

Mountain Safety

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Climbing Code

- Leave the trip itinerary with a responsible person who knows what to do in case of an emergency
- Carry necessary food, clothing and equipment
- A climbing party of three is the minimum unless adequate prearranged support is available. On glaciers a minimum of two rope teams is recommended.
- Rope up on all exposed places and on glaciers. Anchor all belays.
- Keep the party together and obey the leader or majority rule.
- Never climb beyond your ability and knowledge.
- Never let judgment be overruled when choosing a route or deciding whether to turn back.
- Follow the precepts of sound mountaineering as set forth in books of recognized merit
- Behave at all times in a manner which reflects favorably on mountaineering including adherence to Leave No Trace principles.



The code rests on the principle that sensible mountaineers want strong chances of safety and success even in risky or doubtful situations. We want safeguards in case we have misjudged our chances, and we want the ability to control and minimize our exposure to grave danger.



Safe Attitude

- **A realization of the relationship between mountain hazards and our own limitations.**
- **Develop skill and knowledge of techniques and carry equipment to supplement our own natural abilities.**
- **Encounter preferably vicariously the actual situations which teach us the distinction between safety and danger which allow us to evaluate our margin of safety at all times.**



Safety Is an Art

- It starts out as rules to follow
- Climb long enough and you will see why these rules are followed



Art of Safe Trips

- **Planning ahead so you always have a margin of safety**
- **Carry and know how to use the 10 essentials**
- **Develop and use a checklist to make sure that everything that is needed, goes**
- **Clothing and equipment is in good repair**
- **Good leadership and good following of that leadership**



Art of Safe Trips

- Proper nutrition
- Adequate rest
- Optimum physical conditioning
- Belay on exposed terrain or when some one wants one
- Let someone know your plans and your expected return
- Party is large enough for the objective
- Turn back if conditions are not right for the trip



Mountain Hazards

- Subjective
- Objective



Subjective Hazards

- **Incompetence – learn all you can**
 - Learn things twice
- **Over-confidence**
 - I am too good to make that mistake
- **Distraction**
 - Thinking of a cold beer or dinner
- **Pride**
 - Climbing beyond our limits



Toward Safer Climbing

- **Situational Awareness**
 - Failure to meet planned targets
 - So preoccupied that no one fails to detect important changes
 - Sphere of acceptable risks
 - Unresolved discrepancies
 - Your gut feeling
- **Poor judgment chain**
 - Series of bad decisions
 - False information increasing
 - Alternatives decrease
- **Groupthink**
 - No one is questioning decisions



Objective Hazards

- **Rock**
- **Snow**
- **Avalanches**
- **Shortcuts**
- **Fast Water**
- **Weather**
- **Lightning**
- **Drinking Water**
- **Wildlife**



Rock

- **Falls on Rock**
 - Don't slip
 - Climb with your eyes first
 - Three points of contact
 - Continually test the rock



Rock

- **Falling rock**
 - **Technique for traveling on loose rock**
 - Party either close together or really far apart
 - The downhill foot
 - **Yell if you kick a rock loose**
 - What to do if a loose rock is coming your way



Snow

- **Unequipped or under equipped climbers**
 - The tennis shoe brigade



Avalanches

- Power is truly awesome
- Three kinds
 - Slab (180 mph)
 - Dry snow (100 mph)
 - Wet snow (50 mph)



Avalanches

- Power is truly awesome
- Three kinds
 - Slab (180 mph)
 - Dry snow (100 mph)
 - Wet snow (50 mph)
- Slopes are 30 to 55 degrees



Avalanches

- **Avoid avalanche areas if at all possible**



Avalanches

- **Avoid avalanche areas if at all possible**
- **Cross near the top**



Avalanches

- **Avoid avalanche areas if at all possible**
- **Cross near the top**
- **Cross one at a time**



Shortcuts

- **Make sure you really know it.**
 - **If climbing by a hard route and returning by an easy route, make sure that you know where the easy route goes. If need be, climb by the easy route first.**
 - **Easy route carefully worked out and not at all obvious.**



Fast Water

- **Make a judgment call as to how deep and how fast the water is running**
- **Cross where it is shallow and braided**
- **Use a staff to form a tripod**
- **Unhook your waist belt**
- **Use a rope (and know how to use it)**
- **If cold water, warm up afterwards**



