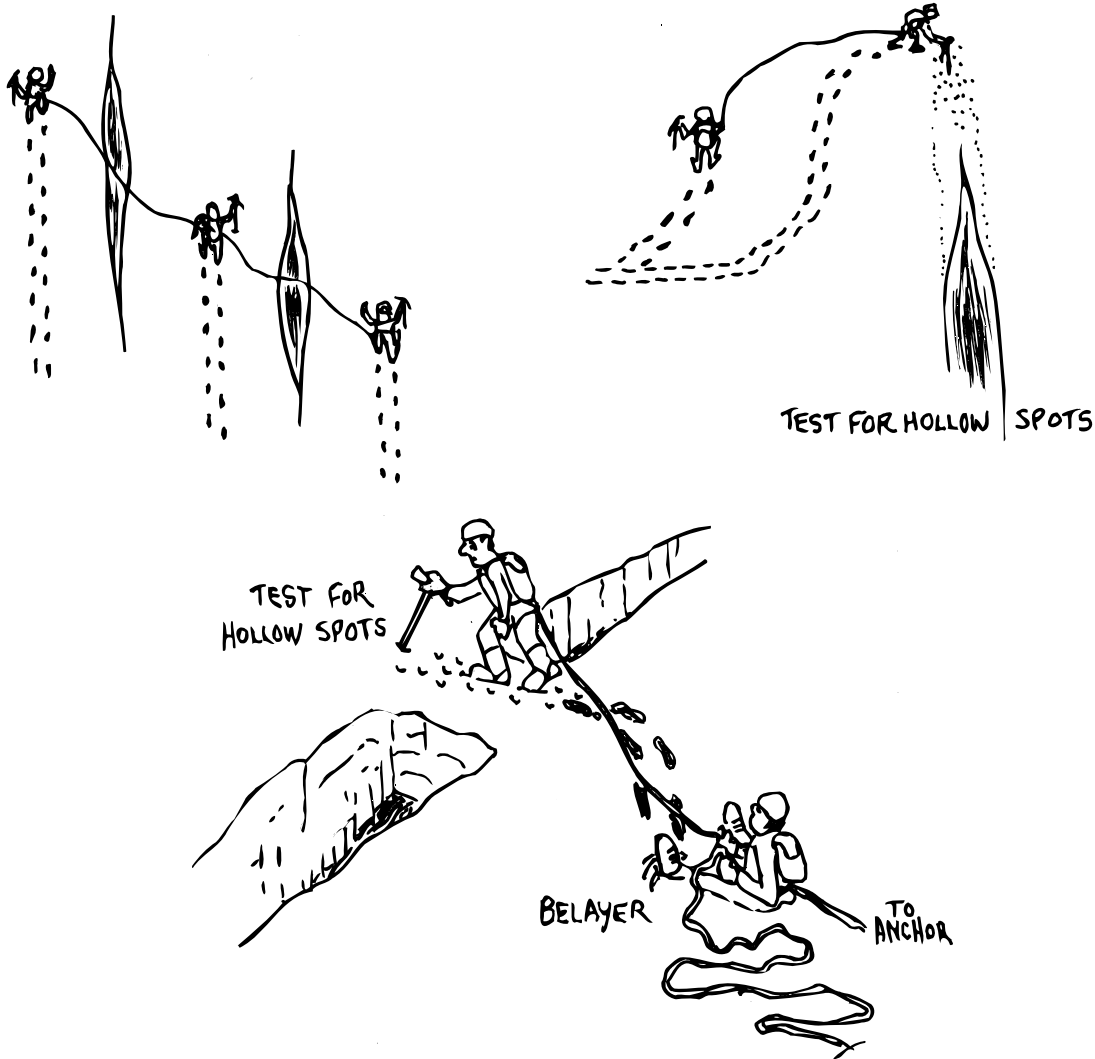
- ⇒ FEET FIRST ON THE BACK
- ⇒ HEAD FIRST ON THE STOMACH
- ⇒ HEAD FIRST ON THE BACK

SELF-ARREST IS DIFFICULT EVEN IN THE BEST CONDITIONS BECAUSE FALLING CLIMBERS ACCELERATE AND, WHEN MOVING FAST ENOUGH, BOUNCE. THE SOONER FALLING CLIMBERS GET INTO THE SELF-ARREST POSITION, THE BETTER CHANCE THEY HAVE OF GETTING SLOWED DOWN AND STOPPED SAFELY.

GLACIER TRAVEL

TWO COMMON HAZARDS ON GLACIERS ARE FALLING ROCKS AND CREVASSES THAT CAN NOT BE SEEN BECAUSE THEY ARE COVERED WITH SNOW OR ICE. ON GLACIERS AND SNOW PITCHES OF LESS THAN FORTY DEGREES, ROPE TEAMS OF THREE OR MORE PERSONS CAN TRAVEL SAFELY WITHOUT PLACING PROTECTION. THE ROPE SHOULD BE KEPT PERPENDICULAR TO CREVASSES EVEN IF THAT MEANS THE TEAM MEMBERS TRAVEL SIDE BY SIDE.

OPTIONS ON STEEP SNOW AND ICE ARE TO, 1) PLACE ANCHORS FOR A RUNNING BELAY (FASTEST), 2) PLACE A FIXED LINE, AND 3) HAVE A LEADER BELAY THE OTHER CLIMBERS TO EACH ANCHOR POINT (SLOWEST). IN THE THIRD



CASE, AS IN ROCK CLIMBING, TWO-PERSON ROPE TEAMS CAN MAKE REASONABLE TIME BY CHANGING THE LEAD WITH EACH LENGTH OF THE ROPE.

MINIMIZE POTENTIAL FALL DISTANCE AND, THEREFORE, FALL VELOCITY BY KEEPING THE ROPE AS TIGHT AS ALLOWS UNENCUMBERED WALKING. ON FLAT TERRAIN, WHERE SELF-BELAY IS NOT CONVENIENT, TRY TO HOLD A FALL WHILE STILL

STANDING. ONLY GO INTO SELF-ARREST AFTER BEING PULLED OFF YOUR FEET. ON STEEP SNOW, WHERE SELF-BELAY CAN BE EMPLOYED WITH EACH PLACEMENT OF THE ICE AX, TRY TO HOLD A FALL WHILE IN SELF-BELAY. ONLY ATTEMPT SELF-ARREST AFTER THE ICE AX HAS BEEN PULLED FROM THE SELF-BELAY POSITION.

