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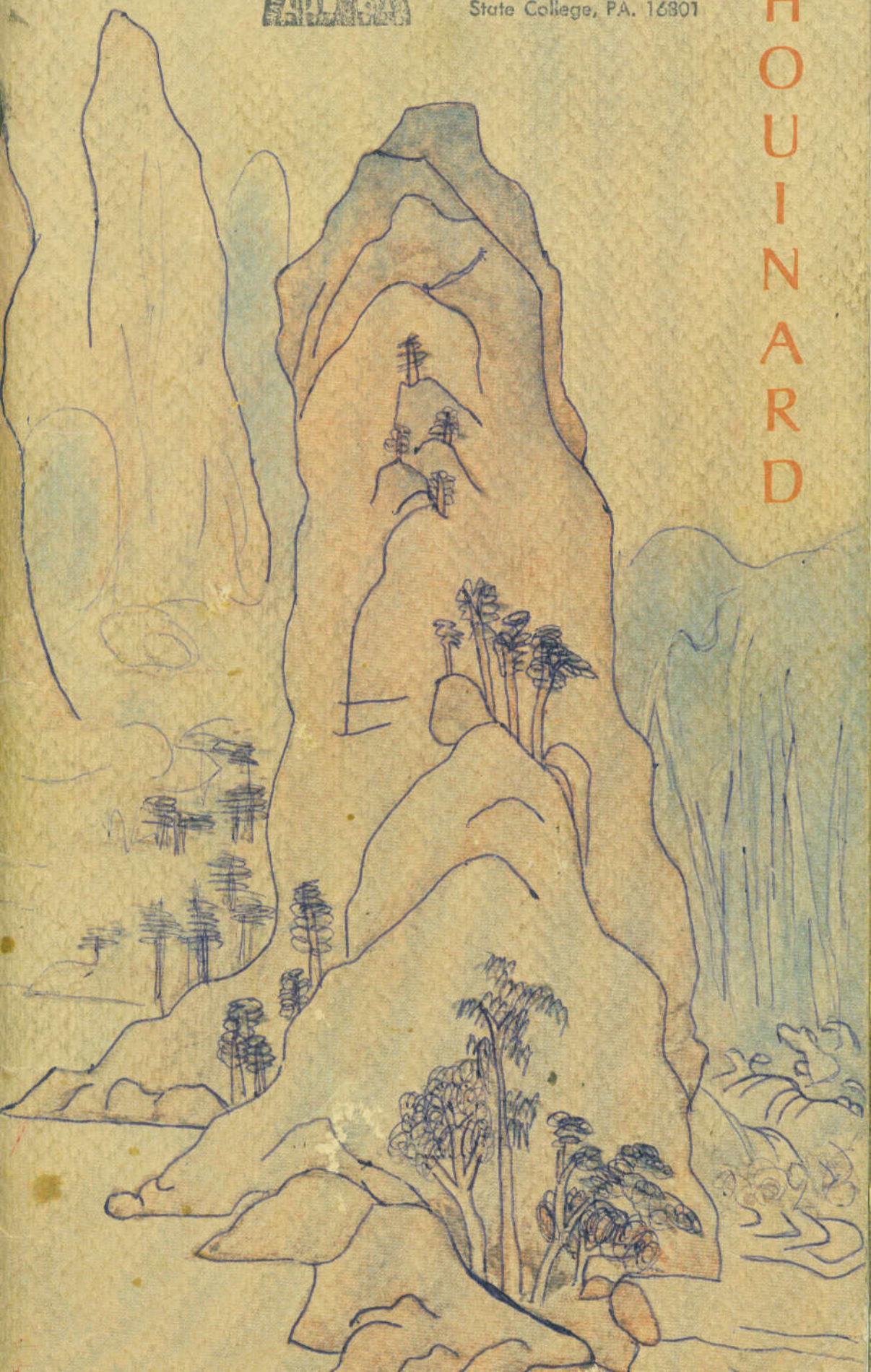
CHOUINARD



One Dollar

"A perfection of means
and confusion of aims,
seems to be our main problem."
— Albert Einstein

a word . . .

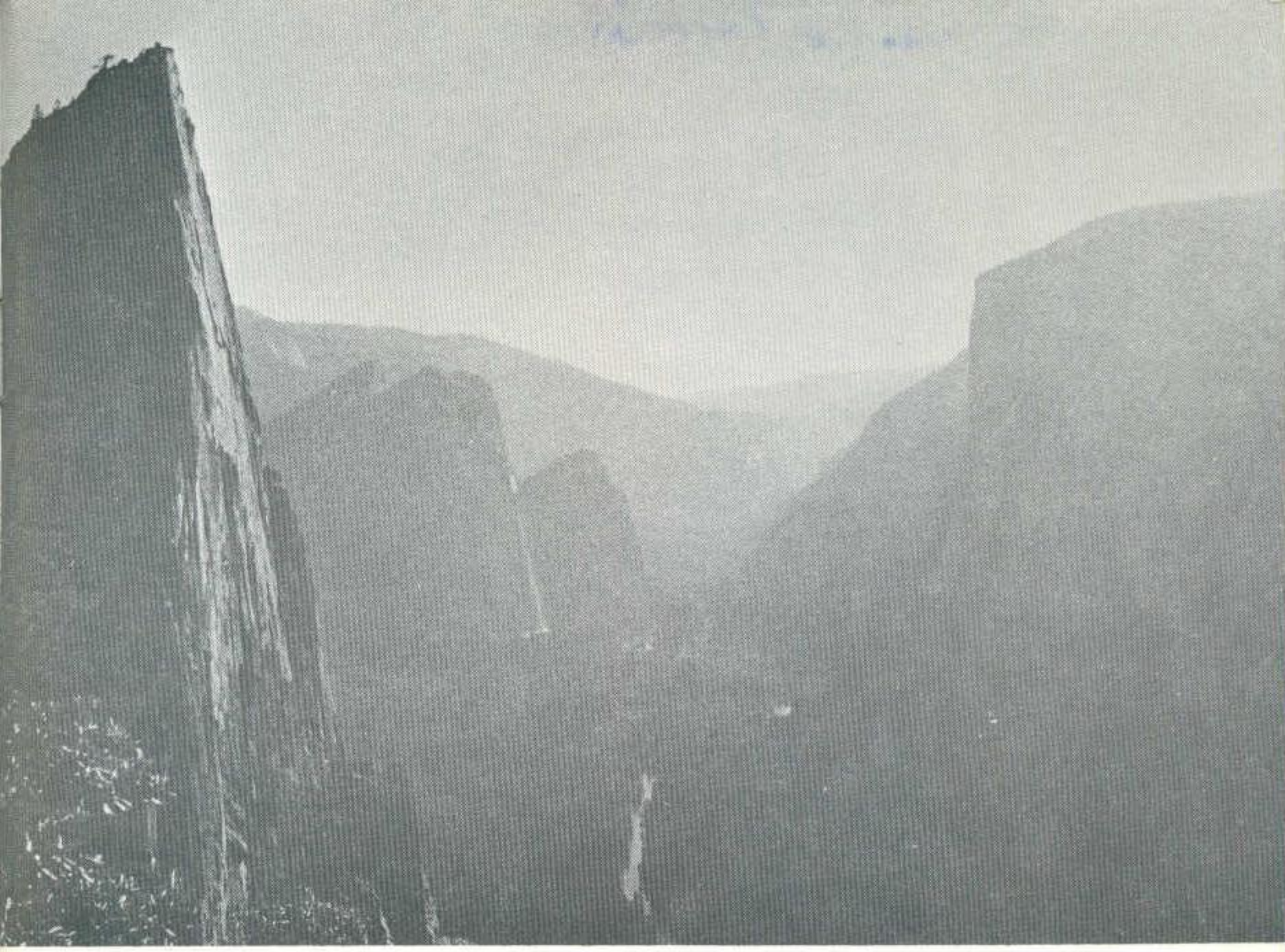
The 1960's marked an awakening in American climbing characterized by a vast increase in climbing activity, closely paralleled by a corresponding improvement in technique and equipment. Significant climbing advances have resulted. On the other hand, this combination is producing a serious problem — deterioration of the climbing environment. The deterioration is twofold, involving the physical aspect of the mountains and the moral integrity of the climbers.

No longer can we assume the earth's resources are limitless; that there are ranges of unclimbed peaks extending endlessly beyond the horizon. Mountains are finite, and despite their massive appearance, they are fragile.

Although alpine tundra, meadows, trees, lakes and streams are all endangered, our primary concern here is with deterioration of the rock itself. Granite is delicate and soft - much softer than the alloy steel pitons being hammered into it. On popular routes in Yosemite and elsewhere the cracks are degenerating into series of piton holes. Flakes and slabs are being pried loose and broken off as a result of repeated placement and removal of hard pitons.

We can offer a few immediate solutions. Stay off climbs you do not intend to finish. Don't climb up to Sickle Ledge unless you plan to do the entire Nose. Do not use artificial aid on free climbs. But most of all, start using chocks. Chocks and runners are not damaging to the rock and provide a pleasurable and practical alternative to pitons on most free, and many artificial climbs. Do not use pitons on established clean routes. Where a piton is necessary a fixed piton should be considered and documented in local guide books. Routes of 5.7 difficulty were climbed 60 years ago in England. Today the footholds on these routes are well polished, but because pitons have not been used the protection cracks are still in mint condition. We urge to your attention Doug Robinson's excellent treatise on the joys and ways of pitonless climbing. It was written especially for this catalog.

Equally serious is a moral deterioration. Armed with ever more advanced gadgetry and techniques the style of technical climbing is gradually becoming so degraded that elements vital to the climbing experience — adventure and appreciation of the mountain environment itself — are being submerged. Siege tactics, bolt ladders, bat hooks, bash chocks, detailed topos and equipment lists, plus a guaranteed rescue diminish rather than enhance a climb. Even now existing techniques and technology are so powerful that almost any climb imaginable can be realized, and the fear of the unknown reduced to rote excercise.



Mad bolters are among the worst offenders of the alpine environment. Young climbers must learn that bolting is done as a substitute for climbing. Guides, climbing schools and established climbers have a heavy responsibility here.

We believe the only way to ensure the climbing experience for ourselves and future generations is to preserve (1) the vertical wilderness, and (2) the adventure inherent in the experience. Really, the only insurance to guarantee this adventure and the safest insurance to maintain it is exercise of moral restraint and individual responsibility.

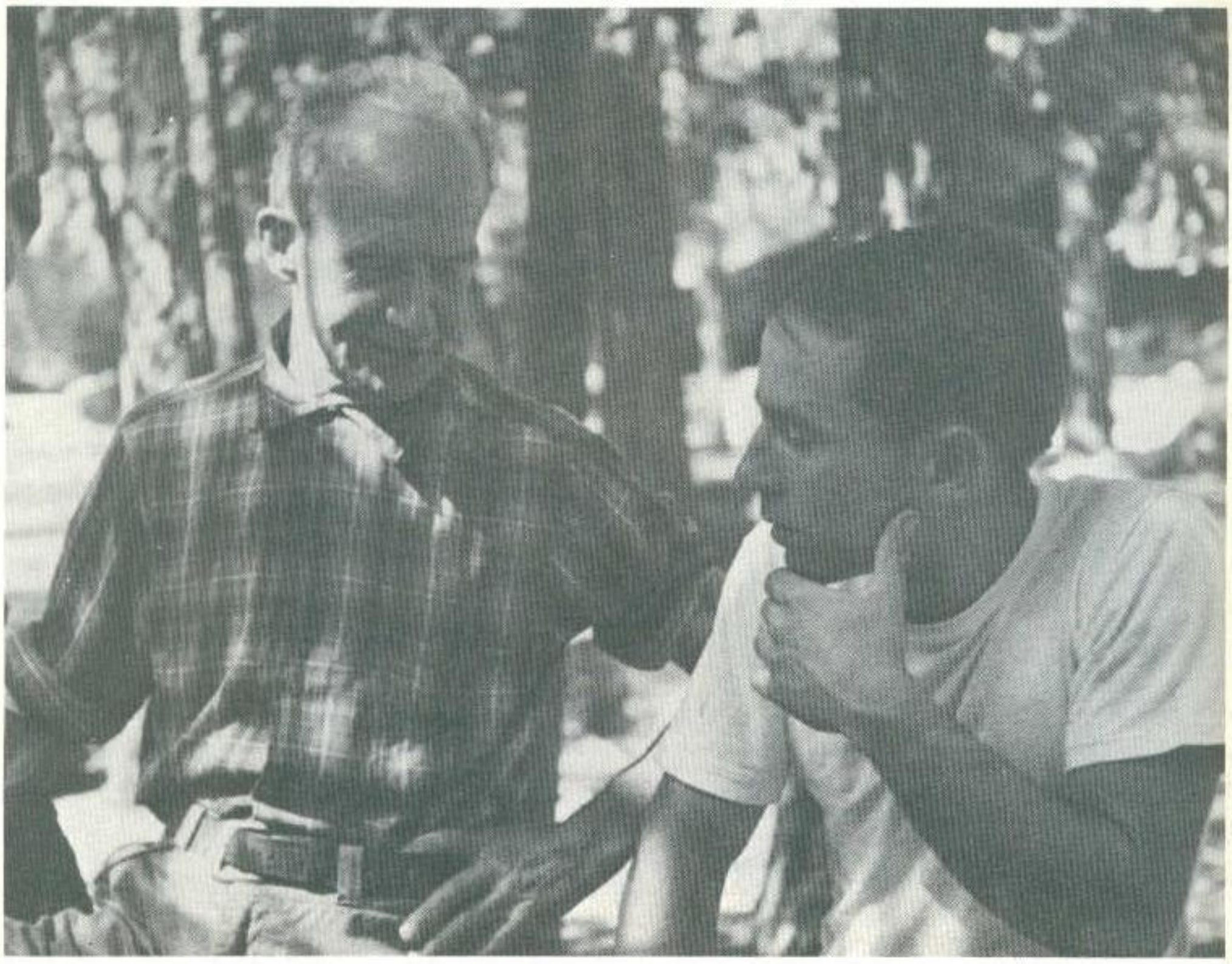
Thus, it is the style of the climb, not attainment of the summit, which is the measure of personal success. Traditionally stated, each of us must consider whether the end is more important than the means. Given the vital importance of style we suggest that the keynote is simplicity. The fewer gadgets between the climber and the climb, the greater is the chance to attain the desired communication with oneself - - and nature.

The equipment offered in this catalog attempts to support this ethic. Basically multi - purpose, the articles are carefully designed to serve the overall needs of the climber. More than mere aids, they are conceived to be used in meaningful combination with accepted technique to elevate the individual to a rewarding alpine experience.

As we enter this new era of mountaineering, re - examine your motives for climbing. Employ restraint and good judgment in the use of Chouinard equipment. Remember the rock, the other climber -------- climb clean.

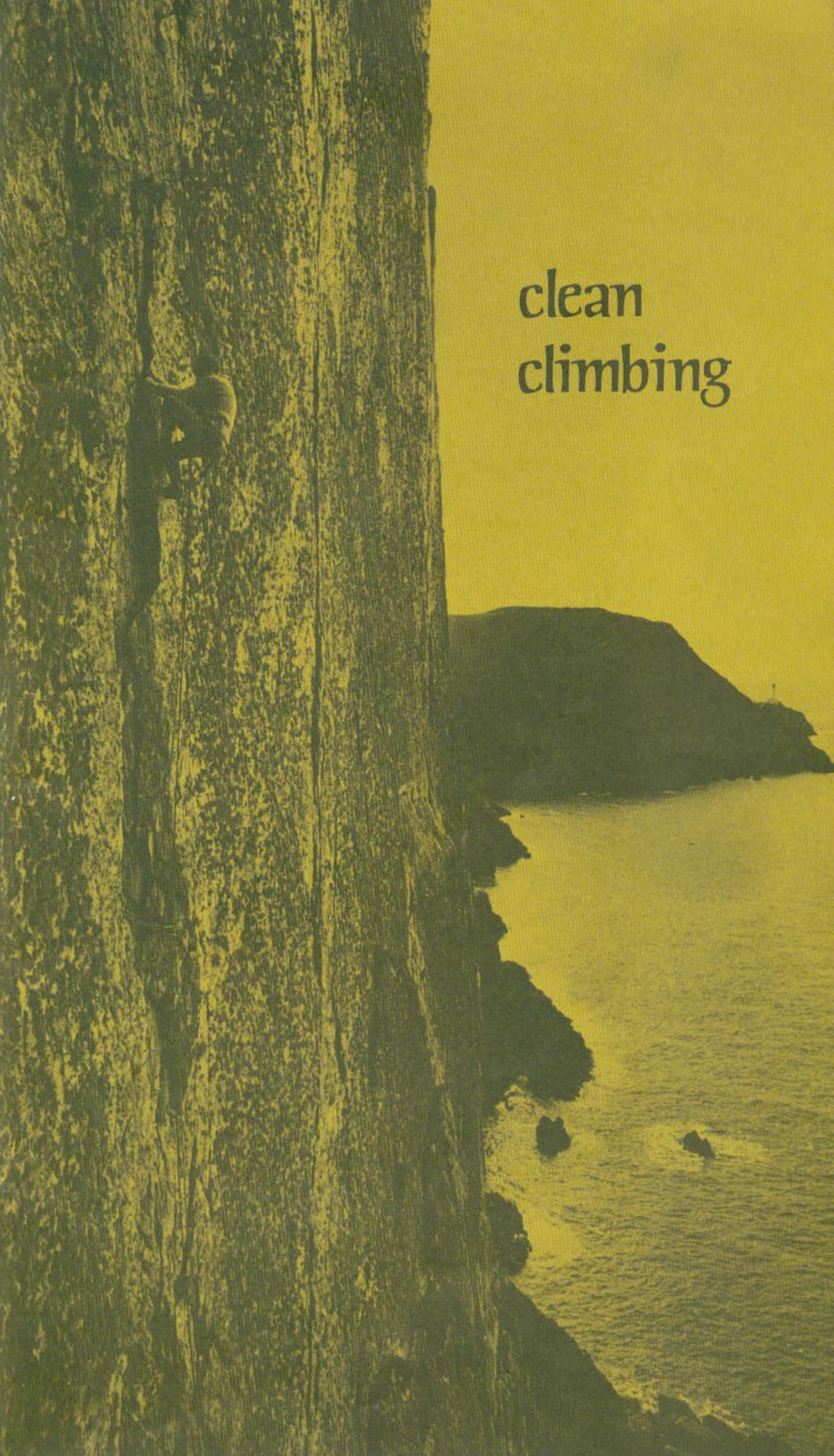
Yvon Chouinard Tom Frost

John Salathe and Yvon Chouinard, 1964



history of ⟨c⟩ firsts

1957 - 58	Chouinard Carabiner, ringless alloy steel angle, Hand - forged Lost Arrow
1959	Horizontal Knifeblade
1960	RURP, Bugaboo horizontal, 1" angle, 1½" angle, Alloy sheet steel Bong
1961	Aluminum Bong
1963-64	Die - forged Lost Arrow
1965	½" wedge angle, 5/8" wedge angle
1966	Yosemite Hammer, Cliff Hanger
1967	Alpine Hammer, 1¼" angle
1968	Chouinard Crampon, new Chouinard Carabiner
1969	Chouinard Piolet
1971	Chouinard Hexentrics
1972	Chouinard Stoppers, Crag Hammer, Climaxe



clean climbing

"One outstanding unclimbed section of the cliff appeared so hard that bolts seemed the only solution: the right hand side of the Great Wall. But it was widely felt at the time (and indeed still is) that bolting this wall would be a terrible desecration of the crag, and represent a threat to the whole delicate basis of British free climbing."

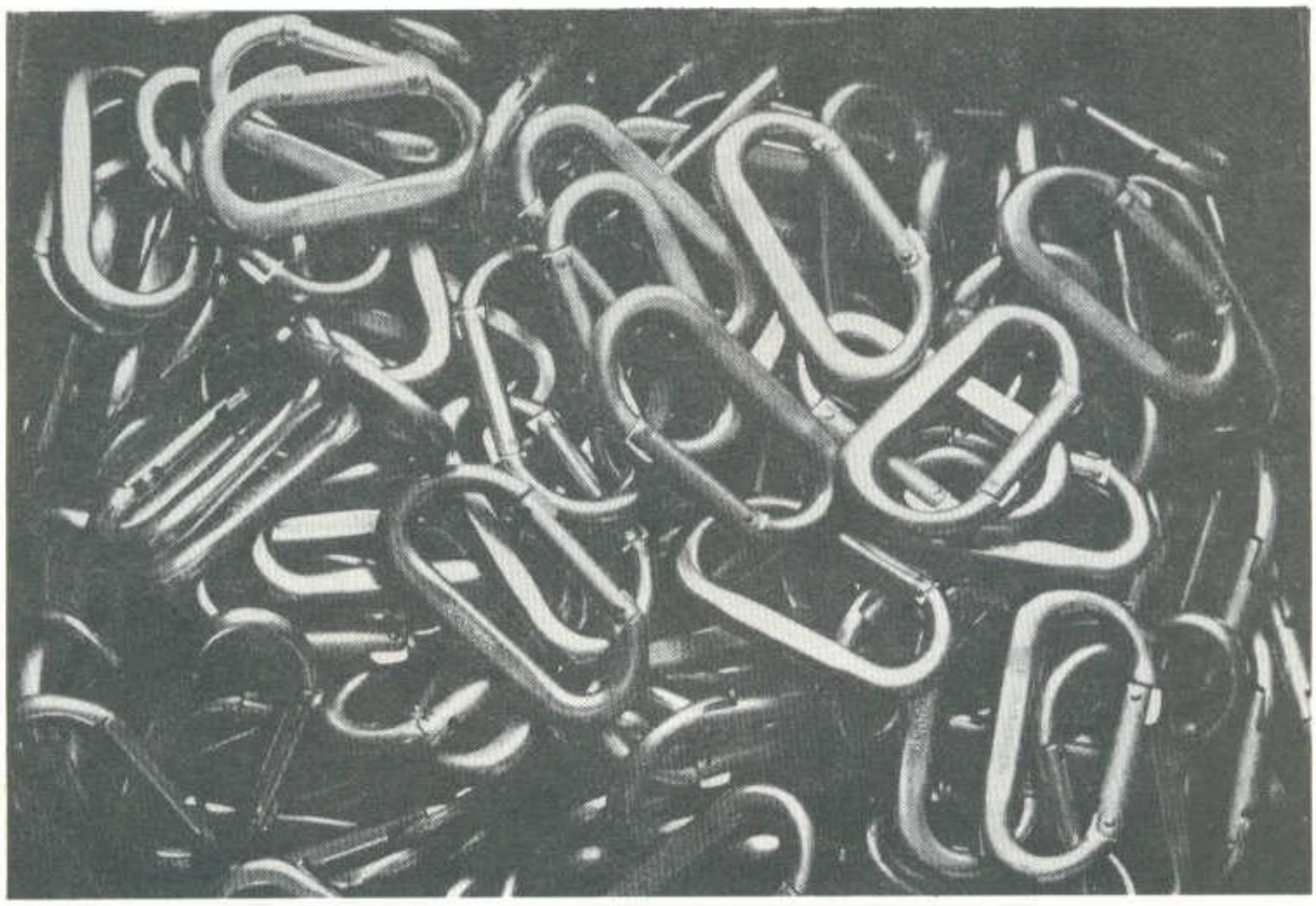
THE BLACK CLIFF, CLOGWYN DU'R ARDDU
Crew, Soper & Wilson

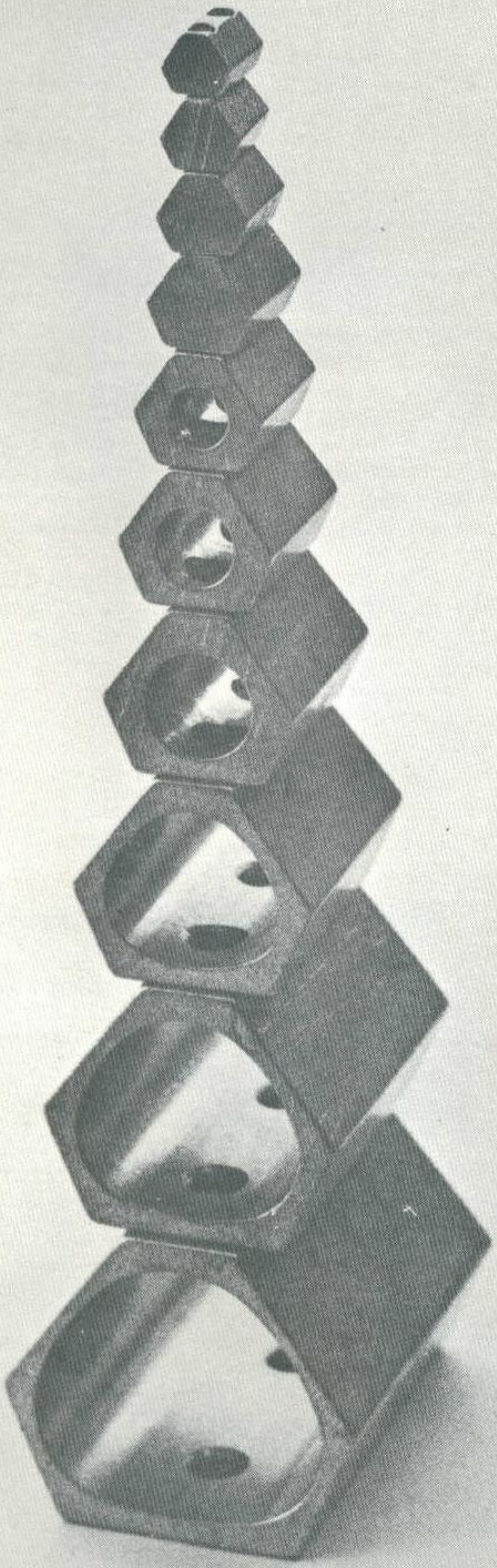
chouinard carabiner

Our carabiner is now made in Germany to our updated design and specifications. A prime advantage of the Chouinard Carabiner is its drop - forged aluminum body. This gives it higher strength without having to use sharp corner radii. In other words, it can have a smoother bottom curve which enhances the carabiner's handling characteristics and reduces shifting when two etrier carabiners are clipped in. Its strength of 4800 pounds and gate open strength of 2600 pounds closely approximates the UIAA standard for carabiners. As a further guarantee of safety, each individual carabiner is tension tested to 3000 pounds before leaving the Salewa factory.

The modified "D" shape lets you know at a glance or by feel on which side and end the gate opens. The gate action is smooth and has the correct stiffness for safe and efficient climbing.

Weight: 2-1/3 oz.





NUT placements can be thought of as falling into two general categories: those where the crack closes down or bottlenecks noticeably, and those where the crack is relatively parallel sided. Bottleneck placements are easy — the nut acts as a spacefiller with little regard for its shape; the whole art of placing nuts comes in the more subtle, smoother sided cracks. Here the Chouinard Hexentrics and Stoppers — chocks made to fit cracks - come into their own.

hexentrics

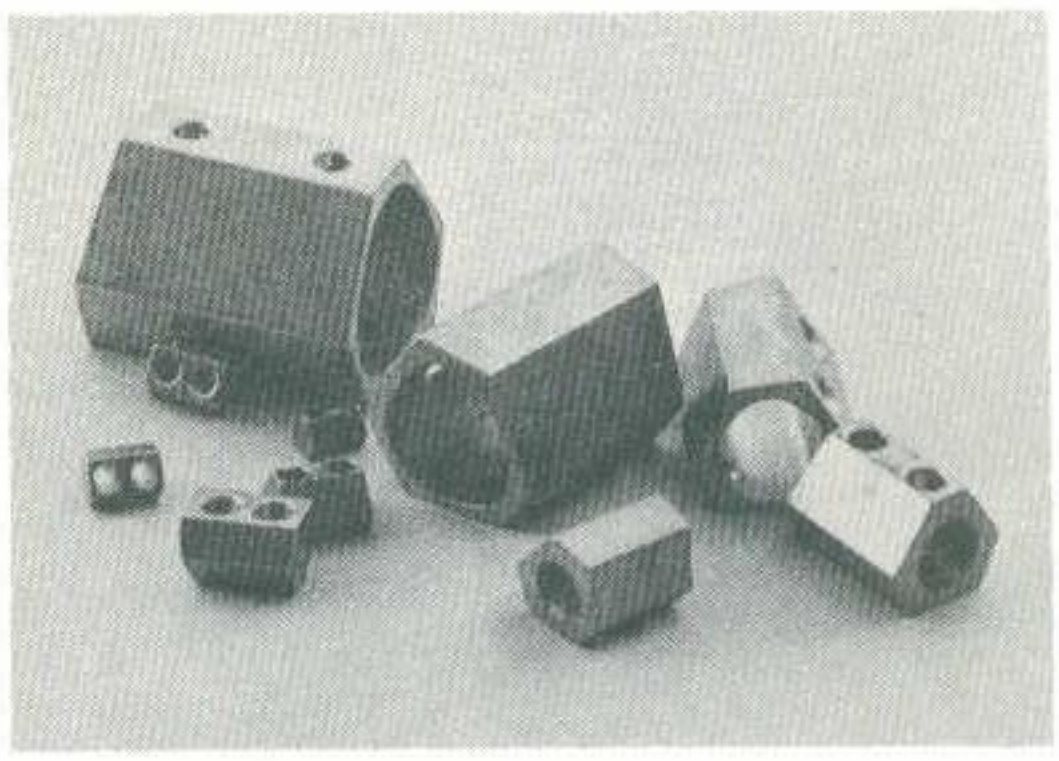
Metal chocks for climbing evolved from the use of machine nuts originally collected alongside the Snowdon Railways tracks as climbers hiked up to Clogwyn du'r Arddu. Now, 11 years later, the irregular hexagon — shaped Chouinard Hexentric is created specifically with cracks in mind.

Hexentrics fit in three different attitudes, but it is in the slightly skewed position their truest and most subtle virtue is shown, for in addition to the helpful cam action of the skewed position, we find not parallel flats but a fine taper for a more secure placement. The Hexentric presents a profile much like a wedge — shaped nut (the Chouinard Stopper), but is shorter for tight settings. To take advantage of the tight settings resulting from piton holes a fine gradation of Hexes in the small to standard angle piton size range is provided. Hopefully, these piton scars need not grow.

The Hexentric's side points are higher, so that even when placed in this less promising attitude it has greater inherent stability because the center of pull is well below the points. Finally, the ends are tapered and graduated such that end and side dimensions overlap to give continuous fitting from ½ to 3 inches. Truly versatile tools!

TABLE A. CHOUINARD HEXENTRICS

Number	Size	Length	Weight	Perlon Sling Size & Approx Strengths		Webbing Sling Size & Approx Strengths	
1	7/16	5/8	1/4 oz.	5mm	1300	1/2"	900
2	1/2	3/4	1/4 oz.	6mm	1500	1/2"	900
3	5/8	7/8	1/4 oz.	7mm	1800	9/16"	1700
4	3/4	1	1/2 oz.	8mm	2400	9/16"	1900
5	7/8	1-1/4	3/4 oz.	8mm	2400	1"Tub.	3100
6	1	1-1/2	1 oz.	9mm	3500	1"Tub.	3500
7	1-1/4	1-3/4	2 oz.	9mm	3500	1"Tub.	3500
8	1-1/2	2-1/4	2-3/4 oz.	9mm	3500	1"Tub.	3500
9	2	2-3/4	4-1/4 oz.	9mm	3500	1"Tub.	3500
10	2-1/2	3-1/4	6-3/4 oz.	9mm	3500	1"Tub.	3200



stoppers

The wedge shape has long been esteemed for climbing chocks, and with good reason. The wedge has a consistent taper like a piton - a taper that resembles the average taper of a crack. Wedges are very secure when well placed because most of the fitting surface will be touching the rock.

Compared with other shapes, Stoppers will normally provide the greatest security (holding power) and the biggest sling size (strength) possible in a given situation. Preferred placement is into the crack the narrow way, since it is most stable and has the largest surface area in contact with the rock in this position. However, it is also designed to fit endwise in wider cracks. Since Stoppers are very shallow in an endwise placement they are especially adaptable to bottoming cracks or placements on the surface of the rock.

As with Hexentrics, Stoppers are a planned progression of sizes laid out with crack fitting in mind. They cover the whole range from thin horizontals through standard angle. The four smallest sizes are wired for greater strength. The wire slings are kept short to minimize leverage on the chock. Sizes 5 through 7 will accommodate the rope sling sizes indicated.

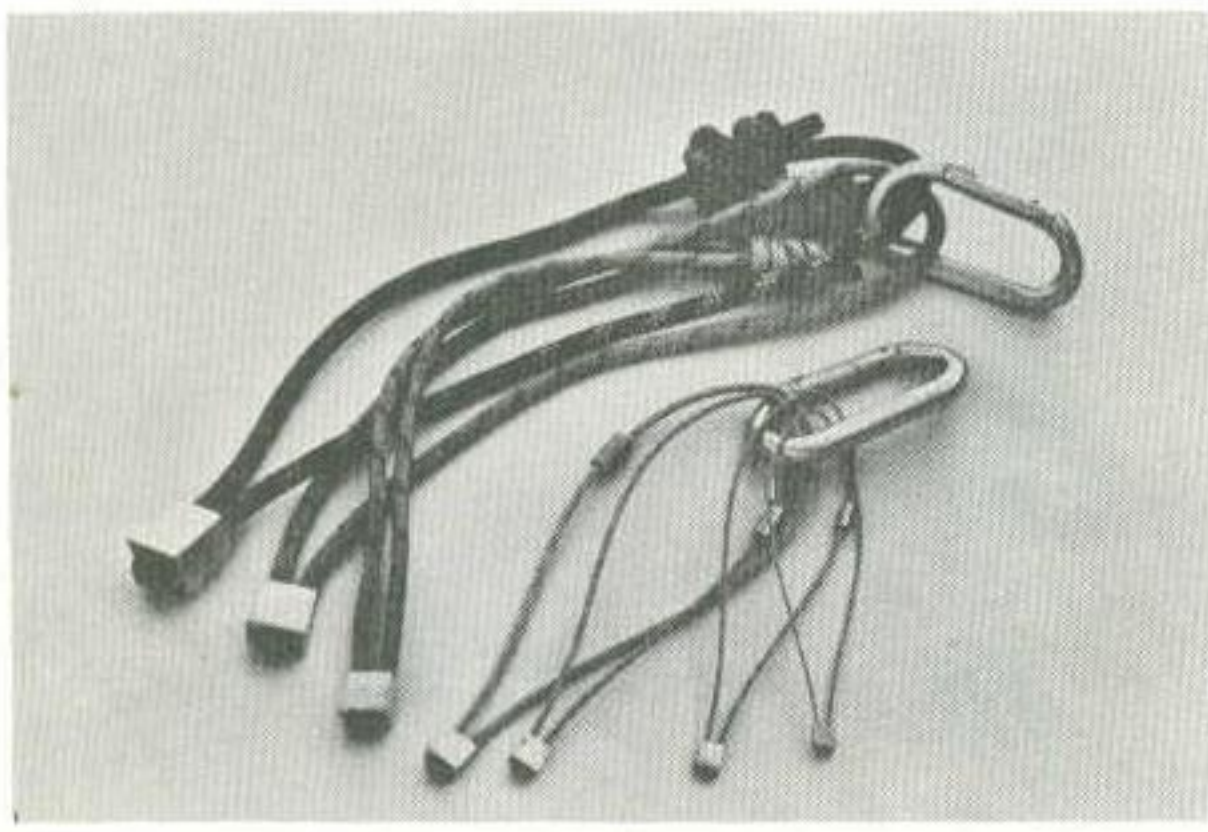


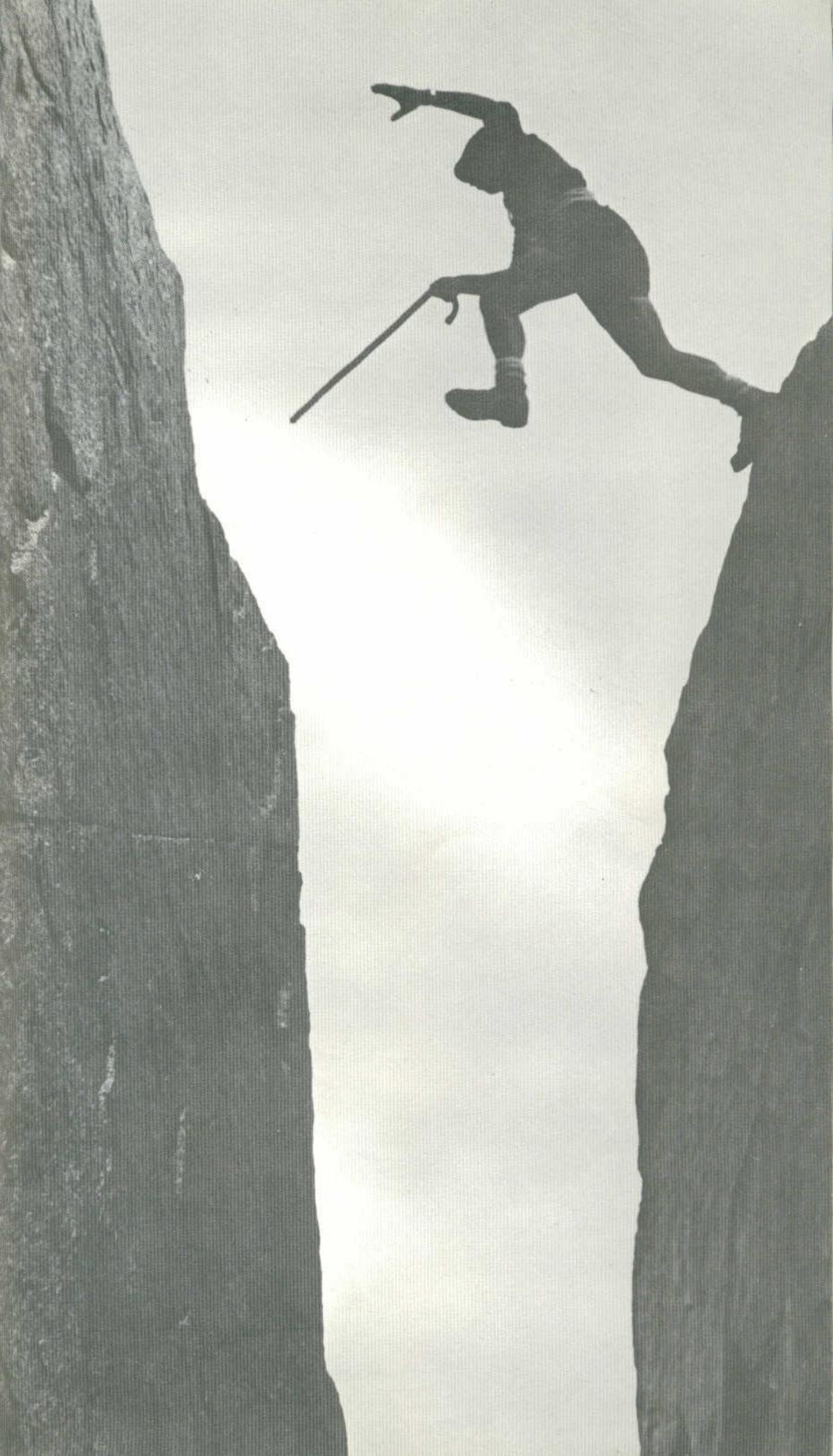
TABLE B. CHOUINARD STOPPERS

Number	Size	Length	Weight	Wire Sling Size & Approx Strength		Perlon Sling Size & Approx Strength	
1	1/8	3/8	1/4 oz.	1/16	800	----	
2	3/16	7/16	1/2 oz.	3/32	1700	----	
3	1/4	1/2	1-1/4 oz.	1/8	2600	----	
4	3/8	5/8	1-1/2 oz.	1/8	2600	5mm	1300
5	1/2	3/4	1/2 oz.	---		7mm	1700
6	5/8	1	1 oz.	---		8mm	2400
7	3/4	1-1/4	1-1/2 oz.	---		9mm	3100

INSTALLING CHOCK SLINGS

The tight fit of the maximum indicated rope sling size in the chock holes can drive even the most tenacious climber up the walls if the following necessary procedures are not followed. (1) Melt one end of the perlon over a candle or similar heat source; (2) Taper the end while hot to smaller than the diameter of the rope (beware of burning the fingers!); (3) With a high proportion of twisting, push the sling end through the first hole from the bottom side; (4) Pull some slack through and insert the same end down through the second hole; (5) Position the rope ends and tie with a Grapevine Knot.