Weather

- **Patterns are local in the mountains**
- **Observe the clouds**
 - **Scattered clouds are good weather**
 - **Dense bands of cirrus clouds mean something is coming**
 - **Cloud cap on the summit means it is cold and windy up there**



Lightning

- **Avoid it**
- **Get off of exposed ridges**
- **Stay out of caves and small hollows**
- **Remove hardware but keep it near by. You will need it to get down after the storm**



Drinking Water

- All sources may be contaminated
- Treatment
 - Boil it
 - Chemical treatments
 - Filter it
 - UV Treatment



Wildlife

- **Shy and retiring**
- **Treat it respectfully**
- **Use bear canisters or bear bag your food**
- **Stay away from dead and dying animals**



Emergency

A good definition is any sudden or unforeseen situation that demands our immediate attention



How to Create an Emergency

- **Keep going in bad weather**
- **Stray out into loose, steep terrain**
- **Let children play out of your sight**
- **Be unfamiliar with your gear**
- **Travel light**
- **Don't eat**



Common Emergencies

- Cold
- Hot
- Lost



Cold

- Do not continue until exhausted
- Energy is heat – conserve it
- Keep warm – protect your hands, feet, head
- Get off or insulate yourself from the snow
- Keep your circulation moving
- Dry socks and inner mitts
- Huddle together to keep warm



Cold

- **Build a fire and gather plenty of wood**
 - Fire needs to burn 8 – 9 hours
- **Eat foods high in energy**
 - sweets, fats, starches
- **Put on all of your dry clothing**
- **Use your sleeping bag**



Hot

- **Keep your head – analyze your situation**
- **Rig a shelter from the sun**
- **Carry extra food and water in your vehicle**
- **Drink all the water you want**



Lost

- **Stop, look, listen and think**
- **Can you find your own way out**
 - **Map, compass and GPS**
 - **Hike to a close by high point and then use your navigation equipment**
 - **Features that delineate the area**



Waiting to Be Found

- Stand out – be conspicuous
- Stay in open country
- Leave notes giving your direction of travel
- Don't panic
- Hang onto your gear
- Make a definite plan and stick with it
- Share your energies with the group
- If alone, you can come to terms with the situation and learn. Confidence comes from not giving up.



Emergency Equipment

- **Signal mirror**
- **Compass**
- **Whistle**
- **Matches**



Walking Out

If you walk out and are overdue, call home and explain the situation so people know that you are OK. This will stop or keep a search being started for you.



Hypothermia on Mount Ritter



We gain heat by

- **External sources**
- **Activity**
- **Digestion**



We loose heat by

- **Evaporation**
- **Respiration**
- **Radiation**
- **Conduction**
- **Convection**



We retain heat in a cold environment by

- **Increased energy cost of physical activity**
- **Shivering**
- **Constriction of our blood vessels**



Hypothermia is the loss of body heat through exposure



Stages of Hypothermia

- 99°-97° F - Normal Temperature
- 97°-95° F - Mild to Severe Shivering
- 95°-93° F - Intense Shivering
- 93°-91° F -Violent Shivering
- 91°-86° F - Shivering Stops
- 86°-82° F - Severely Rigid Muscles
- 82°-78° F – Erratic Heartbeat
- 78°-75° F – Pulmonary Edema



Hypothermia is

- **Sneaky**
 - Can overwhelm the entire party at once
- **Subtle**
 - Hard to diagnose



Prevention

- **Proper clothing**
 - Clothing that is warm while wet
 - Windproof layer
- **Keep dry**
- **Conserve and replenish energy**
- **Stay together**



Symptoms and Signs of Hypothermia

- Continual shivering
- Poor coordination
- Slurred speech
- Slow pace
- Numb hands and feet
- Decreased attention span
- Hallucinations
- Dilated pupils
- Confusion



Symptoms and Signs of Hypothermia

- They look cold and miserable.



Symptoms and Signs of Hypothermia

- They look cold and miserable.
- “They have the stumbles, fumbles, and mumbles”.