CREVASSE RESCUE

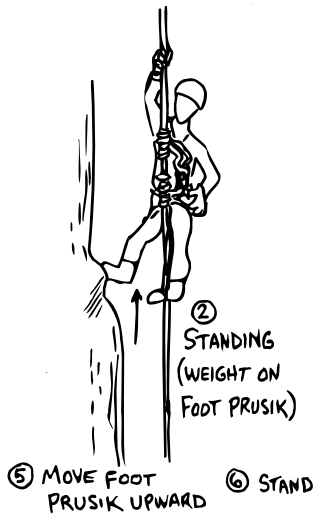


FIRST, SET AN ANCHOR SYSTEM (SETTING ANCHOR SYSTEMS INVOLVES ADVANCED TECHNIQUES NOT COVERED IN THE MOUNTAIN CLIMBING SCHOOL MANUAL).

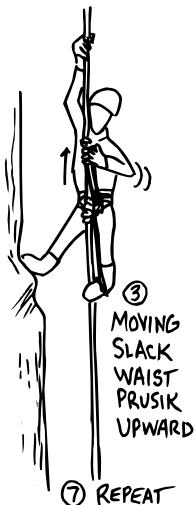
SECOND, COMMUNICATE WITH THE FALLEN CLIMBER.

- ⇒ LOWER WARM CLOTHING OR WARM WATER IF NEEDED
- ⇒ RAPPEL TO OR BE LOWERED TO AN UNCONSCIOUS CLIMBER

THIRD, MAKE A RESCUE PLAN.



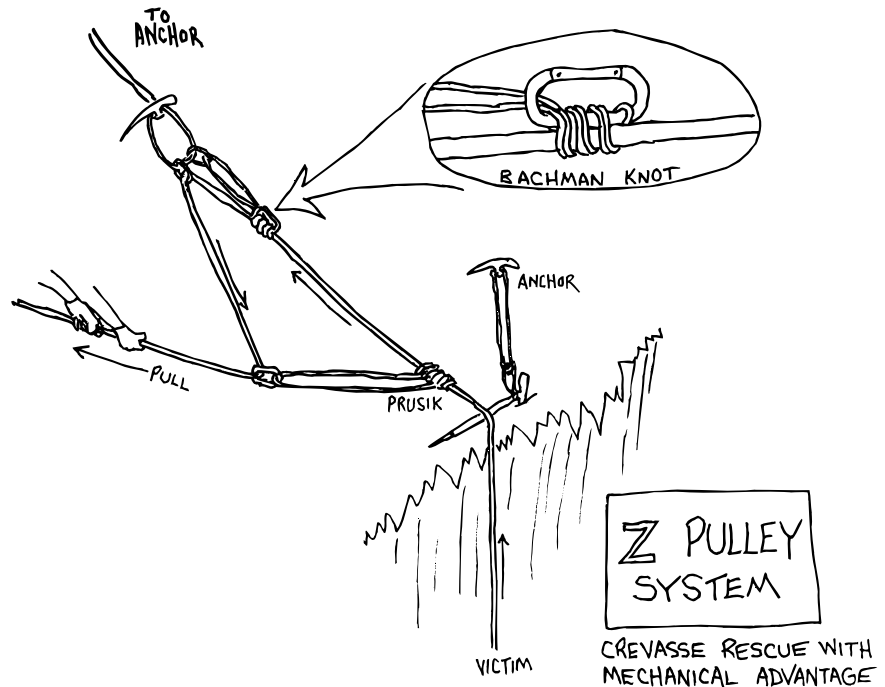
- ⇒ CURRENT OR SECOND ROPE?
 - ⇒ FOR AN ENTRENCHED CURRENT ROPE: USE PRUSIKS AND SLINGS TO REACH THE CLIMBER WHEN THEY NEAR THE TOP
- ⇒ SELF RESCUE
 - ⇒ PRUSIK OUT (ILLUSTRATED ON THIS PAGE)
 - ⇒ CLIMB OUT, PERHAPS BEING LOWERED TO MAKE THAT POSSIBLE
- ⇒ TEAM RESCUE
 - ⇒ MOST FORCE (JUST PULL THE VICTIM OUT): FIVE OR MORE RESCUERS
 - ⇒ C-PULLEY: THREE OR MORE RESCUERS
 - ⇒ Z-PULLEY: TWO OR MORE RESCUERS (ILLUSTRATED ON THE NEXT PAGE)
 - ⇒ Z PLUS C-PULLEY (OR C PLUS Z): ONE OR MORE RESCUERS



COMPLEX RESCUE SITUATIONS

MIDDLE CLIMBER IN (THREE PERSON ROPE TEAM)

- ⇒ FIRST, THE CLIMBER HOLDING THE LEAST WEIGHT SETS AN ANCHOR SYSTEM
- ⇒ SECOND, LOWER THE FALLEN CLIMBER ONTO THE ANCHOR SYSTEM
- ⇒ THIRD, BELAY THE THIRD CLIMBER TO THE ANCHORED SIDE OF THE CREVASSE
- ⇒ FOURTH, PROCEED TO CREVASSE RESCUE STEP TWO ON THE PREVIOUS PAGE



NOT ENOUGH ROOM BETWEEN CREVASSES

- ⇒ USE A PULLEY OR CARABINER TO CHANGE THE DIRECTION OF PULL

ROOFED CREVASSE

- ⇒ ENLARGE THE HOLE TO THE RESCUE EDGE OF THE CREVASSE. CAREFULLY REMOVE SNOW WITH A SHOVEL TO AVOID SNOW DROPPING ONTO THE CLIMBER.

