PETZL®

ENGLISH - 2000

www.petzl.com

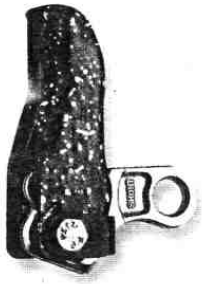
TIBLOC - B01
Small rope clamp/grab for emergencies.
So much genius in such a small device! The Tibloc can be a versatile emergency stand-in for many rope clamps/grabs as well as self-jamming knots.
It can be used to set up a pulley system, climb a rope, or haul a second. Ingenious, effective and reliable, it is the essential little "extra" for all lovers of adventure, whether underground or at altitude!
For use on single ropes from 8 to 11 mm.
39 g - **CE** - **UIAA**

SHUNT - B03
Rope clamp/grab for back-up protection.
A mechanical replacement for self-jamming knots (Prussik, Machard...). Positioned below a descender, the Shunt acts as a back-up belay for an abseil descent. It locks onto the rope as soon as you release it and follows your descent when you press on it.
For use on single rope (10 to 11 mm) or double (8 to 11 mm).
188 g - **CE** - **UIAA**

MICROCENDER - B54
Multipurpose rope clamp/grab. Very compact, it is designed for use in climbing a rope, back-up belaying or tensioning a tyrolean traverse. It slides on the rope if overloaded.
It is installed on the rope using a removable pin and thus completely encloses the rope.
The Microcender is used on single rope from 9 to 13 mm.
162 g - **CE**

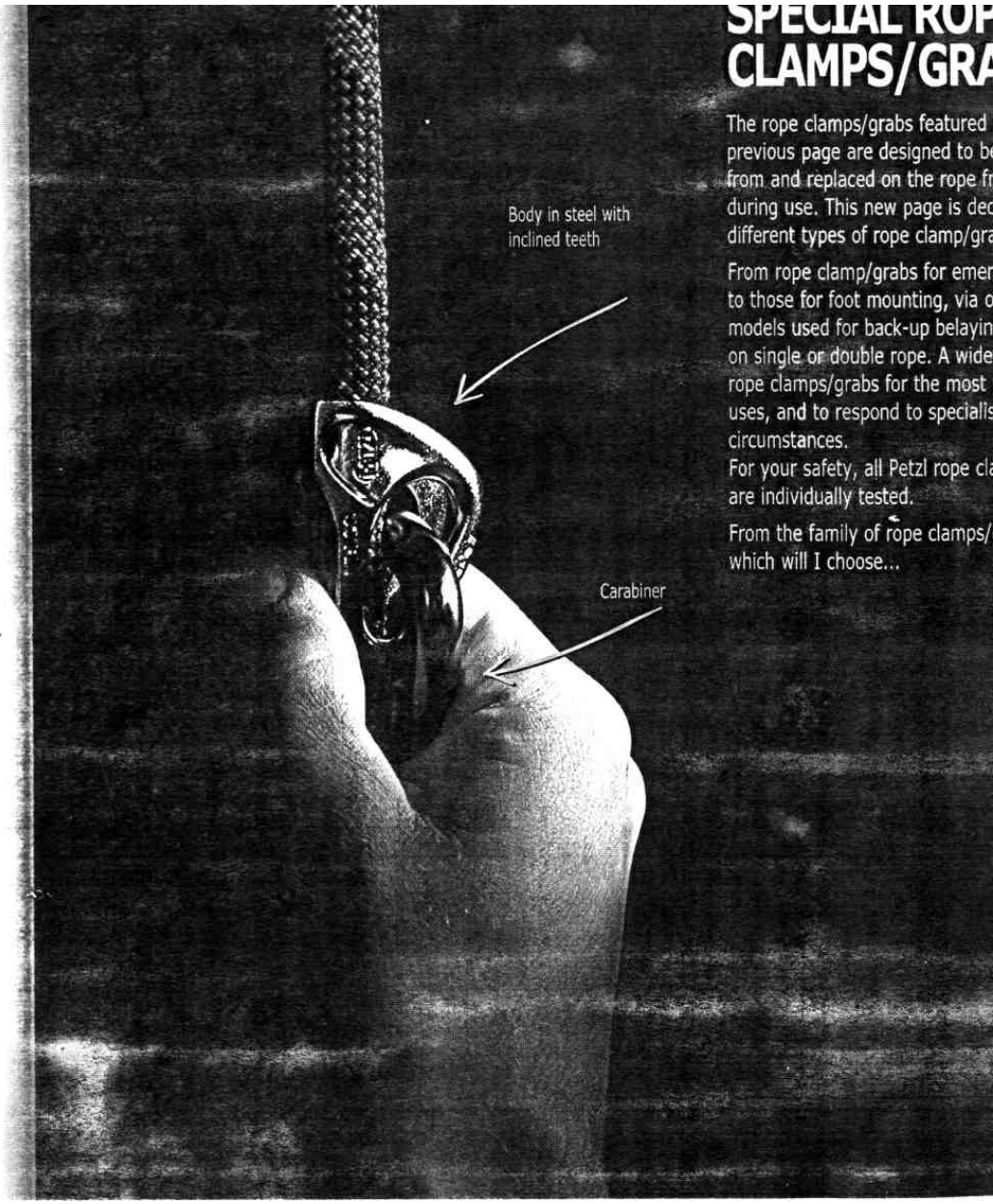
PANTIN - B02
Foot-mounted rope clamp/grab.
A big advantage for long rope ascents. With the Pantin, supporting the foot holds the body in a more upright position and makes the ascent faster and less tiring for the arms. The Pantin is also easily removed from the rope with a simple movement of the foot. The Pantin is used only on the right foot and in complement with the Croll and Ascension rope clamps/grabs: the Pantin is not an item of Personal Protective Equipment (PPE).
For use on single rope from 8 to 13 mm.
122 g


TIBLOC B01


SHUNT B03


MICROCENDER B54


PANTIN B02



SPECIAL ROP CLAMPS/GRA

The rope clamps/grabs featured previous page are designed to b from and replaced on the rope fr during use. This new page is dec different types of rope clamp/gra

From rope clamp/grabs for emer to those for foot mounting, via c models used for back-up belayin on single or double rope. A wide rope clamps/grabs for the most uses, and to respond to specialis circumstances.
For your safety, all Petzl rope cl are individually tested.

From the family of rope clamps/ which will I choose...

MINI TRAXION - P07

A pulley with self-lubricating bushings and a rope clamp/grab "all-in-one".

A new concept in pulleys with anti-return feature. The Mini Traxion can be used for sack-hauling, but it can also be used for hauling of a person. You will appreciate it for setting up hauling systems, for back-up belaying and for moving along a tyrolean traverse, where the cam operates as an anti-return device.

The Mini Traxion: a precious and effective secret weapon!

For use on rope from 8 to 13 mm.

165 g - **CE - UIAA**

MINI TRAXION P07

WALLHAULER - P62

Sack-hauler.