Webbing slings can be fitted by following the same general procedure. It will be facilitated by cutting the webbing at a long slim angle and fusing the end. Tie with a Grapevine Knot.



"The Whole Natural Art of

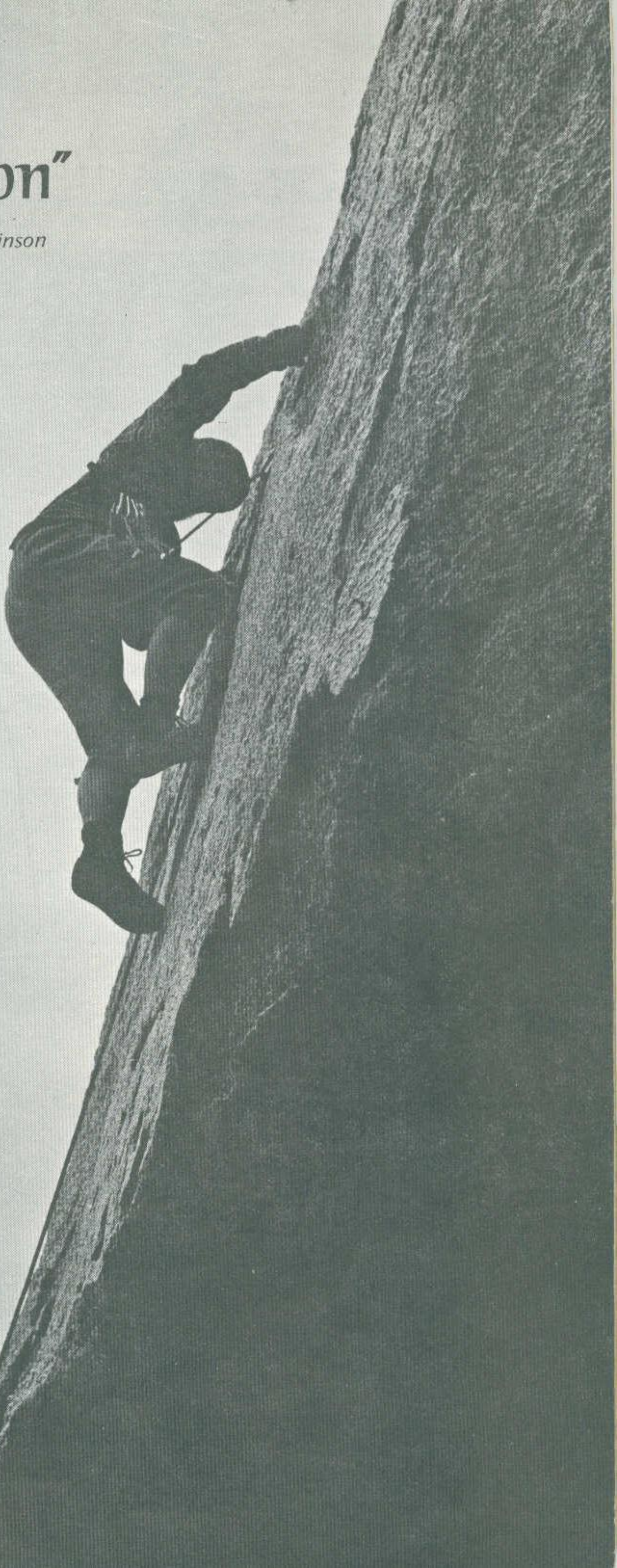
"Vedy clean, vedy clean"
- - Pablo Casals

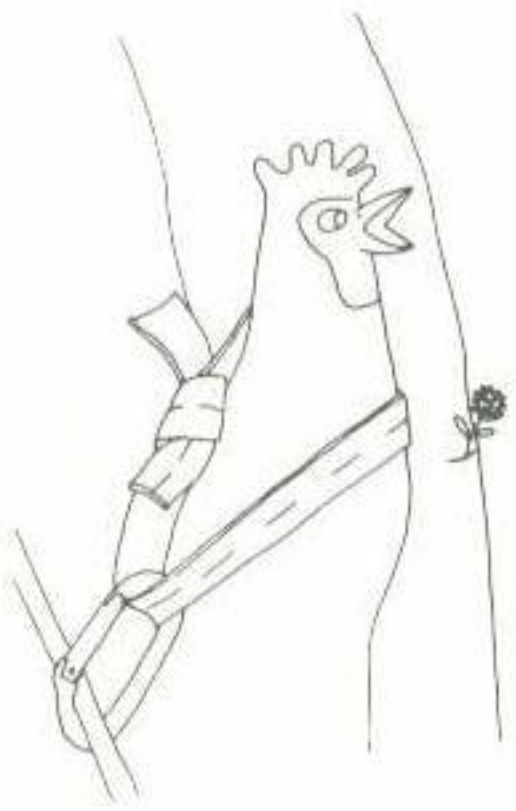
There is a word for it, and the word is clean. Climbing with only nuts and runners for protection is clean climbing. Clean because the rock is left unaltered by the passing climber. Clean because nothing is hammered into the rock and then hammered back out, leaving the rock scarred and the next climber's experience less natural. Clean because the climber's protection leaves little track of his ascension. Clean is climbing the rock without changing it; a step closer to organic climbing for the natural man.

In Britain after thousands of ascents of the popular routes, footholds are actually becoming polished but the cracks that protect them are unscarred and clean. The "Nutcracker" in Yosemite, which was deliberately and with great satisfaction climbed clean on the first ascent, doesn't have polished holds yet, but has obviously been climbed often and irreverently; some section of crack are continuous piton scars for several feet. It can still be done with nuts - they even fit in some of the pin scars - but no one will be able to see this beautiful piece of rock the way the first ascent party did. It didn't have to happen that way. It could still be so clean that only a runner-smooth ring at the base of trees and a few bleached patches where lichen had been worn off would be the only sign that hundreds had passed by. Yet the same hundreds who have been there and hammered their marks could still have safely climbed it because nut placements were, and are frequent, logical and sound. In Yosemite pins have traditionally been removed in an effort to keep the climbs pure and as close as possible to their natural condition. The long term effects of this ethic are unfortunately destructive to cracks and delicate flake systems. This problem is not unique to Yosemite; it's being felt in all heavily used areas across the country. In the Shawangunks a popular route can be traced not by connecting the logical weaknesses, but by the line of pitons and piton holes up the cliff. As climbers, it is our responsibility to protect this part of the wilderness from human erosion. Clean climbing is a method we can use to solve this serious problem. A guide for clean climbers is here presented.

Protection"

by Doug Robinson





RUNNERS

A length of tubular webbing or perlon rope is easily tied into a loop forming one of the most versatile of natural protections - the runner. Normal single length runners can be constructed from about 6 feet of rope or webbing. Double and triple length runners require approximately 10 and 14 feet respectively. Traditionally, these loops have been tied with a Ring Bend which is simple but must be constantly watched because of the slippery tendency of nylon web and rope to untie themselves, especially when wet. A more secure knot that can be tied once for the life of the runner and can be used for both perlon rope and thick tubular webbing is the Double Fisherman's Bend or Grapevine Knot (Figure 1).

Runners are carried over the shoulder and under the opposite arm. In use they are looped over or around anything in sight; blocks, bulges, and bushes, chockstones and chickenheads, knobs, spikes, flakes and trees. For this reason a variety in both material and lengths of runners should be carried. All tubular webbing from 1/2" through 1" and rope diameters from 5 or 6mm through about 8 mm are useful in fitting varying situations. The smallest sizes (1/2" and 5mm) will provide interim protection in tight threading situations. The loop strength of Chouinard 9/16" web and 7mm rope are adequate for most protection needs and 1 inch and 8mm are bombproof (see Tables E and F). A doubled runner will normally have twice the loop strength indicated.

A common mistake is not having enough runners along; a dozen is not too many. Hero Loops or small runners can be used for the fine work in tying off rock spikes, nubbins, rugosities, and twigs (9/16" web is preferred for protection). Large blocks and chockstones can be tied off with a chain of runners looped together or with double or triple runners which can be carried over the shoulder in loops of two or three coils, kept even by a carabiner.

Historically, runners have been commonly used in reducing the rope drag produced by out of the way protection. When climbing clean this role of smoothing out the line of the climbing rope behind the leader is even more important because the addition of a runner will help protect nuts from being bounced or jerked out of the crack by the climbing rope. A runner makes a nut more secure.

Sometimes runner placements themselves are insecure. For instance a placement that would easily hold the heavy downward pull of a fall might be very susceptible to a light side pull from the climbing rope. Another runner can be attached but sometimes the security can be greatly improved by wedging a pebble or nut into the crack above the runner to hold it into place. At other times extra security can be obtained by jamming the knot of the runner into place. Placements on slippery bulges might be improved by tying a slipknot in one end of the runner, then cinching it up as in Figure 2. In extra ticklish situations, British climbers have used even adhesive tape to hold runners in place on small rock spikes.

Clean climbing demands vision and an awareness of the rock. On the equipment side, runners form the basis for protection. They were all that was available to clean climbing Englishmen before the advent of portable and artificial chockstones. In a like manner, they are the foundation of the modern clean climber's repertoire.

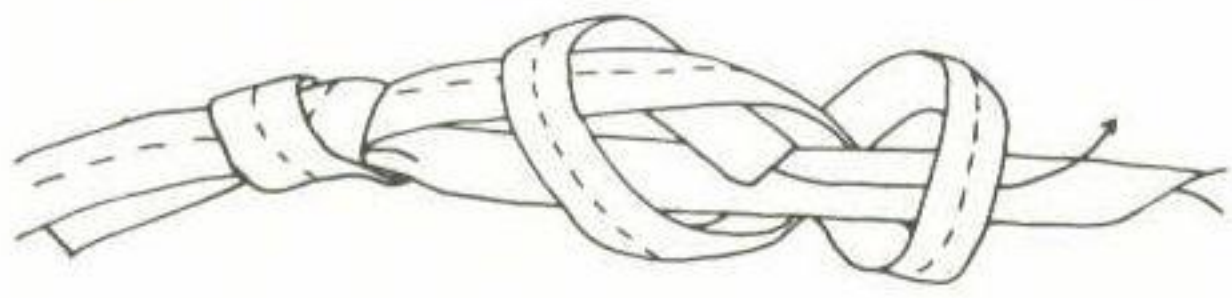


Figure 1

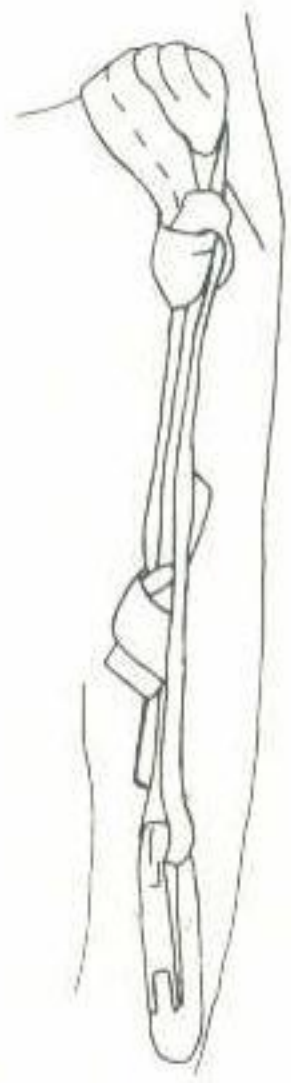


Figure 2

"Dream of White Horses", Anglesey

MAKE THE ROCK HAPPY – USE A NUT

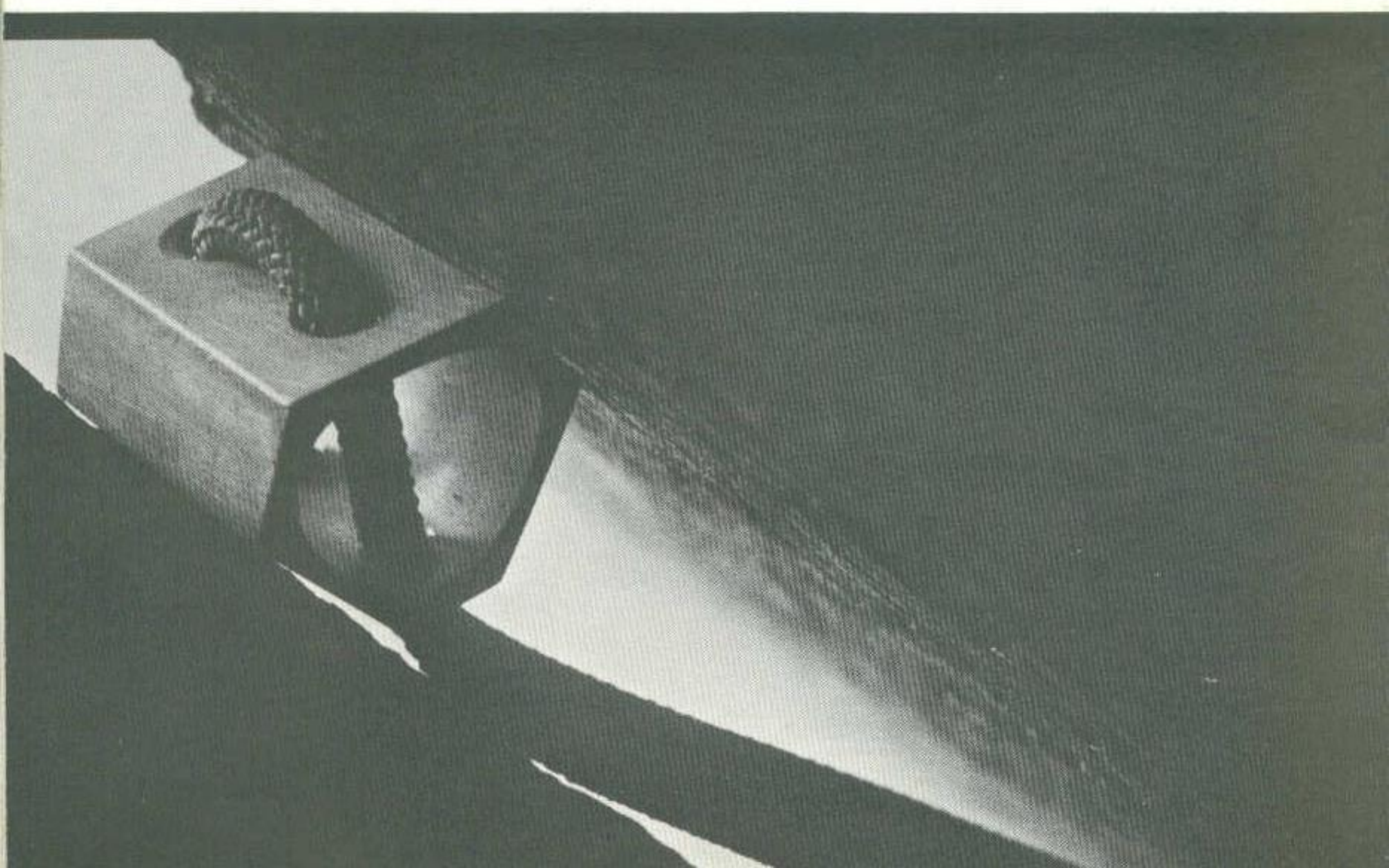
To place a nut you must begin by thinking about the shape of cracks. Right from the start clean climbing demands increased awareness of the rock environment. Consider the taper of a crack. Is it converging, that is, flared in reverse, wider inside than at the lip? Or it may be parallel-sided with an even width. Or at the other extreme, flared.

Converging cracks are easiest to fit; find a wide spot up high and drop the nut in behind. Beware of the nut falling out the bottom, however, or breaking through a thin-lipped crack. Flared cracks are easy too, usually unfittable. But important exceptions have been known, chiefly in the form of knobs or bulges in the crack which will take a nut behind or above. Also, don't overlook the possibility of fitting a much smaller nut far back in the dark recesses of the crack.

The usual nut placement is in a vertical crack. Find a section of the crack that closes downward; that is, where the crack is wide above, narrower below. Select the right size nut, place it into the wide section of the crack, and carefully locate it where the crack narrows. Then give the sling a stout downward jerk to wedge the nut securely in place. Inspect the placement for adequate constriction of the crack and test the nut's security (the degree to which it can resist being accidentally dislodged by the climbing rope) by giving an appropriately light outward jerk on the sling. Nuts have the advantage over pitons in that they are more naturally at home in vertical placements. This is their normal environment as it is for the chockstones from which they derive.

But the crack may not have any obvious wide-to-narrow placements. Often the difference between sliding and setting is so subtle that it can hardly be seen and is easier felt.

This is especially true in granite where cracks are quite uniform and nuts were first thought relatively useless. For these trickier fittings it is helpful to have a good selection of nuts within a given size range; a small variation can be crucial. Pick the largest nut that will just fit in the crack (for Hexentrics remember that a change of attitude will slightly change the size) and work



it downward until it hopefully lodges. Test it with a jerk, but avoid testing it too vigorously which will only make it harder to remove as it inches into tighter placement.

Non-granite rocks have other structures to tempt the clean climber. Limestone and sandstone often have pockets that are partly closed off on the surface -- sort of inverse chickenheads -- that can sometimes be fitted with a nut inserted endwise and turned to wedge.

To complete the range of silent protection do not overlook the potential of using certain sizes of pitons as nuts. Two general classes are possible. (1) Bongs function very well as large chocks. When used in this manner they are normally placed pointing downward with a runner threaded either through the lower lightening holes (Figure 3) or around the entire Bong as if it were a natural chockstone. Also, because they have an end taper, bongs can be wedged lengthwise in six-inch wide cracks, (Figure 4). (2) Long horizontal pitons can oftentimes be placed in cracks without the use of a hammer and have great holding power, especially in horizontal cracks. If used this way in vertical cracks, select a locally wider section of the crack or an area where the rugosities of the crack will grip the piton near each end of the blade and prevent it from rotating or shifting downward. The employment of innovative techniques such as these can turn the occasional compromise situation into good clean climbing!

Finally, a few special cases. Sometimes a crack within a crack will hold a nut when the main crack won't. Very shallow or bottoming cracks or irregularities on the surface of the rock that aren't really cracks will sometimes hold a nut. Shallow cracks can more often be fitted with nuts than with pitons because a nut doesn't necessarily have to be deep to be strong. Slots on the surface of the rock that would take only the most extreme nest of pins and then only for aid will sometimes perfectly hold a happy nut. A nut may even fit between knobs on the surface of the rock; a three-nut nest has been seen set between two knobs that was good enough for aid. Surely more imaginative ways of using them will appear.

Using Bongs as Chocks

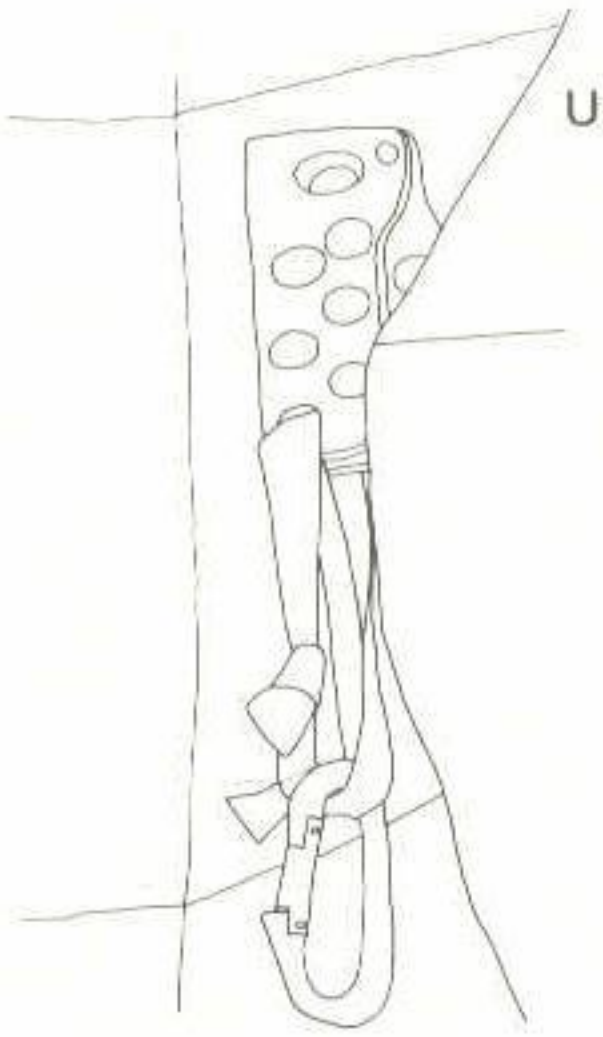


Figure 3

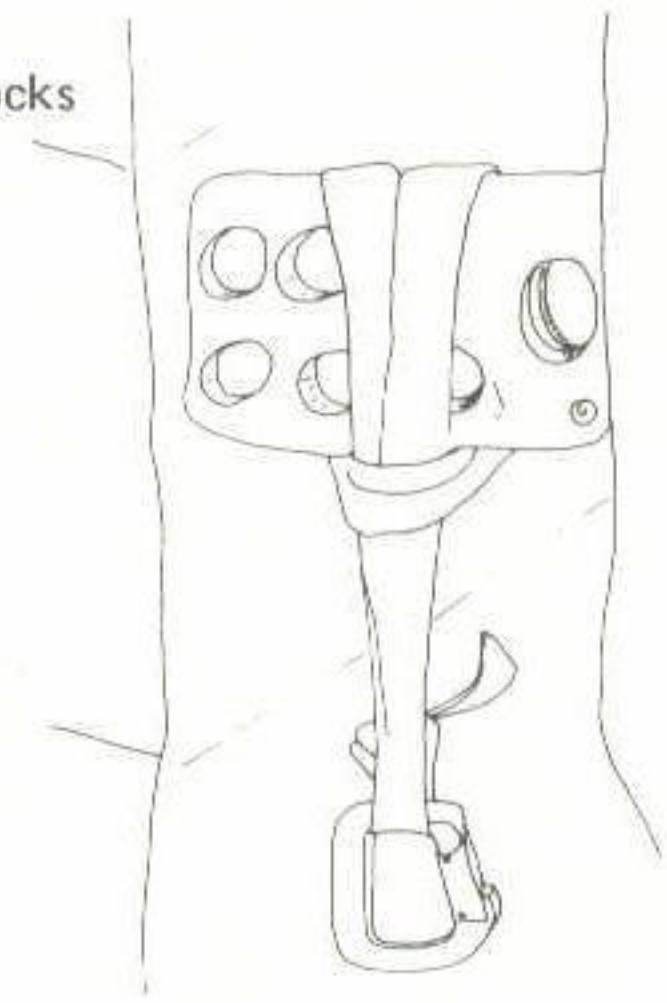


Figure 4

RACKING

The success of many methods of carrying nuts will depend largely upon the length of the slings. Three length categories exist (see Table C) Nuts with long slings can be carried in the same manner as runners, over the shoulder and under the opposite arm. This is probably the best carry for extremely large nuts such as Hexentrics No. 9 and No. 10. Medium length slings can be carried around the neck, necklace fashion. This is an excellent quickdraw position, but if more than a few nuts are carried this way the slings will become tangled as well as block the view of your feet. In this country the most common method is to fix the nut with a short sling and carry them clipped onto the normal hardware loop. If a large number of nuts are being carried two cleanware loops can be worn, one on each side, since the hammer will either be little used or not carried.

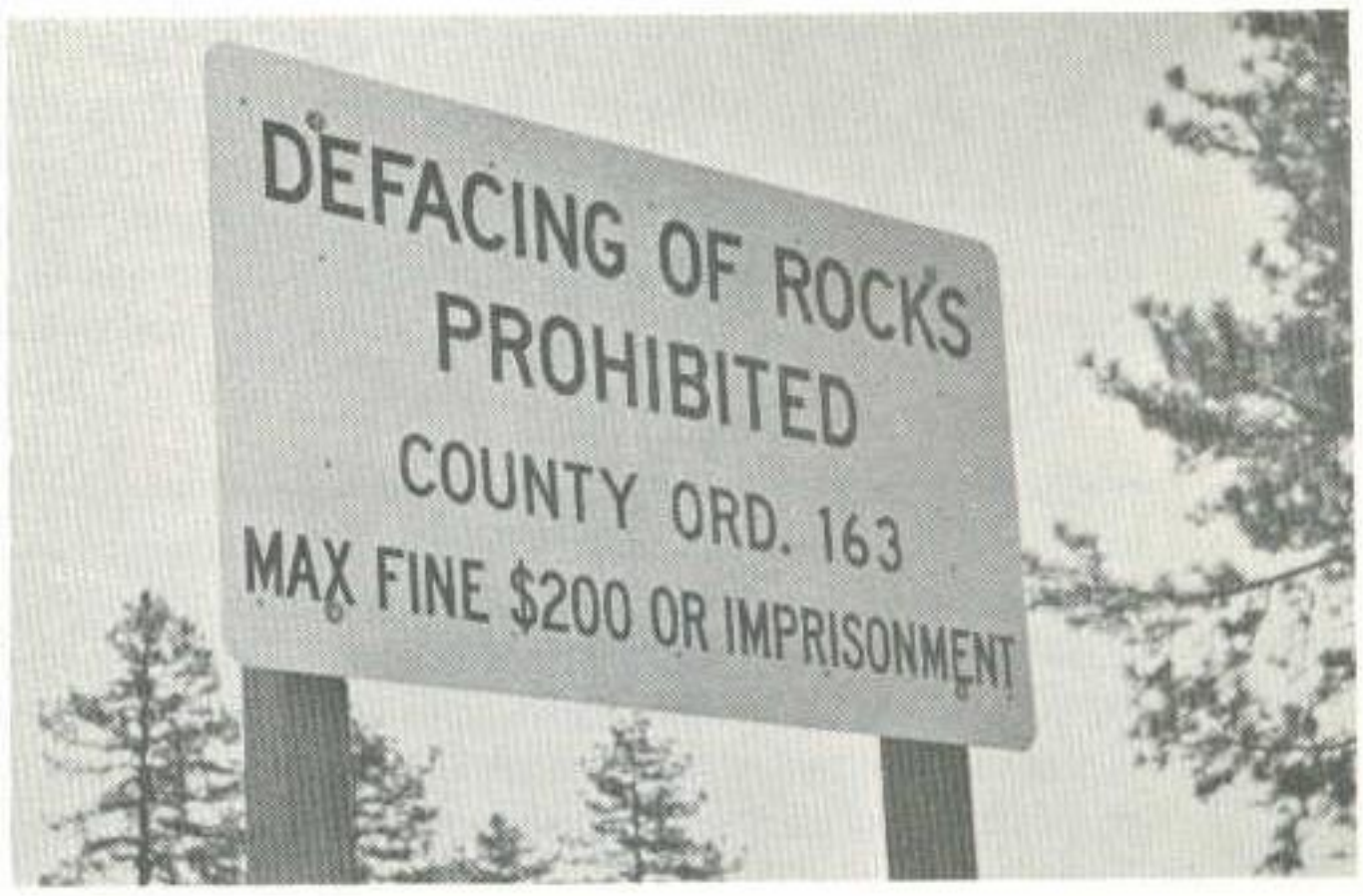
The British carry their chocks in a variety of ways. A common one is on the equipment loops of their climber's belt or harness. Nuts with medium and sometimes even long slings can be successfully carried in this manner because this attachment at the waist, as opposed to higher on the body, prevents their swinging out front when one leans forward. It also helps to spread the equipment out over the body and keeps it out of the way of runners and equipment carried elsewhere. This method of racking can be obtained without a complicated harness by clipping the chock slings directly onto loops of the Swami Belt or the loop of climbing rope around your waist.

Nuts should be racked like pitons in an orderly manner, assorted in sizes from small to large for ready access. They can be racked one to a carabiner for quicker removal. With chocks as with pitons you will want to carry a range and proportion of sizes complementing the climb - but do not forget to allow for the 1/3 more frequently needed for security.

The length and type of sling affects a nut's usage. Short slings are preferred for aid climbing. Medium and long length slings are useful for free climbing because of the greater security they provide. They also facilitate jerking the sling to set the chock securely in the crack. Chocks on short slings can be set by jerking with a bight of the climbing rope after it has been clipped in. Medium length slings on chocks that will occasionally be used for aid should be made long enough so that they can be shortened up with an overhand knot. Although rope slings are preferred because of their better handling characteristics, some webbing slings will be useful for fitting into highly constricting cracks. Wire slings are used in the smallest sized chocks to obtain strength. Chocks with wire slings have advantages in aid climbing and are easier to remove, but if they are not needed for strength reasons they should be avoided in general free climbing use because of their inherently low security.

TABLE C. SLING LENGTH REQUIREMENTS

Perlon Diameter	5mm	6mm	7mm	8mm	9mm
Webbing Size	1/2"		9/16"		1" TUB.
Short Chock Slings	2'6"	2'9"	3'	3'4"	3'9"
Medium Chock Slings	3'6"	3'9"	4'	4'4"	4'9"
Long Chock Slings & Single Length Runners	5'	5'3"	5'6"	5'9"	6'



PRACTICE

The question sometimes arises of tapping a nut with the hammer to seat it in the crack. Probably a holdover from piton pounding, this practice will be found not so much harmful to the rock (which is the problem with pitons) as it is to the whole essence of clean climbing. It is a bad habit. Either you are climbing clean or you are not. As if summarizing the whole ethic of British climbing Joe Brown posed the question, "When does a chock become a peg?" This is a worthwhile guideline to remember, for clean climbing is as much a battle with temptation as it is with the mountain. The use of pitons on a clean climb is somewhat analogous to the placing of bolts on a peg route. They are both antagonistic to principle. The true object, as always, is not simply to get up things and check them off in our guidebook - - it is to challenge ourselves.

You have not totally committed yourself to climbing clean if you still carry the hammer and pegs with which to rescue yourself when the going gets tough. Clean climbing requires judgment and an accurate knowledge of one's own limitations; and helps in the future development of these qualities. The best way to start climbing clean is to relearn climbing itself from the ground up. Begin once again on the easy climbs, committing yourself to clean principles, using only runners and chocks for protection. As before, gradually raise your standard commensurate with the development of confidence in yourself and the new equipment. Setting up practice falling situations will help in this development. The mere abandonment of hammer and pitons on hard climbs without first building the necessary aptitude can be disastrous! In due course guidebooks will list climbs that can be protected with runners andchocks only, just as they now list those that can be climbed free. When so indicated ironmongery may be totally dispensed with; the full rewards of clean climbing will be yours.

Technique is more useful than force in removing nuts. They must be maneuvered into a wider section of the crack where they can be withdrawn. The fingers or the sling on the nut can normally be used for this. Smaller sizes can sometimes be nudged out with a long thin piton, or the skinny pick of a crag hammer. Wired nuts are maneuverable by their wires. A few drops of epoxy glue, welding the wire to the nut, will allow pushing with the wire to facilitate removal.

The ideal of clean climbing is to climb unencumbered by pitons and the hammer. This can safely be done in areas where chock cracks are plentiful and clean. The Sierra Nevada high country is such a place. Certain other areas will require a tool for one or more of the following uses: (1) cleaning dirt, weeds or moss from prospective nut cracks, (2) for use by the second in prying or nudging nuts from cracks, particularly nuts that have been used for aid. (3) Placing anchor pitons where for some reason, a secure, non-directional anchor cannot be obtained with chocks and runners, and (4) testing fixed pitons. (It still is absolutely essential to test pitons in place with light downward blows of the hammer, because of their inherently lower stability than good center pull chocks, and because they cannot be inspected visually as can chocks.)

STRENGTH . . .

Seen through the eyes of a lifetime of pounding, with memories of pounding harder as the fear mounts, the notion of inserting protection with two fingers, and setting it with only a stout downward jerk, tastes of insecurity. For reassurance we need to look back to the homeland of nuts where Joe Brown says that "so many people have fallen on them and been held that they seem to be at least as safe as a normal sling on a flake or chockstone", which of course can be bombproof.

He feels further that the use of nuts in England and Wales has been responsible for a decline in the number of accidents. And this in a country that uses them not occasionally or for convenience, but regularly almost universally, and by extension in many less than ideal settings.

Note the following report regarding the use of a small ¼" size Clog nut in Wisconsin: "Just had to let you know that I think your wired tiny brass hex is one of the most wonderful products of modern technology extant. . . . I took a thirty foot peel onto one and it held (with the help of an excellent belay)".

It would be useless to speculate on the "normal" holding power of nuts since they depend so much on the configuration of the crack. Their ultimate strength in proper placements will depend on the breaking strength of the rope or wire sling that attaches them to the rest of the climbing system, and this in turn depends primarily on the size of the hole in the nut. The approximate strengths of rope, wire, and webbing slings in nuts are listed in Tables A and B. The approximate strengths of runners (loops tested between two carabiners) are listed in Tables E and F. Good placements in turn depend not as might be thought on the rock, but rather on the inventiveness of the climber.

. . . AND SECURITY

The strength and security of an anchor are not the same thing. Strength is the ability of an anchor to hold a fall. Security is its ability to stay put until the fall comes. Both should be considered in placing nuts.

Security can also be obtained by doubling up nuts as explained under anchoring. Extra carabiners left on the sling will weigh it down, helping to hold it in the crack. Extending the nut sling with a runner also helps.

Of the nuts that fall or pop out of the crack behind an unhappy leader, ones on wire slings are the worst offenders, usually because the wire ends up acting as a lever magnifying rope movements to pry the nut loose. For this reason medium sized and larger nuts should be put on rope or webbing instead of wire; their flexibility prevents the lever-action blues.