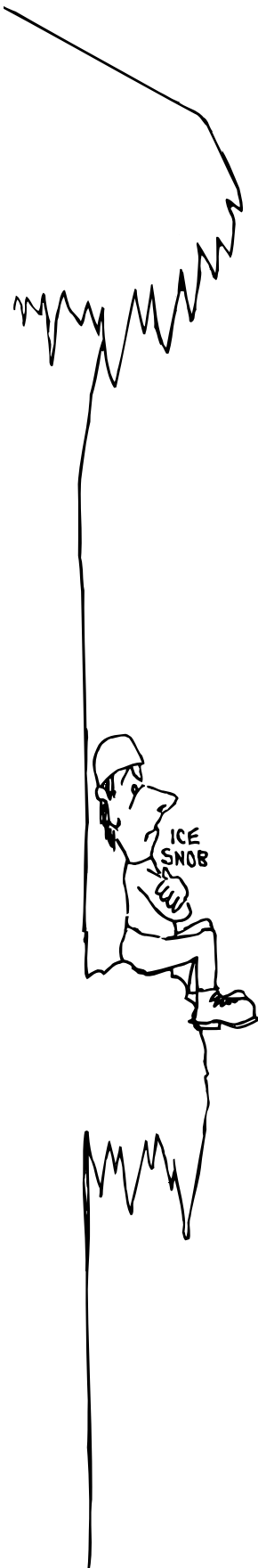
RAPPELLING TO AN UNCONSCIOUS CLIMBER

- ⇒ SECOND ROPE METHOD (RECOMMENDED): WITH ONE END OF THE ROPE ATTACHED TO THE HARNESS AND THE OTHER END TO THE ANCHOR SYSTEM WITH A PRUSIK KNOT, LOWER A LOOP OF ROPE HALF THE DISTANCE TO THE UNCONSCIOUS CLIMBER. TIGHTEN THE PRUSIK KNOT TO THE ANCHOR SYSTEM. THEN RAPPEL ALL THE WAY TO THE END OF THE ROPE. DON'T FORGET A PRUSIK SELF-RESCUE SYSTEM TO GET BACK OUT.
- ⇒ CURRENT ROPE METHOD (NOT RECOMMENDED): INSTALL THE RAPPELLING DEVICE IN THE LOOSE ROPE JUST ABOVE WHERE THE ANCHOR IS ATTACHED TO THE CURRENT ROPE. THEN ATTACH THE ANCHOR TO THE ROPE JUST ABOVE THE RAPPELLING DEVICE AND REMOVE THE ANCHOR ATTACHMENT THAT IS NOW BELOW THE RAPPELLING DEVICE. ATTACH A PRUSIK FROM THE HARNESS TO THE ROPE. RAPPEL DOWN WITH ONE HAND WORKING THE RAPPEL BRAKE, THE OTHER HAND KEEPING THE PRUSIK KNOT LOOSE. WHEN AT THE INJURED CLIMBER HOLD POSITION BY TIGHTENING THE PRUSIK KNOT.

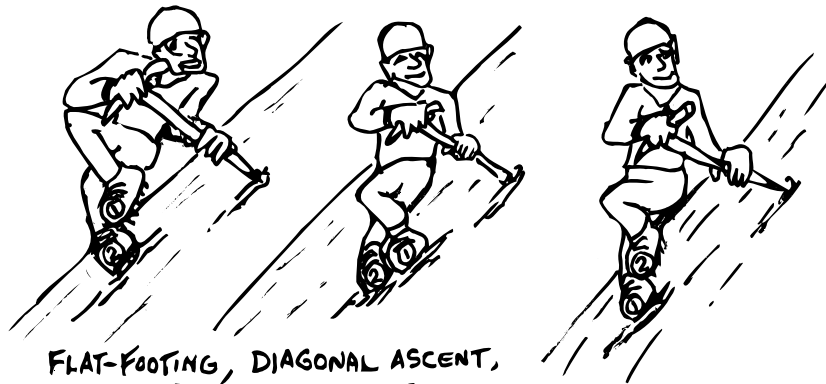
ICE CLIMBING

MOUNTAINEERING DOES NOT GET ANY EASIER THAN ASCENDING MODERATELY SLOPED ICE. IT'S LIKE WALKING ON A SIDEWALK. CLIMBS SOMETIMES START AT NIGHT IN ORDER TO ASCEND ON ICE, OR HARD CRUST, AND DESCEND ONCE THE SUN HAS COME UP AND WARMED THINGS UP TO SNOW AND SLUSH.

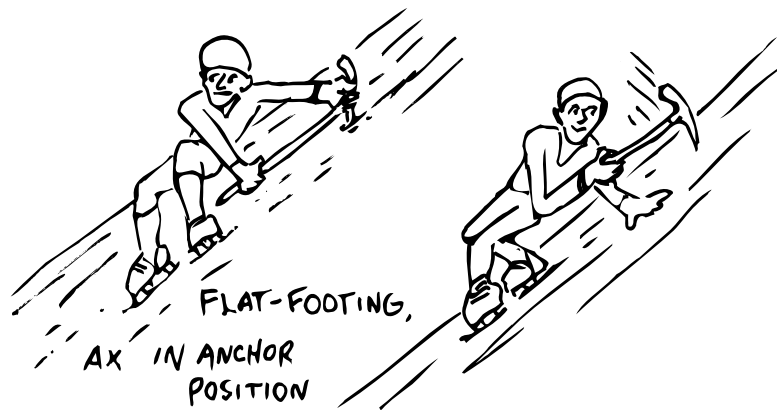
THE KEY TO WALKING WITH CRAMPONS IS TO KEEP ALL THE POINTS ON THE ICE, A TECHNIQUE CALLED FLAT-FOOTING AND FRENCH TECHNIQUE. SOMETIMES THAT MEANS WALKING SIDEWAYS, SOMETIMES WALKING BACKWARDS.



FLAT-FOOTING, DIAGONAL ASCENT,
CANE POSITION

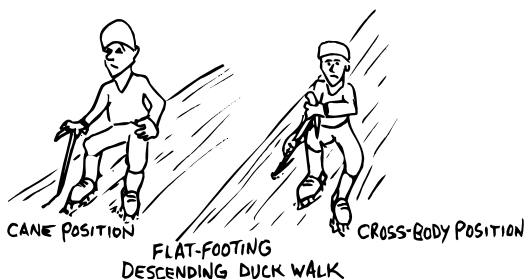


FLAT-FOOTING, DIAGONAL ASCENT,
CROSS-BODY AX POSITION



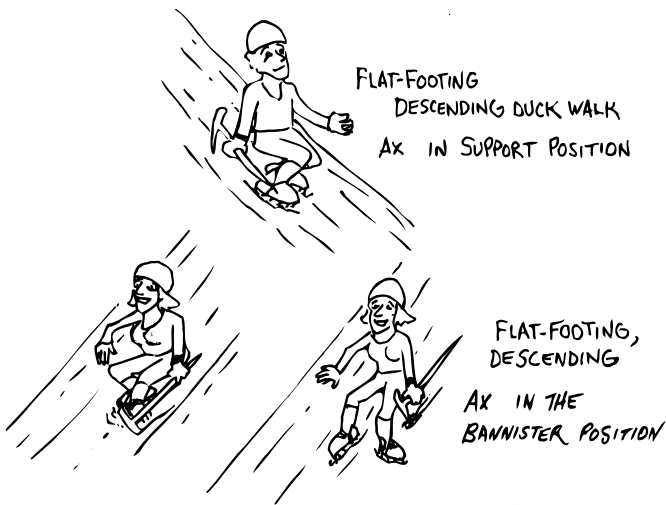
FLAT-FOOTING,
AX IN ANCHOR
POSITION

MORE ICE



MOST ACCIDENTS HAPPEN DURING DESCENTS. PEOPLE ARE TIRED AND READY FOR THE CLIMB TO BE OVER.