Fitted with ball-bearings, the Wallhauler allows easier hauling of a load up a long pitch.

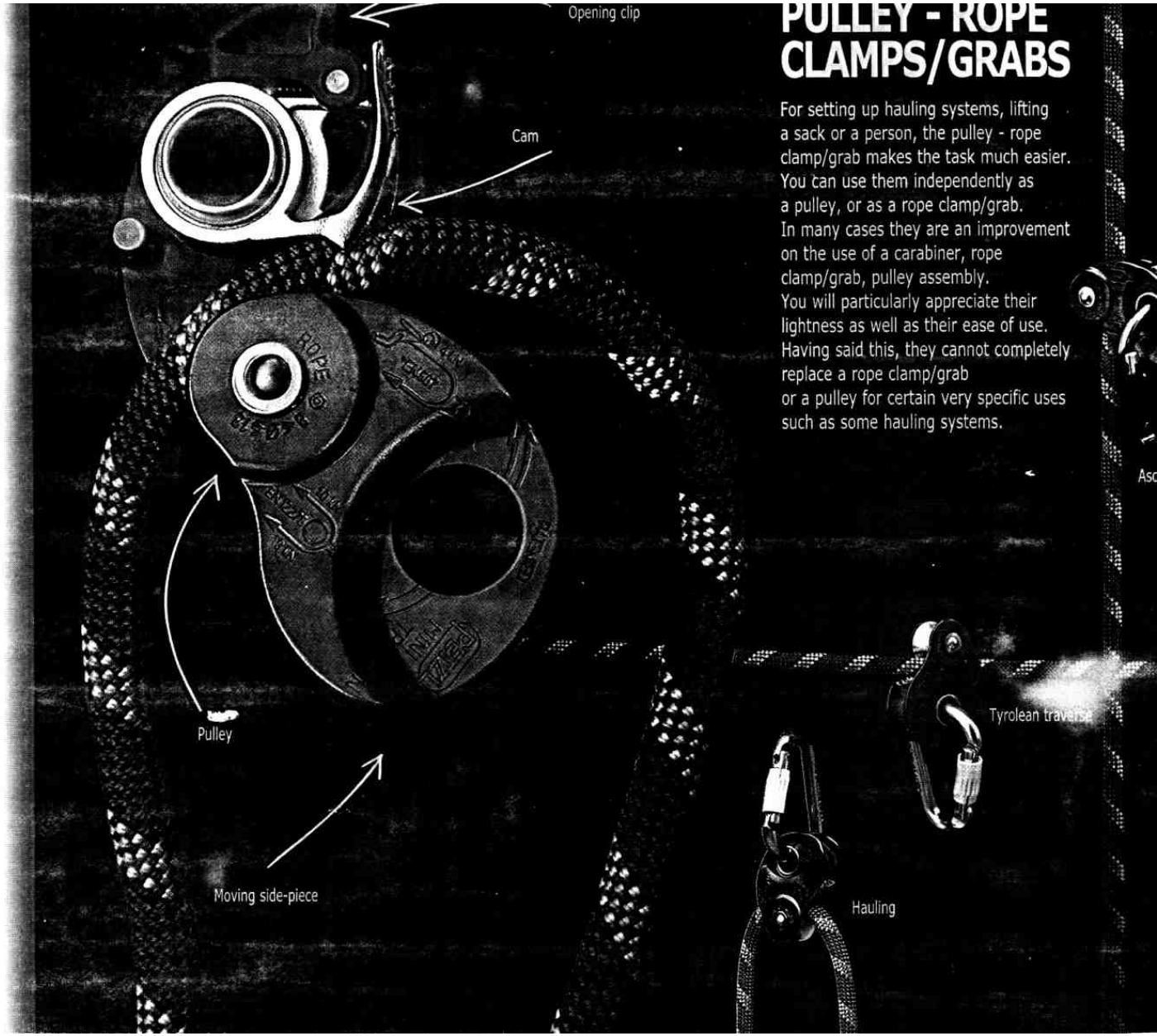
You can also use it as a simple pulley. If you pull out the pin, the cam comes into play and enables the anti-return feature to operate.

Warning, this is not an item of Personal Protective Equipment (PPE) and may not be used for the lifting of persons.

For use on rope from 8 to 13 mm.

240 g

WALLHAULER P62



PULLEY - ROPE CLAMPS/GRABS

For setting up hauling systems, lifting a sack or a person, the pulley - rope clamp/grab makes the task much easier.

You can use them independently as a pulley, or as a rope clamp/grab.

In many cases they are an improvement on the use of a carabiner, rope clamp/grab, pulley assembly.

You will particularly appreciate their lightness as well as their ease of use.

Having said this, they cannot completely replace a rope clamp/grab or a pulley for certain very specific uses such as some hauling systems.

SPIRIT - M15

Carabiner with straight gate.
The Spirit is especially lightweight and used in pairs on all Petzl quickdraws. Made in hot-forged Zicral they are extremely strong.
The straight-gate version of the Spirit is easy to clip on and off any anchor point, thanks to the ergonomic shape and the Keylock system.

49 g - **CE** - **UIAA**

SPIRIT DROIT M15

SPIRIT - M10

Carabiner with curved gate.
The same characteristics as its brother! The curved-gate Spirit is intended particularly for clipping into the rope.

49 g - **CE** - **UIAA**

SPIRIT COURBE M10

EXPRESS - C40

Stitched sling for quickdraws.
The Express has a specially-designed narrowing of the webbing at both ends. This ensures that the carabiner is correctly loaded which is not the case with wider webbing.
Available in three lengths: 11, 17 and 25 cm.

10 - 15 - 20 g - **CE** - **UIAA**

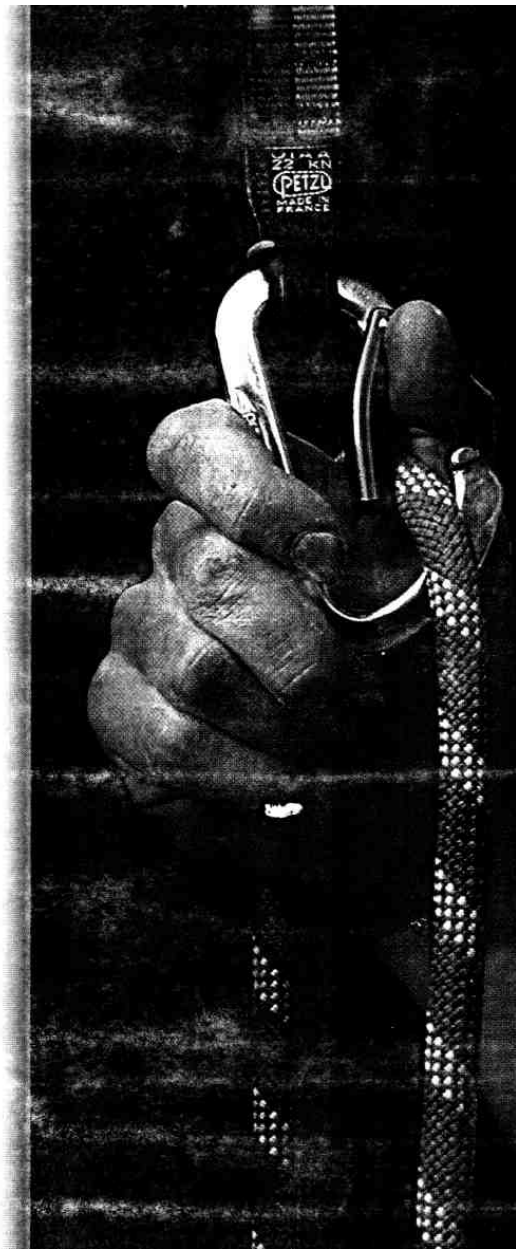
EXPRESS C40

STRING - M90000

Webbing protector.
An essential little extra!
The String keeps the carabiner in its strongest orientation. It also protects the webbing from abrasion.