As a general rule nuts accepting 7 mm and larger slings are not wired. Nuts with 5 and 6 mm slings are used for protecting moves and are recommended over wired nuts for insecure placements where the latter would easily be pulled from the crack. This differentiation is not a sharp one but the sizes and strengths required for mild versus serious falls is thought to grade from the one into the other at about the 7 mm level.[1]

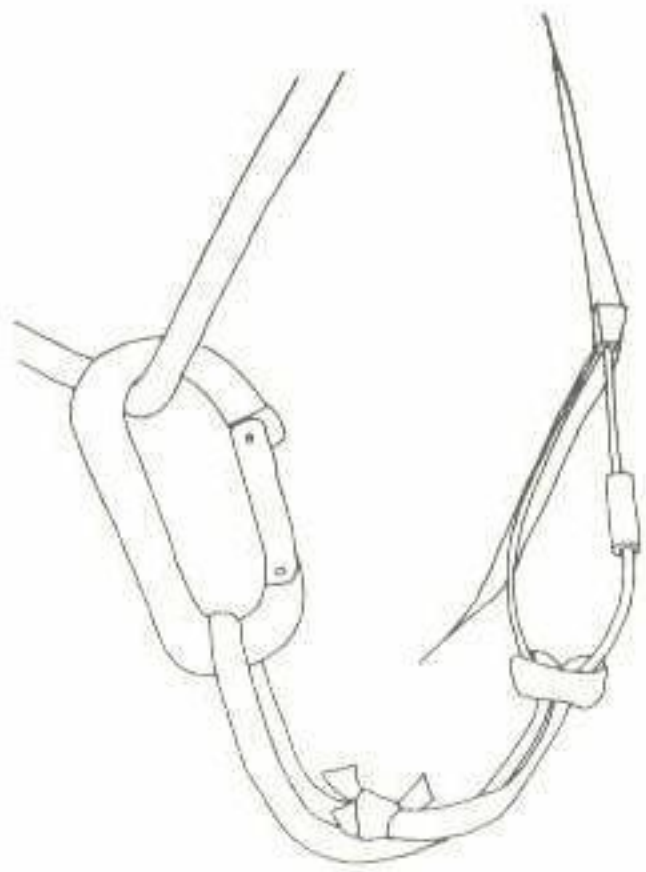
Wired chocks should be tied off with a runner to act as a flexible connection between the still nut and the moving rope. (Figure 5). In order to retain the runner's full strength it must be clipped into the wire sling with a carabiner for if it is looped directly through the wire a serious reduction in runner strength can result as indicated in Table D. We have found that plastic covering over the wire does not appreciably increase the runner's strength.

After taking all these precautions the fact will still remain that many nut placements, like the infamous psychological piton, will be neither strong nor secure. The British, of course, have already recognized this problem and have a solution. They employ as many shakey nuts as necessary (or at least as many as they can get!) to do the job. They average about 1/3 more nuts and runners on a pitch than would normally be used for protection with pitons, mindful that a few will fall out, and some that stay in probably would not hold. For example, as many as 20 nuts and threads can be, and sometimes are, fitted into the very difficult but unusually well protected 120 foot Cenotaph Corner in Llanberris Pass.

1) "Clogs", John Stannard, Summit Nov/Dec 1971

Table D. THE STRENGTH OF RUNNERS ATTACHED TO WIRE SLINGS

Wire Sling Size	Approx. Wire Sling Strength (lbs)	Runners Attached with Single Hitch (Fig.5a)			Doubled Runner through Wire Slings (Fig. 5b)		
		7mm	9/16"	1"T	7mm	9/16"	1"T
1/16	800	800	800	800	800	800	800
3/32	1700	1100	1100	1300	1800	1800	1800
1/8	2600	1200	1300	1800	2000	1900	2400



(a) unsafe

(b) better

(c) correct

Figure 5. Runners on Wired Sling

THE IMPORTANCE OF BEING ANCHORED

Runners around trees share with pitons the quality of being non-directional anchors; pull on them any direction and you get held. Other runners and most nuts are more particular which way they are loaded - they are directional. A leader anticipating the specific direction he might be loading it, places his natural protection with that direction well in mind. But belay anchors are not so simple, and it is with these anchors that the natural climber must make the greatest effort and analysis. A belayer might be pulled down in a fourth class fall, up in a fifth class one, away from the rock or in a sequence of directions if the leader and he are unlucky. So the belayer must have a non-directional anchor, and in the absence of a handy tree or a permanent natural chockstone, he must construct it from directional tools.

Ideally he will be sitting on a ledge with a converging crack at the back of it that can be chocked for a pull up or out. In this case a downward pull on the belayer would be felt as an outward one on the nut. Another method is to place a nut in a horizontal crack well to the side of the belay position, especially to the side away from a diagonal pitch, such that no force would come straight up or down on it without pulling sideways too.

Mostly the answer to a bombproof belay will be several anchors set in opposition to each other so the resultant will hold a pull from any direction. The simplest example would be anchoring to a single vertical crack by placing one nut in the normal position for a downward pull and another somewhere below it upside down for an upward pull. The sling of the upper nut is run through the sling of the lower then clipped to the belay so a downward force is held directly on the upper nut, while an outward or upward force will

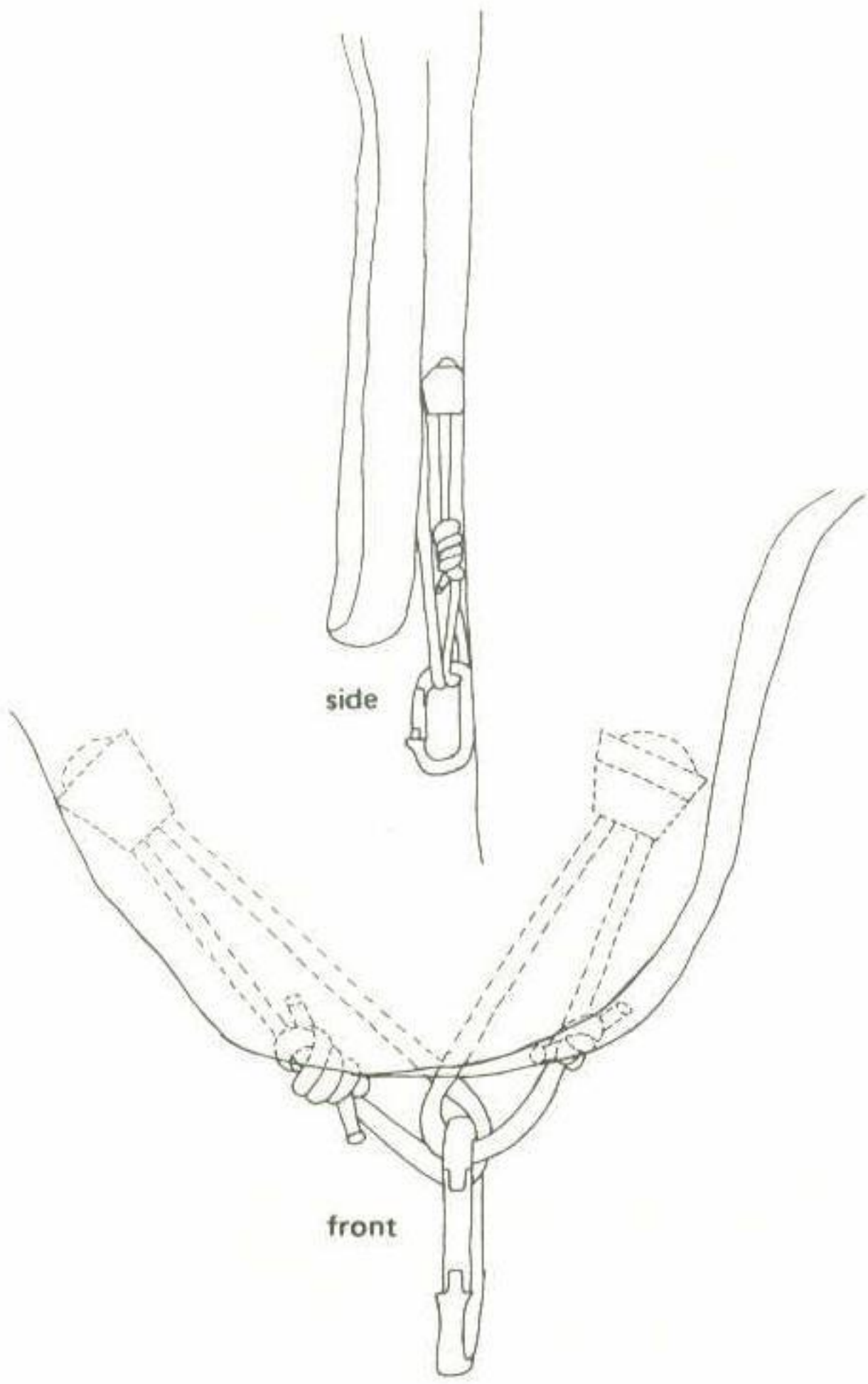


Figure 6

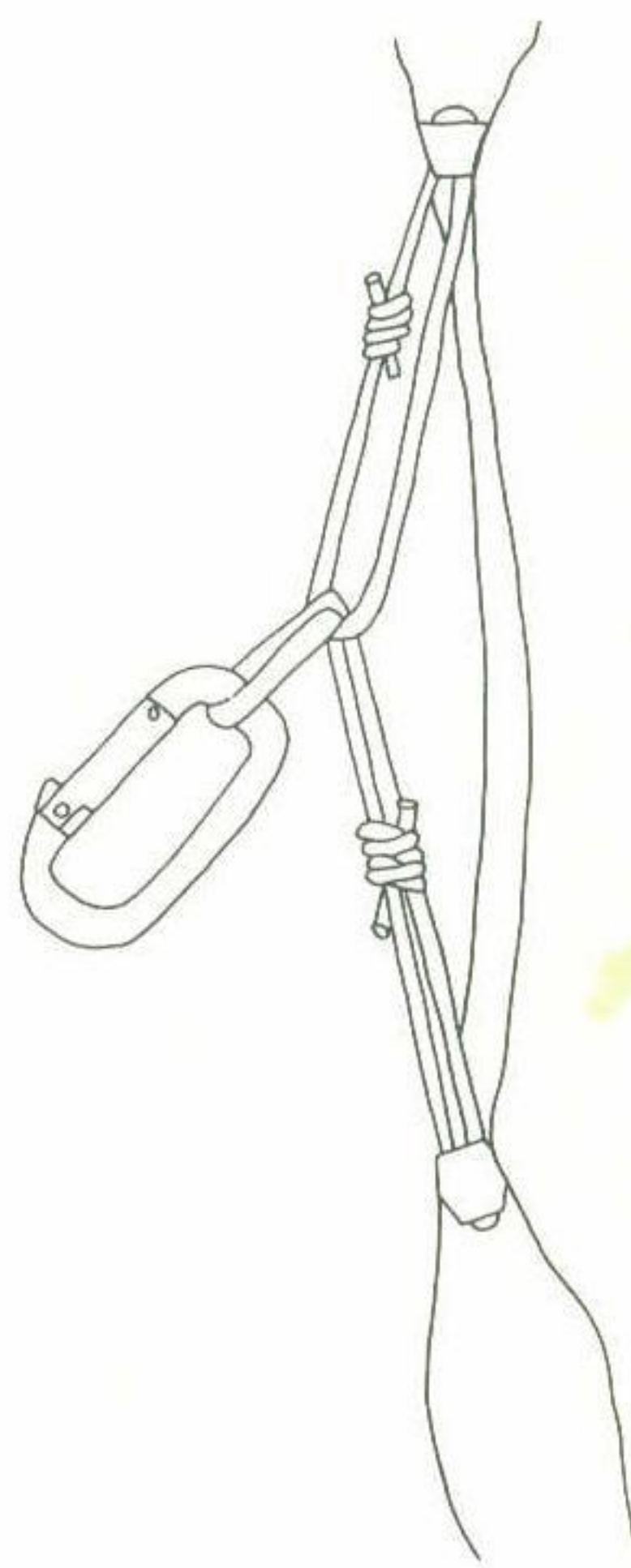
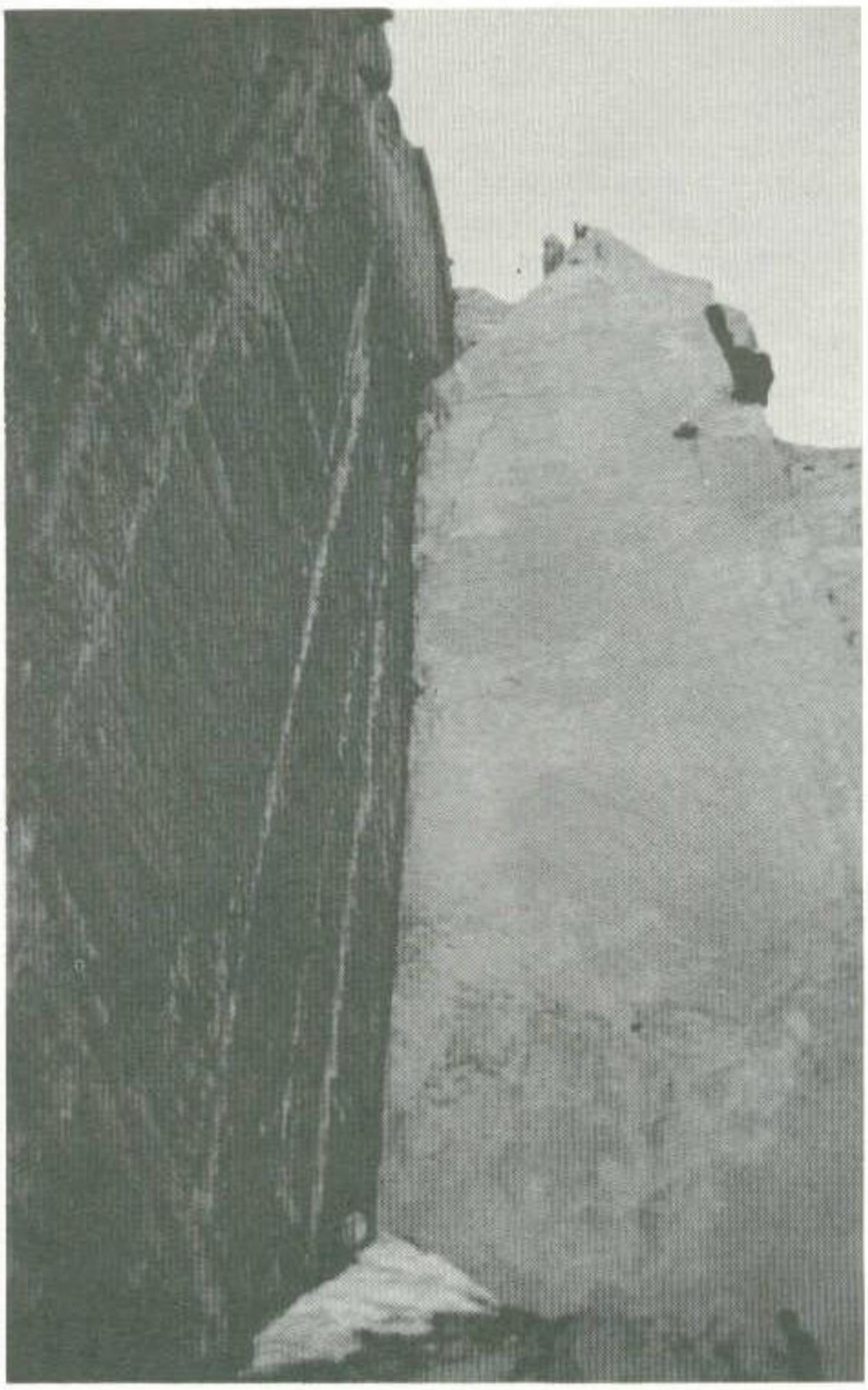


Figure 7

pull the nuts toward each other making the anchor more secure as it gets loaded (Figure 7). Or the slings can be clipped together with a carabiner as in Figure 6. This same principle also works in a horizontal crack for anchoring and for protection where a single nut would not hold. This technique of opposing nuts can be adapted to many situations according to one's ingenuity. A nut and runner may be opposed, or two runners, three nuts . . . When the only possible opposing anchor points are too widely spaced to be effectively tied together, the belayer may tie-in separately to each of them, giving him one anchor for each of the possible directions he may be pulled.

The belay anchor is the foundation of the climber's whole line of defense. It must be bombproof. It must be non-directional in order to safeguard a leader fall.

Today's concept of extra long ropes and full length runouts is quite recent and local, being at first an adaptation to ledgeless routes in Yosemite and the ability of pitons to anchor virtually anywhere, and spreading from there by way of fashion. It is here that the natural climber will find it advisable to make a small readjustment in thinking. It is far more important to be well anchored than to make long pitches. And it is often more efficient time-wise to stop short and throw a sling over a block than run the rope out only to lose 10 minutes constructing an anchor. The British have recognized this as a part of climbing with natural protection. On English and Welsh crags pitches of 30 to 60 feet are common. Every well protected ledge is utilized as a belay stance. And the ease and quickness of placement and removal of runners and chocks make these short pitches even more practical. The clean climber may find, especially on crag climbs and alpine routes, including moving in coils, that a shorter rope of perhaps 120 feet would overall be more useful, economical, and convenient.



RELAX YOUR MIND,

RELAX YOUR MIND,

YOU'VE GOT TO RELAX YOUR MIND . . . . . .

We could easily end here, having said a great deal already, but a few further implications demand notice at least. The use of nuts which begins by trying to solve some pressing environmental problems really ends in the realm of aesthetics and style. We won't pitch the aesthetics at you, only urge it once more to your attention. The most important corollary of clean climbing is boldness, a trait long recognized and respected by, you guessed it, the British climbers.

Where protection is not assured by a usable crack long unprotected runouts sometimes result, and the leader of commitment must be prepared to accept the risks and alternatives which are only too well defined. Personal qualities - judgment, concentration, boldness - the ordeal by fire, take precedence, as they should, over mere hardware.

Pitons have their place in American climbing; aid would be very improbable without them, and many free routes will continue to need them as well. Leaving aside for now the problem of whether and how, and where they might be fixed to save the rock, we might speculate that their use in the future may be reduced to the more difficult routes. When going where cleanliness has been established the climber may leave his pitons home and gain a dividend of lightness and freedom; but if on new ground, or the not yet clean, he can treat this unsavory equipment as the big wall climber does bolts, and leave them at the bottom of his rucksack, considering the implications as he brings them into use. There will be room for almost clean climbs that use few pins, but fixed ones, so carrying pins will still be necessary.

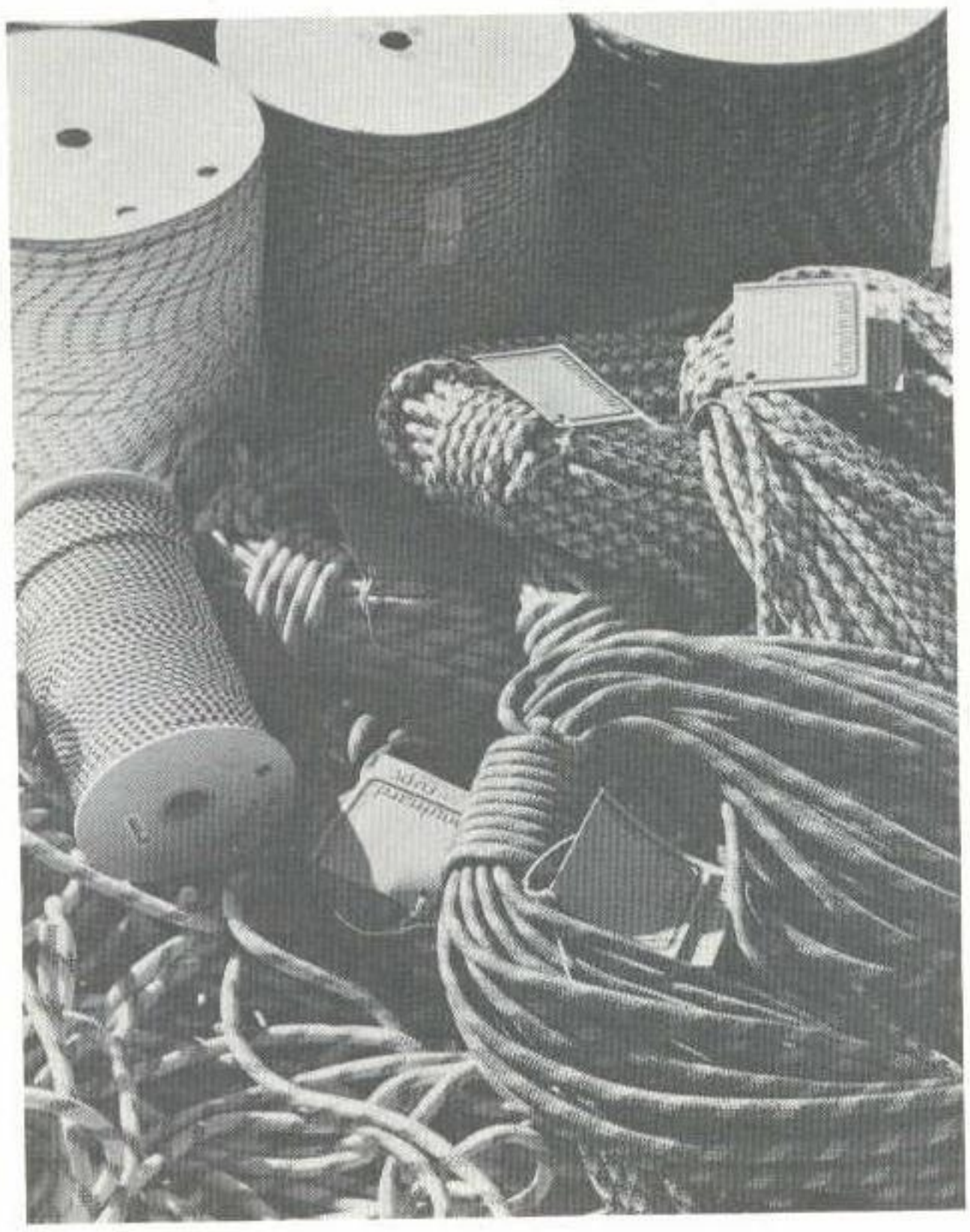
Using pitons on climbs like the "Nutcracker" is degrading to the climb, its originator and the climber. Robbins must have been thinking of that climb when he wrote, "Better that we raise our skill than lower the climb." Pitons have

been a great equalizer in American climbing. By liberally using them it was possible to get in over ones head, and by more liberally using them, to get out again. But every climb is not for every climber; the ultimate climbs are not democratic. The fortunate climbs protect themselves by being unprotectable and remain a challenge that can be solved only by boldness and commitment backed solidly by technique. Climbs that are forced clean by the application of boldness should be similarly respected, lest a climber be guilty of destroying a line for the future's capable climbers to satisfy his impatient ego in the present -- by waiting he might become one of the future capables. Waiting is also necessary; every climb has its time, which need not be today.

Besides leaving alone what one cannot climb in good style, there are some practical corollaries of boldness in free climbing. Learning to climb down is valuable for retreating from a clean and bold place that gets too airy. And having the humility to back off rather than continue in bad style - - a thing well begun is not lost. The experience cannot be taken away. By such a system there can never again be "last great problems" but only "next great problems."

Carried out, these practices would tend to lead from quantitative to qualitative standards of climbing, an assertion that the climbing experience cannot be measured by an expression of pitches per hour, that a climb cannot be reduced to maps and decimals.That the motions of climbing, the sharpness of the environment, the climber's reactions are still only themselves, and their dividends of joy personal and private.

After going as far with natural protection, and criticizing bolts in their turn as well, we must finally admit to still being, after all, a manufacturer of pitons. We are proud of our pitons and continue to refine their design and construction. If technical rockclimbing in places as Yosemite were still confined to the handful of residents and a few hundred occasional climbers who bought and used our first pitons then the switch to clean climbing would be purely a matter of individual preference for the aesthetic opportunities it offered, for silent climbing, lightness, simplicity, the joys of being unobtrusive. But the increased popularity of climbing is clearly being felt in the vertical wilderness, and if we are to leave any of it in climbable form for those who follow, many changes will be necessary. Cleanliness is a good place to start.



chouinard rope

The Chouinard rope is constructed of perlon by a leading rope manufacturer with whom we have worked closely to produce ropes that have the characteristics we feel are important in a technical climbing rope. It has a smooth sheath that snakes through carabiners and offers the best abrasion resistance of any kernmantel rope that we have tested. Under a low static load the specially woven dynamic core allows only a minimum amount of stretch (almost half that of some other ropes) - making it ideal for prusik and pendulum use. But under high loads the rope has a large amount of stretch to absorb the energy of a fall and minimize the forces imposed. The Chouinard ropemeets the UIAA requirement which is a guarantee that the rope strength is great enough and the rope flexibility is soft enough to sustain an extreme fall with a static belay. [1]

It is possible to manufacture ropes with even more stretch (lower impact strength). However, this creates a limp rope that is too soft to handle well. With the Chouinard rope we have reached an optimum compromise between strength, stretch, stiffness, durability, and smooth handling.

The 11 and 9 mm ropes are available in 120, 150, and 165 foot lengths. The 9 mm size meets the UIAA requirement as a double rope but its single rope strength is adequate for many mountaineering applications. The 7 and 8 mm ropes are excellent for hauling lines and are available in 150 and 165 foot lengths for this purpose. All sizes from 5 through 9 mm are available by the foot for use as runners and slings in chocks. Our wide variety of colors allows each chock to be fitted with a different color sling for easy identification.

1) In the UIAA rope test a 176 pound weight is dropped 16 feet on 9 feet of rope having a static anchor. The effects of sharp bends and knots are included in the test by passing the rope through a carabiner one foot above the anchor and attaching it to the weight with a bowline. Thus the UIAA test closely approximates an extreme fall (height of fall equalling twice the length of rope.) This is the most serious case and one in which the peak forces imposed on the system do not depend upon the height of fall but only upon the flexibility of the rope. The greater the rope flexibility, or stretchiness, the lower the peak force. The peak force in this UIAA standard test is labeled the Impact Force of the rope. It is a measure of the softness with which a fall will be held.

Table E. CHOUINARD ROPE

Rope Size	Tensile Strength	UIAA Peak Impact Force	Approx Loop Strength[1]	Weight lb. per 100 Feet	Color
5 mm	1210	----------	1800	1.1	gold/purple spiral
6mm	1650	----------	2400	1.5	yellow w/blue diag.
7mm	1960	----------	2800	2.1	orange w/ purple diag.
8mm	3300	----------	3500	2.9	blue
9mm	----	double rope 2530	5000	3.5	purple w/orange diag. green/gold spiral white w/green diag.
11mm	----	single rope 2330	-----	4.5	fantasia purple w/orange diag. orange/purple diag. green/gold spiral

1) Loops tied with Grapevine Knot and tested between carabiners.

KNOTS – FOR TYING IN

The standard knot for roping up is the Double Knotted Bowline, Figure 8. Lay a second loop atop the initial Single Hitch and proceed as with a standard Bowline. Finish the knot by drawing all parts up neatly and securing the tail with an Overhand Knot.

The most secure tie-in to the Swami Belt or Whillans Harness is a loop formed with a One-and-a-Half Fisherman's Bend illustrated in Figure 9. The first half of the knot is an Overhand in the standing part (the start for the single Fisherman's Bend). The second half is that of the Double Fisherman's Bend or Grapevine Knot. It is important that this procedure be followed carefully because the full Grapevine Knot will be exceedingly difficult to untie if fallen upon.

KNOTS – FOR ROPE LOOPS

The Grapevine Knot, or Double Fisherman's Bend, is a secure, high strength knot, preferred above all others for tying together the ends of a rope to form permanent loops. All chock slings and runners that are constructed from perlon rope should be tied with this knot. Its construction requires a considerable amount of rope which is taken into account in Table C. The Grapevine Knot is also excellent for joining the ends of two rappel ropes (Figure 10).

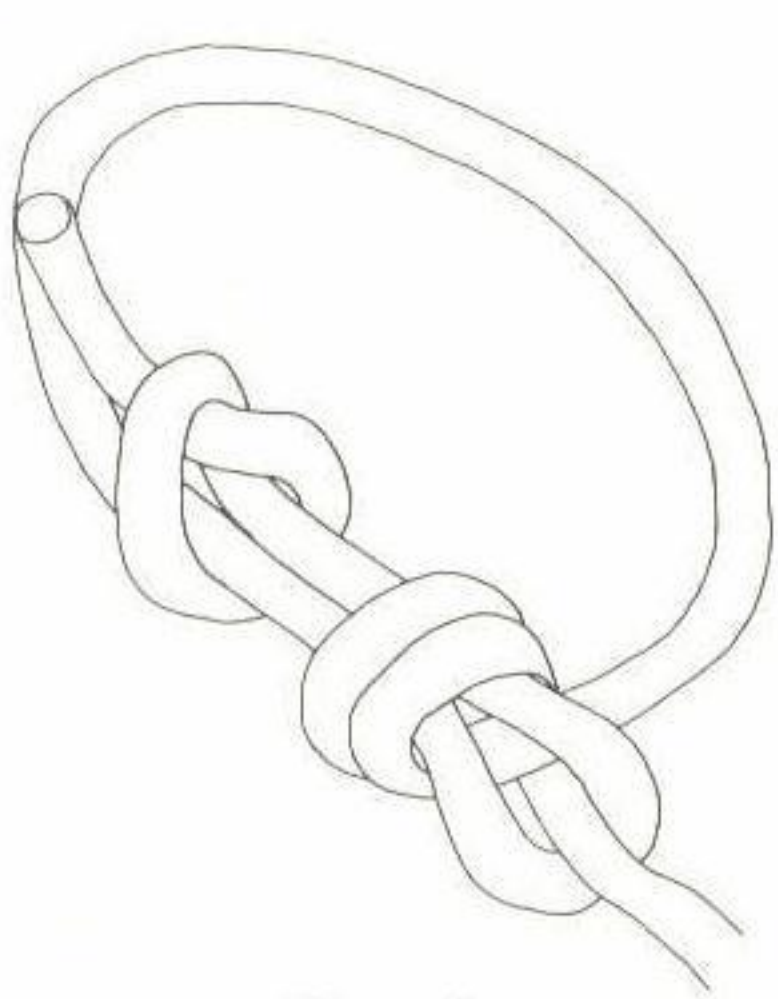


Figure 8

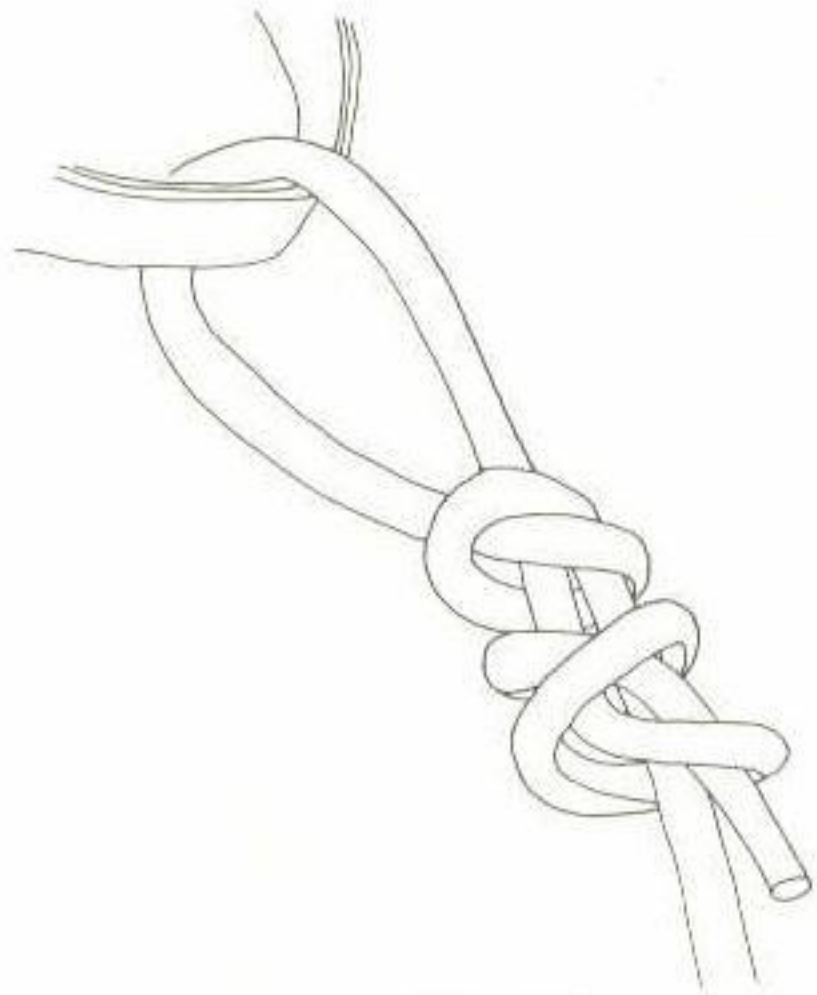


Figure 9

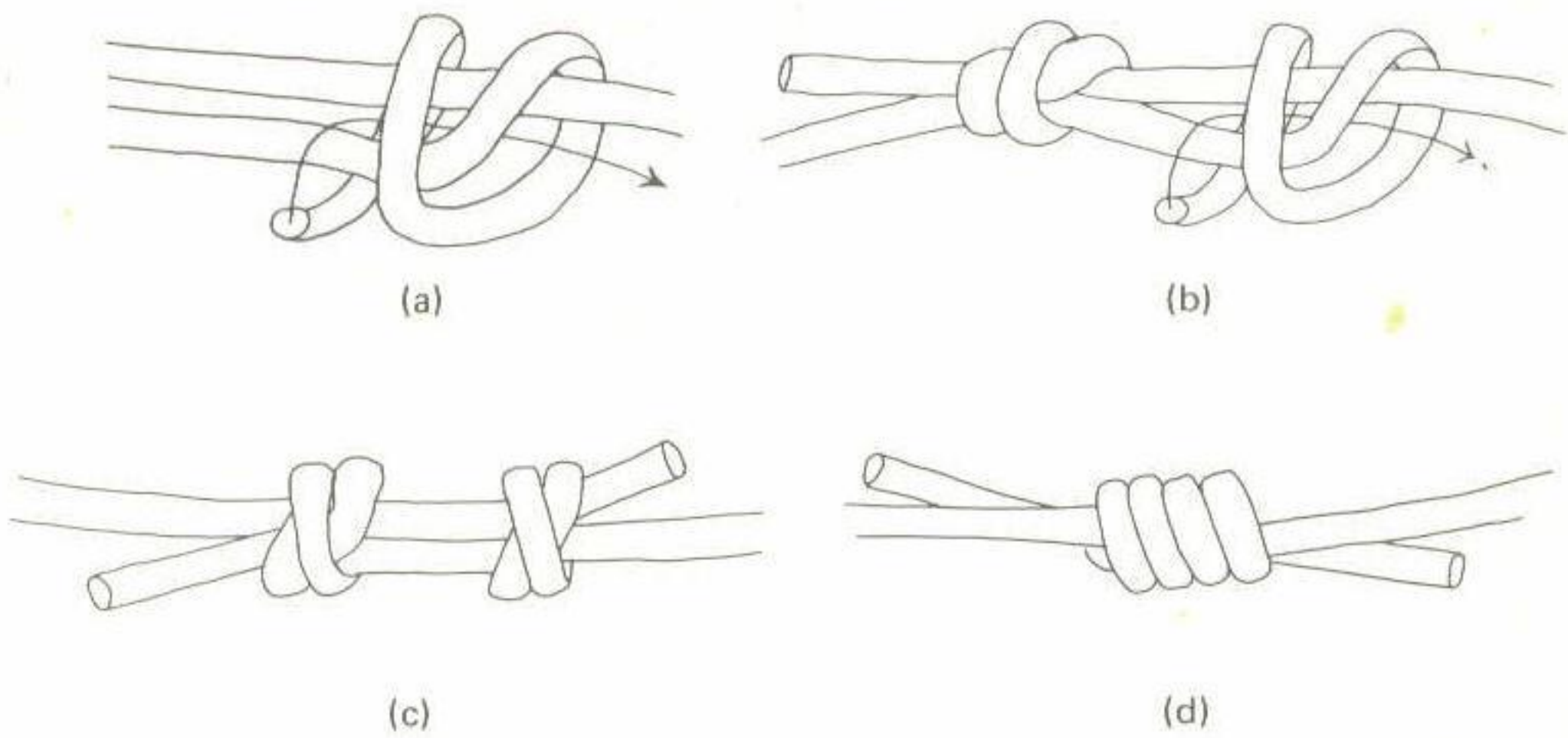


Figure 10.

BELAYING

Modern theory as well as practice indicates that falls should be belayed statically. There are several reasons for this:

1. The leader's fall should be stopped in the shortest possible distance to minimize the possibility of his hitting ledges and rock projections, his main danger.
2. Modern climbing ropes which meet the UIAA requirement are sufficiently strong and flexible to hold the most severe statically belayed fall.
3. Compared to theory (and the falling block and concrete anchor of the UIAA test) the most static belay possible in the field is actually relatively dynamic because of the inherent flexibilities of both belayer and faller which is an additional factor of safety.