PLAN IN ADVANCE TO USE AN EXTRA MEASURE OF CAUTION ON THE DESCENT AND STICK TO THE PLAN.



FRONT POINTING PLACES THE FRONT CRAMPON POINTS DIRECTLY INTO STEEP ICE.

IN THE PACIFIC NORTHWEST THERE IS NO ICE THIS STEEP ON STANDARD MOUNTAIN ROUTES. YOU HAVE TO GO LOOKING FOR IT.

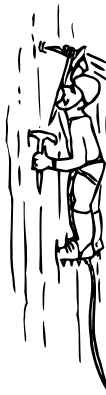
FRONT POINTING LOOKS HARD, BUT IS AMAZINGLY EASY. ALTHOUGH FRONT POINTING WORKS WITH ONE AX, TWO-TOOLING, WHICH USES TWO ICE AXES, IS MUCH EASIER ON LONG PITCHES.



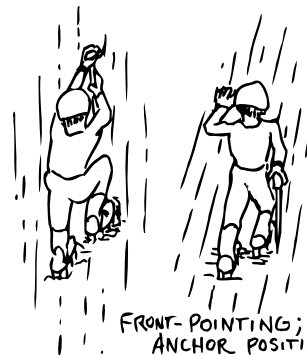
FRONT-POINTING;
HIGH DAGGER POSITION



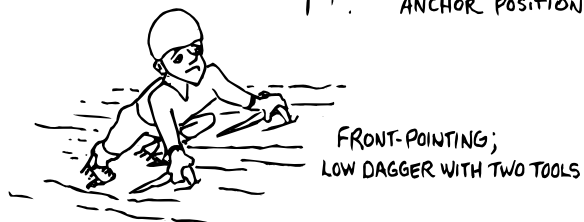
FRONT-POINTING WITH AX IN
LOW DAGGER POSITION



FRONT-POINTING;
LEFT TOOL, TRACTION;
RIGHT TOOL, HIGH DAGGER



FRONT-POINTING;
ANCHOR POSITION



FRONT-POINTING;
LOW DAGGER WITH TWO TOOLS

GLOSSARY

ALPINE: CONCERNING HIGH MOUNTAINS, ORIGINALLY, CONCERNING THE ALPS.

ALPINE START: AN EARLY MORNING START IN ORDER TO ASCEND BEFORE THE SNOW BECOMES SOFT FROM THE SUN OR IN ORDER TO RETURN BEFORE NIGHTFALL.

ALPINE STYLE: LIGHTWEIGHT CLIMBING THAT EMPHASIZES THE ROLE OF SPEED IN SAFETY TO TAKE ADVANTAGE OF GOOD CONDITIONS THAT MIGHT PREVAIL ONLY A SHORT TIME.

AMS (ACUTE MOUNTAIN SICKNESS): SYMPTOMS OF LOW BLOOD OXYGEN LEVEL DUE TO HIGH ALTITUDE: HEADACHE, LOSS OF APPETITE, NAUSEA, VOMITING, MALAISE AND DISTURBED SLEEP. HYPOXIA IS A RELATED DEBILITATING LACK OF OXYGEN.

ANCHOR: POINT WHERE THE ROPE IS SECURED TO THE SNOW, ICE OR ROCK WITH EITHER FIXED BOLTS, ROCKS, TREES OR NON-FIXED GEAR TO PROVIDE PROTECTION AGAINST A FALL. AN EQUALIZED ANCHOR (EQUALIZED ANCHOR SYSTEM) PLACES EQUAL WEIGHT ON MULTIPLE DEVICES TO REDUCE THE CHANCE OF FAILURE. ANY INDIVIDUAL ANCHOR POINT, WHETHER CREATED WITH ONE PIECE OF PROTECTION OR WITH MULTIPLE PIECES IN AN EQUALIZED ANCHOR, MUST BE ABLE TO HOLD A FALL. THE CONDITION OF THE ROCK, SNOW OR ICE DETERMINES WHETHER AN INDIVIDUAL ANCHOR DEVICE WILL PROVIDE ADEQUATE SECURITY OR WHETHER AN EQUALIZED ANCHOR IS REQUIRED.

APPROACH: THE SECTION OF THE CLIMB LEADING UP TO THE TECHNICAL SECTION OF THE CLIMB.

ASCENDER (JUMAR, CLOG) : A MECHANICAL BRAKING DEVICE USED FOR BELAYING ONESELF FROM A VERTICAL FIXED ROPE. BY COMPARISON, CARABINERS ON SLINGS ARE OFTEN USED TO CONNECT TO A FIXED LINE ON A TRAVERSE.

AVALANCHE: THE MOVEMENT DOWN THE MOUNTAIN OF PREVIOUSLY STATIONARY SNOW, ROCK, OR BOTH. SNOW AVALANCHE CONDITIONS FOR OPEN SLOPES CAN OFTEN BE PREDICTED BY MONITORING THE WEATHER.

BELAY: SAFETY TECHNIQUE WHERE A STATIONARY CLIMBER PROVIDES PROTECTION BY MEANS OF ROPES, ANCHORS AND BRAKING DEVICES OR TECHNIQUES, TO AN ASCENDING OR DESCENDING PARTNER. A STATIC BELAY IS WHEN A FALL IS HELD FAST. A DYNAMIC BELAY IS WHEN A FALL IS BROUGHT TO A GRADUAL STOP BY ALLOWING THE ROPE TO SLIDE SOMEWHAT TO NOT OVERLOAD THE ANCHOR WITH THE FORCE OF THE FALL.

BELAY DEVICE (ATC, FIGURE EIGHT): A METAL DEVICE THROUGH WHICH A CLIMBING ROPE IS THREADED TO CREATE FRICTION TO BRAKE A FALL. MANY BELAY DEVICES CAN DOUBLE AS A RAPPEL DEVICE.

BELAY STATION: AN ANCHORED STANCE FROM WHERE A CLIMBER PROVIDES ROPED PROTECTION FOR A PARTNER IN MOTION.

BERGSCHRUND (SCHRUND): A GAP OR CREVASSE THAT APPEARS NEAR THE HEAD OF A GLACIER WHERE THE NEVE FIELD PORTION OF THE GLACIER JOINS THE VALLEY PORTION OF THE GLACIER. A MOAT IS A GAP BETWEEN THE TOP EDGE OF A GLACIER AND THE UPPER PORTIONS OF THE MOUNTAIN FACE. SCHRUNDS AND MOATS CAN CREATE OBSTACLES.