2 g

STRING M90000



CARABINERS

What do we ask of carabiners, in general ? Lightness and easy handling. However, these two qualities are not synonymous with strength. The carabiner is in fact the weak link in the chain which protects the climber, if the probability of incorrect positioning is taken into account... and it is a good idea, when possible, to always use a back-up.

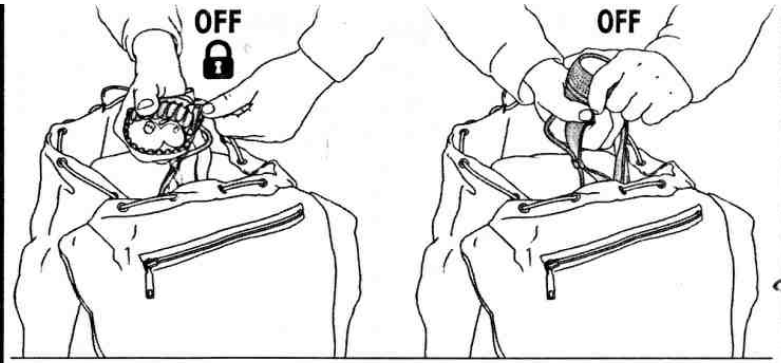
The greatest care must be exercised in the manufacture of carabiners, and the same is true when choosing and looking after them.

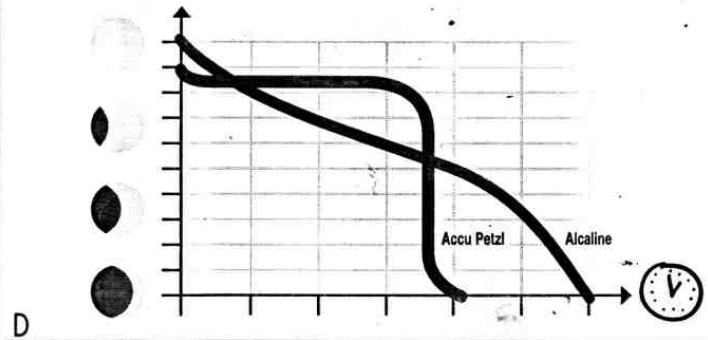
To guarantee their quality, PETZL carabiners undergo an individual test in traction (which leaves the tiny marks which can be seen on the body of the carabiner).

This first page shows carabiners which are non-locking. Hot-forged, extremely strong, with the Keylock system. The cream of the cream in their category!

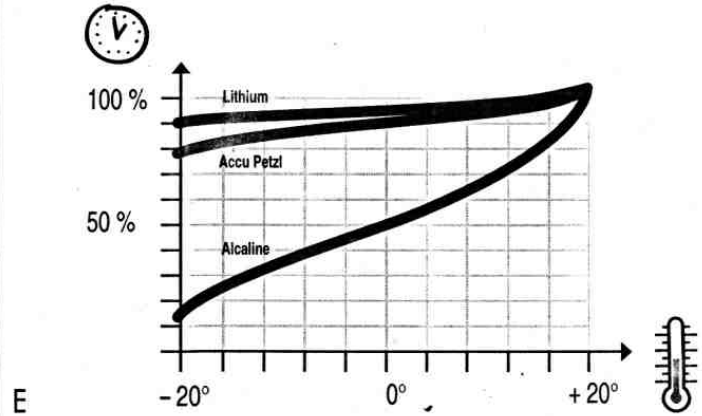
Keylock

C


OFF
OFF


Accu Petzl
Alcaline

D


100 %
50 %
Lithium
Accu Petzl
Alcaline
-20°
0°
+20°

E


HILL-WALKING

Hill-walking is firstly about discovering the beauty of the countryside. Then, from the slow rythm of the walk, comes the feeling of a deep communion with nature and all its elements.
For this, you have to take the time for a long walk : beautiful hill-walks require some endurance.

When you're in the mountains or when you get off the beaten track, the terrain can become difficult : when walking on a scree slope, it's better to choose the big rocks, stay closely grouped or avoid walking directly above others (A); when walking along a grassy ledge, a rope handrail can be reassuring ; if you become lost, reading the guide book becomes important : you must try to anticipate, and especially to look at your surroundings ...

In the late afternoon, a storm is threatening. How should you protect yourself from lightning and from the electrical currents which are induced at the ground surface ? For the lightning itself, everyone knows that you must avoid close proximity to a peak, a large rock or a tree. As for the surface currents, you should sit on your rucksack in a protected zone, such as for example, those which are marked in sky blue on the diagrams (B).

Night has fallen, the terrain is steep, and I must find a hut or a bivouac site. Luckily, I have remembered to bring my head lamp, which is more than useful for finding the way in conditions like these. As for the lamp, I have the choice between ordinary or rechargeable batteries. Rechargeable ones give a constant intensity of light right up to the end (D).
In addition, I know how long they will last, provided that I have taken the trouble to recharge them before leaving.

If it's very cold, it's a good idea to keep the batteries warm under my clothes, as the battery life falls sharply as the temperature drops (C).
Also, it's better to use a rechargeable or lithium battery which performs much better in the cold (E).