In practice a "static" belay can be executed with a vise like grip on the rope (both hands should be used as braking hands), or by taking an additional wrap or two around one's thigh with the tail end to give additional friction. In this case a sufficient amount of slack must be kept in the rope at all times to allow for the movement of the leader. Anchors must be bombproof and secure also in an upward pull as described on page 22.

MISCELLANEOUS

Keep the rope clean, as grit will abrade the rope from within. Avoid stepping on the rope. Keep it sheltered in areas of rockfall. If rockfall damage is suspected or if a serious fall has been taken, inspect for core damage by running your hand along the rope searching for depressions or irregularities that might signal damage of internal fibers.

The use of long climbing ropes (165 feet in length) is becoming a craze. It sprang from not so early ascents (the first several ascents were made strictly with 150-foot ropes) of one climb - the Dihedral Wall of El Capital - where it is desirable to stretch a few leads beyond 150 feet. This is the only climb we know of where a longer than standard rope is advantageous. A 165-foot rope is costlier, heavier, and is unpleasantly awkward to coil; and when used on first ascents where bolts are necessary for anchors, it forces another party using shorter ropes to place their own bolts. For these reasons we discourage climbers from using ropes longer than 150 feet.

chouinard webbing

Not just military spec. webbing done up in civilian colors - - the dimensions, weave and strengths of this webbing were designed by us specifically for climbing. Their beautiful deep colors are not only tasteful but are helpful for identification.

Table F. CHOUINARD CLIMBING WEBBING

Size	Construction	Color	Tensile Strength	Approximate Loop Strength [1]
1/2"	Tubular	blue	1600-1800	1800
9/16"	Tubular	gold	2200-2800	3000
1"	Tubular	purple		
		green	4000-4400	4500
1"	flat	orange	3000-3500	4500
2"	flat	maroon	6000	- - - - -

1) Loops tied with Grapevine Knot and tested between carabiners.

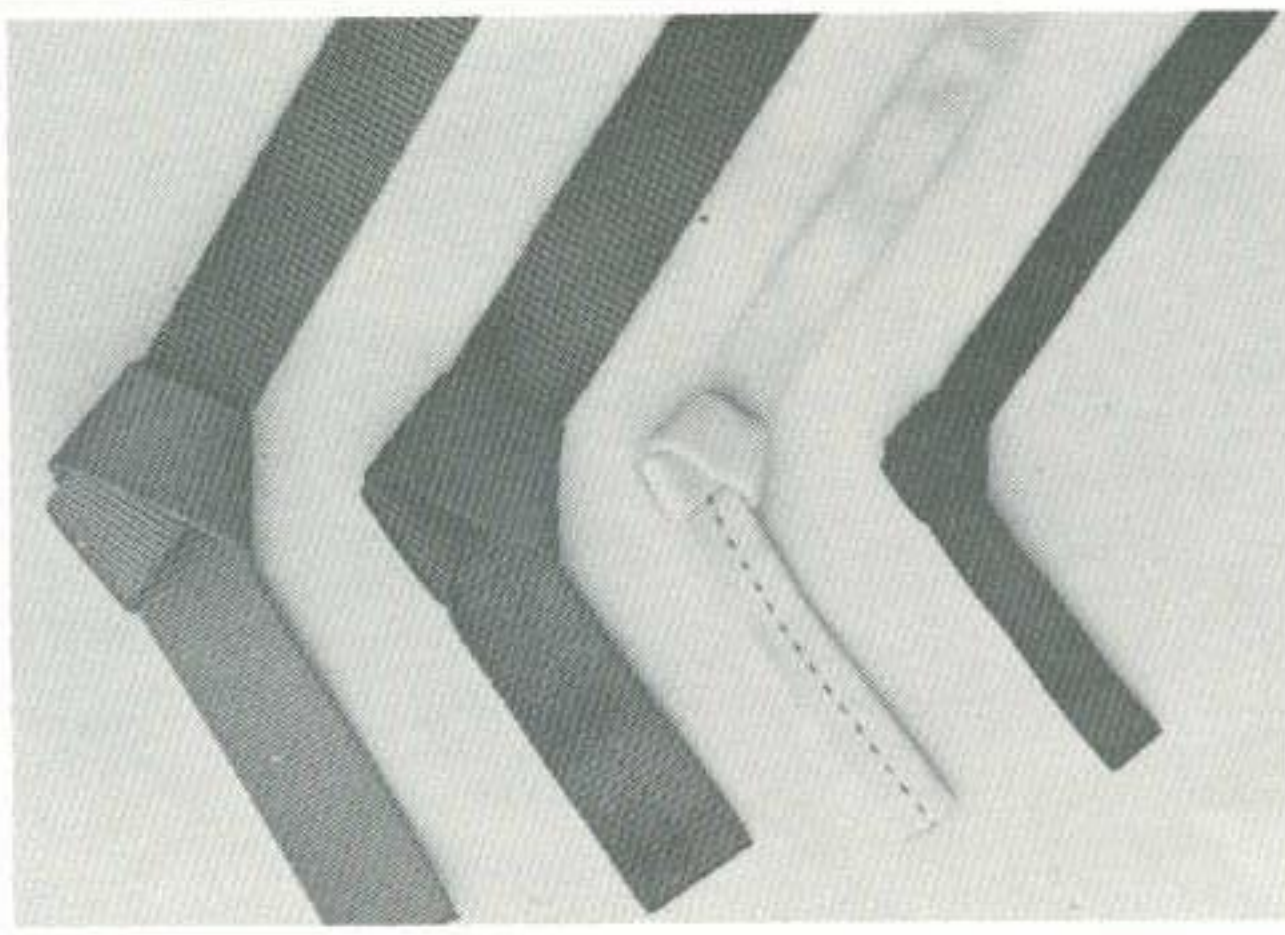


Table G. WEBBING USES & LENGTHS

	Web Size	Approximate Length
Hero Loops	1/2"	2'
Runners	9/16" or 1" T	Single-6'
		Double-10'
		Triple-14'
Etriers	1" flat or T	13'
Swami Belt	1" T	18-20'
	or 2" flat	10-12'

WEBBING KNOTS

A secure bend that is recommended for the construction of all runners and other loops in nylon tubular webbing is the Grapevine Knot. Its tying is executed as with perlon rope (Figure 10) but refinements applicable for use with webbing are shown in Figure 1.

Experience has now shown that the commonly used Ring Bend is too insecure (it unties itself with remarkable ease) for use with tubular webbing. The knot is shown in Figure 11, but it is recommended only for use with the 1" flat and 2" flat webbing. Ring Bends in your Swami Belt should be checked regularly.

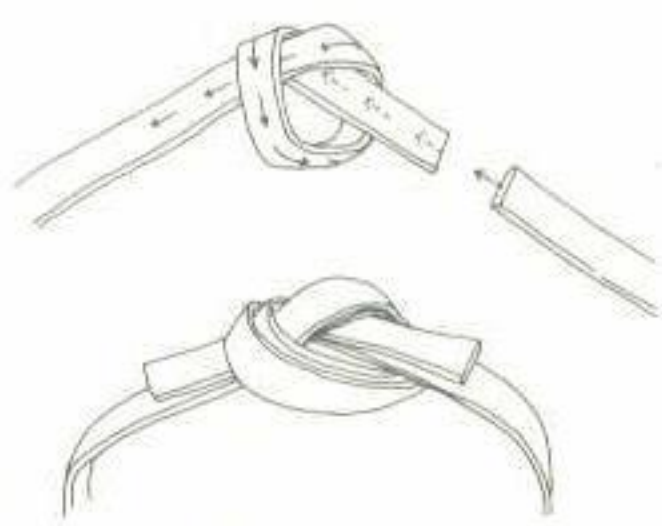


Figure 11

crag hammer

We have designed a hammer strictly for use in free climbing. It is lighter than the Yosemite Hammer and has a long, thin, blunt pick. It functions well for extracting nuts, cleaning dirt and vegetation from prospective nut cracks, testing fixed pins, and for placing an occasional piton. The handle, head and sling arrangements have been put together with the same close attention to strength and dependability as our other hammers.

robbins shoes

This shoe, designed by Royal Robbins and manufactured by Galibier in France, is a kletterschuh design especially adapted to suit American rock climbing conditions and technique. The shoe has proven particularly successful on big wall problems in Yosemite and on the steep face climbs of the Tetons. Superb lasts and a padded tongue make the shoe comfortable on multi-day climbs and on long approaches and descents, and stiff arches add to the comfort of standing in etriers. A rubber covered toe and heel increase efficiency in jam cracks. The Robbins shoe has a high-friction of cleated sole and fully lined royal blue suede uppers. Available in sizes 2 through 12 (plus half sizes) in medium width.

For soles and resoling service contact Steve Komito, Box 2106, Estes Park, Colorado 80517

ice climbing

"Have you ever thought . . . about whatever man builds, that all of man's industrial efforts, all his calculations and computations, all the nights spent over working draughts and blueprints, invariably culminate in the production of a thing whose sole and guiding principle is the ultimate principle of simplicity?

"It is as if there were a natural law which ordained that to achieve this end, to refine the curve of a piece of furniture, or a ship's keel, or the fuselage of an airplane, until gradually it partakes of the elementary purity of the curve of the human breast or shoulder, there must be experimentations of several generations of craftsmen. In any thing at all, perfection is finally attained not when there is no longer anything to add, but when there is no longer anything to take away, when a body has been stripped down to its nakedness."

Antoine de Sainte Exupery, WIND, SAND & STARS

chouinard piolet

The Chouinard ice axe is manufactured in Italy by Nicola Codega and Sons to our design specifications. Just like a nice bamboo fly rod, this fine tool is meant to be a lifelong treasured companion on ice climbs. It is not a day-glo metal monster for snow slogging. The head of the piolet is hand forged from chrome-nickel steel and is ground, polished and superbly finished. Only two of Codega's forty workers are qualified to work on our ice axe. The adze has a fine cutting edge that cuts steps even in water ice. The pick is well drooped and curved and has deep notches on the end which allow the axe to be planted and used as a secure anchor. The shafts on these new axes are made of laminated bamboo which has a consistent strength equal to the very best hickory or even some metal shafts (UIAA strength of 270kp). These shafts also have the advantage of being lightweight, non-cold conducting, and the grip of the bamboo improves with age as the grain becomes raised.

55cm - for mixed climbs where the longer lengths would be difficult to carry, weighs 1 lb, 12 oz.

70cm - the perfect size for all serious ice climbing, the axe balances well in this length and it works better than the short axes on even extremely steep water ice, weighs 1 lb, 14 oz.

80cm - for snow climbers over six feet tall, weighs 2 lb.

USE

There is no single piece of climbing equipment that means as much to the alpinist as his ice axe. Even to the non-climber it is the symbol of mountaineering. The axe is the climber's most functional and most companionable tool. Yet the design of most of the modern axes has evolved into all sorts of grotesque forms with weird shafts, serrated and cupped adzes, ice pick spikes and other abnormalities that make them more suitable for assassinations than for climbing ice. You may wish to soak or rub the shaft with a 50/50 mixture of linseed oil and turpentine to prevent water absorption, although this is not absolutely necessary. Avoid prying boulders and striking crampons with the shaft. Employ Penberthy's crampon wrap instead to eliminate snow balling. The carabiner hole is solely a convenience for carrying the axe. It is not to be used for belaying; a shaft boot belay is preferred. The only time that a wrist loop is advantageous is on mixed climbing. You can improvise a simple effective wrist loop by using 1/2" webbing and making a prusik knot around the handle or by just looping a 1/2" runner through the carabiner hole. When a lot of steps have to be cut in very steep ice where only one hand can be used, a wrist loop can be used effectively to transfer the strain from your finger to the wrist. With the sling attached to the hole, coil it around the shaft until it is tight 'round your wrist when your hand is at the correct balance position on the shaft (Figure 12.)

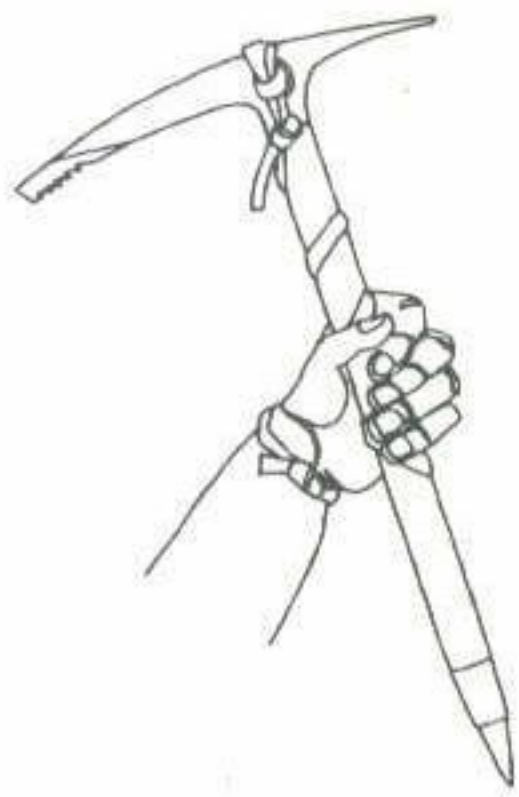
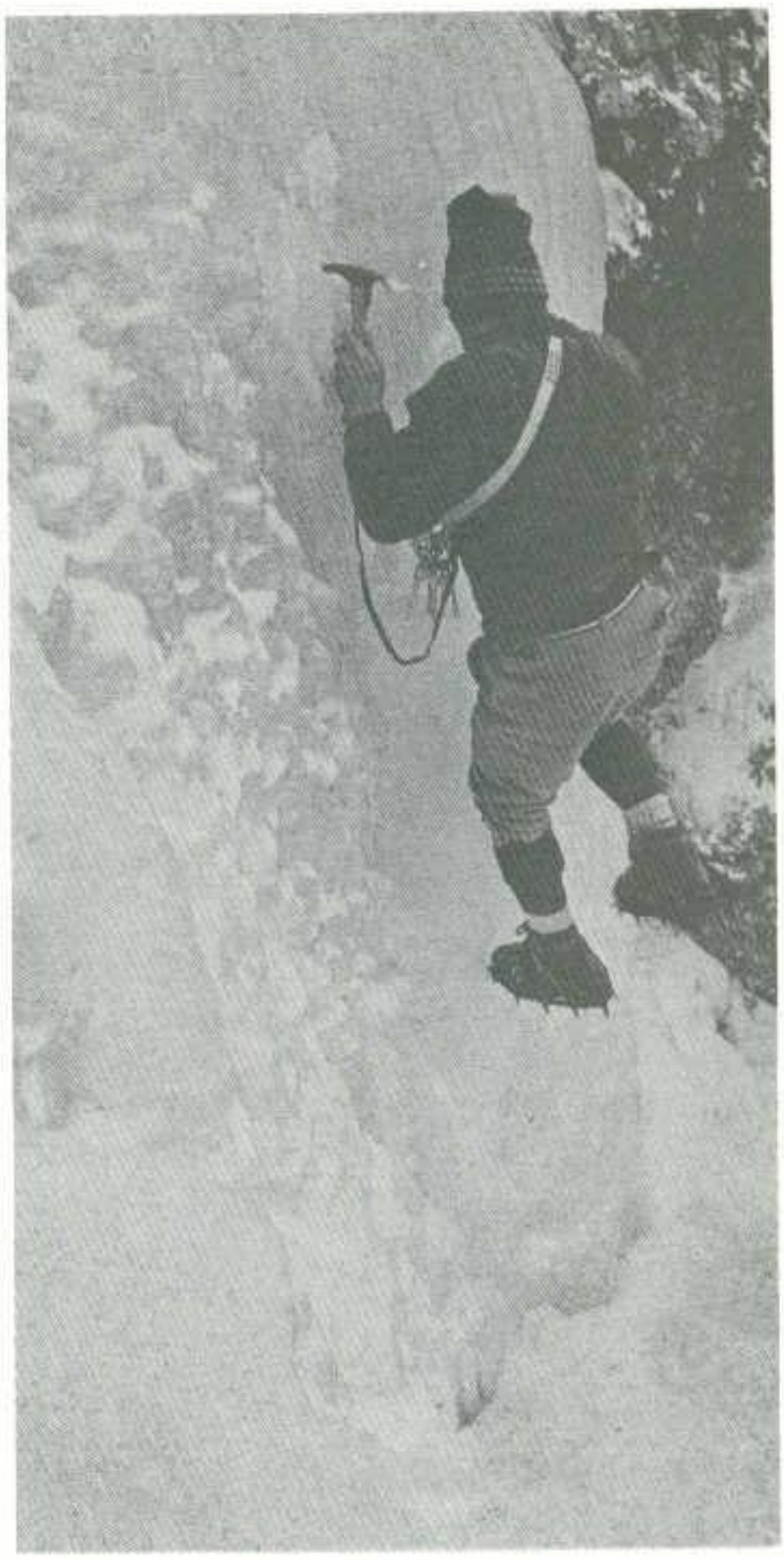


Figure 12

alpine hammer

The improved Chouinard Alpine Hammer is good for cleaning moss and ice out of cracks, removing nuts, placing and removing ice pitons, and chopping steps at close quarters. However, its special design feature is for use as an ice dagger on hard water ice. For this purpose it has a specially designed long, narrow drooped pick with notches at the tip. The head is rounded so that it fits comfortably in the hand. The entire head is now drop-forged which makes for a stronger pick and more consistent quality.

Weight: 1 lb, 11 oz.

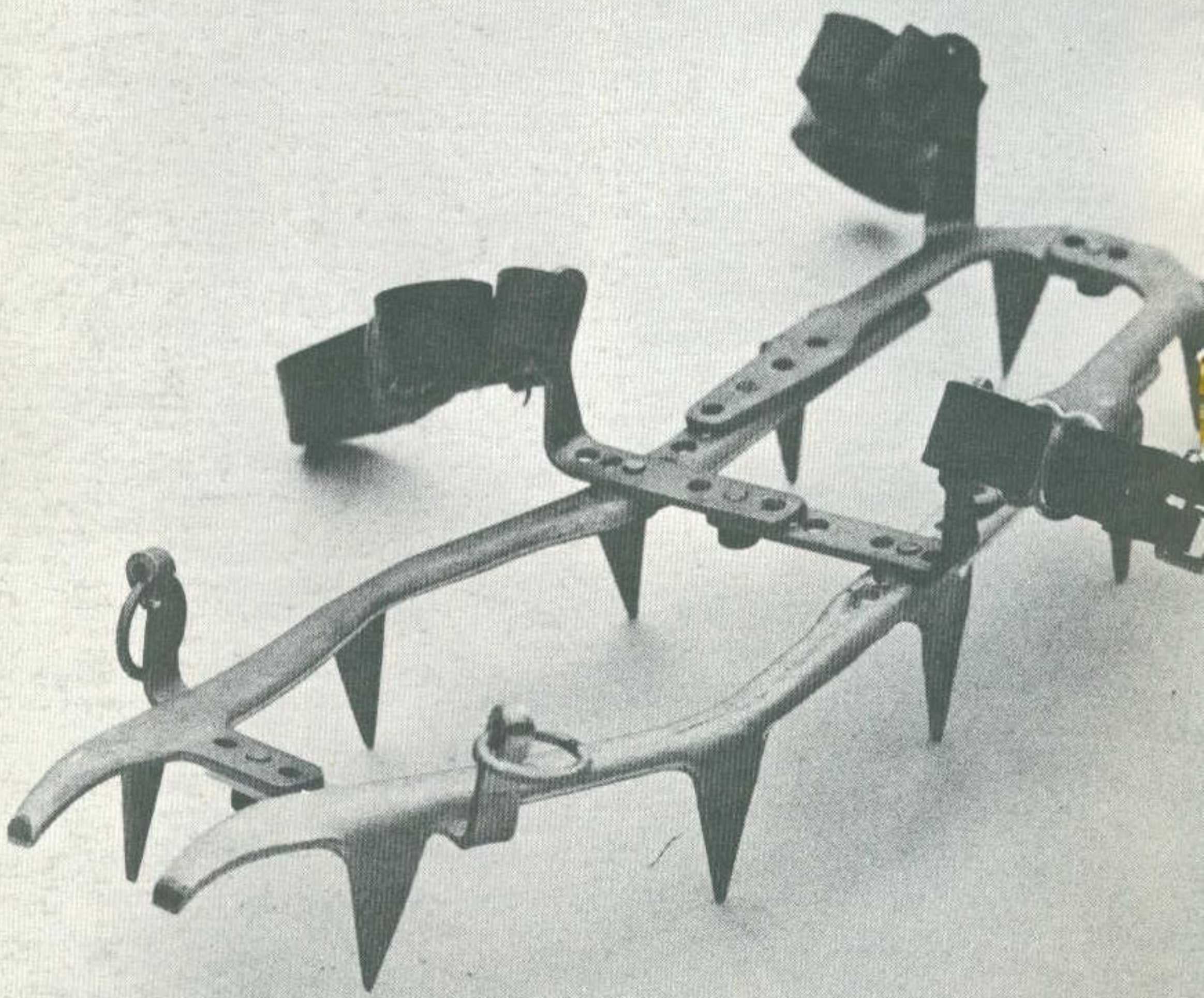


climaxe

The ultimate technique on steepening ice, before resorting to artificial climbing or chopping steps, is front pointing using two Alpine Hammers. Rather than each man having to carry two hammers we have designed a mini-axe with the same pick as the Alpine Hammer but having an adze for cutting "pigeon hole" steps in extremely steep ice or for clearing away verglas on rock climbs. This combination of axe and Alpine Hammer is perfect on near vertical ice. The Climaxe is so versatile that it can also replace the more cumbersome ice axe on some mixed climbs.

Weight: 1 lb.

chouinard/salewa crampons



As with the carabiner, the Chouinard Crampon is now being manufactured in Munich by Salewa to take advantage of their sophisticated production capabilities. The Chouinard/Salewa crampon is improved in strength, rigidity, and fatigue resistance, but in other respects it has the same basic design as its predecessor. It is a hingeless, fully adjustable twelve-point crampon. The rigid design provides stiffness throughout for unexcelled point penetration on technical ice and security on rock. The point length is 1¼" (32 mm) for use on both snow and ice courses and the points are aligned on the edge of the sole for efficient utilization of small rugosities on the slopes. The front points are wider for minimal shearing in snow or granular ice and are drooped to help relieve strain on the calf muscles when front pointing (your heels can be kept lower). The crampons are manufactured from aircraft alloy steel and are plated against rusting. The adjustment is in both length and width and provides a superb fit on boot sizes approximately 7 through 13. Smaller sizes can be provided on special order.

USE

A good, well fitting pair of crampons will be part of your feet the same as a well fitting kletterschuh on extreme friction climbing. You wouldn't think of wearing a loose-fitting, soft, sloppy shoe for rock climbing. The test of a good fitting pair of crampons is if they will stay on the boots without straps.

When you rock climb on dolomite or steep limestone you wear absolutely stiff soled boots and you edge on your toes. This keeps your body away from the rock and in balance. A soft-soled boot will not allow you to edge on your toes without tiring your legs and feet. This also applies to steep ice. To be able to crampon up hard steep ice you must have very stiff-soled boots, rigid crampons, and a perfect fit. The front points of the crampons must penetrate the hard ice and the primary cause of lack of penetration is vibration. Vibration can cause the points to shatter the ice and not actually penetrate. This vibration can be caused by front points that are too dull or have the wrong angle (as with an ice axe), by sloppy fit, soft-soled boots, or the joint in the middle of a hinged crampon.

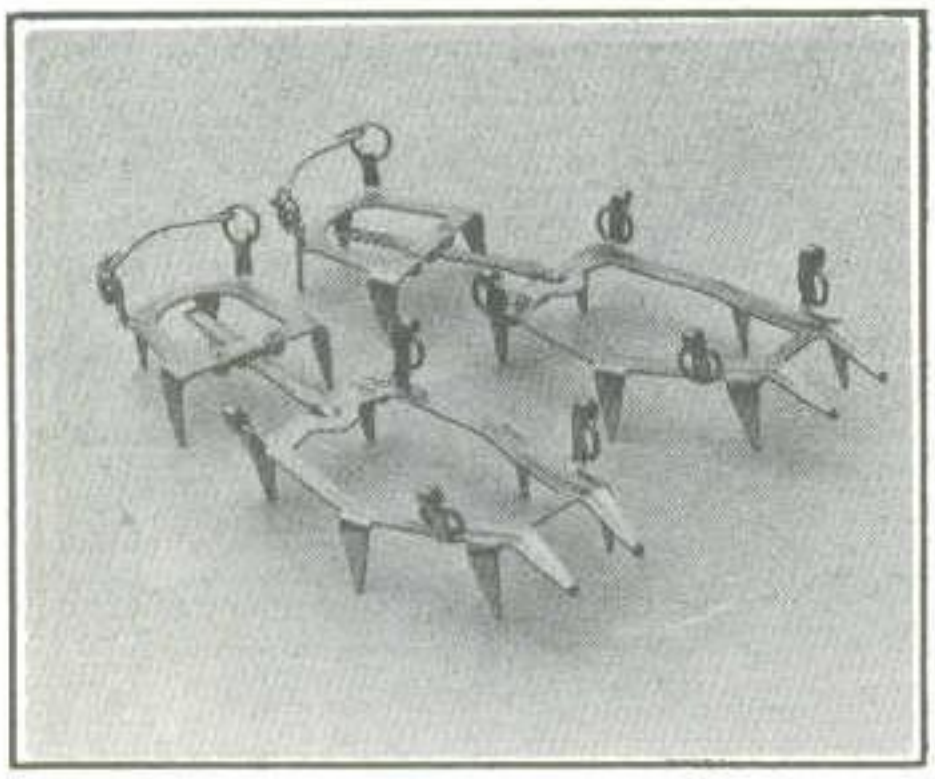
The French long-pointed crampons are excellent for the hard snow/soft ice conditions of the French Alps, New Zealand or the Himalaya,but they are worthless on harder ice. Points of medium length are best for all-around snow and ice climbing. Keep your crampon points sharp and avoid walking on rock whenever possible. Before every climb check the crampons and straps thoroughly for any weaknesses or cracks. A broken crampon or strap in the course of a climb can be serious.

Balling up of soft snow under the crampon can be minimized by adopting a shuffling gait which clears them out on each step, or carefully wrapping the crampon with plastic sheet or coated nylon fabric which is first forced on over the points. This idea was developed by Larry Penberthy and is essential in certain snow conditions.

crampon straps

Chouinard Crampon Straps are supplied with the Chouinard/Salewa Crampon. These are custom made from the highest quality neoprene coated nylon, a material that does not absorb water and remains flexible in below-freezing temperatures. An independent two-strap system is employed. It is attached to the crampon with metal slides supplied with the straps.

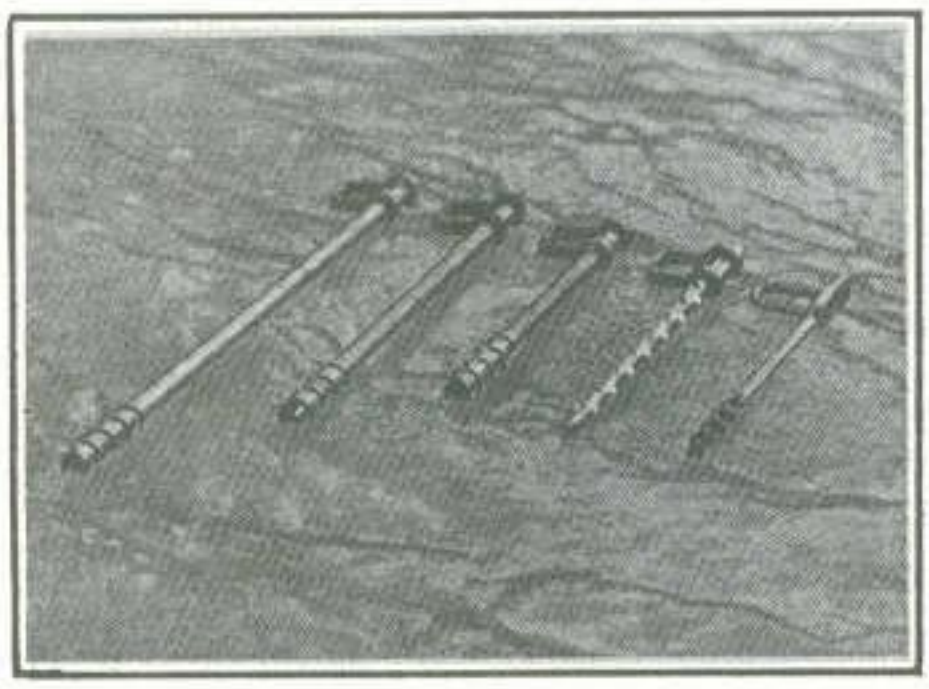
salewa crampons



Due to the problem of flexing in the rigid Chouinard/Salewa crampons, it is recommended that they be used only with stiff soled boots. If flexible boots are to be worn and if glacier walking and non-technical climbing is anticipated, the Salewa crampon is highly recommended. We feel it is the most practical and reliable hinged crampon available today. It has a clean design, high strength, and fits boots well. For these reasons its performance on even technical ground is unusually good for a hinged design. Chouinard Crampon Straps are recommended but not supplied with the crampon. For fitting, please send a boot sole outline.

Weight: 1 lb, 6 oz.

ice pitons



Most any type of ice piton will work adequately when the temperature is below freezing and they have a chance to melt the ice as they are driven and then freeze in place. But freezing summer temperatures in the States and Canada are a rare occurrence so we have recommended the following ice pitons because they will work well enough in above freezing conditions.

salewa tubular screws

For normal alpine use in granular and snow ice, the Salewa tubular ice screw provides the greatest security. It is machined from thick wall steel tubing and we carry only the more practical longer lengths of 21, 25 and 35 cm. The 21 cm length has a longitudinal slit to relieve the inner core of ice. This improvement is especially welcomed for winter climbing. The long 35 cm is good for use in soft snow-ice type conditions often found in the USA and Canada.

Weight: 21 cm - 4 oz; 25 cm - 5 oz; 35 cm - 6 oz.

salewa spiral (wart hog)

The spiral piton is an improvement over an old Czechoslovakian design. It is a hammer driven piton which melts its way into the ice. We have tested this piton thoroughly and found it to be excellent in any kind of water ice, summer or winter.

Weight: 4 oz.

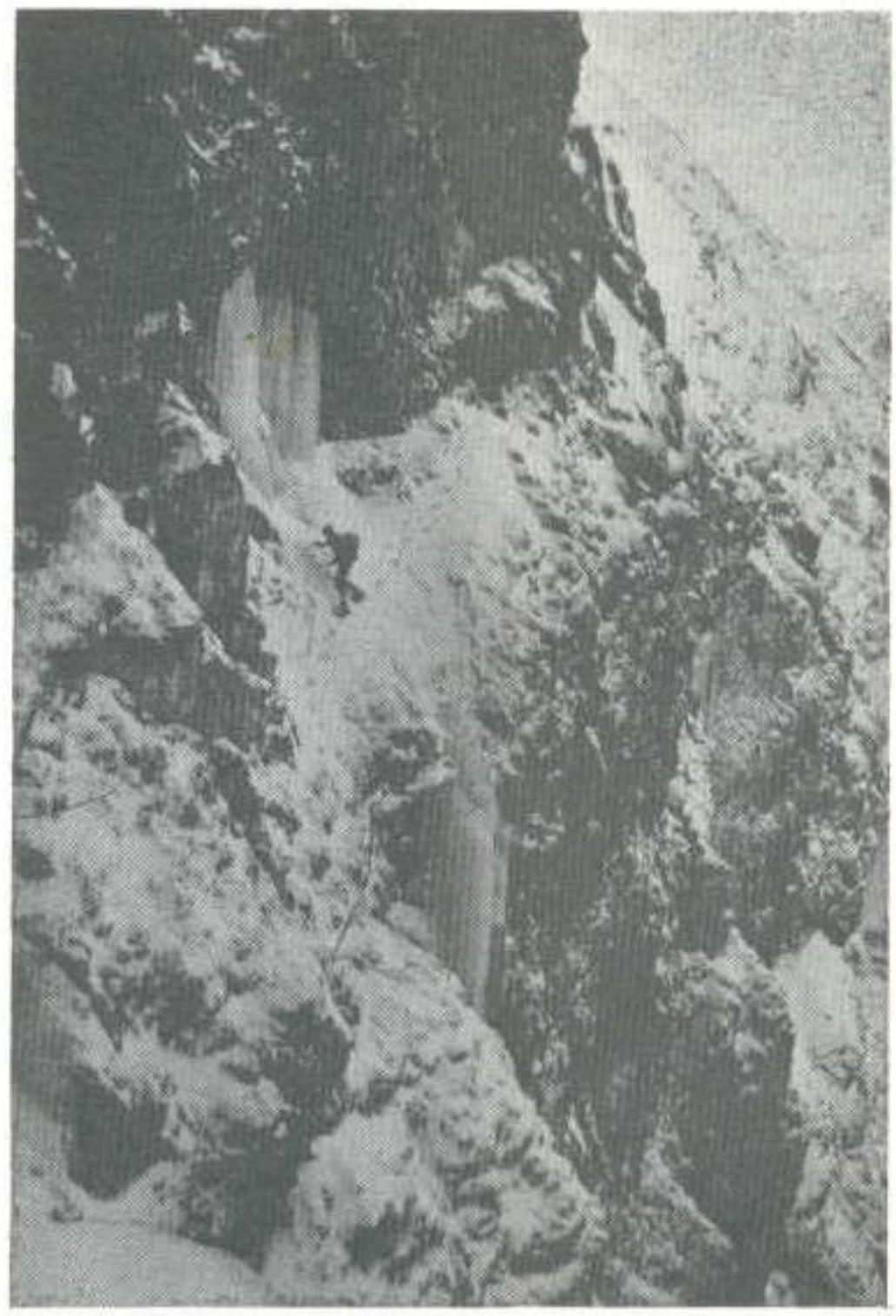
charlet-moser screw

This is a corkscrew type ice piton having deep threads and a striking anvil so it can be started with a hammer. The Charlet is excellent for winter conditions and hard ice. It lacks the freeze-up problem common with tubes and has somewhat greater holding power than the Wart Hog.

Weight: 3 oz.

USE

The Salewa tube screw has the greatest holding power of any ice piton. Whenever it is possible use them in preference to other kinds. You place them by hammering until the threads catch, then screw them in, using for leverage another piton, an Alpine Hammer or the ice axe. It is possible to screw in even the 35 cm length in just a few seconds by using the axe like a bit and brace (Figure 13). All ice pitons should be driven into the ice at an angle of more than 90 degrees to the slope. In winter or cold conditions the ice core will freeze inside the tube and you must remove as much of this ice as possible before you can use the piton again. You can do this with some sort of home made tool or with the tip of a Spiral piton. It is sometimes necessary to carry the tube screws inside your clothes to loosen or melt the core.



Correct placement of the Charlet Ice Screw is extremely important in brittle water ice. The correct method is to begin by chopping a platform in the slope and making a small hole in the center with the pick of the Alpine Hammer. Drive the ice screw in this hole with a couple of hammer blows until it is possible to begin screwing in the piton. When the ice is very brittle, turn the piton a half turn, then give it a blow with the hammer; then turn a half turn and hammer again, OR pound continuously with small blows as you turn the screw. The pounding helps to melt the ice and keeps it from shattering. It is very rare but it can happen that the Charlet Ice Screw will break at the junction of the threads and the shaft. This normally happens as the piton is being screwed in and therefore it should be apparent that it has happened.

The Salewa Spiral piton (Wart Hog) is not screwed in but just hammered straight in with many light hammer blows. The more brittle the ice the lighter the blows. Very brittle ice is generally not very thick so you can nearly always chop away a few inches to get to more plastic ice. The spiral piton must be removed by chopping it out.

Tests by various people indicate the following approximate strengths and holding power for ideal conditions in soft water ice.

Salewa tubes (short)	- 2500 lbs.
(long)	- 3000 lbs.
Salewa spiral	- 1500 lbs.
Charlet screw	- 1700 lbs.