BIVOUAC (BIVY, BIVI): A HIGH CAMP, NOT ALWAYS A PLANNED OVERNIGHT STOP.

BOLLARD: AN ANCHOR IN SNOW OR ICE CREATED BY CUTTING OR SHAPING THE SURFACE SO A ROPE OR SLING CAN SECURELY ENCIRCLE THE FEATURE.

BOLT: A SUBSTANTIAL METAL PIN DRILLED IN THE ROCK TO PROVIDE PERMANENT PROTECTION. A TYPE OF ANCHOR REJECTED BY TRADS.

BOOT-AX BELAY: A BELAY TECHNIQUE USED ON SNOW WHERE THE CLIMBING ROPE IS WOUND AROUND BOTH A FIRMLY PLANTED ICE AX SHAFT AND THE BELAYER'S BOOT. BOOT-AX BELAY OFTEN REQUIRES AN ANCHOR IN ADDITION TO THE AX.

BOULDER: TO CLIMB A DIFFICULT, BUT SHORT, ROCK PITCH WHERE A POTENTIAL FALL WILL BE OF MINIMAL CONSEQUENCE (SHY OF A CRATER).

CAIRN: A PILE OF ROCK, WOOD OR BOTH USED TO MARK A ROUTE OR ROUTE JUNCTION.

CAM: A MECHANICAL SPRING-LOADED DEVICE THAT CAN BE INSERTED IN ROCK CRACKS THROUGH WHICH A CLIMBING ROPE CAN BE THREADED FOR PROTECTION.

CARABINER (BINER): FORGED ALUMINUM DEVICES OF VARIOUS SHAPES (OVAL, D, ETC.) WITH A SPRING-LOADED GATE THROUGH WHICH A CLIMBING ROPE CAN BE THREADED. USED TO CONNECT TO PROTECTION OR TO PROVIDE CONNECTIONS IN AN ANCHOR. THE GATE OF A LOCKING CARABINER CAN BE SCREWED OR LOCKED TIGHT FOR INCREASED SECURITY.

CHIMNEY: A ROCK ROUTE LARGE ENOUGH FOR THE CLIMBER TO FIT INSIDE.

CLEAN: TO REMOVE PROTECTION (CAMS, PICKETS, ETC.); USUALLY THE RESPONSIBILITY OF THE LAST CLIMBER IN A ROPE TEAM.

CLIPPING IN: USING A CARABINER TO CONNECT TO BELAYS AND ANCHORS OR TO CONNECT ROPES TO PROTECTION.

CORNICE: WIND-SCULPTED SNOW OVERHANGING A RIDGE; A HAZARD TO AVOID BY NOT WALKING ON OR IN THE FALL LINE BELOW IT.

COULOIR: A GULLY, SOMETIMES A POTENTIAL ROUTE. A CHUTE OR BOWLING ALLEY IS STEEP ENOUGH FOR ROCK OR ICE FALL TO BE A CONCERN.

CRAMPONS: SPIKED METAL DEVICES THAT ATTACH FIRMLY TO CLIMBING BOOTS TO PROVIDE RELIABLE FOOTING ON ICE AND FIRM SNOW SLOPES.

CREVASSE: A CRACK IN A GLACIER SURFACE. CREVASSES VARY IN WIDTH AND DEPTH AND ARE OFTEN CONCEALED BY SURFACE SNOW. CONCEALED CREVASSES ARE A HAZARD FOR CLIMBERS ON GLACIERS.

DEADMAN: ANY DEVICE (PICKET, SHOVEL, BAG OF SNOW) BURIED IN DEEP SNOW THAT PROVIDES AN ANCHOR.

DIAL IN (DIALED, WIRED): KNOWING A ROUTE WELL FROM HAVING CLIMBED THE SAME PITCH OR MOUNTAIN REPEATEDLY. A SIMILAR CONCEPT IS HANGING ON A ROPE IN THE SAME PLACE TO PRACTICE MOVES OVER AND OVER, A PRACTICE KNOWN AS HANGDOG OR DOG. A LEGITIMATE QUESTION TO ASK A CLIMB ORGANIZER IS, "DO YOU HAVE THE ROUTE DIALED IN?" EXPERIENCED CLIMBERS OFTEN GO EXPLORING TOGETHER. NEW CLIMBERS SHOULD CONSIDER LIMITING THEMSELVES TO CLIMBS DIALED IN BY ONE OR MORE CLIMB PARTICIPANTS. SNOW ROUTES, HOWEVER, OFTEN CHANGE FREQUENTLY ENOUGH TO EVADE GETTING DIALED IN.

DOWNCLIMB: DESCENDING A PITCH IN A MANNER THAT OFTEN REQUIRES MORE SKILL THAN CLIMBING UP AND THEREFORE PROVIDES GOOD PRACTICE FOR THE CLIMBER AND, OFTEN, THE BELAYER. STATISTICALLY SAFER THAN RAPPELLING.

DOUBLE FISHERMAN'S KNOT: A KNOT USED TO TIE LENGTHS OF SMALL ROPE TOGETHER OR INTO SLINGS.

DRY-TOOL: TO ASCEND A SECTION OF ROCK USING ICE TOOLS, A TECHNIQUE OFTEN USED FOR SHORT SECTIONS OF ROCK ON ALPINE CLIMBS.

EDGING: A ROCK CLIMBING TECHNIQUE WHERE THE EDGES OF THE CLIMBING SHOES ARE USED TO STAND ON SMALL FOOHOLDS. BY COMPARISON SMEARING APPLIES AS MUCH OF THE SOLE OF THE CLIMBING SHOE AS POSSIBLE TO A ROCK SLAB TO ACHIEVE MAXIMUM FRICTION.

EXPOSURE: THE DISTANCE FROM THE CLIMBER TO WHERE THE CLIMBER WOULD LIKELY STOP IN THE EVENT OF AN UNPROTECTED FALL.

FALL: TO INVOLUNTARILY LOSE ONE'S POSITION OR, CARL OCKIER'S DEFINITION, "A DYNAMIC RETREAT FROM A CLIMB." SHORT FALLS ONTO PROTECTED ROPE TEND TO BE SILENT SINCE THERE IS INSUFFICIENT TIME TO CALL OUT. A SCREAMER IS LONG ENOUGH TO PROVIDE THE LUXURY OF VOCAL PANIC. A WHIPPER IS SIMILAR TO A SCREAMER BUT PULLS THE VOCAL ROUTINE BACK TO NORMAL AS THE ROPE CATCHES THE FALL. A CRATER ENDS WHEN THE CLIMBER HITS THE GROUND.