Information is non-exhaustive.
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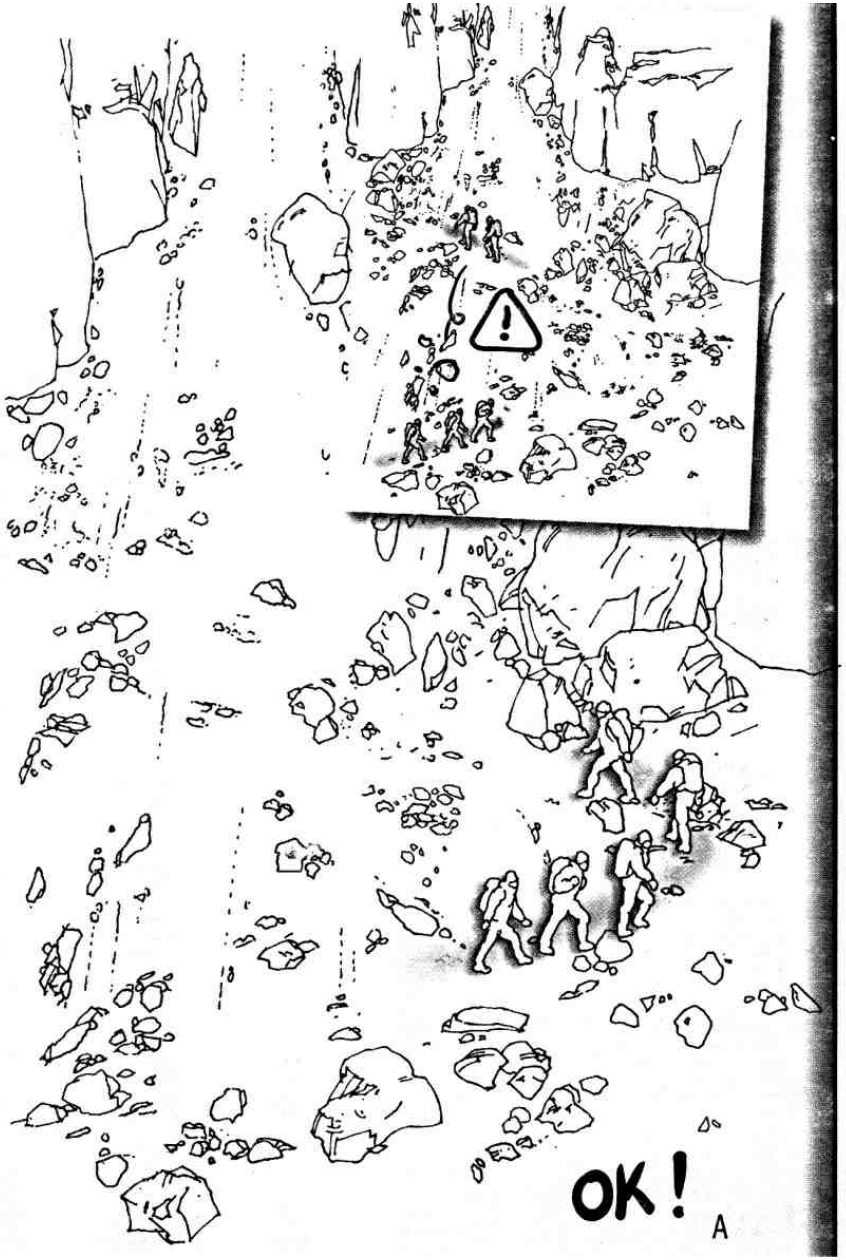
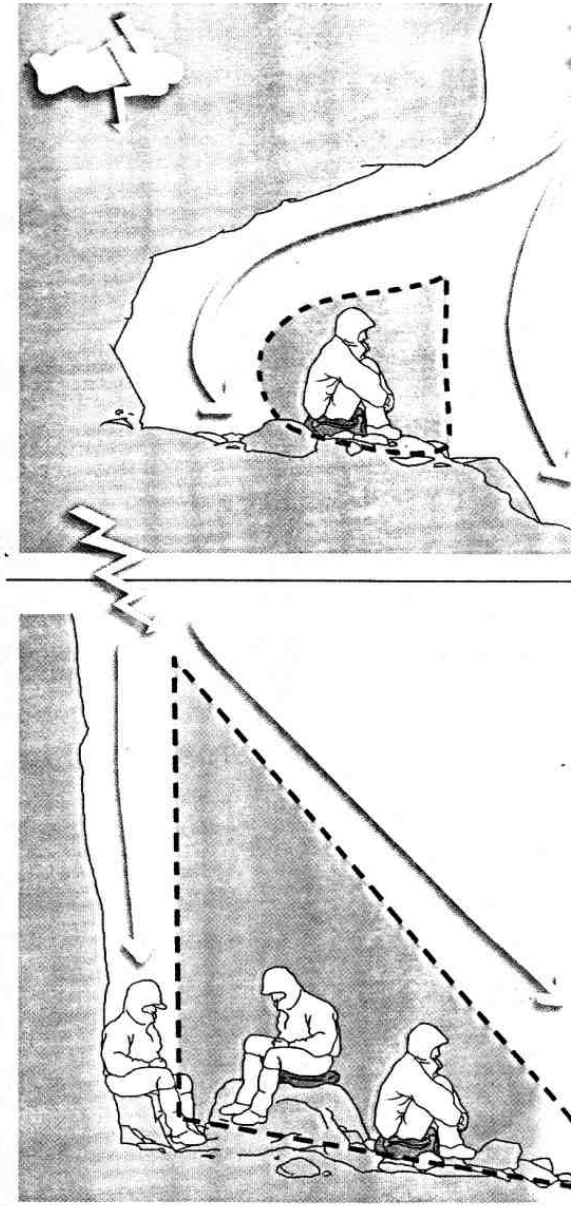


A


B

To each, their own adventure !
A series of engineered pathways joined by ladders and protected by cables, via ferratas allow adventurous hill-walkers to explore the vertiginous world of vertical mountain faces. They give a taste of the feeling of rock-climbing. But beware : like the prepared pistes of a ski resort, via ferratas are routes which have been engineered in an environment which remains uncompromised, the environment of the mountain and of verticality. The apparent simplicity and the fun aspect must not be allowed to obscure the risks. And to undertake this adventure, care is necessary, as well as a certain level of physical fitness and technique.

On a via ferrata, the harness, energy absorber and helmet make up the minimum equipment. Protection is from a carabiner which slides along the cable.
The length of a fall can therefore be large in comparison to the length of the lanyard attached to the cable, so an energy absorber is needed (A). But the golden rule, much more so than in climbing, is to avoid falling at all costs, because the obstacles are numerous (ladder, cable, anchor points of the cable as well as the rock) and the forces generated by the fall can be relatively high.

Some rules to remember:
- In a group, there must always be at least one experienced person.
- Do not go on to a section of cable which is already in use by another person.
- Be careful to always remain connected to the cable (B).
- If you become tired, remember the possibility of self-protection from a ladder rung or anchor point (B).
- On vertical sections, the most experienced person can install a rope on an anchor point for the rest of the team. They can then move up while protected by a Basic rope clamp / grab on the rope (C).

N. B. : different types of energy absorbers exist which are based on very different principles of operation : V-shaped energy absorbers, of which a single arm only must be clipped to the rope (because the other must be free for energy absorption in a fall), or Y-shaped energy absorbers, both arms of which may be clipped to the rope. We strongly urge you to consult the technical instructions of your equipment. Moving roped-up using a belaying technique is of course the safest method. But this must never entail both climbers moving simultaneously with the rope tight between them.

