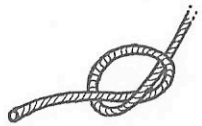
PITONS Pitons are pieces of metal, usually spike-like, which are driven into cracks in the rock for protection or actual aid in climbing. They come in a bewildering variety of shapes, sizes, metals, hardnesses, and strengths. They will be discussed further in the section on PITONCRAFT AND NUTCRAFT.

ARTIFICIAL CHOCKSTONES Referred to as 'nuts' or 'chocks', these gadgets are a British invention and are presently available in multiple shapes, sizes, and materials, usually metal. They can often be substituted for pitons, and are to be preferred because they do not damage the rock. More about them under PITONCRAFT AND NUTCRAFT.

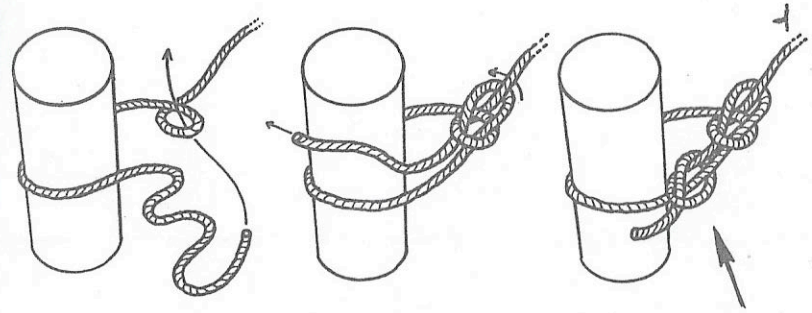
BOLTS These are nail-like shafts of metal gear driven into holes drilled in the rock. Those commonly used in climbing vary in diameter from 3/16″ to 3/8″, and in length from about 3/4″ to 2½″. There are two basic types, the contraction bolt, which is squeezed together when driven into the hole, and the expansion bolt, which presses apart a surrounding sleeve. Like many of the technological wonders of modern man, bolts are at once a blessing and a curse. They make possible some of the finest rock climbs on earth by opening up stretches of blank and otherwise unclimbable rock. But they also diminish the value in climbing by making it possible for anyone to go anywhere if they are willing to drill. Bolts should *never* be placed on established routes unless the route since has been changed so it is impossible without them.

Knots

There are many knots one might use in mountaineering. We shall consider only a few essential ones. The simplest is the OVERHAND:

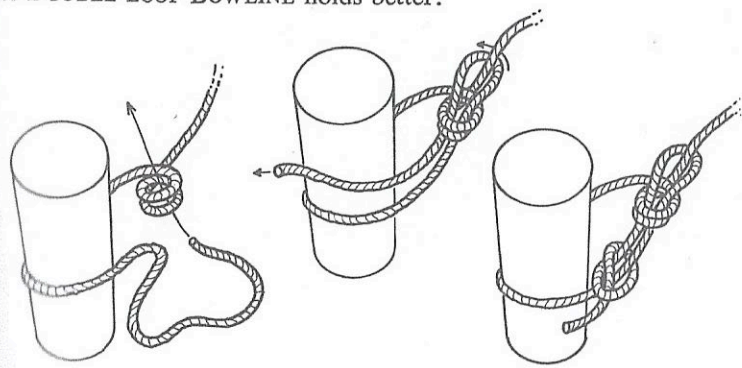


The BOWLINE is the traditional knot for attaching the end of the rope to oneself:

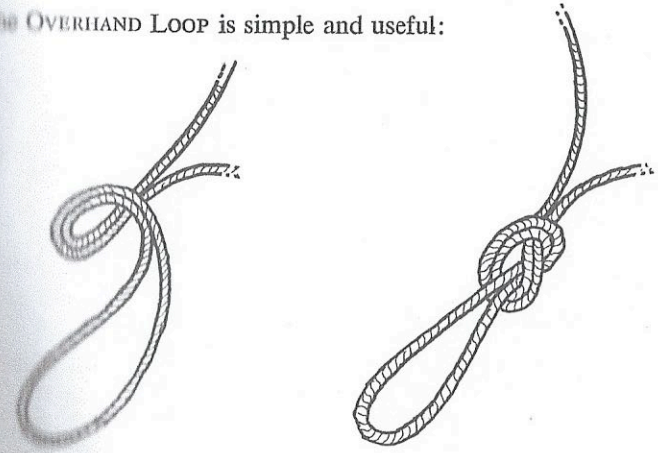


Use an OVERHAND KNOT to secure the end.

The DOUBLE-LOOP BOWLINE holds better:



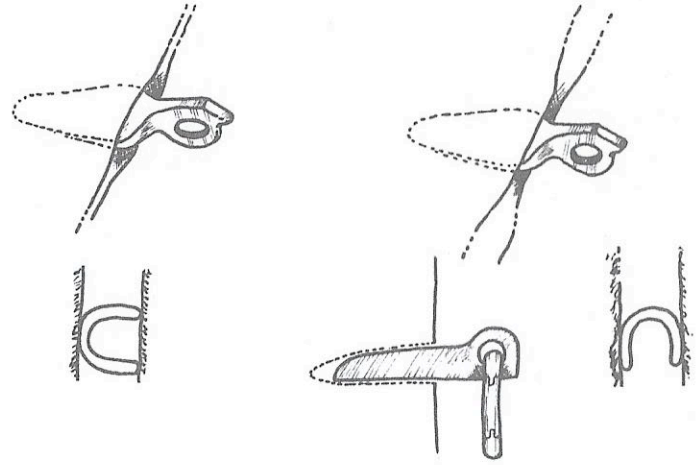
The OVERHAND LOOP is simple and useful:



...ted pins on El Capitan
...by Royal Robbins

PLACING PITONS: The placement of pitons is normally the function of the leader, and since a discussion of leading is beyond the scope of this book, we shall cover this subject only briefly.

Ideally, a piton should be inserted into a crack ½ to ⅔ of its length and driven hard to the hilt. A ringing sound, steadily increasing in pitch, usually indicates a solid piton. Another test is to tap the hammer lightly against the side of the head of the pin. If the piton doesn't give, and if the hammer bounces with a good spring, it's probably good. But these tests are not completely reliable. Expert climbers avoid trusting their luck to one piton, no matter how tight it seems. When there is a choice, select a honizontal crack over a vertical.



A piton driven straight up, or upward at an angle, is not necessarily bad, especially when it is long and driven well.

When placing a piton in a vertical crack make use of any variations in the shape of the rock to cradle the piton and hold it in place. A slightly wider part of the crack which narrows above and below will hold a piton better than a flush crack, or a part of the crack where the sides are both convex.

Be alert to the character and formation of the rock. Rock which appears solid may be unstable. Avoid driving pitons behind loose flakes and blocks.

REMOVING PITONS: To remove pitons, hit them back and forth until loose and then pluck out. If possible, aim the blow at the heftiest part of the neck of the piton, or at least at the top of the eye. Horizontal pitons are best knocked as far as possible in each direction, but with