FALL! (FALLING!): WHAT CLIMBERS IN THE VICINITY YELL TO PROTECT THEIR TEAM AND OTHERS WHEN SOMEONE IS IN A FALL.

FALL LINE: THE DIRECTION A FALL WOULD TAKE. THE BELAY POSITION AND BELAY ANCHORS SHOULD BE IN LINE WITH THE FALL LINE TO PREVENT A PENDULUM EFFECT.

FIGURE-EIGHT KNOT: THE BASIC CLIMBER'S KNOT, WHEN RETRACED, USED TO ATTACH A CLIMBER'S HARNESS TO THE ROPE AND FOR MANY OTHER PURPOSES. NOT TO BE CONFUSED WITH A FIGURE-EIGHT BELAY AND RAPPEL DEVICE.

FIXED ROPE: A ROPE ANCHORED TO A ROUTE BY THE LEAD CLIMBER AND LEFT IN PLACE FOR OTHERS WHO FOLLOW; A MECHANICAL ASCENDER OR, ON A TRAVERSE, CLIPPED-IN CARABINERS SLIDING ALONG THE ROPE CAN BE USED FOR EXTRA CLIMBING ASSISTANCE AND PROTECTION.

FLAT FOOTING (FRENCH TECHNIQUE): KEEPING ALL THE CRAMPON POINTS IN THE ICE BY WALKING SIDEWAYS WITH ANGLED ANKLES OR BY WALKING BACKWARDS.

FLUKE: A DYNAMIC SNOW ANCHOR THAT DIVES DEEPER AS IT MOVES. FOR USE IN SOFT SNOW WHERE PICKETS WILL PULL OUT. BECAUSE A FLUKE SLOWS A FALL RATHER THAN STOPS A FALL, FLUKES SHOULD ONLY BE USED ON PITCHES WHERE SLOWING A FALL IS ADEQUATE PROTECTION.

FREE CLIMB: TO CLIMB USING ONLY ONE'S HANDS AND FEET WITHOUT ARTIFICIAL AIDS. A BELAY ROPE MAY BE EMPLOYED. AS OPPOSED TO AID CLIMB.

FREE SOLO: TO FREE CLIMB WITHOUT EVEN A BELAY ROPE AND TO ACCEPT A CRATER AS THE POTENTIAL CONSEQUENCE OF A LONG FALL.

FRONT POINTING: A TECHNIQUE FOR ASCENDING STEEP OR OVERHANGING ICE WHERE THE EXTENDED FRONT POINTS OF THE CRAMPONS PROVIDE GRIP OR BITE INTO THE ICE.

GENDARME: A MASS OF ROCK PROTRUDING FROM A RIDGE THAT FORCES THE ROUTE FROM THE TOP OF THE RIDGE TO ITS SIDE. FROM THE FRENCH WORD FOR CONSTABLE OR POLICE.

GIRTH HITCH: A KNOT MADE BY LOOPING THE END OF A SLING OVER ITSELF. MOSTLY USED TO ATTACH TO ANCHORS.

GLISSADE: DESCENDING MODERATE SNOW SLOPES UNDER CONTROL BY SLIDING ON ONE'S FEET OR RUMP. GLISSADING INAPPROPRIATELY STEEP OR ICY SLOPES IS THE CAUSE OF A SURPRISING NUMBER OF MOUNTAINEERING ACCIDENTS.

GYM RAT: ONE OF MANY USUALLY COLORFUL TERMS FOR PERSONS WHO BELIEVE THEY KNOW CLIMBING BECAUSE THEY CLIMB IN GYMS BUT NEITHER KNOW NOR TRUST ANCHORS AND PROTECTION OUTSIDE OF A GRI-GRI.

HACE (HIGH ALTITUDE CEREBRAL EDEMA): SWELLING OF THE BRAIN DUE TO CELL DEATH AND FLUID INCREASE; THE MOST SERIOUS FORM OF ALTITUDE SICKNESS.

HACE (HIGH ALTITUDE DUMB): TEMPORARY INTELLIGENCE LOSS DUE TO REDUCED OXYGEN IN THE BLOOD SUPPLYING THE BRAIN. UNLIKE HACE AND HAPE, HADE OFTEN OCCURS AT MODEST ALTITUDES AND CAN BE ARTIFICIALLY INDUCED EVEN AT SEA LEVEL BY DRINKING TOO MUCH BEER.

HAPE (HIGH ALTITUDE PULMONARY EDEMA): FLUID BUILD UP IN THE LUNGS. CAN LEAD TO HACE IF DESCENT IS NOT IMMEDIATE.

HARNESS: A STRONG BELT WITH LEG LOOPS MADE OF NYLON WEBBING USED TO SECURE THE CLIMBER TO THE ROPE, OFTEN WITH LOOPS TO HOLD CLIMBING HARDWARE. A CHEST HARNESS IS SOMETIMES WORN IN ADDITION TO A WAIST HARNESS TO PREVENT AN INVERTED FALL, FOR EXAMPLE, WHEN CROSSING A GLACIER WITH A HEAVY PACK.

HEADWALL: THE UPPER SECTION OF A MOUNTAIN WHERE THE TERRAIN IS SET OFF FROM THAT BELOW BY BEING MORE STEEP.

HEXCENTRIC (HEX): A HEXAGON-SHAPED NUT ATTACHED TO A FLEXIBLE LOOPED WIRE FOR INSERTION INTO A ROCK CRACK FOR PROTECTION.

HYPOTHERMIA: LOW BODY TEMPERATURE CAUSED BY COLD AMBIENT TEMPERATURE; THE MOST COMMON CAUSE OF DEATH IN THE WILDERNESS.

ICE AX (AXE): A MOUNTAINEERING TOOL, POINTED AT THE BASE OF THE SHAFT AND WITH A HEAD CONSISTING OF A PICK AND AN ADZE. A STANDARD AX SHAFT MAY BE 60 TO 75 CM IN LENGTH WHILE TECHNICAL AXES ARE TYPICALLY 50 CM LONG. SECOND OR THIRD TOOLS MAY BE SHORTER YET, 38-45 CM.

ICE HAMMER: A VARIANT OF THE ICE AX WHERE THE HEAD CONSISTS OF A PICK AND A HAMMER, USUALLY USED IN COMBINATION WITH AN ICE AX. THE HAMMER IS USED TO POUND IN PROTECTION.

ICE SCREW: A THREADED PITON DESIGNED TO BORE INTO ICE SECURELY ENOUGH TO SERVE AS AN ANCHOR.