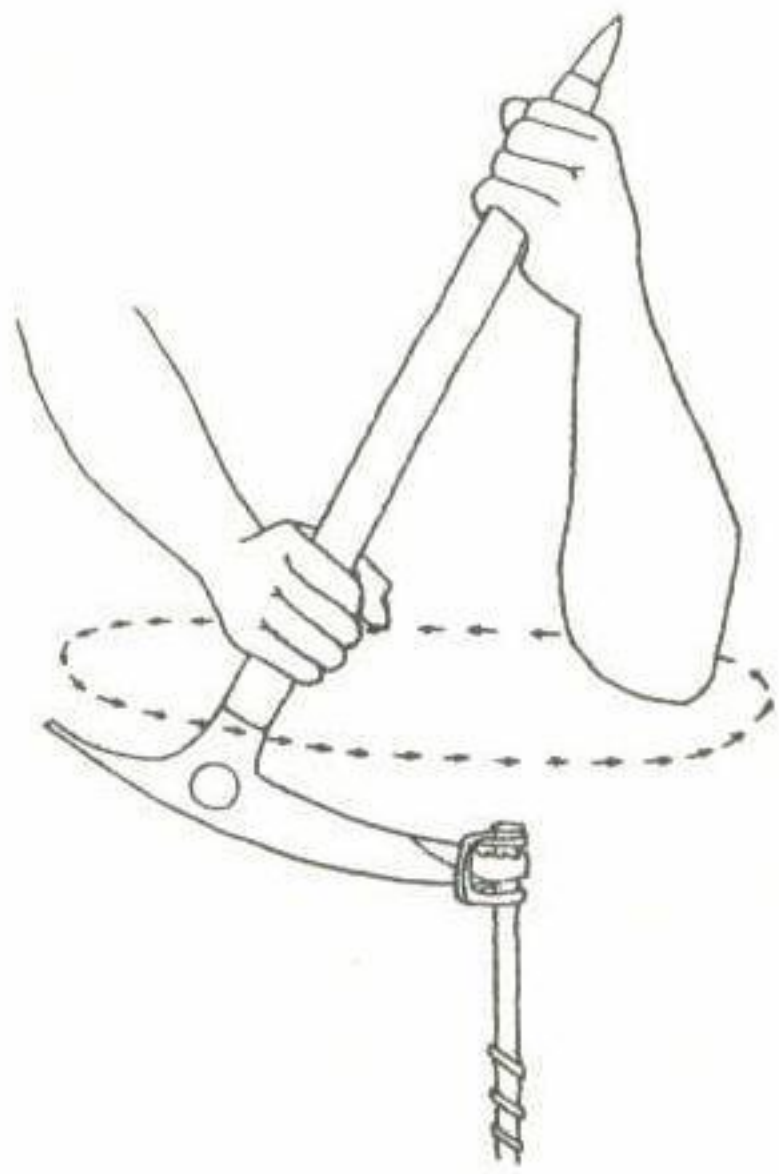
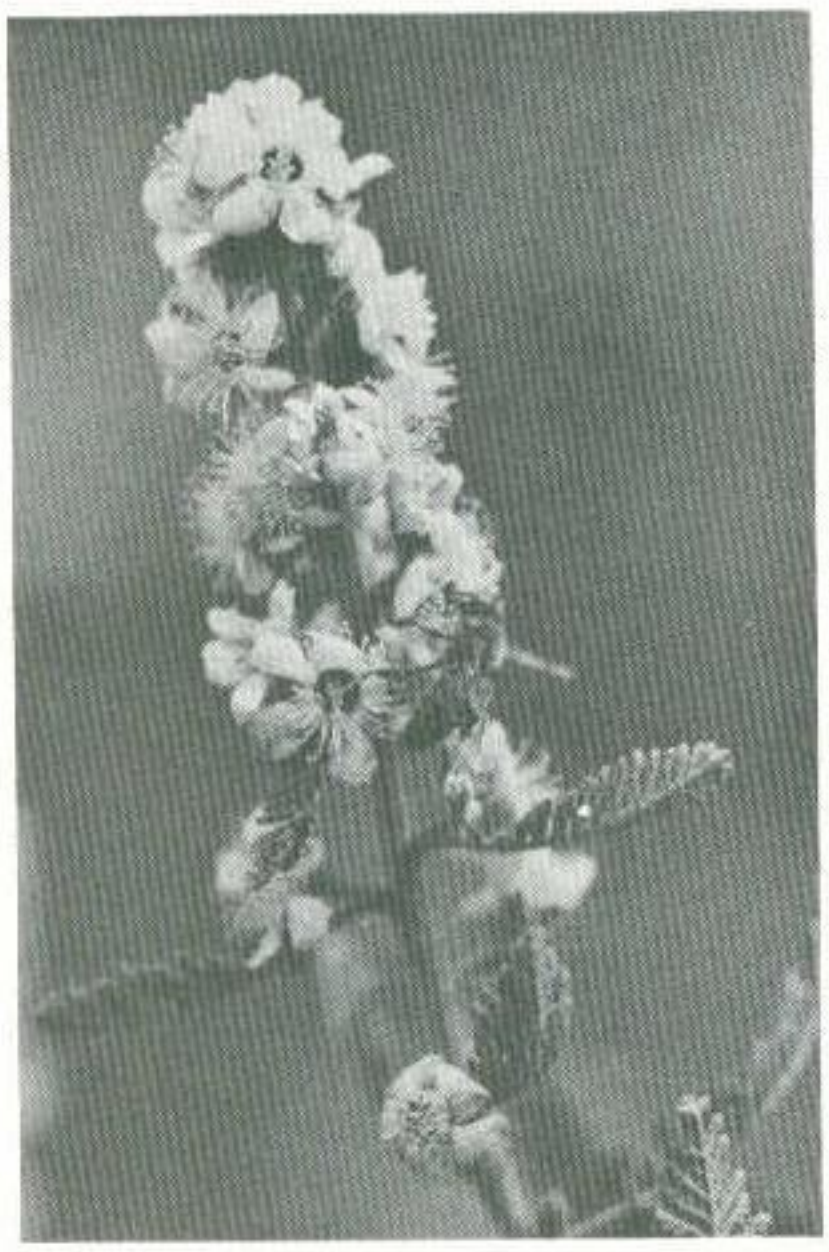
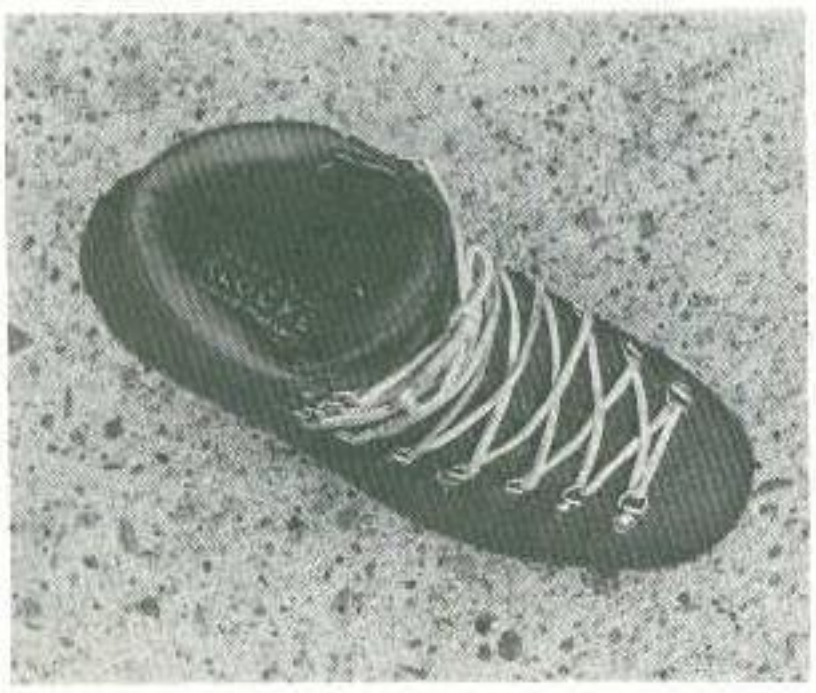


Figure 13

klocker boots



This is a mountain boot designed by Peter Habeler, one of Europe's best alpinists. They are entirely hand made in Innsbruck by Klocker and his two employees who have been custom making boots for the top Austrian guides such as Habeler and Reinhold Messner. Needless to say the factory production is limited!



This is not a hiking boot. The leather is all hand selected top grain back leather. The leather is thick and stiff over the toe and back to the ankle, thus preventing crampon straps from crushing the boot and cutting off circulation - the primary cause of cold feet. The narrower, cupped heel was designed for American feet and the box toe has ample room for the toes yet the outline of the sole is the same as the narrower French boots. This is accomplished by not having any sewing on the welt. The entire sole is held together with hand whittled wooden pegs. By not having a wide welt you can really edge on small holds. Resoling is a simple matter even if you have worn through the toe rubber and into the leather; not so with a sewn welt.

The tops are canted forward and are lower cut than most modern boots. This is necessary for ankle flexibility because of the stiff leather, and ankle flexibility is absolutely necessary for rock climbing and French style ice climbing.

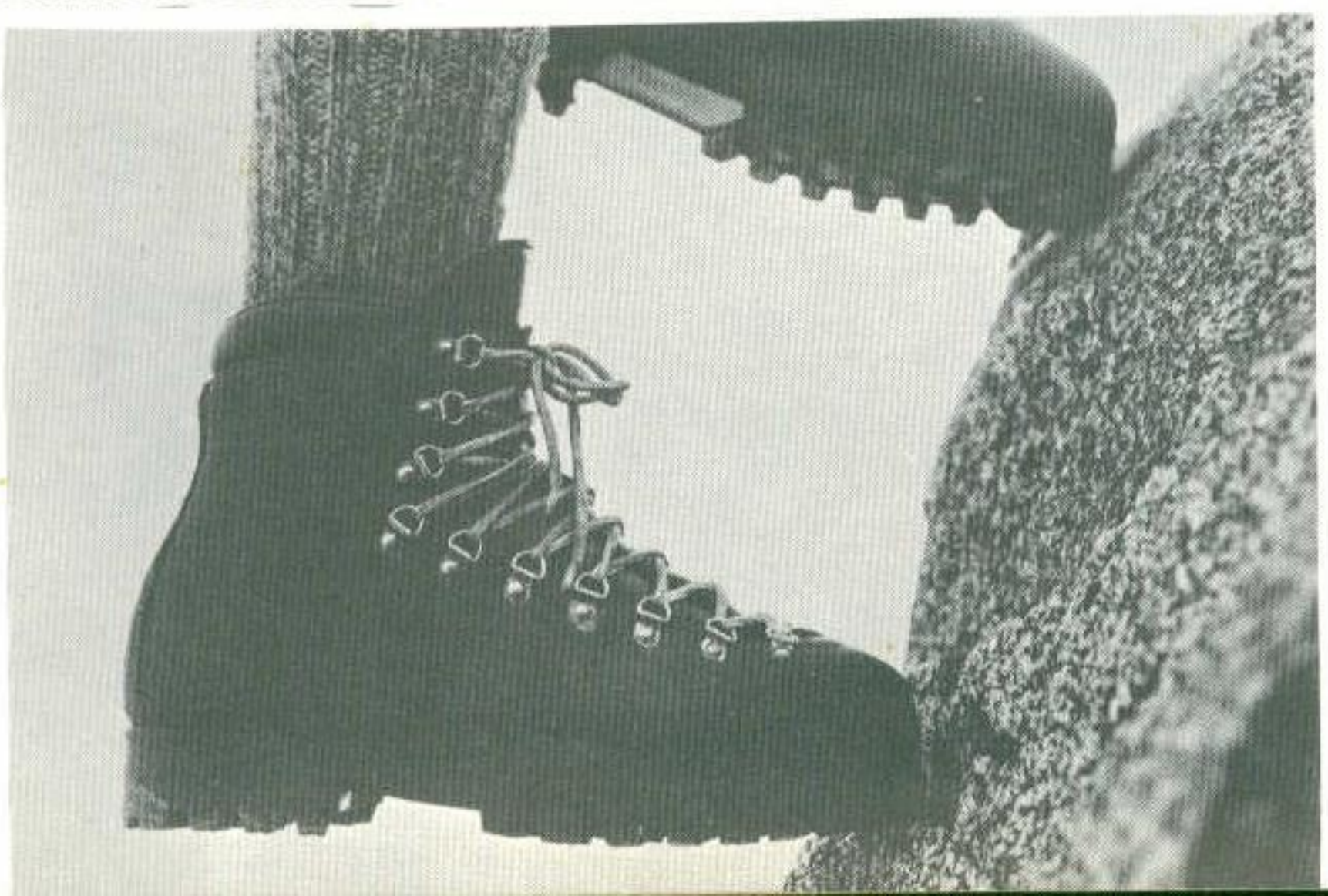
The lacing is all the way to the toe and uses "D" rings rather than hooks which tend to break and are a potential danger from lace hookups on hairy third class.

A pair of these boots weighs a full 12 ounces less than some mountain boots but because of their superior quality they will outperform and outlast any machine made boot.

Sizes 7 to 11 in half sizes, medium and wide widths.

Weight of size 8: 5 lb, 8 oz.

Please include street shoe size and foot outline wearing sox.



ironmongery

". . .the essence of mountaineering lies in pioneering first ascents in good style. The mixed rock and ice faces of the European Alps had all been climbed by the 1950's. In Yosemite Valley, that mecca of American rock climbing, all the natural lines had been ascended by the mid - 1960's. There has been no significant contribution made to climbing in these areas since. In fact the search for new routes has resulted in a decline of climbing standards and disregard for climbing ethics. . . . generally the modern pioneers in these areas have gone . . . beyond the crack and crevice and out onto areas of blank rock. Progress here is only possible by drilling holes for expansion bolts . . . . a persevering climber can go anywhere without fear of retreat. Slowly the truth has dawned that drilling removes the uncertainty as to the outcome of the climb, and therefore the challenge."

CLIMBING IN THE ARCTIC
Doug Scott
London News, December '71

chouinard carabiner

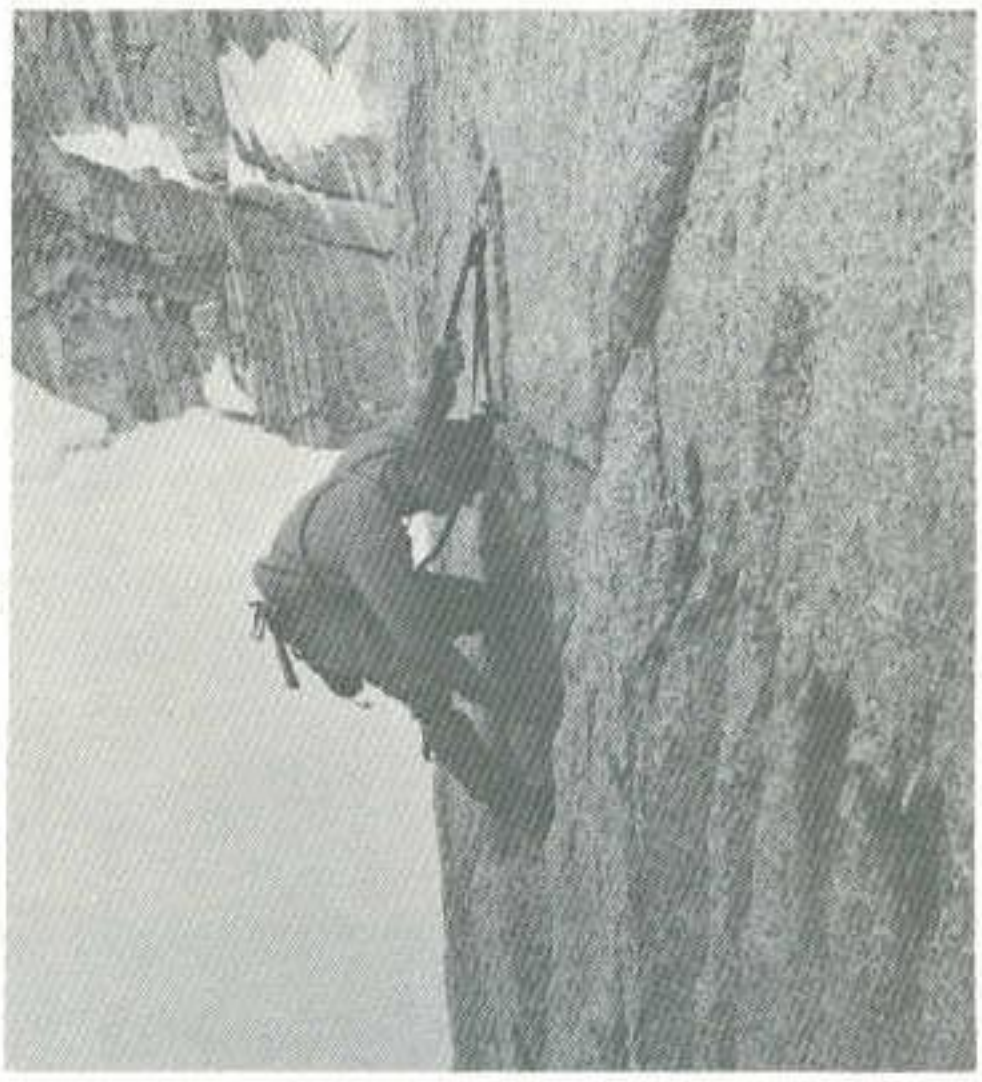
In addition to its high strength, which has been pre-tested at the Salewa factory, and its modified "D" shape which gives superb feel, handling and utility, the Chouinard Carabiner has many other advantages for the technical climber. Its smooth bottom curve reduces shifting when two etrier carabiners are clipped in. The gate opens while standing in these etriers and enough room is left for the 11 mm climbing rope to be clipped in, thus allowing the most efficient aid climbing sequence to be used. The carabiner's larger racking capability allows it to carry three standard angles.

USE AND CARE

After clipping in, the Chouinard Carabiner should be flipped over so that the small end is upward in the eye of the piton or the sling of the chock. Be sure the carabiner does not bind in a piton eye such that an unnatural torque or leverage would result during a leader fall. Hero Loops or runners are frequently useful for inserting between the piton eye or chock sling and the carabiner as an extension or flexible joint to reduce rope drag.

Sticking gates resulting from hard carabiner usage are usually attributable to one of the following causes. Small burrs on the mating parts, usually resulting from misguided hammer blows, can be removed with a file. If the gate is closing off center, put it in a vise and force the body to the opposite side. In a similar manner pinched ends of the gate can be widened by forcing the body sideways while the gate is closed. Do not use oil; dirt will cling to it and clog the gate.

yosemite method



With Chouinard Carabiners the most efficient sequence of artificial climbing is as follows. The sequence is described using pitons, but it applies equally well when chocks are used in which case the etriers may be clipped directly into the chock sling rather than the free carabiner. (1) place piton and test with hammer; (2) clip in free carabiner; (3) clip in etrier; (4) step into new etrier. (If the piton is doubtful, test it further by applying greater than body weight with a sufficient little hop in the etrier. If it passes this test erase any thought of the piton pulling out.) (5) collect old etrier, and reduce rope drag at the old piton as required; (6) step up and clip in the climbing rope when you come about swami belt high to the piton. There are several advantages to this sequence of stepping up to the new piton level before clipping in. It is economical of time and energy because the climber need not haul up eight feet of slack at first, only to let four feet of it slide down when he moves up. It leaves less slack in the rope should the new piton pull out and it reduces the need for constant communication with the belayer. His continuing assignment need only be to keep some slack in the rope. This Yosemite Method can be used without variation on every piton, establishing a recurring pattern that minimizes delays. There are just two exceptions: on strenuous overhangs the leader may advantageously pull (ey) himself up with tension on the climbing rope below the carabiner; and on rare occasions it may be advisable to use the flexible flake procedure described on page 46. Basic to the entire system is composure - artificial climbing is no longer tension climbing - and today's skilled climbers move and balance in their slings with poise and efficiency.

a simple rappelling system

In modern Yosemite climbing rappelling has proved more dangerous than leading. For this reason a simple, foolproof, and safe method is needed that can be applied on all terrain. A carabiner brake of only three carabiners provides enough friction while eliminating confusion. Construct it by clipping a carabiner into the seat sling and waist loop to get a working distance from your body and lessen the chance of catching your shirt tail in the brake. Next clip in two carabiners to form the body of the brake and pull a loop of the rappel ropes through both carabiners and clip one or two brake carabiners across it so that the ropes run over the back of the cross bar carabiner. Lead the rappel ropes on either side of the spacing carabiner to help prevent tangling, and then around the hip far enough to provide the desired additional amount of friction (Figure 14).

Easy detachment from the brake can be obtained if the two body carabiners are oriented identically, with the gates on the same side. In this configuration the cross bar carabiner may be pulled laterally through the gates of the body carabiners for a rapid, frustration-free detachment from the rappel rope.

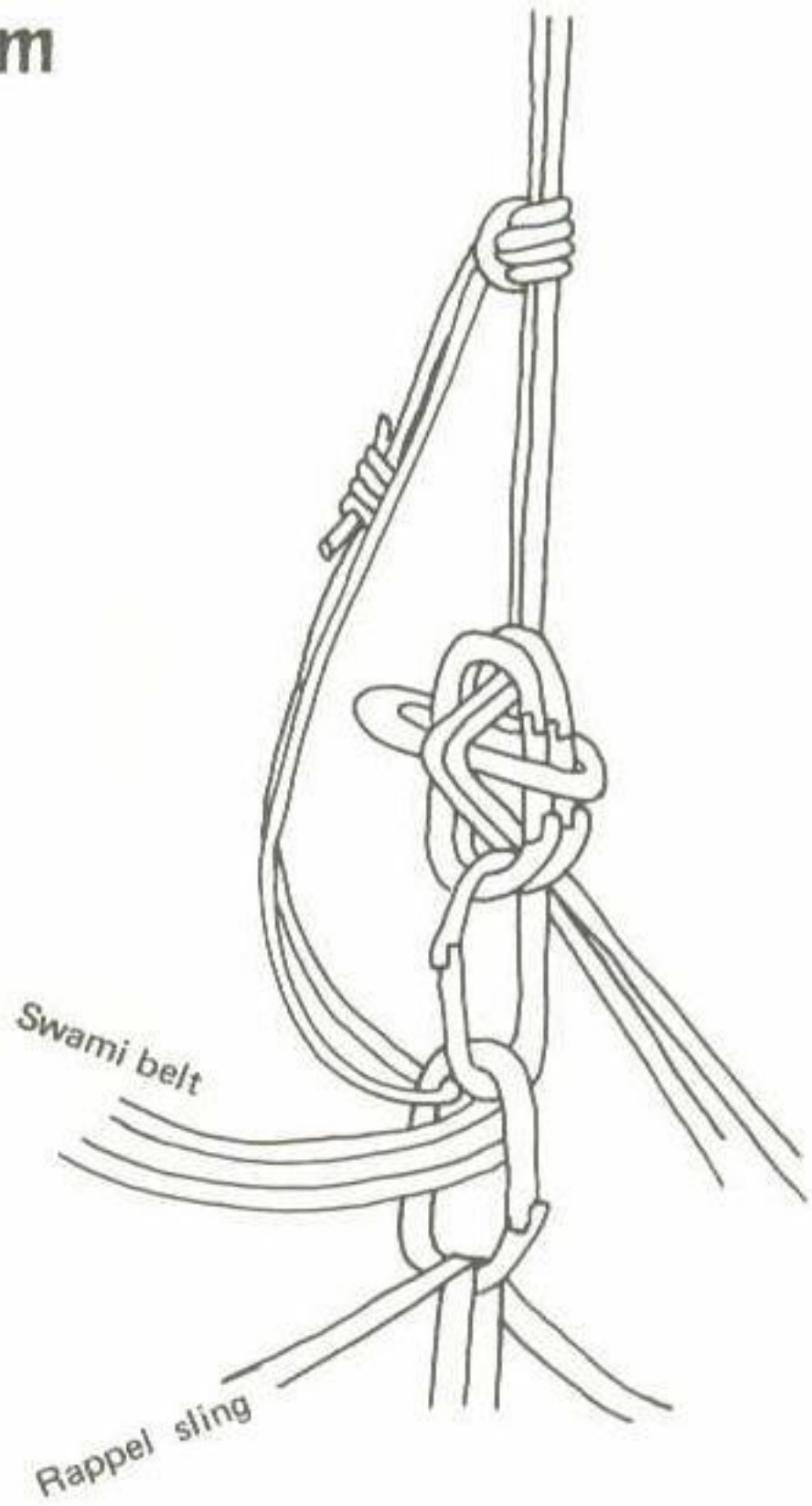
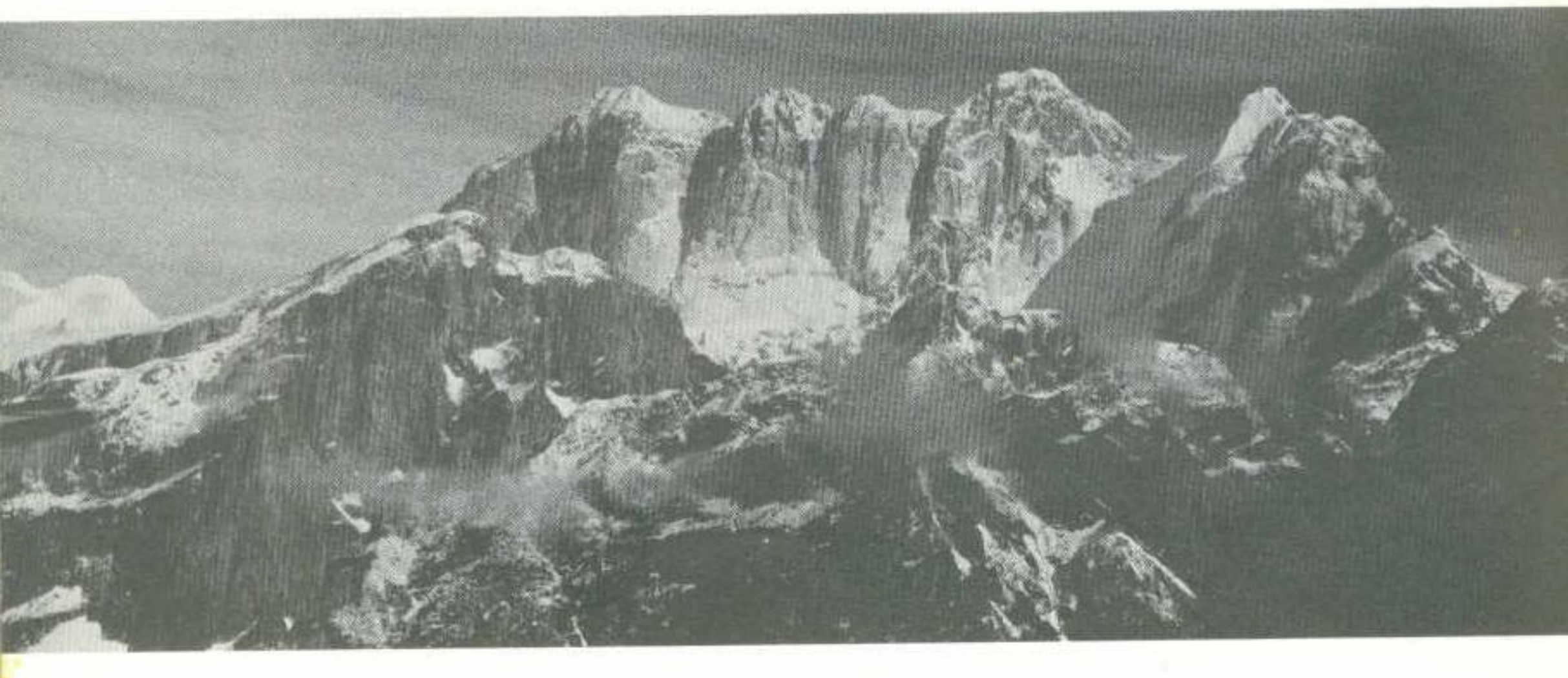


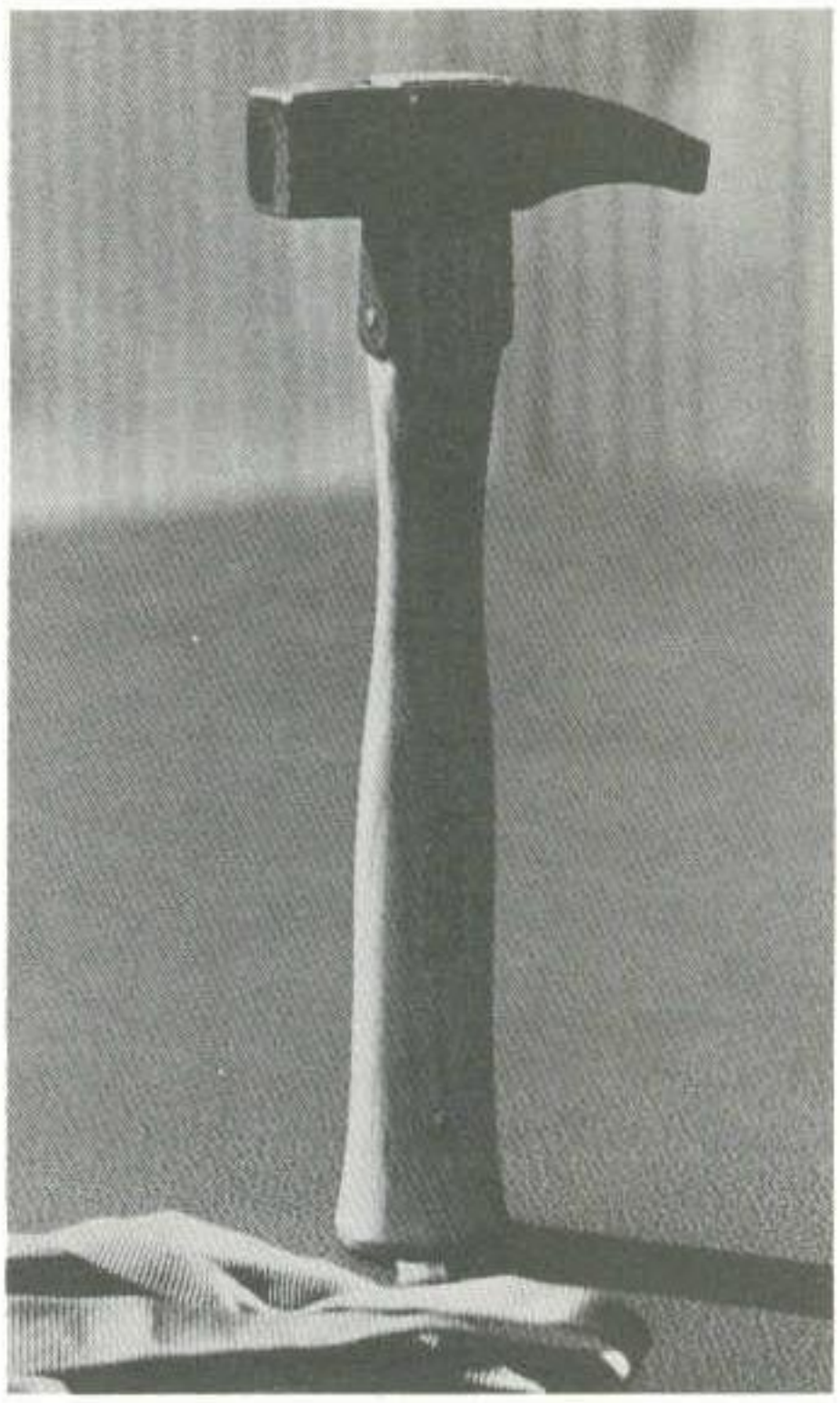
Figure 14

Accidental detachment from the carabiner brake and other hazards inherent in rappelling can be guarded against by the simple expedient of tying a prusik knot to the ropes above the carabiner brake and clipping it to the waist loop. A three wrap prusik, with 5, 6, or 7 mm cord, will provide greater security on perlon rappel ropes than the usual two. Keep the knot loose on the rope and cupped in the balance hand as it slides along with the descending climber. If you lose control of the rappel the knot tightens. But make sure the prusik loop is not so long that the knot tightens up out of your reach. This method is also used to stop at the bottom of an unknown rappel while searching for an anchor.



yosemite hammer

This is a hammer for the serious rock climber with design and construction features developed for big wall climbing - where performance and reliability overshadow all other considerations. An outstanding feature of the Yosemite Hammer is its "Buckeye" quality American hickory handle which gives unexcelled balance plus a high reliability previously unattainable with wooden handles. The hammer weight of 22 oz. is concentrated in the 18 oz. head. The drop-forged alloy steel head has a specially designed blunt pick for use in removing pitons. The blow can be precisely directed to the neck area of the piton and the carabiner and sling left clipped in if desired - thus preventing accidental dropping. This method speeds removal time and prolongs piton life. Each hammer comes with a sewn nylon shoulder sling.



Weight: 22 oz.

method of driving

The most common error made in the use of alloy steel pitons is over-driving them. This not only destroys the piton, but experience is showing that it destroys the rock as well. Optimum holding power comes not from beating the piton to death, but from sophisticated placing so that under a load it will wedge itself and resist shifting. In vertical cracks, the dominant requirement for piton holding power is resistance to rotation, and the section of crack that best provides this natural resistance must be located. This ideally will be a locally wider section of the crack that grips the piton near each end of the blade. In a perfect placement the rugosities of the crack will provide a resistance to downward rotation approaching that which is enjoyed in horizontal cracks. By way of contast, a poor placement is where only a single high spot contacts the blade and provides an unwanted pivot point. If the available piton will not go in all the way to the eye leverage on it can be reduced by tying it off with a Hero Loop (Figure 15). Testing with the hammer is an important part of correct driving. In a much less violent way, testing is identical with the first step of the removal procedure, and as such gives an indication of the holding power of the piton. All pitons found in place should be tested in this manner before use.

The complete method of placement is summarized as follows. First select the piton size for the crack and then locate the section of the crack that best fits the piton. (Depending upon its length and taper, the piton should normally allow one-half to three-quarters of the blade to be inserted into the crack before driving.) Pound the piton in only part way, then test with one or two light downward blows on the head to see how well it is in, and how well it resists shifting. Then drive more according to the results of the test, and retest with another downward blow (vertical crack assumed) until the piton appears adequately solid in its resistance to shifting. Restrain the urge to give it that one extra blow - this is the one that will make the piton difficult to remove and cause it and the rock to be damaged in the process. If, however, a perfect placement is not possible then the best security can of course be obtained from a really hard driven piton, particularly in vertical cracks. →

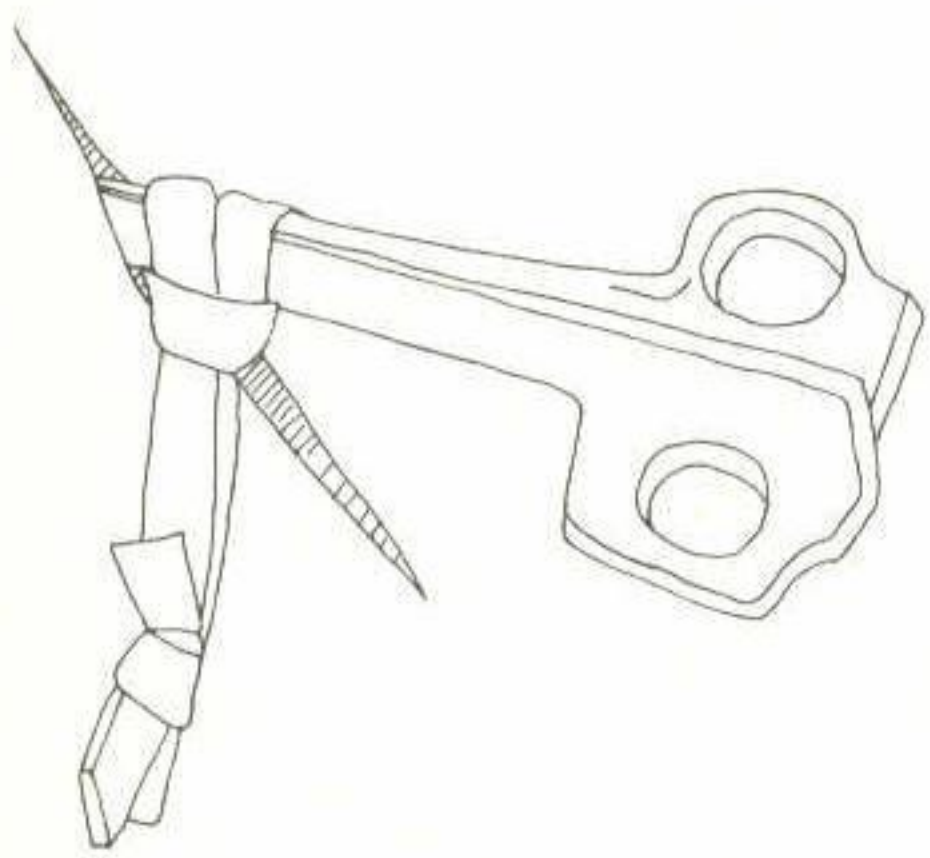


Figure 15

The overall speed of the party is enhanced considerably if pitons are placed no firmer than required to do the job, and with an eye toward removal as well as holding power, because the total time spent on any piton is the sum of placement time and removal time. Theoretically, pitons used only for artificial aid need hold little more than body weight. Anchors and protection pitons may be required to hold as much as 3,000 pounds. Much less driving is required when the crack fits the piton - and therefore, removal is easier and piton and crack life is prolonged.

nailing flexible flakes

When driving more than one piton behind the same flexible flake or slab, caution must be exercised so that each succeeding piton does not expand the crack and loosen the preceding ones. To minimize expansion the possibility of using chocks is urged to your attention. They are inherently more stable than pitons and, therefore, can provide more holding power with less expansion of the crack. Chocks can enhance both climber safety and preservation of flakes and slabs.

Alternatively, use long bladed pitons having little taper and place them in locally wider sections of the crack that provide natural resistance to rotation. Insert the piton with the fingers about three-fourths of its length, then pound it just enough to hold without overly expanding the crack. Begin driving the next piton then clip the climbing rope into it before driving it home; or clip in to the new piton via an etrier or runner in case the one you are standing in comes out. With a bit of luck the piton you are driving will hold your fall.