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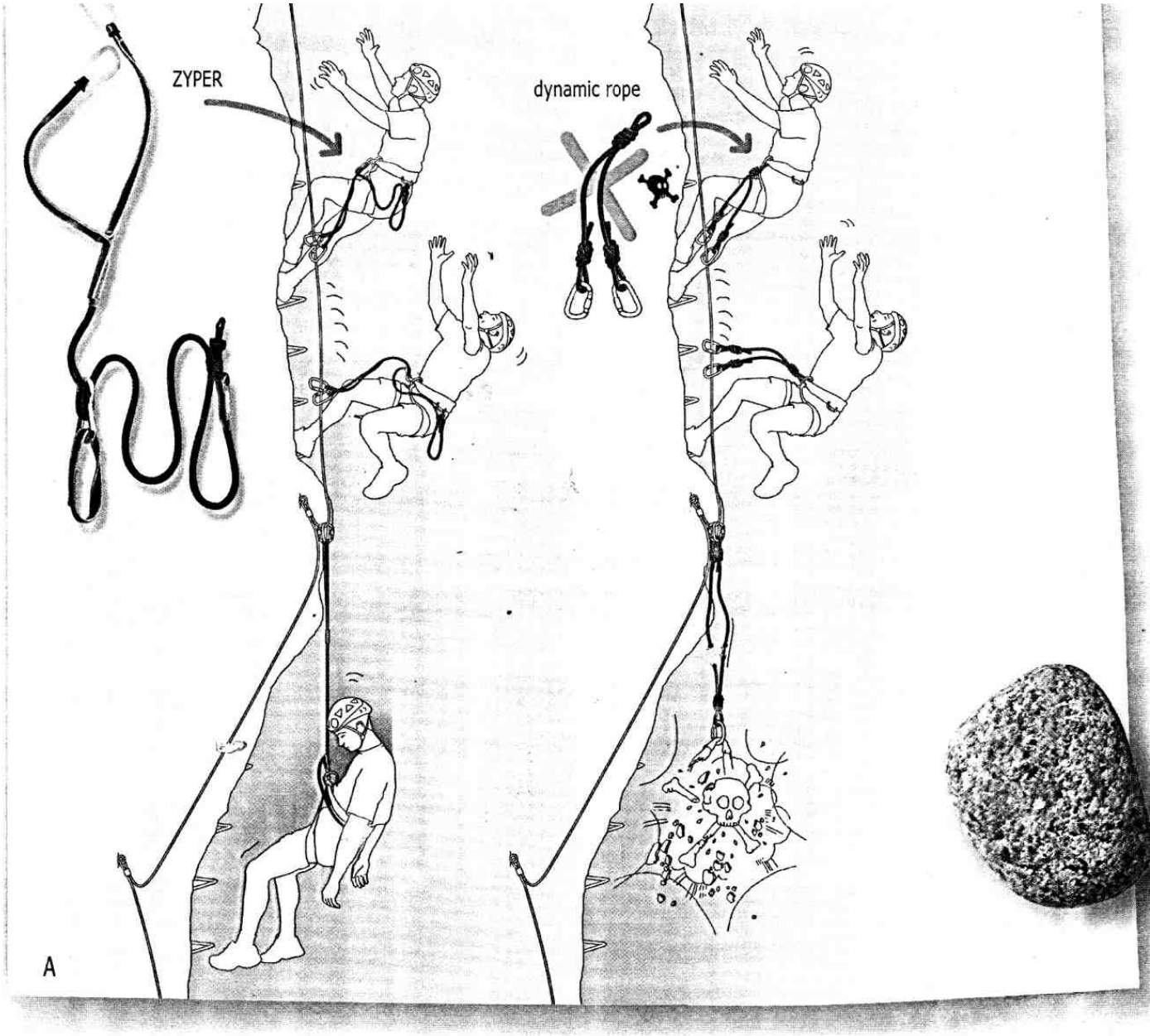
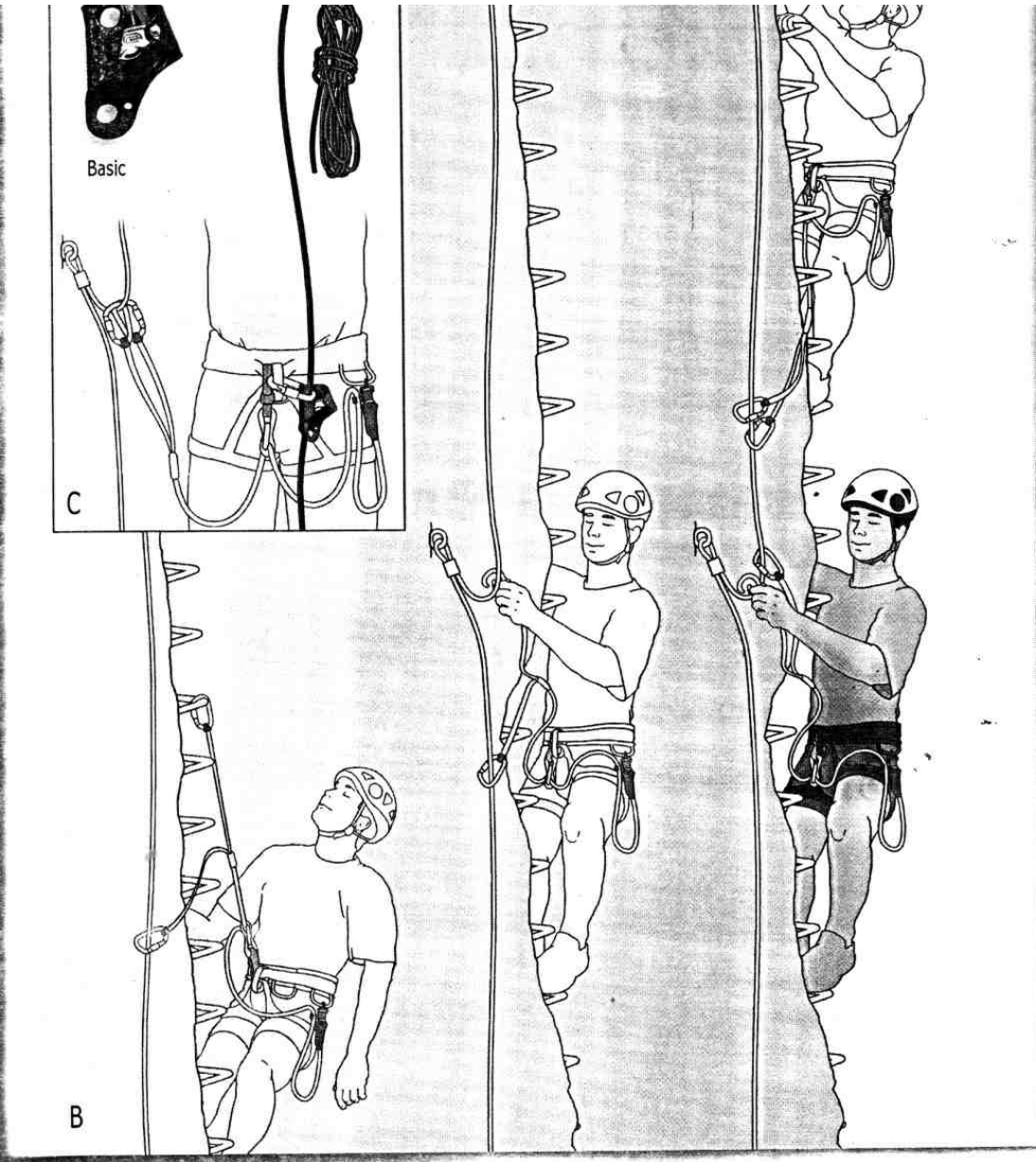