JAM: TO WEDGE OR JAM BODY PARTS--FINGERS, A HAND, A FOOT, ETC.--INTO CRACKS AND APPLY TORQUE TO ADHERE TO THE ROCK. BOTH STRENUOUS AND REMOTE FROM ORDINARY EXPERIENCE, JAMMING IS DIFFICULT TO LEARN AND REQUIRES REAL ROCK TO DO SO. GYMS DO NOT REPLICATE CRACKS WELL. ONCE MASTERED, JAMMING OFTEN BECOMES THE HOLD OF CHOICE BY CRACKMASTERS.

LEAD (SHARP END OF THE ROPE): TO BE THE FIRST CLIMBER UP A PITCH AND TO PLACE PROTECTION ALONG THE WAY WHILE BEING BELAYED BY A PARTNER FROM BELOW.

LIEBACK (LAYBACK): A TECHNIQUE WHERE THE CLIMBER'S HANDS PULL ONE WAY AND THE FEET PUSH THE OPPOSITE WAY.

MIXED CLIMBING: ASCENDING A ROUTE INVOLVING A COMBINATION OF SNOW, ROCK OR ICE.

MORAINE: A RANDOM ACCUMULATION OF BOULDERS, ROCKS, SCREE AND SAND CARRIED DOWN THE MOUNTAIN AND DEPOSITED BY A GLACIER. CROSSING A MORaine IS SLOW GOING AND IS ONLY DONE WHEN ALTERNATIVE ROUTES WOULD TAKE EVEN MORE TIME.

MULTI-PITCH CLIMB: A TECHNICAL CLIMB THAT IS LONGER THAN A SINGLE ROPE LENGTH, THUS REQUIRING MULTIPLE ANCHOR AND BELAY STATIONS.

NUT (STOPPER): A METAL WEDGE WITH A WIRE LOOP THAT IS INSERTED IN CRACKS IN ROCK FOR PROTECTION.

PICKET: A "T" SHAPED LENGTH OF ALUMINUM 2' TO 3' LONG POUNDED OR BURIED IN THE SNOW FOR PROTECTION.

PITCH: A SECTION OF CLIMBING BETWEEN TWO BELAY POINTS, NO LONGER THAN THE LENGTH OF A CLIMBING ROPE.

PITON: A METAL SPIKE THAT CAN BE HAMMERED INTO ROCK CRACKS FOR PROTECTION. A TYPE OF ANCHOR REJECTED BY TRADS.

PLAN B: THE CONSEQUENCES OF A FALL. A GOOD PLAN B GENERALLY INVOLVES BEING CAUGHT BY A PROTECTED ROPE. A BAD PLAN B INVOLVES PROBABLE INJURY. WHEN CONDITIONS DO NOT ALLOW FOR ANY GOOD PLAN B, FOR EXAMPLE, SNOW TOO SOFT TO HOLD PROTECTION, THE SAFE COURSE IS TO TURN AROUND. LOOP ROUTES ARE INHERENTLY MORE HAZARDOUS THAN ASCENDING AND DESCENDING THE SAME ROUTE BECAUSE CLIMBERS FORFEIT THE OPPORTUNITY TO ASSESS A PLAN B FOR THE DESCENT ROUTE. FOR EXAMPLE, ASCENDING BY A ROUTE THAT CAN ONLY HOLD PROTECTION BEFORE THE SUN WARMS IT, THEN DESCENDING BY ANOTHER ROUTE DOES NOT ALLOW THE CLIMBERS TO OBSERVE THE CONDITION OF THE DESCENT ROUTE BEFORE HAVING NO CHOICE BUT TO USE THE ROUTE.

PROTECTION (PRO, FIXATION DEVICE): ANY ANCHOR--A NUT, CAMMING DEVICE, ICE SCREW, PICKET OR FLUKE--USED DURING A CLIMB TO MINIMIZE THE CONSEQUENCES OF A FALL. INTERMEDIATE PROTECTION IS THE PRO USED BETWEEN TWO BELAY POINTS. TO MAINTAIN ADEQUATE SPEED EQUALIZED ANCHORS ARE GENERALLY NOT USED IN INTERMEDIATE PROTECTION.

PRUSIK: A SLIDING FRICTION KNOT USED TO ANCHOR A SMALL DIAMETER ROPE TO A LARGE DIAMETER ROPE; ALSO, TO ASCEND A ROPE WITH PRUSIK SLINGS.

RACK: THE COLLECTION OF PRO CARRIED BY A CLIMBER ON WAIST HARNESS LOOPS AND SHOULDER SLINGS. A CLIMBER WEARING A COLORFUL RACK BEARS A STRIKING RESEMBLANCE TO A FANNED PEACOCK, WHICH IS ONE REASON TO TRUST ONLY CLIMBERS WITH GRAY OR BLACK RACKS, ALTHOUGH BLACK WITH WHITE ACCENTS IS ALWAYS IN GOOD TASTE.

RAPPEL (RAP, ABSEIL): TO DESCEND A FIXED ROPE, USUALLY BY MEANS OF A BRAKING DEVICE. STATISTICALLY THE MOST DANGEROUS CLIMBING ACTIVITY PROBABLY BECAUSE TOO MANY CLIMBERS RAPPEL WITHOUT A GOOD PLAN B, THAT IS, WITHOUT A BELAY. FOR THE LAST PERSON DOWN A PITCH THERE IS NO WAY TO BELAY A RAPPEL.

FOR THAT REASON THE LAST PERSON OFTEN RAPPELS WITHOUT A BELAY. AN ALTERNATIVE FOR THE LAST PERSON IS TO DOWNCLIMB THE PITCH WHILE BEING TOP ROPED.

REQUIRED TURN-AROUND TIME: THE TIME OF DAY AT WHICH CLIMBERS MUST TURN BACK IN ORDER TO DESCEND SAFELY. UNANTICIPATED SLOW-GOING CAN CAUSE CLIMBERS TO REACH THE REQUIRED TURN-AROUND TIME BEFORE REACHING THE SUMMIT.

RIME: A THIN LAYER OF ICE AND HARD SNOW OVER ROCK. BY COMPARISON VERGLAS IS A THIN LAYER OF ICE OVER ROCK, A HAZARDOUS CONDITION TO BE AVOIDED.

ROCK!: WHAT CLIMBERS IN THE VICINITY YELL TO PROTECT THEIR TEAM AND OTHERS WHEN NATURE OR A CLIMBER SENDS A ROCK FLYING DOWN THE MOUNTAIN. OFTEN USED TO ALERT CLIMBERS OF ANY FALLING OBJECT, ICE, WATER BOTTLES, ETC.