Treatment

- Prevent further heat loss
- Insulate from the cold
- Treat victim very gently
- Rewarm
- Hot food and liquids if the person can take them
- Stay with them







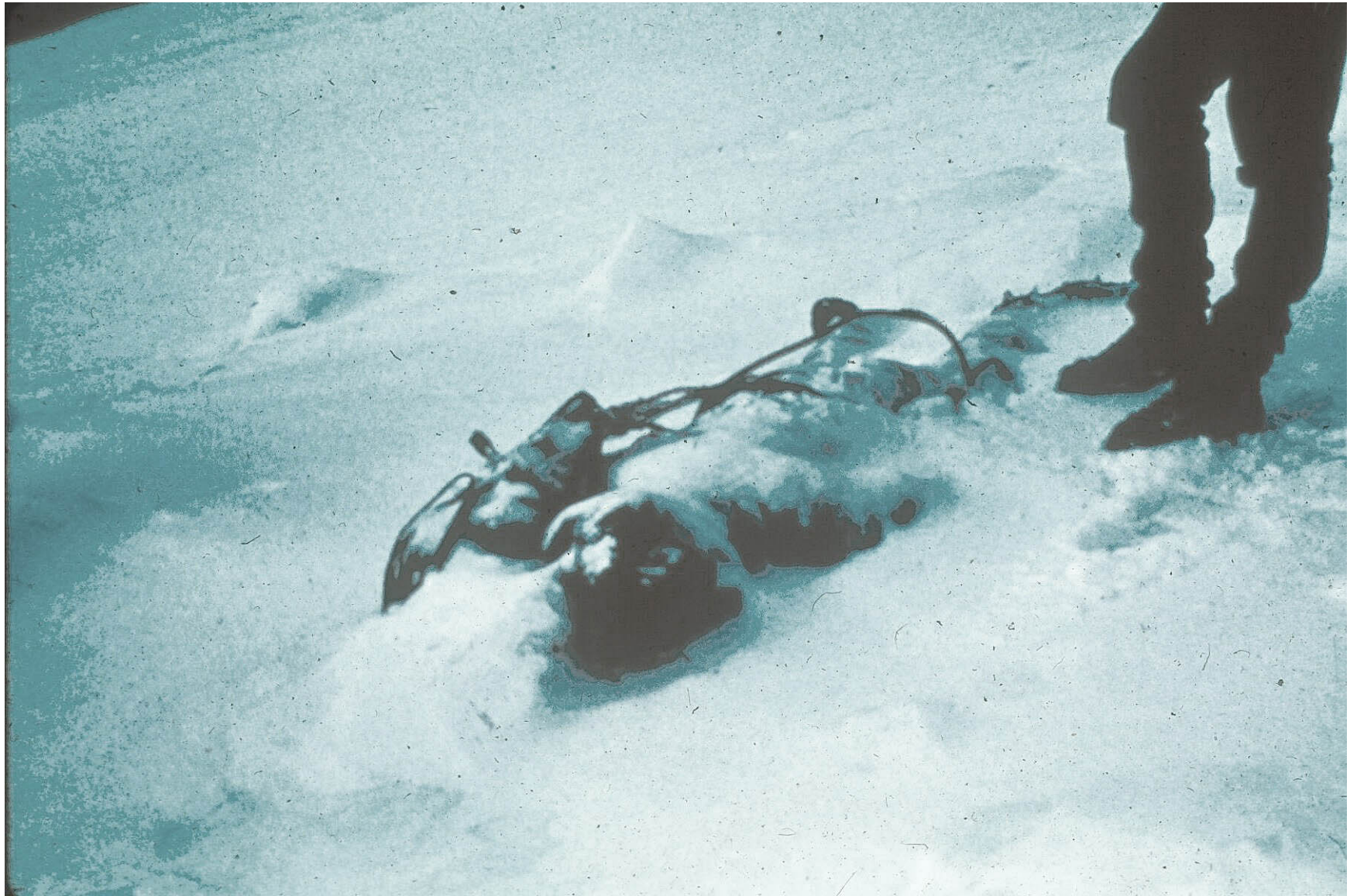




















Results from Inquest

- **Inadequate Equipment**
- **Failed to heed signs of bad weather**
- **Small amount of food and water**
- **Failed to mark critical places on the route**
- **Skill level of some of the climbers**
- **Failed to heed signs of hypothermia until it was too late**



Bill survived

- **Excellent condition**
- **Did not panic**
- **Warmed by the sun on Monday**



What Can We Learn From This

- Recognize signs and symptoms of hypothermia
- Conditions that precipitate hypothermia
 - Cold, wet, windy weather
- When to turn the group around



A Perspective

To the best of my knowledge this kind of accident has not re-occurred in the Sierra since.