When nailing underneath the lower edge of a flake, try to place the piton at an angle to the direction of pull rather than straight up. This way, if the crack should expand, hopefully the piton will shift a bit and cunningly jam itself rather than easily pulling out.

method of removing

The usual mistake in removing is not hitting it far enough to the side in each direction, but just tapping it back and forth near the center of its range of travel. The proper method is to hit the piton in one direction until it will absolutely go no further -- then hit it some more before driving it back in the opposite direction. Use plenty of force but remember that much of the damage which occurs to the rock happens during the removal stage. Keep aware and avoid the breaking off of flexible flakes and rugosities along the edges of the crack. Avoid damage to the piton also. Direct the removal blows to the neck area rather than the anvil of the piton. In flared cracks and when the etrier is left clipped in to prevent dropping the piton, the blows are applied to the neck with the blunt pick end of the Yosemite Hammer.

Because pitons are tapered they will work themselves out. But if a piton is tenaciously gripped by an expanding flake it can usually be removed by applying the flexible flake technique in reverse - drive a thicker piton nearby and purposely expand the crack. Also, the etrier can be attached and pulled steadily out upon while the piton is pounded from side to side.

Rather than damaging a piton or destroying a crucial flake or crack in trying to remove it, the piton should be left in place for others to use. Succeeding parties must become aware of the problem too, and employ wisdom and restraint in the removal of necessary fixed pitons that will precipitate further damage to the climber's natural environment.

safety considerations

Pitons of alloy steel are actually much safer than those of soft steel because of their greater holding power. Tests have shown * that the average pull-out load for soft pitons in horizontal cracks in hard rock is less than 1,500 pounds; whereas, the average pull-out load for alloy steel pitons under identical conditions is in excess of 4,000 pounds. The primary reason for their greater holding power lies in their inherent stiffness and resistance to bending. However, this resistance to bending also poses a potential danger. Whereas, a good soft iron piton will deform and usually pull out of a crack before breaking, an alloy steel piton subject to a heavy load (e.g., a leader fall) may break if it has not been placed properly.

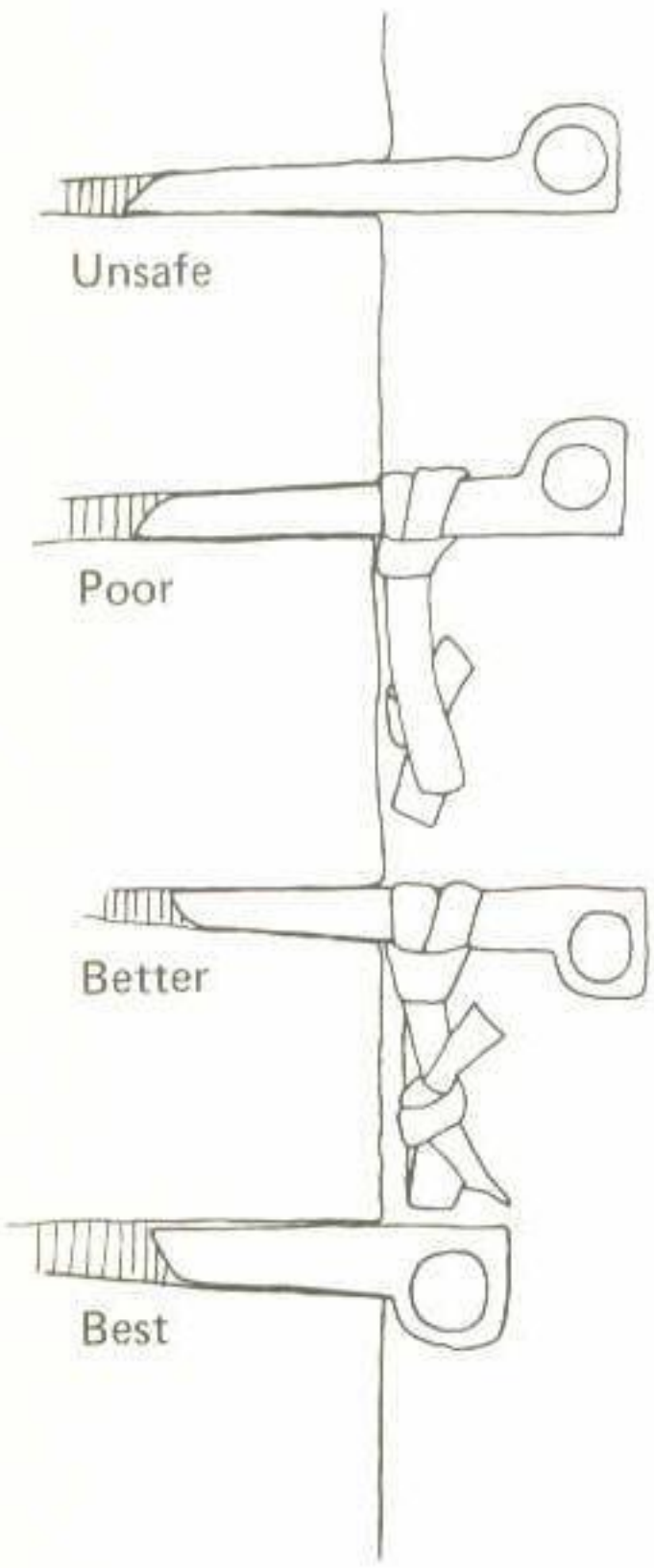


Figure 16

In order to obtain maximum piton strength the following guidelines must be adhered to. The proper placement for all pitons (both horizontals and angles) used for protection in horizontal cracks is eye downward, and placed all the way in to the eye. If the piton will go in only halfway, maximum piton strength can only be realized by tying it off with a Hero Loop to reduce leverage. It is evident that in this situation maximum safety is a trade-off between Hero Loop strength and "improperly placed" piton strength. (For protection purposes a Hero Loop of 9/16" or stronger webbing should be used.)

Beware of forcing pitons into very crooked cracks, such as the ones found in some types of limestone. A good rule of thumb to follow in placing horizontal pitons is "expect them to break if they are bent over 45 degrees." Angle pitons will break if bent backwards through a much smaller arc. So act accordingly - either tie off a thicker piton or use a shorter one (Figure 16.)

Alloy pitons wear differently from soft pitons. Rather than becoming unrecognizable blobs of bent iron, they keep their shape for a long time, sometimes for a hundred uses; but when fatigue cracks develop - usually at the junction of the eye and blade or in the case of angles and Bongs along their length - the pitons should be retired. When the tips of your pitons become so worn that they are ragged and sharp, they should be filed to a smooth radius to prolong their life. This is especially true of the RURP and Knife blades which take considerable punishment. Pitons of alloy steel rust at a much faster rate than those of mild steel or iron. For this reason, keep your hardware in a dry place.

*Griffin, L., 1965, The Holding Power of Pitons in Rock, UIAA

racking hardware

Speed in artificial climbing comes not from mere quick actions, but from overall efficiency. This is enhanced by carrying the hardware in a logical order so that the required piton can be easily located and removed. On normal climbs a single hardware sling is carried and all the equipment is carried on it in the following order. Racked front to back are knifeblades, horizontals, angles, and Bongs, followed by Hero Loops, and finally free carabiners in chains of two, three or four. The racking carabiners should be oriented with the large end downward and gate outward so the pitons and slings can be removed with one hand. On long artificial pitches where much equipment is needed, two hardware slings may be carried - one on each side of the body - with the Bongs and free carabiners on the hammer side. When cleaning a pitch the pitons and carabiners should be racked in their proper places as they are collected so that no time is lost in sorting at the beginning of the next pitch.

rurp

The Realized Ultimate Reality Piton was developed by us in 1960 specifically for the ascent of the West Face of Kat Pinnacle in Yosemite. Since then it has become standard equipment on all major artificial climbs and has helped to place the standard of American artificial climbing above the rest of the world. For use in bottoming incipient cracks it has helped to stem the malignant growth of bolt placement by opening otherwise unclimbable passages. The RURP has been improved this year through the use of chrome-nickel steel and a machine-ground taper.

Blade length: 1/2" Weight: 1/2

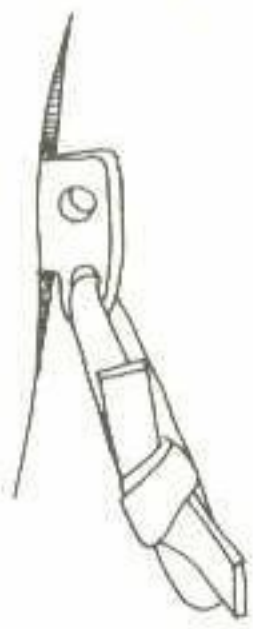
USE

Before use, the RURP must be fitted into a carabiner sling, best constructed of 1/2" nylon webbing and knotted into a loop with a Grapevine Knot. For normal RURP use in vertical cracks the sling is attached to the bottom hole (see Figure 17 a). To minimize leverage on the RURP when it is placed in horizontal cracks the sling should be tied to the center hole as shown in Figure 17 b. This should be done before placement by inserting the sling and tying off the end with a Figure Eight or Overhand Knot.

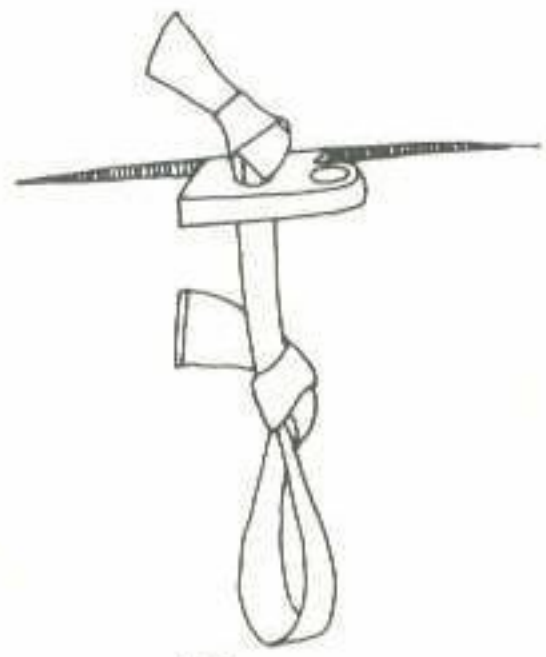
The RURP is ideally suited for placement in incipient cracks in granite with slightly rotten edges. In this situation the piton chops its way into the softer rock, creating its own hold. The hammer blows should be directed in line with the head of the piton. Glancing blows create a vibration which tends to dislodge the piton. Also keep hold of the RURP with the free hand while pounding, in order to dampen the vibration.

A good deal of practice is necessary before one can become proficient and confident in the use of the RURP. It is a good idea to practice placing them on a boulder and standing in etriers to see just how little a RURP will hold.

But for the sake of the rock don't practice on actual climbs or popular boulders. Use them with care as they do scar the rock.



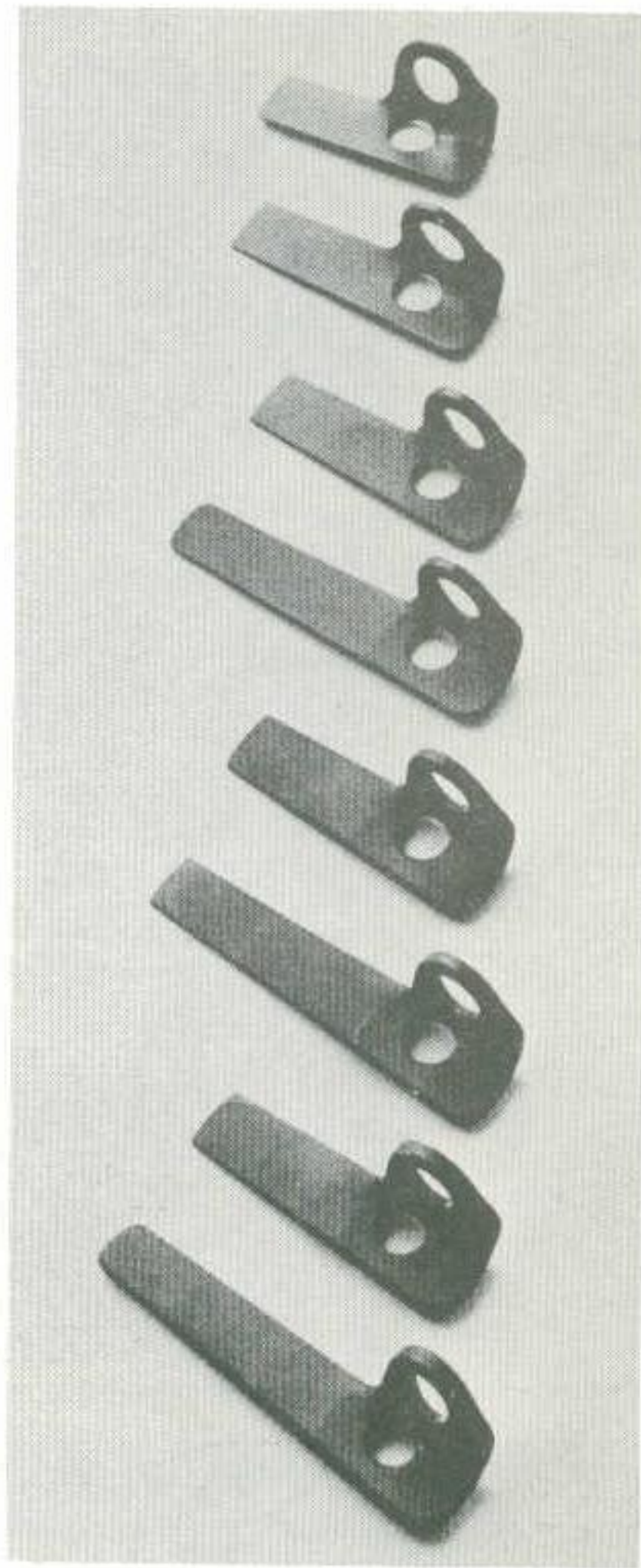
(a)



(b)

Figure 17

knifeblades & bugaboos



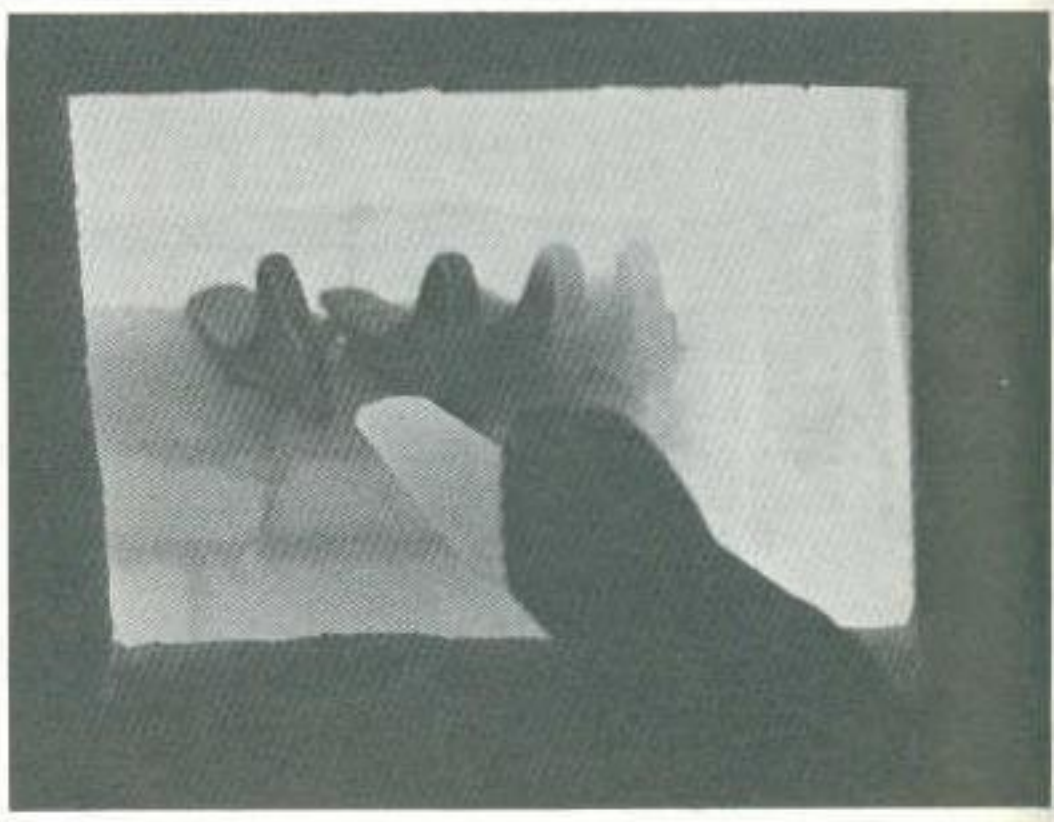
The Knifeblade and Bugaboo pitons have been improved this year in many ways. A large lightening hole has been placed in the thickest part of the head, bringing their weight closer to the efficiency of the Lost Arrow without sacrificing strength or durability. This hole is intended primarily for lightening the piton and it is recommended that the offset eye still be used except when reducing rope drag on aid pitches. Both the Knifeblades and Bugaboos have taper ground blades resulting in a consistent blade shape that is optimum for both strength and holding power. The Knifeblades are further strengthened by the use of a tougher, more durable chrome nickel steel than was previously used. Four new sizes of Bugaboos have been added this year.

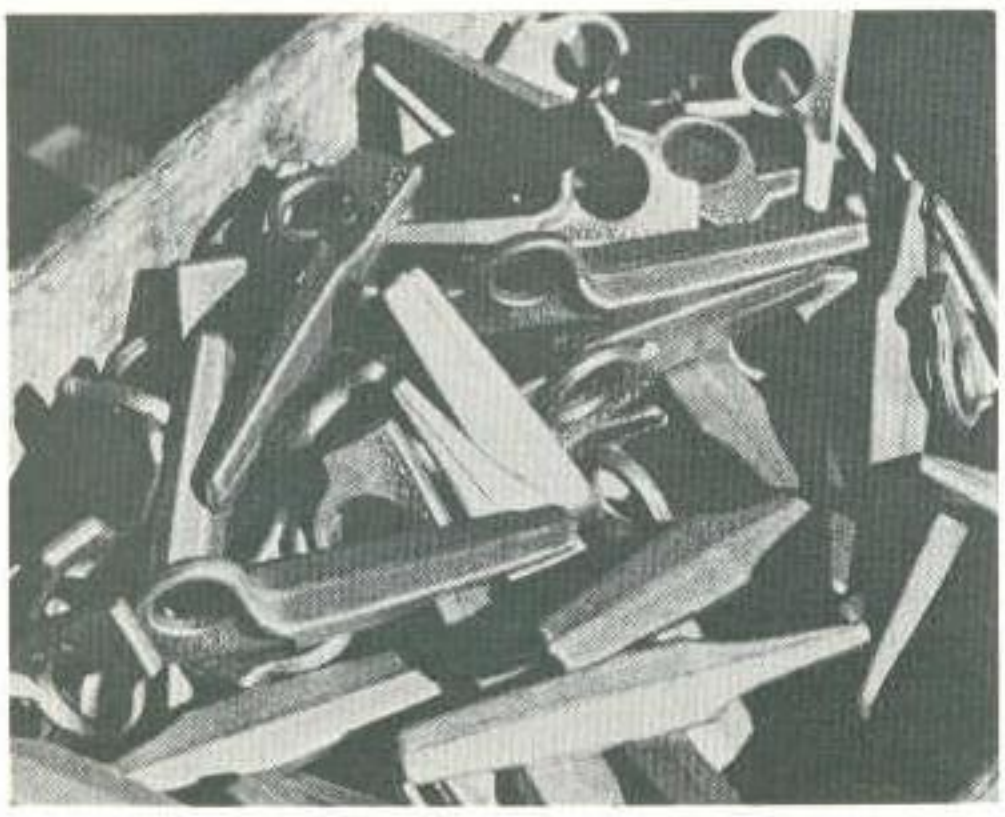
Model	Blade Thickness	Overall Length	Weight
Knifeblade, standard	3/32"	3"	3/4 oz.
Knifeblade, thick	1/8"	3-1/2"	7/8 oz.
Bugaboo, short thin	5/32"	3-1/2"	2-1/3 oz.
Bugaboo, long thin	5/32"	4-5/8"	2-3/4 oz.
Bugaboo, short medium	3/16"	3-5/8"	3 oz.
Bugaboo, long medium	3/16"	4-7/8"	3-3/4 oz.
Bugaboo, short thick	1/4"	3-3/4"	4 oz.
Bugaboo, long thick	1/4"	5-1/8"	5 oz.

USE & CARE OF HORIZONTALS

Lost Arrows, Bugaboos, and Knifeblades can be used back-to-back in many varied arrangements. This "stacking" is particularly useful for filling up bottoming cracks on difficult artificial climbs (Figure 15) but is also applicable to free climbing protection if the group is well placed. The Lost Arrow Wedge is tapered in two ways. Thus, in a pinch, it can be used as a vertical piton and substitute for a standard angle. A piton's potential holding power is somewhat proportional to its blade size thus Knifeblades and short horizontals must be well placed to hold a fall.

lost arrow





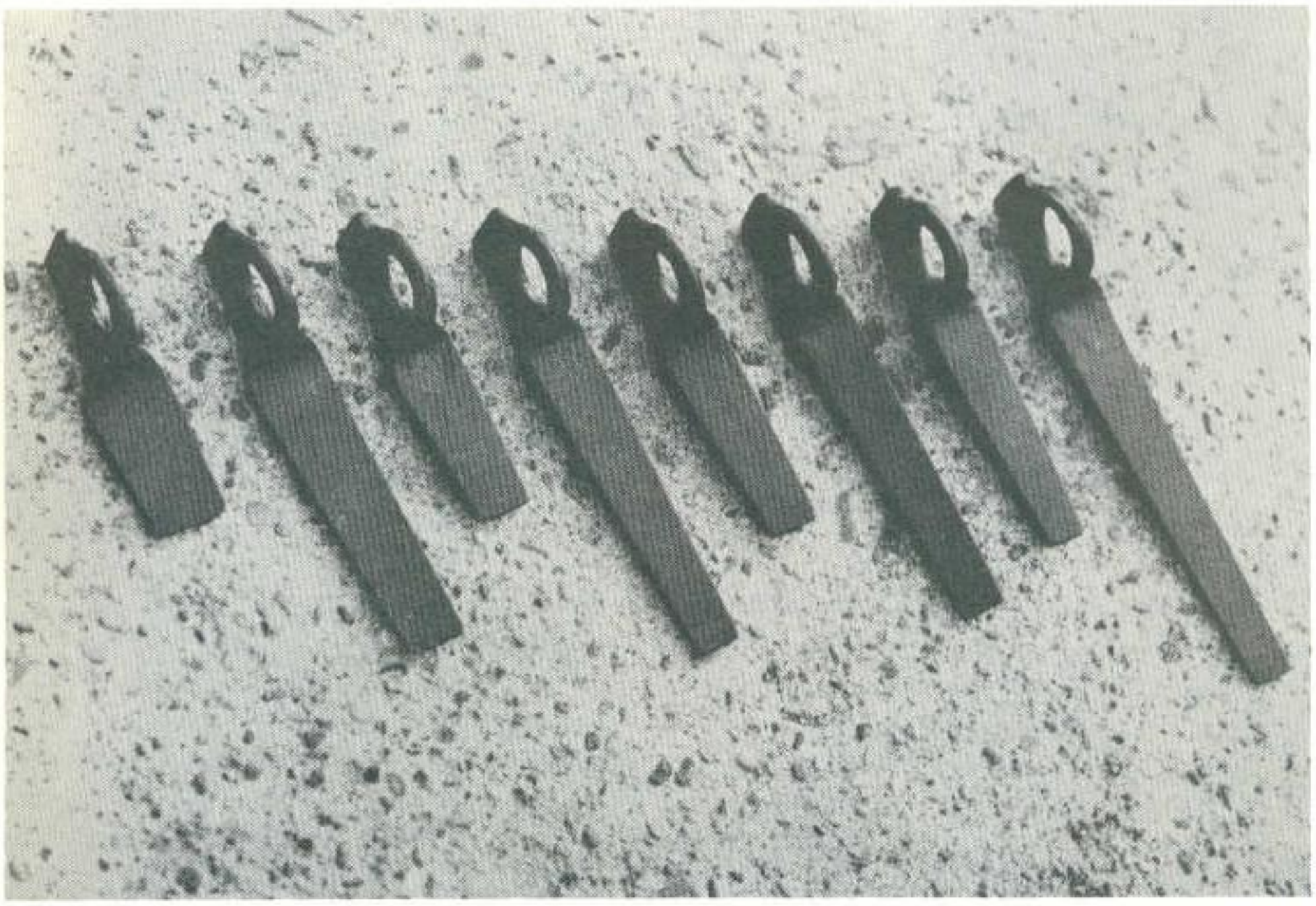
"Any number of various shapes will work, but there must be one shape that will ultimately work best; by best I mean it is the most functional, with the least material, with the smoothest lines, with strength and lasting qualities."

Y. Chouinard

. . . . horizontal pitons incorporating simplicity of design, economy of material, high strength and classic beauty . . . .

These "big wall" pitons are patterned after the original design of John Salathe and their consistent quality and reliability are made possible through the use of forging dies and expert hand blacksmithing. They represent the lightest design possible for a given blade size, yet are tough enough to withstand repeated usage.

Model	Thickness	Blade Length	Weight
Short thin	5/32"	1-7/8"	2 oz.
Long thin	3/16"	3-1/4"	3 oz.
Short medium	1/4"	2"	2-1/2 oz.
Long medium	1/4"	3-3/8"	3-1/2 oz.
Short thick	5/16"	2-1/8"	3 oz.
Long thick	5/16"	3-1/2"	4 oz.
Wedge	3/8"	2-3/4"	3-1/2 oz.
Long dong	9/32"	4-1/2"	4 oz.



angles

Masterpieces in design, having fair lines and functional shapes, these angles typify the high qualities of beauty in the Chouinard line of pitons. The angle pitons have inherently exceptional holding power; yet when not overdriven they are easy to remove, and retain long service life. While light in weight, the 1/2" wedge fits the very common wedge-size cracks found in granite. The 5/8" wedge eliminates the need to tie off standard angles in shallow cracks. Both wedge angles work exceptionally well in holes commonly found in dolomite rock. Because this size crack is frequently encountered, the 3/4" angle has become the standard angle piton of the American climber. The 1", 1-1/4", and 1-1/2" angles are consecutively larger sizes required for wide-angle cracks. The latter two are riveted closed for greater strength, holding power, ease of removal and endurance. All the angles are made of aircraft quality alloy steel, and heat-treated for optimum toughness.

Model	Thickness	Total Length	Weight
1/2" wedge	1/2"	4"	2 oz.
5/8" wedge	5/8"	4-1/4"	2-1/2 oz.
3/4" standard	3/4"	5-3/4"	3-1/2 oz.
1"	1"	5-1/2"	4-1/2 oz.
1-1/4"	1-1/4"	5-1/2"	5 oz.
1-1/2"	1-1/2"	5-3/4"	7 oz.

USE & CARE

It is important to remember that angle pitons must be placed so they cannot be bent backwards. The smaller angle pitons, if driven only part way in, upside down, and clipped into the eye, may break if subjected to the load of a leader fall (Figure 16,) It is also important to avoid using too large an angle or Bong for the crack, and forcing it in by overdriving. Because their sides will flare out, these pitons continue to go into the crack as long as you pound on them. Relatively little pounding is required to provide a safe anchorage since these pitons have tremendous holding power and lend themselves to sophisticated placing.

Alloy steel angles are more destructive to the cracks than any other piton. Because of the tremendous stiffness and hardness of the alloy steel, in a short time the thin edges of their blades can cut grooves in even the toughest rock. However, these sized cracks are the ones most suited for chocks. We urge the use of chocks whenever possible.

bong bongs

Chouinard Bongs are blanked and formed from high strength aluminum alloy, are plated for corrosion resistance, and have a riveted head to ensure maximum rigidity while driving. All four sizes have lightening holes which not only save weight, but also provide eyes for carabiners and tie-off loops.

Chouinard Steel Bongs have been discontinued because they cause more wear to the rock than do the Aluminum Bongs. The Aluminum Bongs have been considerably strengthened over the past several years and if the practices described below are adhered to they will serve well the needs of the big wall climber. The Chouinard Hexentrics are visualized as a challenging, fulfilling alternative to Steel Bongs for protection on short, hard free climbs.

Size	Thickness	Length	Weight
2"	2-1/8"	6"	4 oz.
2-1/2"	2-3/4"	6"	6-1/2 oz.
3"	3-1/2"	6"	8 oz.
4"	4-1/4"	6"	10 oz.

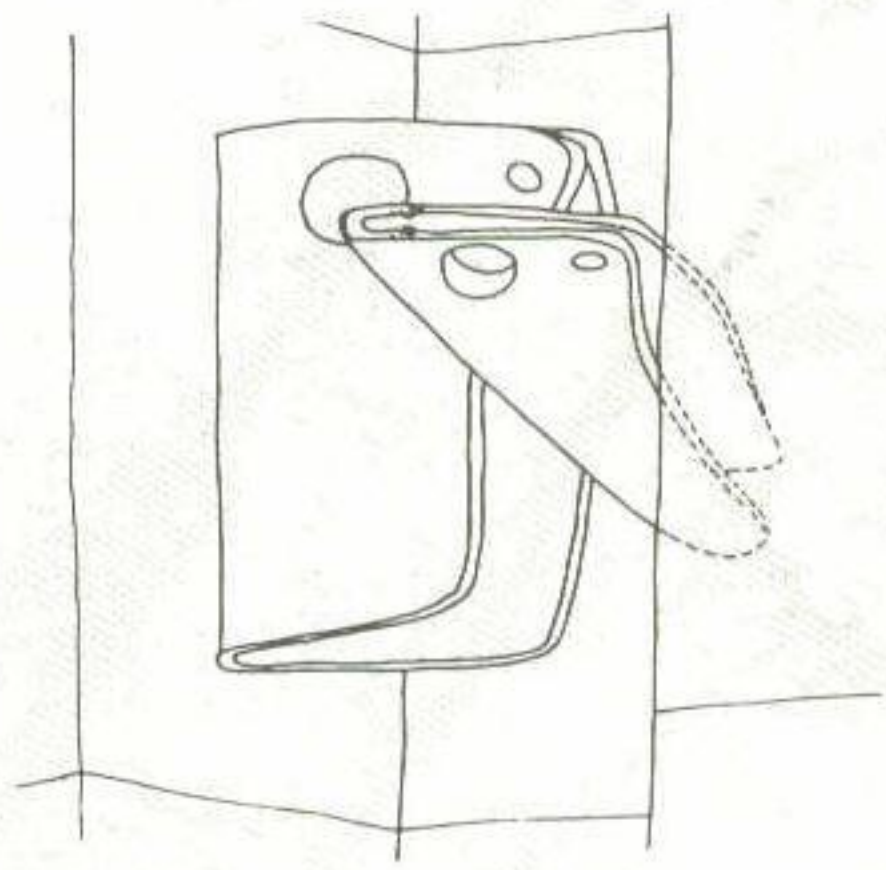
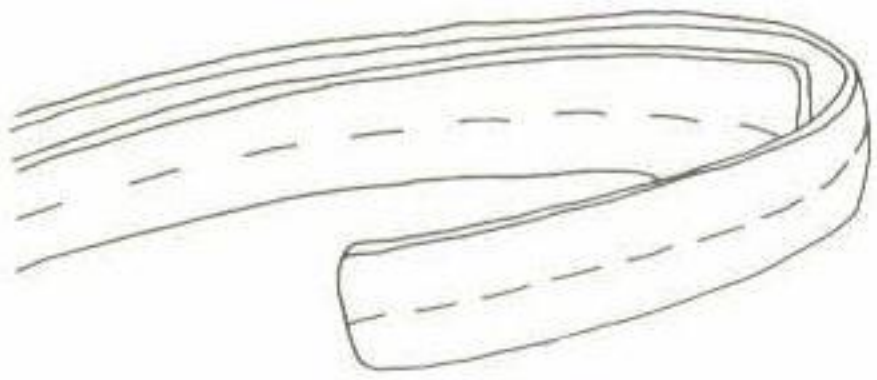


Figure 18

USE & CARE

Aluminum Bongs have very high holding power and frequently require less driving than steel pitons. As aluminum Bongs are driven they should be tested soon and often with the hammer to determine their resistance to shifting to safeguard against overdriving and subsequent damage during removal. They are relatively fragile in the sections between the lightening holes and the edge of the blade. Piton life will be prolonged if you can avoid striking these narrow areas with the hammer during removal. It will also be prolonged if you avoid hard driven placements in which high points of the rock are situated adjacent to the lightening holes, because the resulting stress concentration can cause a fracture, particularly during removal. Bongs can be tied off to reduce leverage by placing a sling through the lightening holes - this is best done before the piton is placed - or by placing the sling around the end of the piton before driving. In deeper cracks, the sling may be placed around a Bong as if it were a chockstone. In very wide cracks, some of the larger Bongs can be placed endwise and used as chockstones. Angles and Bongs should not be "nested" one inside the other. They are correctly stacked by criss-crossing them back to back (Figure 18). Aluminum Bong Bongs should be removed as gently as possible. The larger Bongs can frequently be hit from behind and knocked directly out of the crack.

etriers



The webbing etrier should be designed to suit the size of the individual, and the type of climbing he will be doing. A few points to consider in their construction are mentioned here.

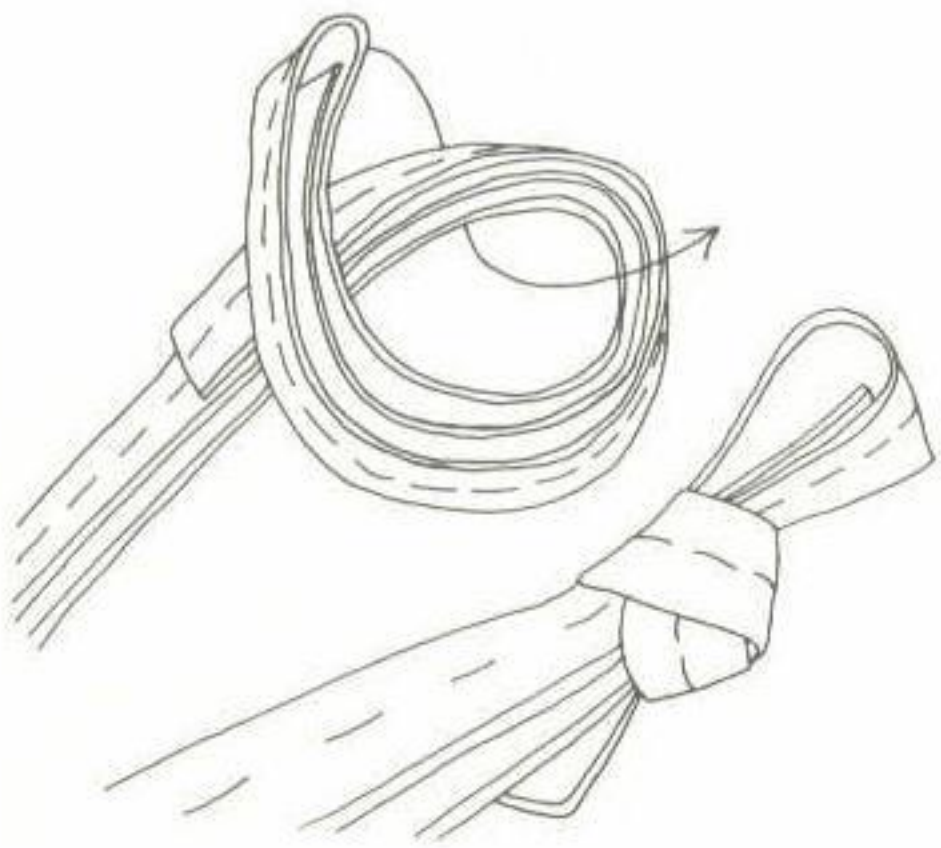


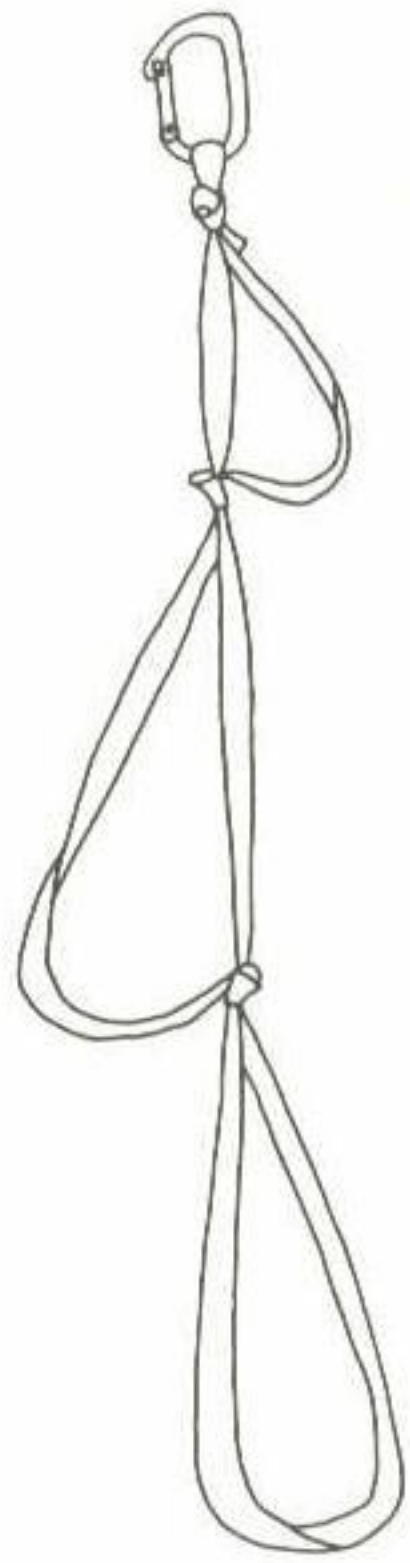
Figure 19
Frost Knot

First in order to be of greatest utility the top loop of the etrier should be positioned to provide as high level a step as possible while still keeping the free carabiner barely within reach for use as a handhold. Meeting this condition will allow the top loop to be used over 95% of the time. On low angle faces the very maximum reach is obtained by using a Hero Loop clipped into the etrier carabiner.