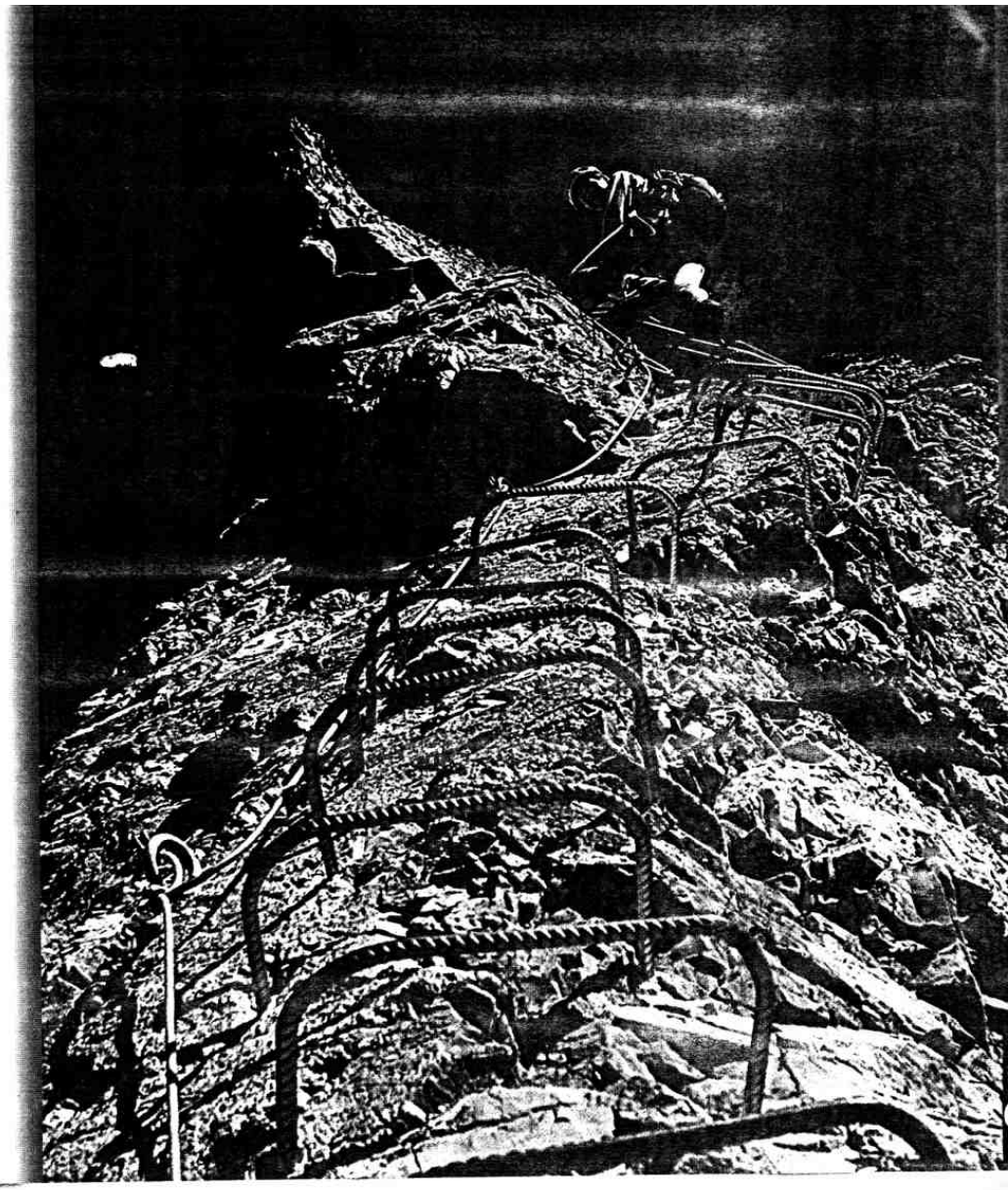
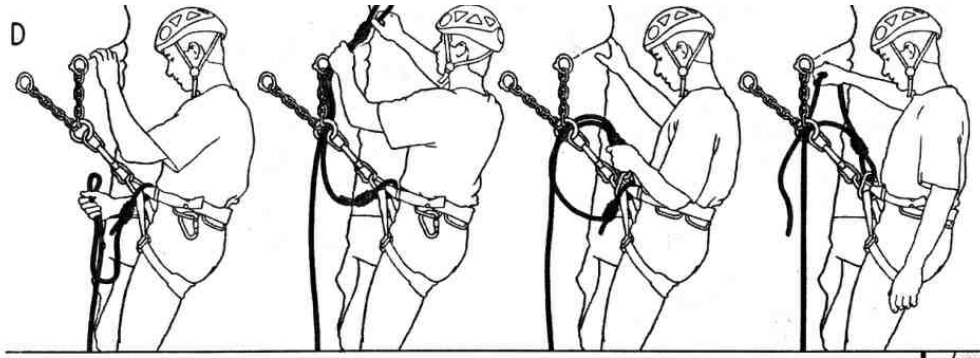
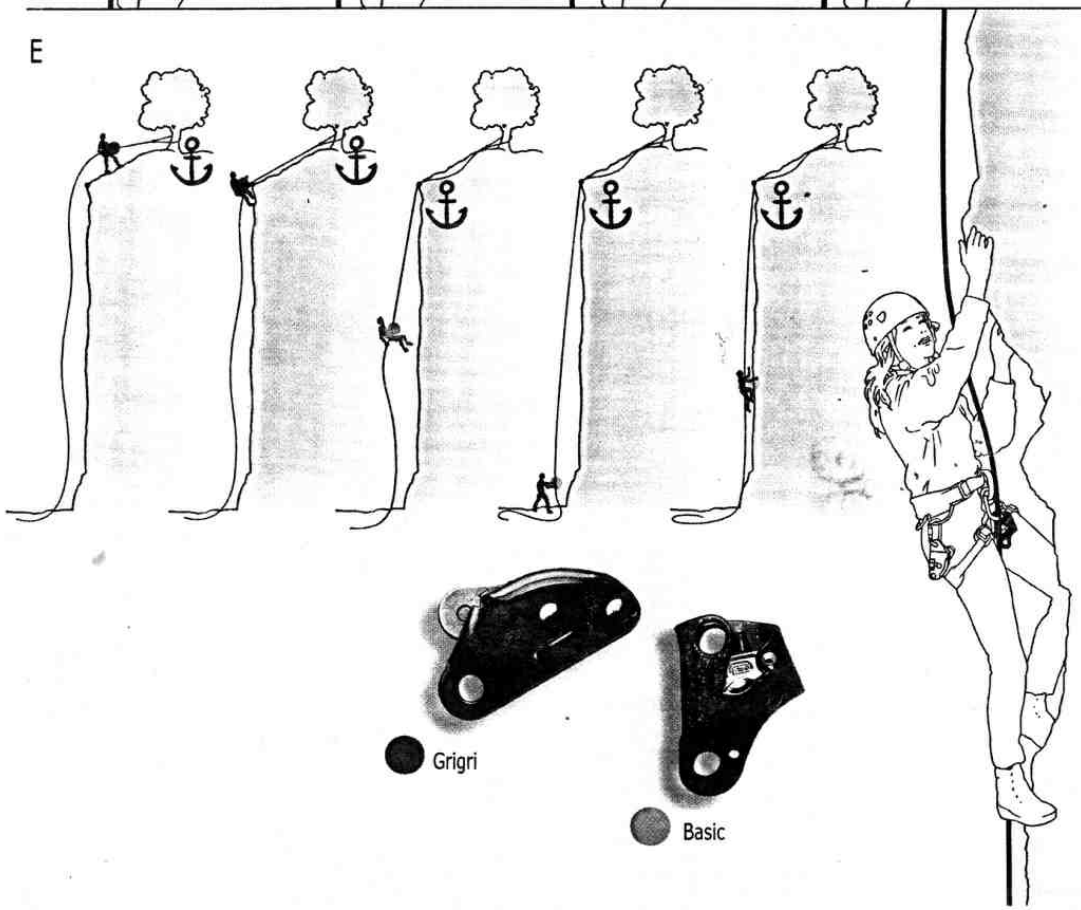