RUNNEL: IN COMMON USAGE A RIVULET OR BROOK. IN MOUNTAINEERING, A GROOVE IN SNOW CREATED BY A FALLING CORNICE. CROSSING RUNNELS IS SLOW GOING. A SERIES OF RUNNELS OFTEN ENDS AN ASCENT.

RUNNING BELAY: A SIMILAR TECHNIQUE TO A FIXED LINE EXCEPT THE ROPE MOVES WITH THE CLIMBERS.

RUNOUT: THE DISTANCE BETWEEN TWO POINTS OF PROTECTION; THE DISTANCE BETWEEN A LEAD CLIMBER AND THE LAST PIECE OF PROTECTION; THE FALL DISTANCE ALLOWED BY THE DISTANCE FROM THE LAST PIECE OF PROTECTION.

SADDLE (COL, LOW POINT): THE LOWEST POINT OF ELEVATION BETWEEN TWO PEAKS. A COL MORE OFTEN REFERS TO A LOW POINT BETWEEN TWO LESSER POINTS, FOR EXAMPLE, A LOW POINT IN A RIDGE. SADDLES AND COLS ARE COMMON WAYPOINTS IN ROUTES BECAUSE ROUTES OFTEN FOLLOW THE LOW GROUND.

SCRAMBLE: EASY UNPROTECTED CLIMBING.

SCREE: SMALL LOOSE ROCKS. DIFFICULT TO ASCEND, LIKE CLIMBING A SLOPE OF LOOSE SAND, SCREE SLOPES ARE OFTEN USED FOR DESCENTS, A PRACTICE DISCOURAGED BY TRADS.

SECOND (FOLLOW): THE CLIMBER WHO FOLLOWS A LEAD UP A PITCH AND BELAYS FROM BELOW WHILE THE LEAD ADVANCES, THEN ASCENDS TO THE END OF THE PITCH WHILE OFTEN REMOVING THE INTERMEDIATE PROTECTION.

SELF-BELAY: A TECHNIQUE FOR SELF-PROTECTION ON SNOW AND ICE WHERE ONE OR MORE ICE AXES ARE SECURED BEFORE THE FEET MOVE; ALSO, USING AN ASCENDER OR CARABINERS TO ATTACH ONESELF TO A FIXED LINE.

SEW UP: TO PLACE PROTECTION CLOSE TOGETHER ALONG A ROUTE WITH THE IMPLICATION BEING THAT THE PROTECTION BEING PLACED IS EXCESSIVE WHEN COMPARED TO COMMON PRACTICE. SEWING A ROUTE ON GOOD ROCK OR SNOW ADDS TO SAFETY BY REDUCING THE POTENTIAL FALL DISTANCE AND THE POTENTIAL FALL FORCE REACHING AN ANCHOR. IN POOR ROCK OR SOFT SNOW THE SAFER TECHNIQUE IS TO USE THE SAME AMOUNT OF

PROTECTION (OR MORE) TO CREATE FEWER ANCHOR POINTS BUT TO MAKE EACH ANCHOR POINT AN EQUALIZED ANCHOR SYSTEM.

SLING (RUNNER): A LENGTH OF NYLON WEBBING OR CORD EITHER SEWN OR TIED INTO A LOOP. USED IN CONJUNCTION WITH THE ROPE AND ANCHORS TO PROVIDE PROTECTION. A DAISY CHAIN IS A SLING SEWN INTO LOOPS SO ITS LENGTH CAN BE ADJUSTED EASILY. A QUICKDRAW IS A SEWN SLING WITH A CARABINER AT EACH END.

SPINDRIFT: LOOSE, POWDERY SNOW INCAPABLE OF HOLDING PROTECTION.

SPORT CLIMBING: CLIMBING A BOLTED ROCK ROUTE (SPORT ROUTE), A TYPE OF CLIMBING WITH SOME OF ITS OWN TERMINOLOGY. PINKPOINT AND REDPOINT REFER TO THE DEGREE THE ROUTE HAS ALREADY BEEN SET UP.

SPUR: A ROCK OR SNOW RIB ON A MOUNTAIN; A LATERAL RIDGE.

STEM: TO BRIDGE THE DISTANCE BETWEEN TWO HOLDS WITH ONE'S FEET; TO PUSH AGAINST ADJACENT OR OPPOSING WALLS WITH THE FEET AS ONE MIGHT DO IN A CHIMNEY.

TALUS: AN ACCUMULATION OF ROCK LARGER THAN SCREE THAT HAS FALLEN TO ITS LOCATION. THE PRESENCE AND AMOUNT OF TALUS SHOULD BE CONSIDERED WHEN CROSSING A SLOPE OR CLIMBING THE PITCH ABOVE IT.

TOP ROPE: A CLIMBING ROPE ANCHORED ABOVE BOTH THE CLIMBER AND THE BELAYER; TO BELAY SOMEONE FROM BELOW USING A ROPE THAT LOOPS UP THROUGH A HIGH ANCHOR AND THEN BACK DOWN TO THE CLIMBER.

TRAD: A PERSON WHO ADHERES TO THE PRINCIPLES OF TRADITIONAL CLIMBING: TO PLACE AND REMOVE THE PROTECTION USED ON A CLIMB; TO USE NO DEVICE OR TECHNIQUE THAT WILL SCAR THE ROCK OR MOUNTAIN.

TRAVERSE: MOVING Laterally across terrain instead of ascending or descending.

UNDERCLING: A HAND HOLD ON ROCK THAT DEPENDS ON UPWARD PRESSURE ON A DOWNWARD HOLD.

UNZIP (ZIPPER FALL, ZIP OUT): A FALL WHERE ONE PIECE OF PROTECTION AFTER ANOTHER IS PULLED OUT BY THE FORCE OF THE FALL. OFTEN REFERS TO THE FAILURE OF INTERMEDIATE PROTECTION IN ROCK CLIMBING BUT ALSO A THREAT FOR FIXED LINES AND RUNNING BELAYS IN ALPINE CLIMBING.

WATER KNOT: A KNOT USED TO TIE LENGTHS OF WEBBING TOGETHER OR INTO SLINGS.

WEBBING: FLAT NYLON TAPE OR TUBING USED FOR SLINGS.

YOSEMITE/TAHQUITZ DECIMAL SYSTEM: AN EVOLVING SYSTEM TO DEFINE ROUTE DIFFICULTY NUMERICALLY WITH FINE DEFINITIONS WITHIN CLASS 5. THE SYSTEM BEARS THE NAMES OF WHERE IT DEVELOPED IN THE 1950S.