Today, as more and more climbs are being pushed free and artificial pitches are being followed on Jumars, extra consideration should be given to the ease of carrying. A short etrier carries easily over the shoulder. An etrier with two large loops deploys quickly when the top loop is placed around the neck. Experience has shown that tall individuals climb most efficiently in large loops whereas climbers with short legs find a longer etrier with smaller loops advantageous.

To construct the webbing etrier cut the proper length of webbing. One inch tubular or solid webbing is normally used but for special cases where weight is of primary importance 9/16" or 1/2" may be employed. Thirteen feet are required for the standard three-loop etrier. A length of 10 feet 10 inches makes a good two-loop etrier.

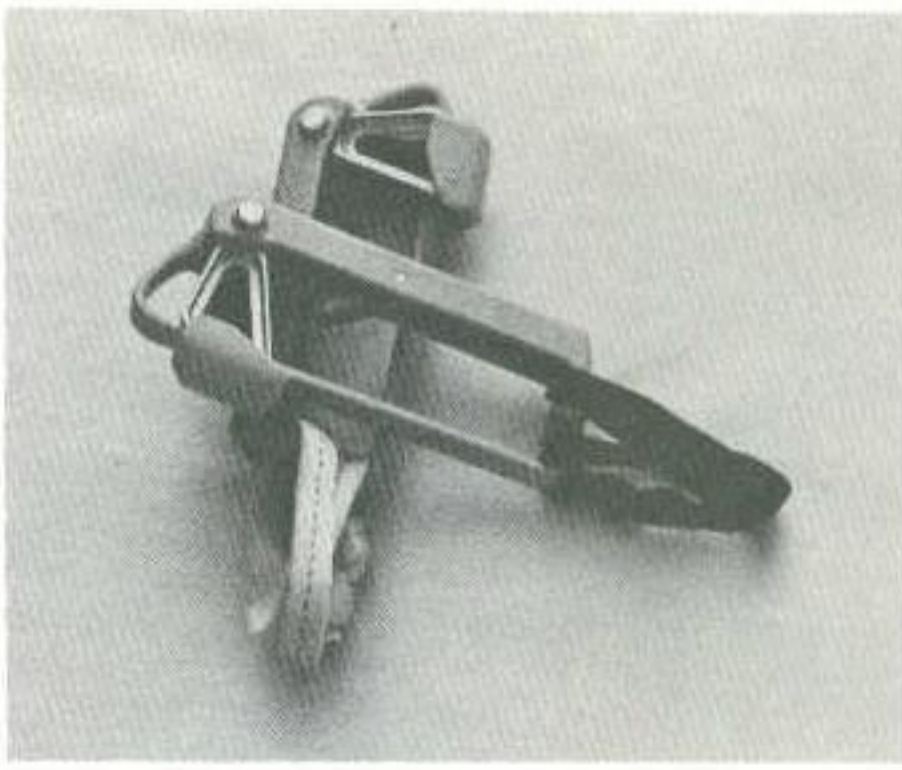
Form a large loop with a 9" overlap and tie the Frost knot -- a simple Overhand knot over the triple thickness section -- to fashion the carabiner loop (Figure 19). Form individual loops with Overhand knots leaving about 4 inches of eccentricity in the loops. While tightening the knots, first carefully by hand, then by vigorous bouncing in every loop, maintain a close check to insure that the etrier dimensions, particularly loop eccentricity, are maintained. All three of the etriers used by one individual should be the same size.



jumars

The safe and efficient mechanical prusiking device. These are standard equipment for rescue work, hauling on big walls, and cleaning aid pitches. We suggest tying on a doubled loop of 1/2" webbing as in the photo and using both of these to clip into.

Weight: 1 lb, 4 oz.



USE

The Yosemite big wall techniques were developed in about 1963, principally by Royal Robbins. The increased efficiency of these methods opened the door for small parties to America's big technical climbs.

The technique consists of two related parts: hauling and following. In a two-man party, one pair of ascendeurs is carried by each man. When the leader reaches his stance, he pulls up the slack in the climbing rope and anchors it. He locates a pulley and the "detent" ascendeur upside down in a convenient anchor. Then, after pulling up the slack in the hauling line, he clips it into the ascendeur and pulley (or pulley carabiner if a pulley is not used) and attaches an "actuating" ascendeur with foot sling to the tail of the line. The hauling bag can now be brought up at leisure, using primarily leg power. The process is facilitated by weighting the "detent" ascendeur or cunningly locating the pulley carabiner to hold it down.

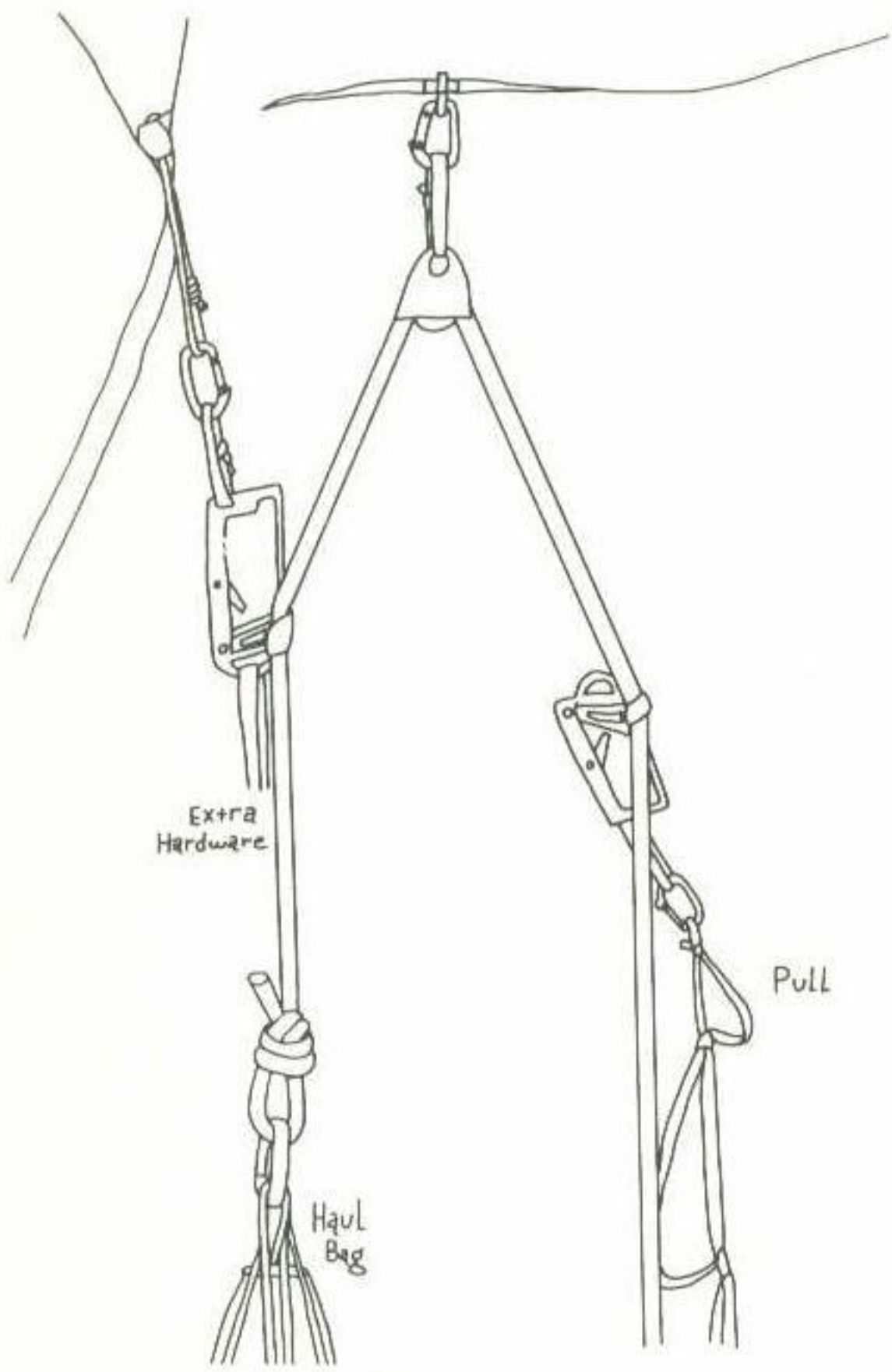
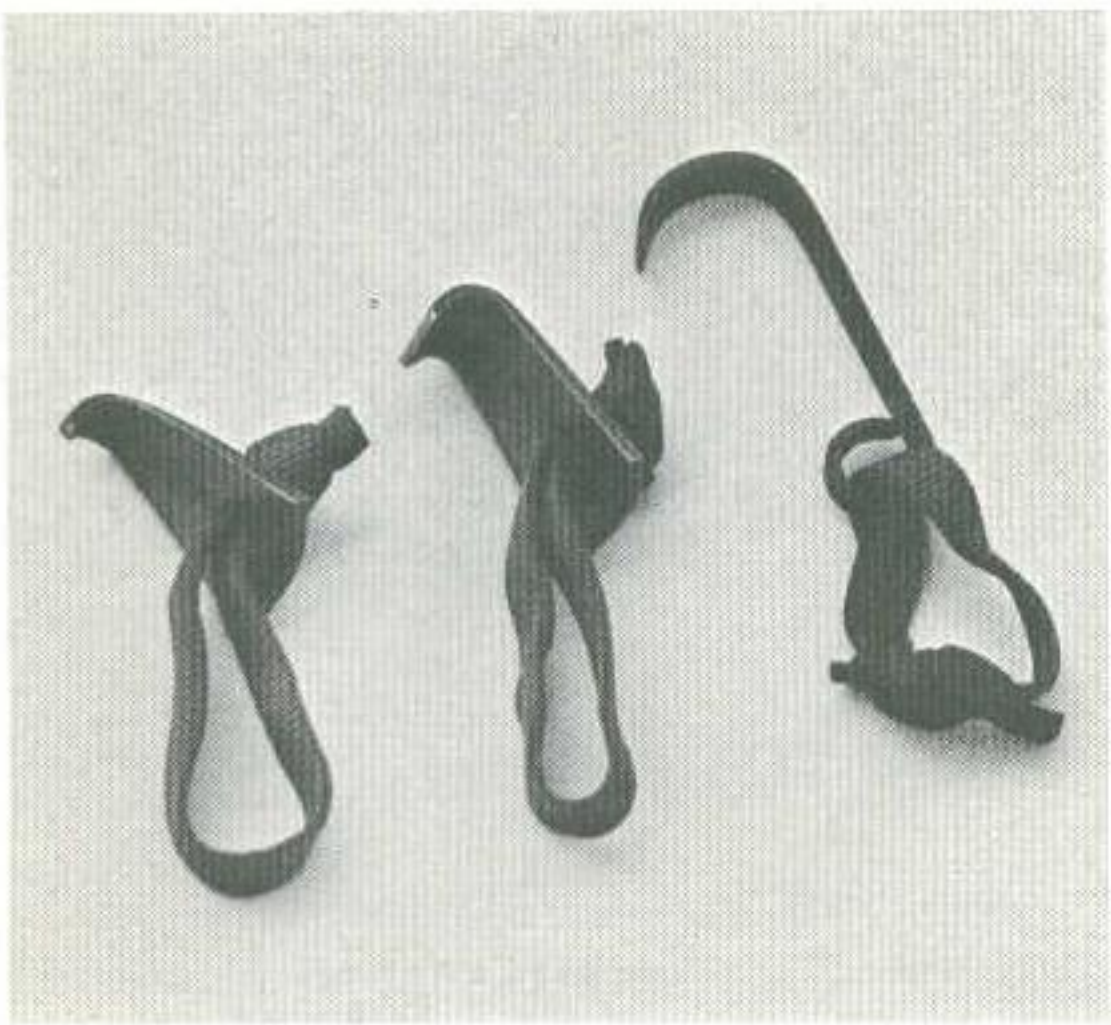


Figure 20

As soon as his climbing rope is anchored, the second man proceeds to ascend it using the normal "American Jumar" technique. The basic setup for this consists of etriers from right ascendeur to right foot and left ascendeur to left foot plus a runner from Swami Belt or Whillans harness to both ascendeurs. Rubber bands cut from an old inner tube can be used to keep the etriers from slipping off the feet. Put a Ring Hitch (first half of a Prusik knot) around the etrier just above the foot, then loop the rubber under the instep. To remove a piton, it is necessary to prusik above it. This is accomplished by unclipping the top Jumar and reattaching it to the rope above the piton. With the body weight transferred to the upper etrier, the rope may be unclipped from the piton.

Special care must be exercised during non-vertical prusiks to insure that the Jumar mechanism is locked fully closed by the spring loaded lever. If locked closed, it cannot pop off a normal sized climbing rope. If not locked, it will pop off. Horizontal prusiks are usually best negotiated by keeping both Jumars pointed up hill, towards the opposite ends of the rope, or by employing prusik knots instead.



logan sky hooks

These sky hooks designed by Jim Logan and made by Ed Leeper work best for hooking on minute crystals and nubbins. The special wide base prevents them from rotating off their tiny holds. The sky hooks come in two point shapes.

narrow - pointed hook

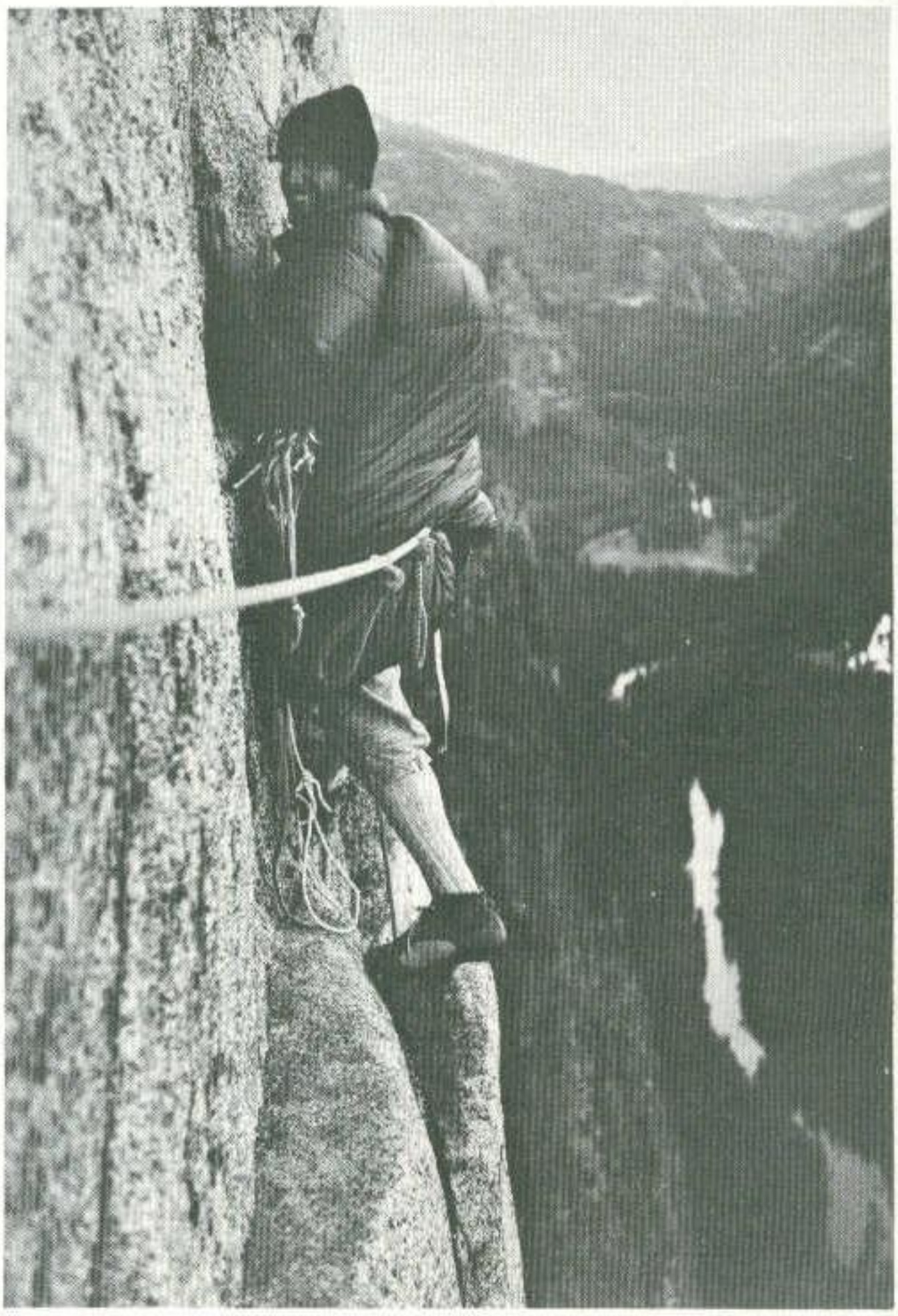
wide - 1/2" wide hook

weight: 1 oz.

cliff hanger

The Cliff Hanger hooks on larger flakes and rugosities, and edges too rounded for the Logan Sky Hooks. All are indispensable aids for extreme artificual climbs. Short slings of 1/2" webbing are necessary for the function of the Logan Hooks, and desirable to help prevent rotation in Cliff Hangers.

Overall length: 3½" **Weight: 1½ oz.**



soft goods

hammer holster

Heretofore all hammer holsters were the "quick draw and return" style. Good on big "nail-ups" but not so good for running through the woods and down scree slopes. We have a holster that won't let it fall out every time you bend over. The back is made of nylon for permanent stiffness with 2" wide slots for the widest belts. The pouch is stiff leather rigid enough to stay open but resilient to "give" in crack climbing and on bivouacs.

chouinardware sling

Our new hardware sling is made of two inch wide nylon webbing, the lower half of which is rolled to a slender diameter to cleanly accept carabiners. The wider width allows you to more comfortably carry heavy racks of iron on big climbs and the loop strength of 5,000 lbs. means it can double as a runner for free climbing protection. The selection of sizes ranges from small for ladies and short persons to the larger sizes for use over sweaters and down jackets.

XS = 41" S = 44" M = 47"

L = 50" XL = 53"

whillans sit harness

Chouinard and others are positively opposed to harnesses and such contraptions, but as a concession to Frost, (who has sold out to British technocracy) the Whillans Sit Harness is herein offered to American climbers. The basic design was developed by Don Whillans, in conjunction with Troll Products, as an aid to prusiking at high altitude on the South Face on Annapurna. It underwent subsequent development and finally this model was derived to meet the specific requirements of American climbers. The prototype has been subjected to numerous falls 10 to 15 feet in height on a statically anchored rope. The buckling system, while never taking the full force of a fall, has a minimum slip in excess of 4400 lbs. The minimum strength of the webbing which could be subject to full force is in excess of 5,000 lbs and the stitching is always stronger than the webbing. The Whillans Harness provides greater comfort than the Swami Belt for falling, taking tension, and belaying on inadequate stances. It is a comfortable seat sling for prusiking and rappelling. It carries the hammer holster and its equipment loops are preferred over the normal hardware sling for carrying chocks and nuts. The harness is designed to be loose fitting while walking or climbing but with an upward tension on the rope it snugs up under the thighs and buttocks.

Waist sizes: 28, 30, 32, 34, 36"

USE

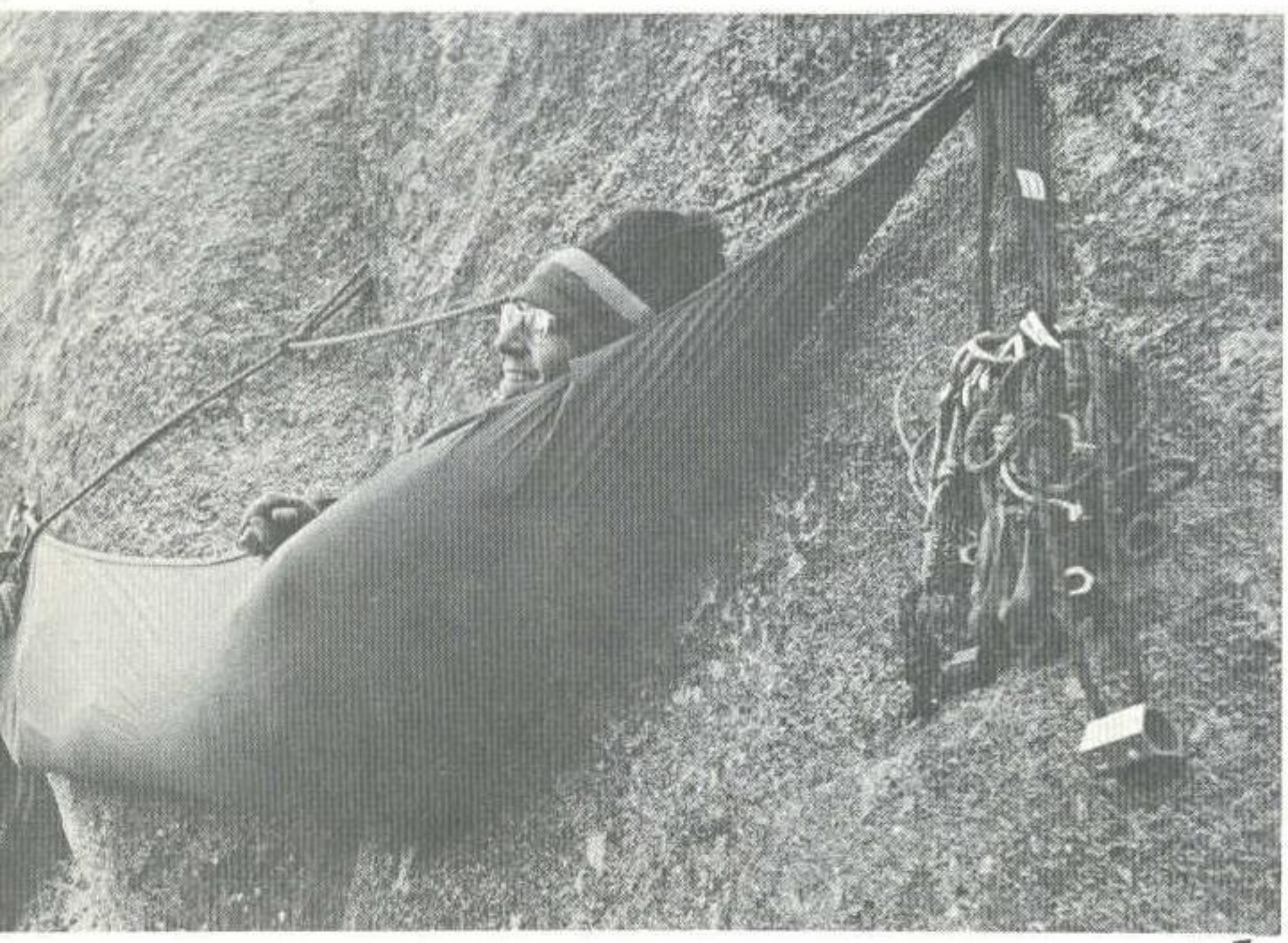
Equipment loops for the harness may be fashioned from approximately five feet of 5, 6, 7, or 8 mm perlon. Pass it through the equipment loop attachment points and secure with overhand knots.

In putting the harness on, the climber's legs go through on either side of the blue crotch strap. Buckle the waist belt then always thread it back through the right side of the buckle and secure the end in the second buckle on the right rear side of the harness.

Tie the climbing rope to the loop in the blue crotch strap with the One - and - one - half Fisherman's Bend shown on page 27. For anchoring at the back, pass a runner around the waist strap at the back center of the harness and clip it to the anchor piton.

belay seat

This is the original Royal Robbins design - the climber's companion on long artificial routes. It is constructed of red ripstop and flat webbing. The belay seat is compact enough to fit in the back pocket. The size is 12 x 28. Weight: 2½ oz.



pea pod

The Chouinard Peapod two-point suspension hammock is so comfortable that a sound night's sleep is guaranteed (even for T.M. Herbert!) This hammock was designed by Chuck Kroger and the Chouinard crew to eliminate the squashed shoulders normally suffered during hanging bivouacs and is constructed of heavy duty ripstop nylon. Although an amenity high on smooth walls, the Peapod is considered absolutely essential in the campground. Weight: 8 oz.

cagoule

Our cagoule is made for us in Scotland and who knows more about climbing in the rain than the Scots? It is constructed of neoprene-coated nylon which has the advantage over plastic coatings of not peeling off and provides a better sealed stitch. As a sewing needle penetrates the fabric it makes a hole which remains in plastic coated fabrics but our elastic neoprene nylon snaps smartly back and forms a seal around the thread. The hood is cut to provide cover and visibility when used with a wool cap. The cuffs are elastic with an added cowl for more protection and it has a velcro-closed chest pocket. The cagoule is cut full to allow you to pull it over your knees in a bivouac or rainstorm.
Orange. Sizes: M, L, and XL
Weight: 1 lb, 6 oz.

elephant foot cover

Made of the same material as the cagoule. In a bivouac it protects the legs from the elements. A bivouac sac provides the warmest bivouac but when an ample ledge isn't available, a cagoule and foot cover is the best system. Orange.

Length: 4'

Weight: 9 oz.

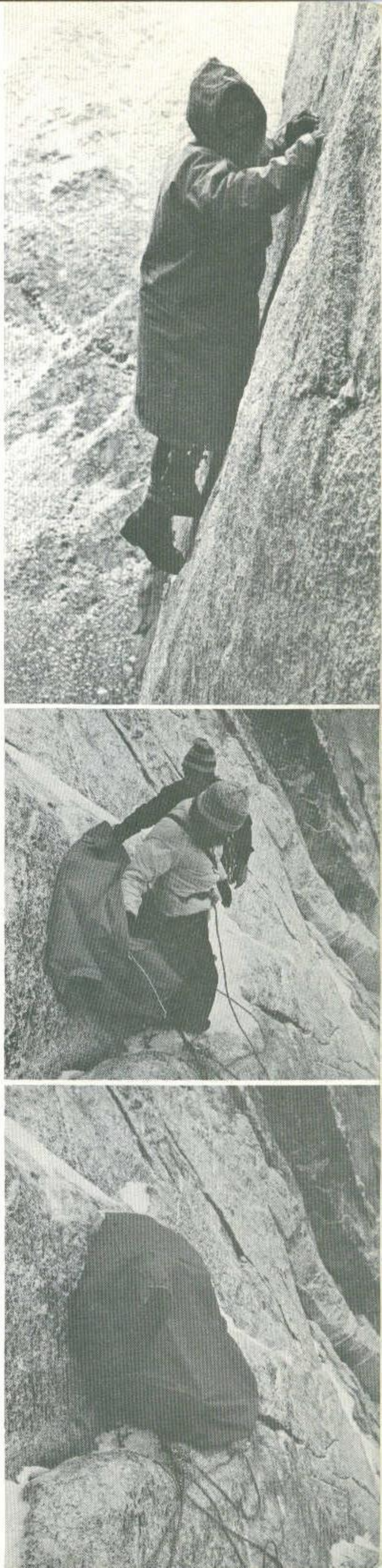
bivouac sac

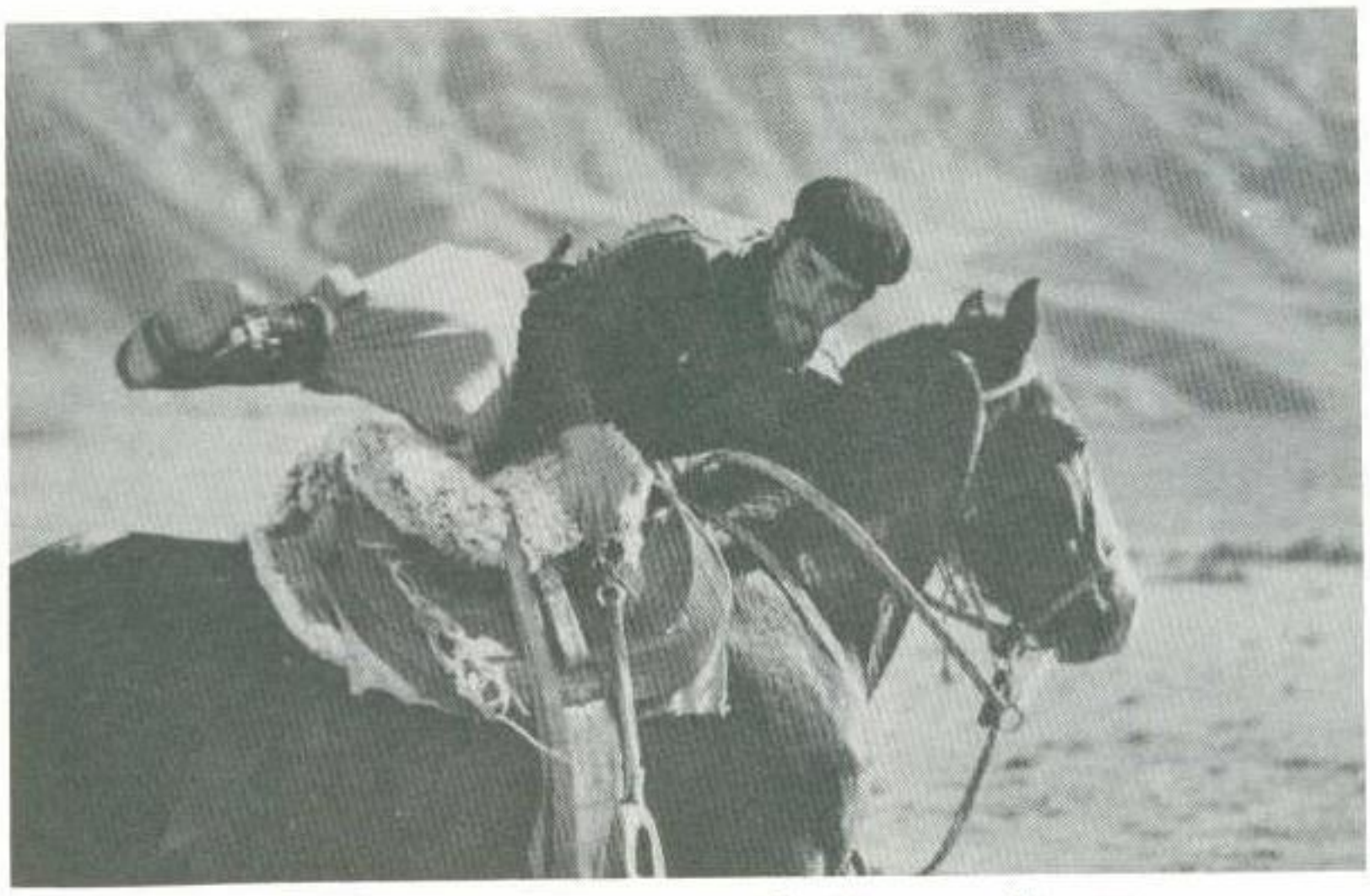
A waterproof sac can provide the greatest protection against the elements during a harsh alpine bivouac. This two-man model is imported from Germany. It is constructed of lightweight coated nylon fabric, has one ventilation hole, grommets for hanging, and a draw-string at the bottom. Red or green. It measures 62 x 76 inches and weighs 22 oz.

plastic rubber

There is no cagoule or bivouac sac that is absolutely waterproof under a torrential Alaskan rain -- unless the seams have been sealed. We offer this seam sealant and strongly recommend that you use it on the cagoule, bivouac sac and elephant foot. We have tested every type of so-called seam sealant available and found that this is the only stuff that works. Its only disadvantage is its white color. If the sealing is done on the inside we recommend two coats.

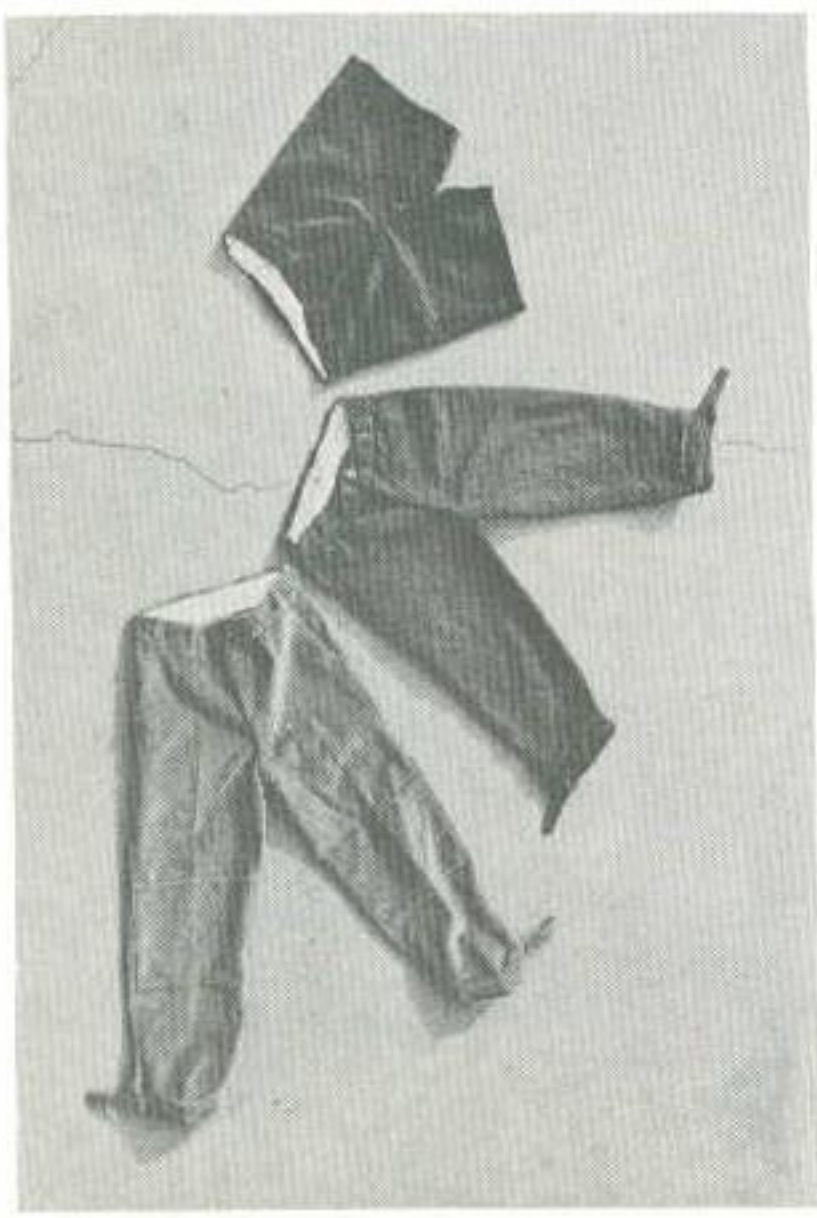
4 oz tube (enough for all your waterproof gear)





cord knickers

Knickers used to be baggy, and used to serve their intended purpose of covering the legs yet allowing maximum freedom of movement. But the fashion freak skiers got hold of the idea and they have since become high water pants - useful only for bar hopping. Here's a man's knicker, super-baggy and constructed of the toughest corduroy available, with a double seat and knees and wide belt loops spaced to allow hammer holsters. They come in two generous lengths so that you can let them down to the feet for those cold bivouacs. Tan.



wool knickers

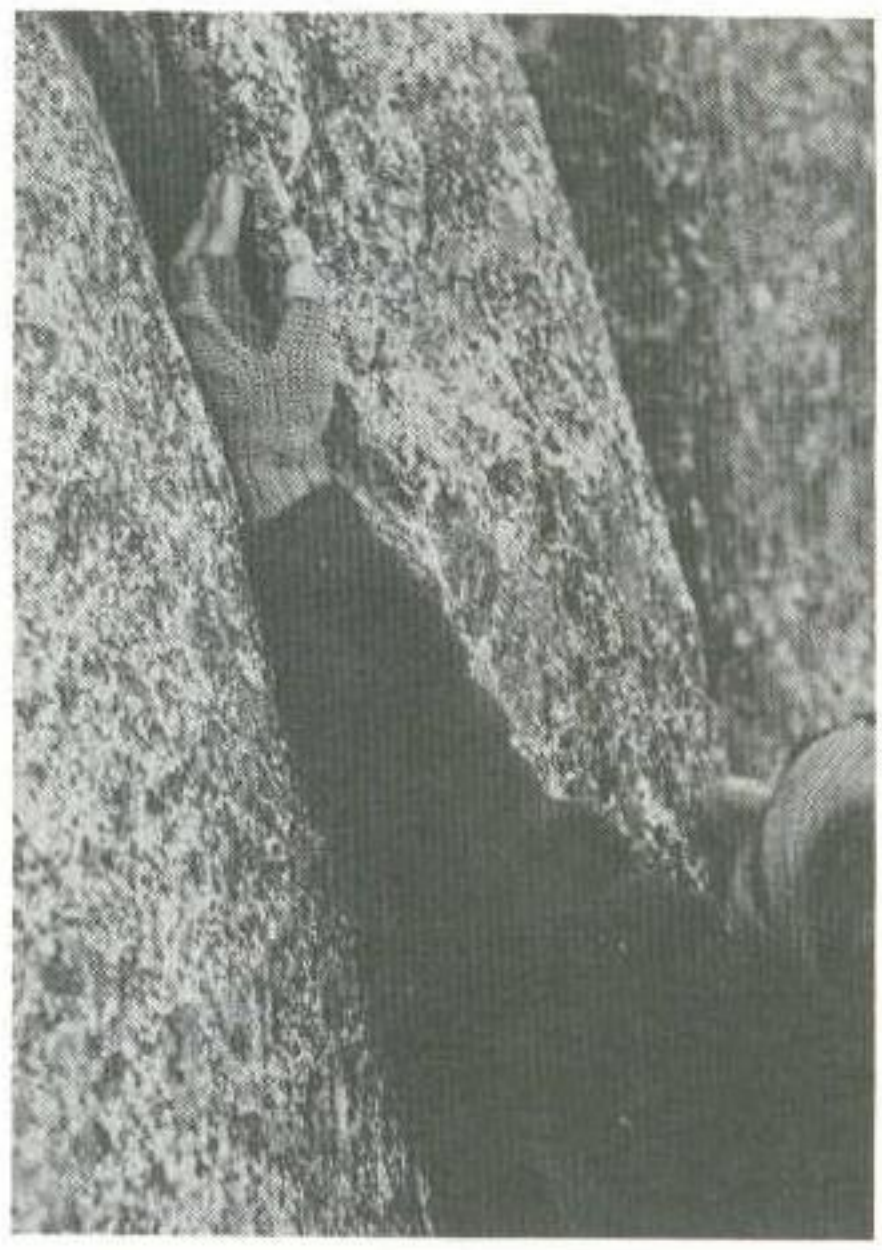
These are the same design as the corduroy but don't have double knees. The fabric is a heavy Scottish wool and is a recycled wool (from old Harris tweed game keeper's coats?) The material is extremely tough, durable, and water repellant. It will not shrink and is machine washable. Made in Scotland. Heather.