Basic
C
B




D


E
Grigri
Basic

Climbing has many joys to discover : reading the rock, physical exertion, balance and the pleasure of movement, the beauty of the rock and of the situation.

The belayer is on the ground. The climber cannot exceed a fall of factor 1. On the other hand, the danger comes from the possibility of hitting the ground (A) To reduce the risks the belayer must :

1/ Be correctly placed. The best position is close to the rock face. In this way, there is less rope between the belayer and the climber, thus, in the early stages of the climb, less risk of hitting the ground.

2/ have a stable standing position on both legs, and even sometimes be belayed, especially if there is a big difference in weight between the belayer and the climber. This precaution will avoid problems for the belayer if the leader falls (being thrown against the rock).

How can a fall be arrested dynamically ? (B)

A little jump by the belayer at the moment that the rope comes tight makes the leader's fall almost comfortable. Other methods such as letting some rope run or running toward the rock are better in theory than in practice and involve some risk.

Clipping carabiners is a tricky operation which requires care. The basic principles are (C):
- The rope must always run out of the carabiner towards the climber.
- When climbing diagonally, the gate of the carabiner must always be away from the direction taken by the climber.
- The carabiner must not be obstructed, any pressure from the rock reduces its strength.

A very worrying phenomenon can occur between the carabiner and the rope : unclipping. During the fall, the rope makes a "whipping" movement which can result in the rope unclipping from the carabiner (especially if the quickdraw is twisted !).

At the belay, I clip myself in while I set up a lower-off, always using the same well-practiced technique. Before descending, I check things once more.... (D).

Today, I'm climbing on my own. At the top of the crag, I install the rope on a tree set back from the edge.
Then I descend a few metres using my GRIGRI, find the belay, fix the rope there and descend to the ground.
Once there, I swap the GRIGRI for a rope clamp / grab, and I'm ready to climb (E).

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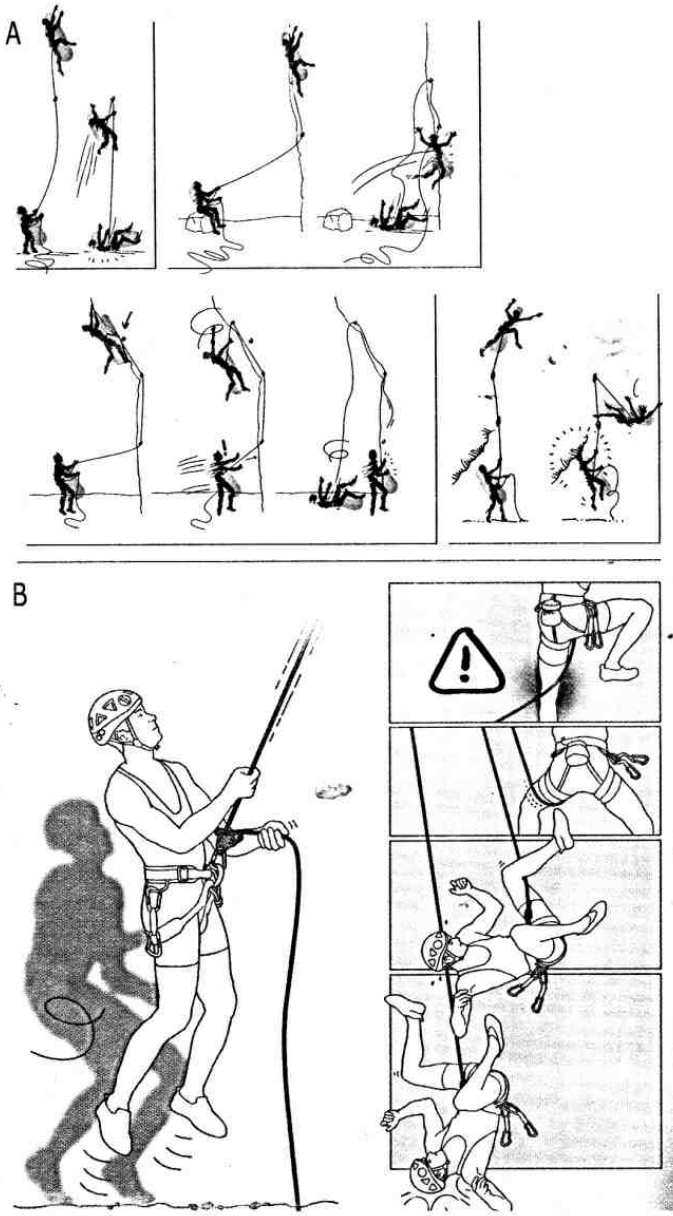