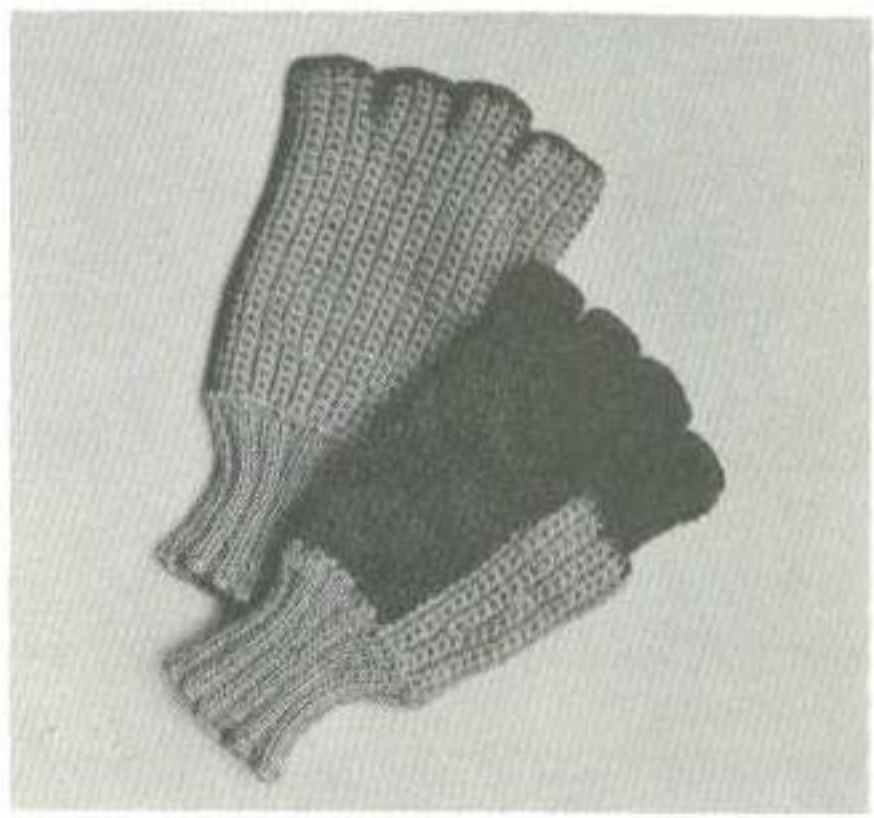
cord shorts

Free climbing in shorts on warm sunny rock is the ultimate in freedom of movement and these Chouinard shorts are made specifically to allow this freedom. They aren't just bermudas with a fashionable collegiate cut. These are climbing shorts. The legs are short and cut wide and they have two large hip pockets that extend clear across the rear, thus creating a double seat. The material is the same tough corduroy as the knickers and the pockets are a nylon mesh that is both tough and provides ventilation. Tan.

millarmitts

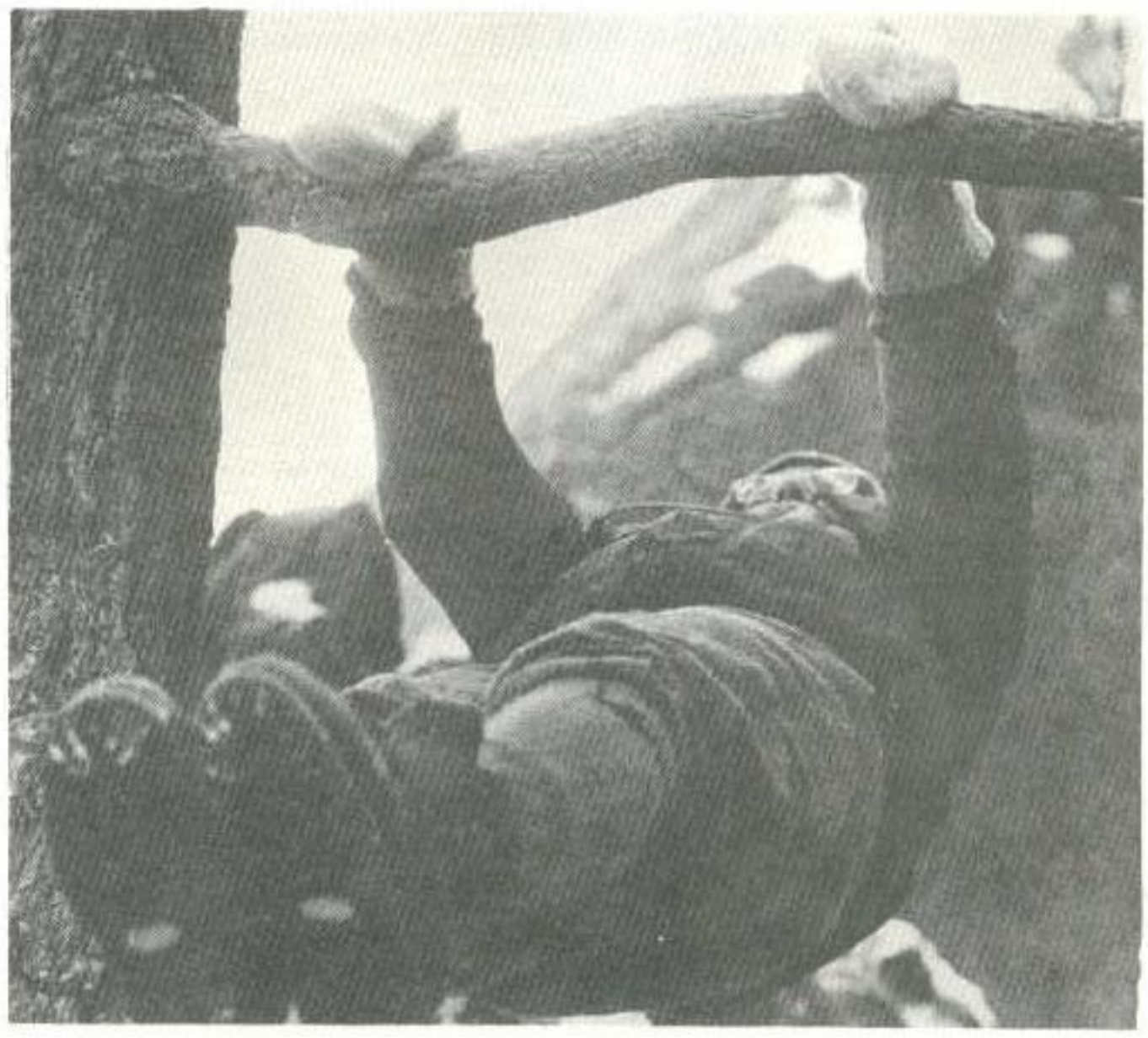
A fingerless glove with a silicone treated quality wool back and slip resistant palm, manufactured in Great Britain for the serious alpinist Hand-made in S, M and L.

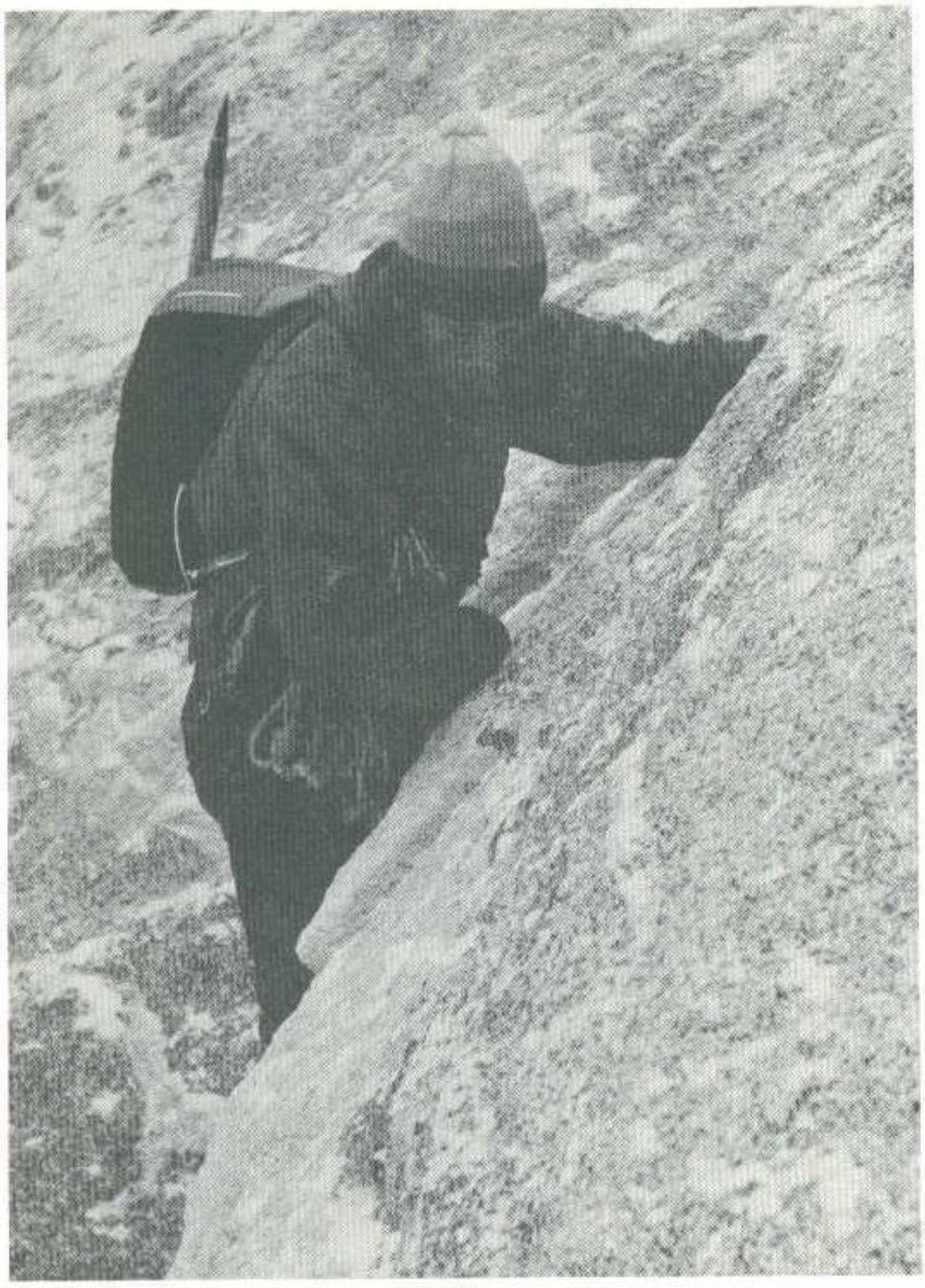




dachstein mitts

Constructed of closely knitted and shrunk natural wool, these mitts are near waterproof. They are used on all the big winter ascents in the Alps. An ideal combination is the fingerless Millarmitt inside the standard weight Dachsteins. They come in two thicknesses, standard and thick, and sizes S, M, and L. (Please include hand outline when ordering.)





pocket pack

Weighing only 7 ounces, the Pocket Pack is ideal for hiking, skiing, bicycling, travelling, or even for carrying books. The pack has a main chamber 5 x 12 x 30" with a drawstring closure and a snapfastened flap top. An inner compartment and adjustment can be used for carrying small heavy items. The shoulder straps are of nylon covered neoprene sponge that stays flat and are comfortable even on bare shoulders. It can be crumpled into back pocket or purse. Made of nylon in a dazzling combinations of red, blue, green, and purple.
Weight: 7 oz.

mountain pack

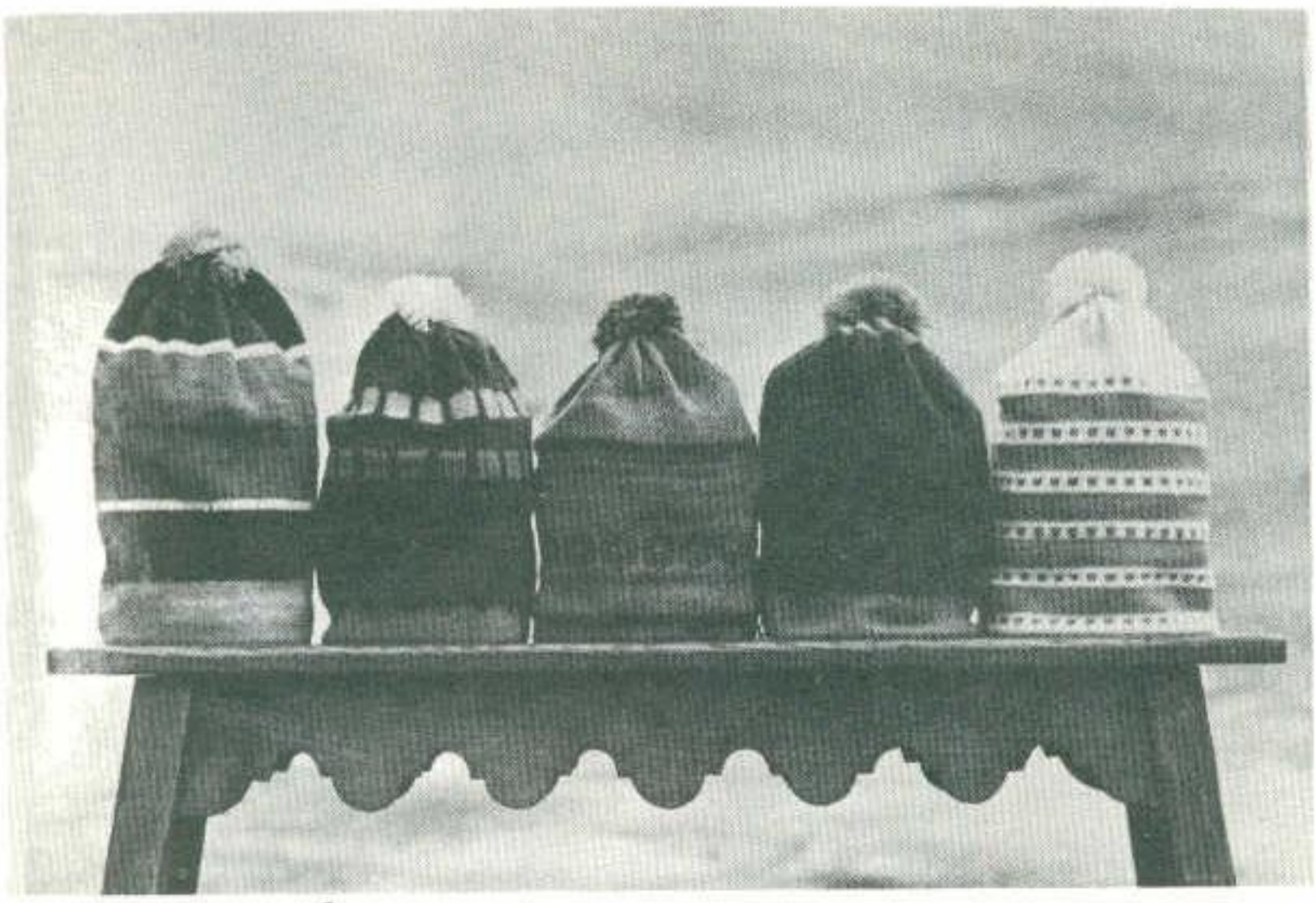
This is the same basic construction as the Pocket Pack but is made more rugged so it can be used for rock and ice climbing. Made of waterproof nylon pack duck. It has fixtures for carrying crampons and an ice axe. It is the pack to take into remote regions, for it can serve as a stuff sack while backpacking, and then be used as a summit pack. It is large enough to be used for overnight climbs.
Weight: 11 oz.

jensen pack

This classic Don Jensen design allows the carrying of large pack frame sized loads in a soft pack suited to the outdoor specialist's needs. Because of the pack's ingenious compartmentalization and contoured shape it rides closer and clings to the wearer's back as if it were an extension of his body. This feature makes the Jensen Pack the world's best for ski touring and makes the carrying of loads over difficult terrain easier for the alpine climber. Because it clings to the back and has a usable waist belt the weight is transferred natually to the body at points other than the shoulders, greatly relieving the shoulder discomfort normally experienced while back packing. The sack's size makes its use appropriate for week long back country trips. In addition ample tie-on points are provided for ropes, crampons, axe and skis. The quality of construction is immaculate - hot cutting, double stitched seams, leather reinforced stress points. Fabric is deep copper-red colored, 8 oz. nylon duck; double polymer coated to be completely waterproof. Zippers are nylon coil covered with generous weather flaps to prevent abrasion. The pack is backed with soft unwaled corduroy. Shoulder straps are padded and adjustable. Four different lengths are supplied to assure a perfect fit. Measure from the nape of the neck to the small of the back as follows:

Short	15 - 17
Medium	17 - 18½
Long	18½ - 20½
Extra long	20½ and up

Total weight of the Jensen Pack is about 2 lbs.



schizo hat

The Schizo Hat -- exotic, beautiful, warm. Handcrafted by Emmy Spencer of Boulder, Colorado, in wild colors and patterns. No two alike. Entirely reversible - two hats in one. Washable orlon. Take what comes (it's worth a gamble) or specify major color preference.

annapurna glasses

These glacier glasses, manufactured by the French optical craftsman-mountaineer Cauderlier, are the finest available. They are ground optically perfect from Orma synthetic for protection against the sun rays. Leather side protectors and nose piece guard against stray glare. Hard protective case included. **Weight: 3 oz**

high altitude glasses

The Annapurna glasses are excellent for moderate alpine conditions, but for Peru, the Himalaya, & New Zealand you need more protection from the intense rays. These glasses are similar to the Annapurna but they have a darker flat lens that cuts out more blue UV rays. Soft protective case included.

THE GREAT PACIFIC IRON WORKS

Price List

clean climbing

Chouinard/Salewa Carabiner	4.00
Hexentric No. 1 wired	1.85
Hexentric No. 1	.80
Hexentric No. 2	.85
Hexentric No. 3	.90
Hexentric No. 4	1.00
Hexentric No. 5	1.10
Hexentric No. 6	1.20
Hexentric No. 7	1.30
Hexentric No. 8	1.40
Hexentric No. 9	1.50
Hexentric No. 10	1.75
Tube Chock 4"	2.00
Tube Chock 5"	2.30
Tube Chock 6"	2.60
Stopper No. 1 wired	1.65
Stopper No. 2 wired	1.70
Stopper No. 3 wired	1.85
Stopper No. 4 wired	1.95
Stopper No. 4	.80
Stopper No. 5	.80
Stopper No. 6	1.00
Stopper No. 7	1.20
Stopper No. 8	1.35
Chouinard Rope 5 mm	ft/.12
Chouinard Rope 6 mm	ft/.15
Chouinard Rope 7 mm	ft/.18
Chouinard Rope 8 mm	ft/.30
Chouinard Rope 9 mm	ft/.32
Chouinard Rope, 9 x 120	38.00
9 x 150	47.00
9 x 165	51.00
Chouinard Rope, 11 x 120	47.00
11 x 150	58.00
11 x 165	64.00
11 x 150 bicolor	66.00
Webbing, ½" tubular	ft/.05
Webbing, 9/16" tubular	ft/.12 <.12
Webbing, 1" tubular	ft/.13 <.13
Webbing, 1" flat	ft/.15
Webbing, 2" flat	ft/.15
Crag Hammer	18.00
Robbins Shoes: sizes 2 thru 12½	pr/42.00

ice climbing

Chouinard Piolet: 55cm, 70cm, 80cm	35.00
Alpine Hammer	18.00
Climaxe	27.00
Chouinard/Salewa Crampons w/ straps	43.00
Crampon Straps	6.50
Salewa Crampons: sizes 0, 1, 2, 3	25.00
Salewa Tubular Ice Screw: 21cm	6.50
Salewa Tubular Ice Screw: 25cm	6.00
Salewa Tubular Ice Screw: 35cm	7.00
Salewa Wart Hog	8.00
Charlet Ice Screw	3.50
Haderer Boots	115.00
LeTrappeur Boots	64.00

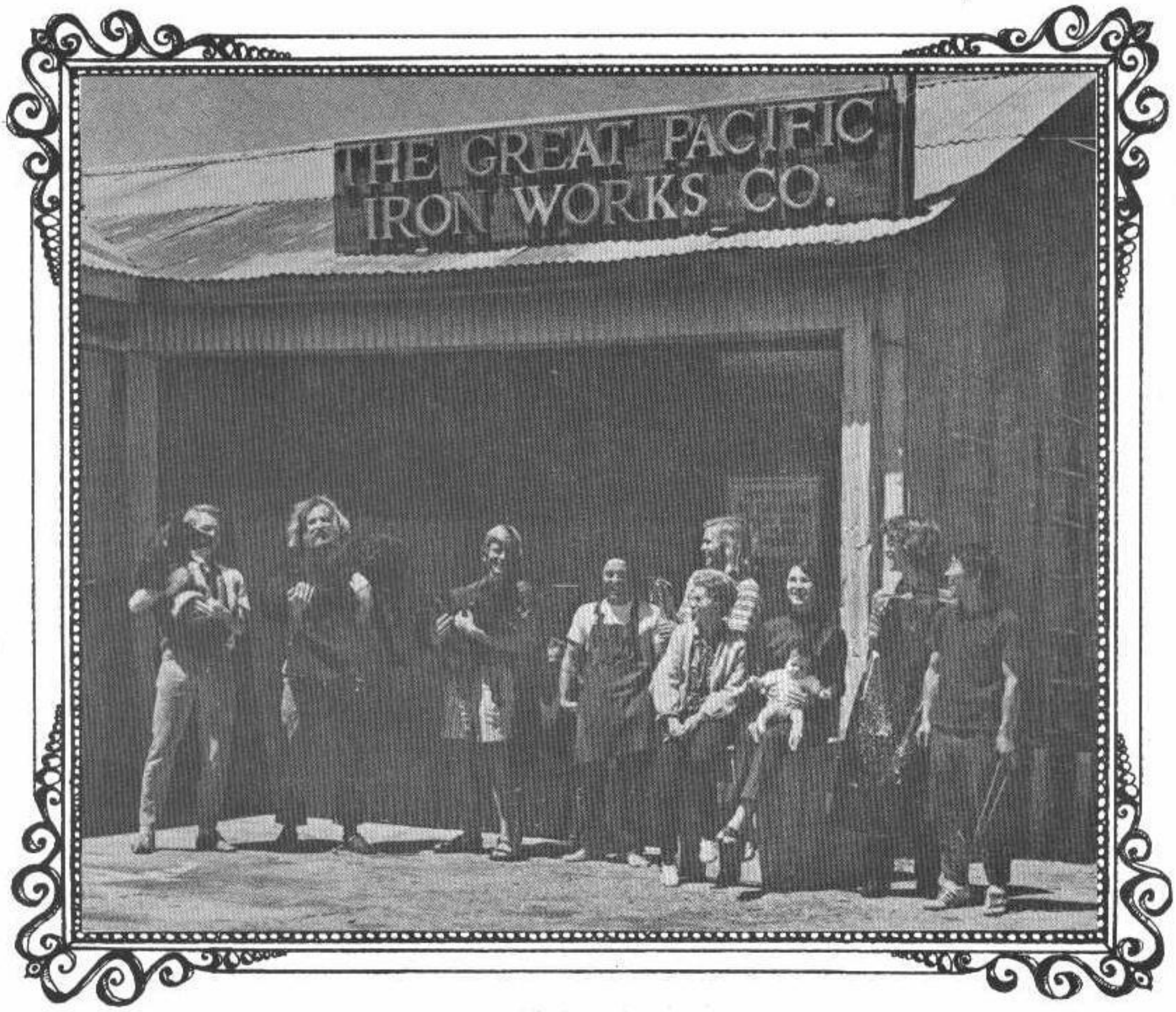
ironmongery

Yosemite Hammer	16.00
RURP	1.10
Knifeblade: standard and thick	1.50
Bugaboo: short thin and long thin	1.65
Bugaboo: short medium and long medium	1.85
Bugaboo: short thick and long thick	1.85
Lost Arrow: short thin, long thin, short medium,	2.25
long medium, short thick, long thick,	2.25
long dong, wedge	2.25
Angle, ½" and 5/8"	1.15
Angle, ¾" standard	1.25
Angle, 1"	1.35
Angle, 1-¼"	1.50
Angle, 1-½"	1.75
Bong, 2" aluminum	2.60
Bong, 2-½" aluminum	2.85
Bong, 3" aluminum	3.25
Bong, 4" aluminum	3.50
Jumar Ascendeurs	pr/35.00 50.00
Cliff Hanger	1.25

soft goods

Hammer Holster	3.50
Chouinardware Sling: Xs, S, M, L, XL	2.50
Whillans Modified Sit Harness: 28" thru 36"	25.00
Belay Seat	4.50
Chouinard Peapod: standard and long	15.00
Cagoule: S, M, L, XL	26.00
Elephant Foot Cover	9.00
Bivouac Sac for 2-men	26.00
Plastic Rubber	1.00
Corduroy Knickers	28.00
Wool Knickers	28.00
Standup Shorts	16.00
Corduroy Shorts	18.00
Millarmitts: S, M, L	7.25
Dachstein Mitts, standard weight: S, M, L	5.00
Dachstein Mitts, thick weight: S, M, L	6.00
Walker Wool Gloves: M, L	7.75
Schizo Hat	10.00
Annapurna Glasses	11.50
Rivendell Pack	45.00
Pocket Pack	20.00
Mountain Pack	36.00
Alpine Pack	48.00
Ultima Thule	48.00
Foamback Cagoule	30.00
Foamback Anorak	28.00
Foamback Pants	20.00
Rugby Shirt, 2 color	16.00
Rugby Shirt, 3 color	22.00
Supergators, summer	25.00
Supergators, winter	27.00
Varappe Sleeping Bag	74.00
Expedition Sleeping Bag	87.50
Deluxe Jacket	79.00
Deluxe Hood	9.75
Expedition Jacket	63.00
Expedition Hood	15.00

This listing includes all new items planned for the '73 season; please write for estimated availability dates on items not shown in our latest catalog.



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credits

Cover: "Landscape in the Spirit of Verses by Tu Fu", Wen Chia (1501-1583) from Chinese Painting; Skira , page 135.

Page 1	East Face Moose's Tooth, Alaska
Page 3	Yosemite Valley
Page 4	John Salathe & Yvon Chouinard, 1964
Page 5	Park Lane, Anglesey - by Leo Dickinson
Page 11	Smoke Blanchard, Little Scheelite Pinnacle - by Jan Tiura
Page 13	Doug Robinson at Peabody Boulders
Page 15	Dream of White Horses, Anglesey - by Leo Dickinson
Page 23	Pratt's Crack - by Yvon Chouinard
Page 24	Doug Robinson on Grandpa Peabody
Page 31	Summit of Morning Pass in 1864, "Scrambles Amongst the Alps" - Edward Whymper
Page 39	Ian Clough in Scotland - by Yvon Chouinard
Page 41	Hardware Selection for 2nd Ascent of the Nose, 1960
Page 43	Tom Frost in Alaska - by Chris Bonington
Page 44	South Face Moose's Tooth, Alaska
Page 58	Shrike - by Ken Wilson
Page 62	Gaucho in Patagonia - by Doug Tompkins
Page 63	by Barratt's Photo Press
Page 72	Cerro Torre, Patagonia - by Doug Tompkins

Illustrations - by Russ McLean

— All photography not otherwise credited is by Tom Frost —

mountaineering literature

AAJ, The American Alpine Club, 113 East 90th Street, New York, N.Y. 10028; yearly in June $6.00

Ascent, Sierra Club Mountaineering Journal, Sierra Club, Mills Tower, San Francisco, California 94104; yearly $3.00

Basic Rockcraft, an instructional booklet by Royal Robbins, 906 Durant Street, Modesto, California 95350; $1.95

Mountain Magazine, 30 Collingwood Avenue, London N.10, England; bimonthly, $1.25 per copy

Summit, Big Bear Lake, California 92315; ten issues per year for $7.00

mountaineering films

The following are available on a rental basis from Chouinard Equipment Company. Fees are for one showing.

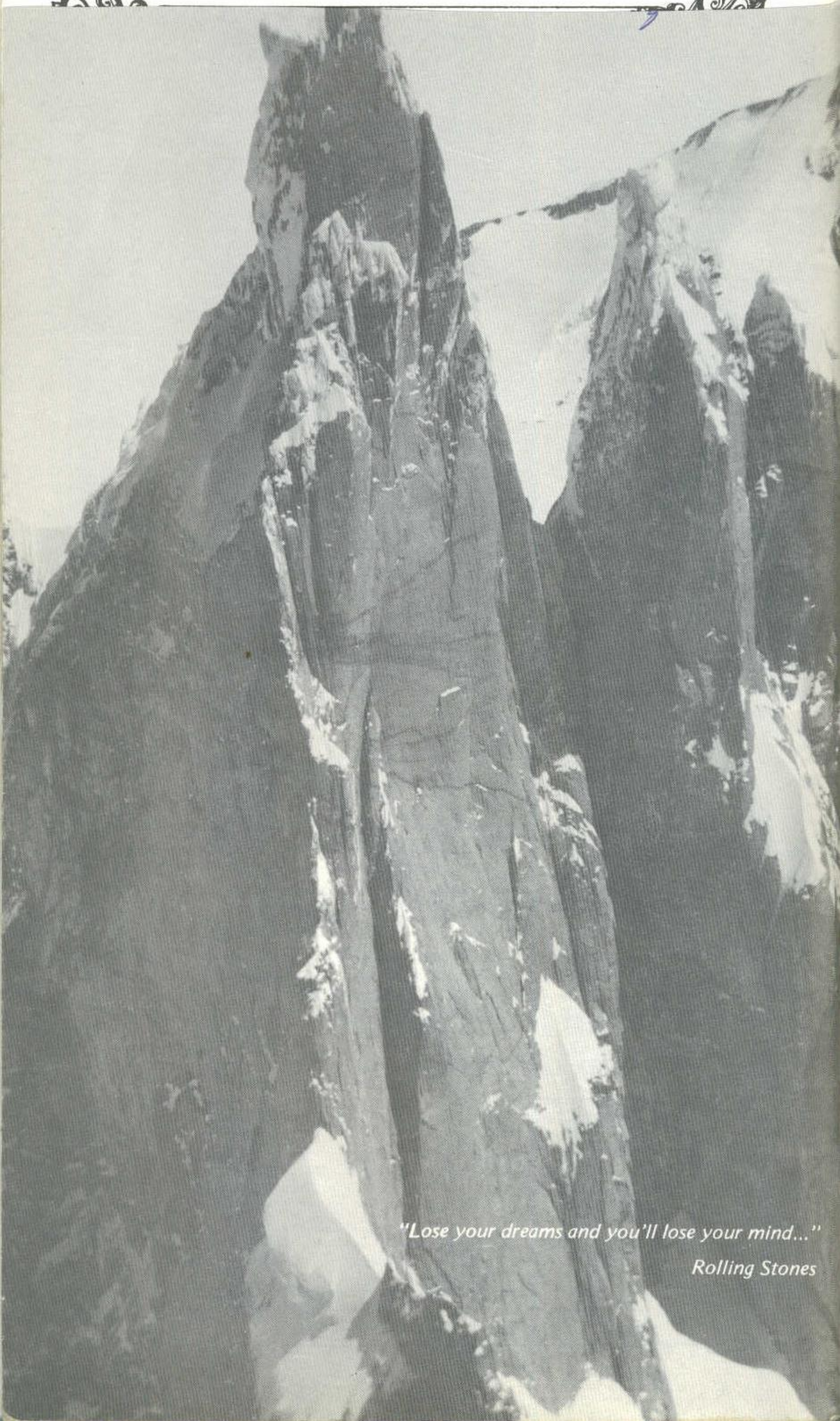
Sentinel, the West Face; a 16mm color movie documenting a two-day ascent of the west face of Sentinel Rock, Yosemite's standard grade VI. by Royal Robbins and Yvon Chouinard. Filmed by Tom Frost and Roger Brown with the technical assistance of Chuck Pratt. First prize winner at the 1968 Trento Film Festival; 25 minutes; $75.00 plus postage both ways.

Fitzroy: First Ascent of the SW Buttress; a 16mm color film which records the third ascent of one of the world's greatest mountains - Fitzroy in Patagonia of Argentina - by Yvon Chouinard, Dick Dorworth, Chris Jones, and Doug Tompkins. Filmed and edited by Lito Tejada-Flores. Features Patagonian storms where "the wind sweeps the land like the broom of god"; shows technical climbing on verglas-covered rock; and the monotony and frustration of ice cave living. Personalities of the climbers developed through location dialogue. Winner of the first prize at the 1969 Trento Film Festival; 28 minutes; $100.00 plus postage both ways.

Calanques and *Tant Que Nous L'aimerons;* two short French films rented together. Les Calanques is 16mm color film with music background which won a Gold Medal at the Trento Festival. Two French girls start from the sea and climb a pinnacle along the French Riviera. Nice underwater footage, free climbing on white "Calanque" limestone, and the blue Mediterranean. Filmed by Gilbert Dassonville; 12 minutes. Tant que nous l'aimerons is a black and white film with French narration. Lucien Bernardini and Edmund Denis, who lost fingers and toes on the South Face of Aconcagua, return to the Alps to climb the South Face of the Dent du Geant. Good technique shots of alpine climbing and the European method of artificial climbing. Filmed by Helene Dassonville and Rene Vernadet. 20 minutes; $75.00 plus postage both ways for the two films.

mail order instructions

1) Please use the order form provided; another will be returned with your order.
2) State name and address (including zip) legibly; this is your mailing label.
3) Adequately state size, color, etc; enclose foot outline for boots.
4) Enclose full remittance by check or money order in U.S. $.
5) We pay surface postage to destinations within USA; please include appropriate additional for air mail, special handling, special delivery, or foreign postage as indicated on order form.
6) California residents please add 5% sales tax
7) Refunds of more than $1 will be sent by check; less than $1 will be in form of credit memo towards future purchases
8) Items temporarily out of stock will be held on backorder if delivery expected within two weeks; otherwise they will be cancelled. Please state if you wish to be held on backorder for a longer time for a particular item.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Rolling Stones

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