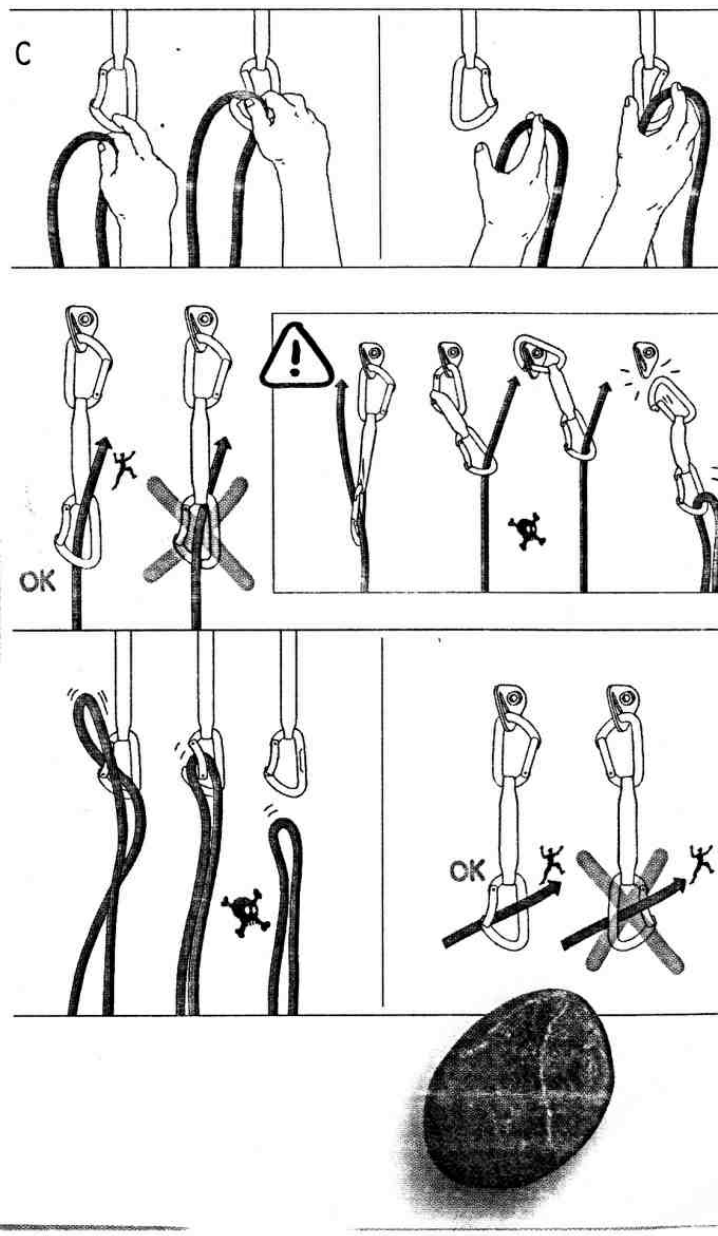

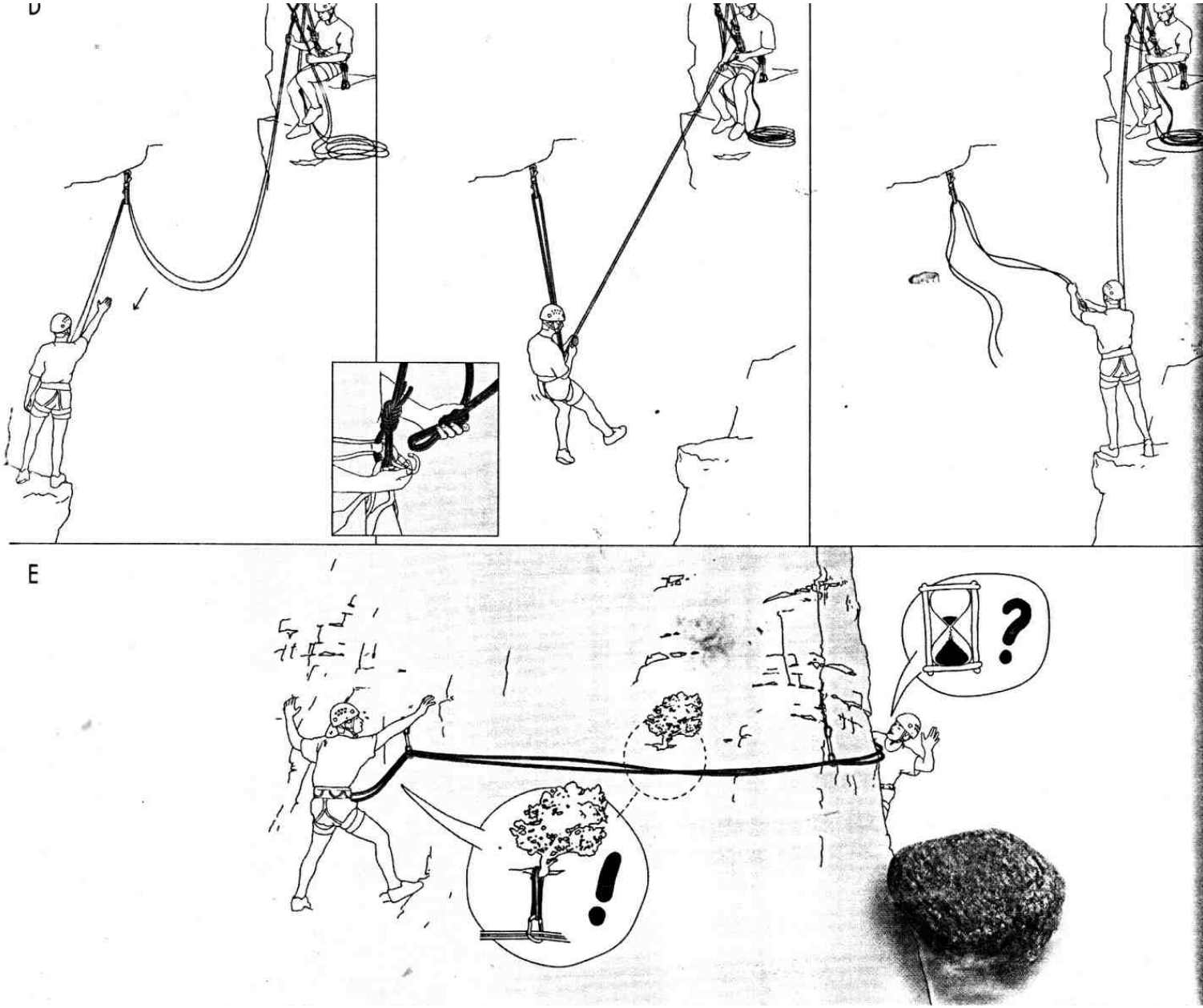
D
E
?
!

When you're more than one rope length from the ground, everything changes. As well as the feeling of exposure which comes from the verticality, there's a thrill of anxiety from the feeling of a much greater commitment. And new problems appear : route finding, planning the pitches, choice of belays, finding traverse lines...
At the same time, endurance becomes an important factor. It's important to conserve energy in the early stages of the climb, if you don't want the later part to become an ordeal.
The changeover manoeuvres at the belay must be simple and precise if you want to be quick and efficient (A).

The belayer is on a belay in the middle of the wall. The leader's fall could exceed factor 1.
It is fundamental to know that the belayer, depending on the device he or she is using, could have difficulty in stopping the fall : the force could exceed 3 kN, the rope would slip in the hand, risking not only a burn but the possibility of letting go.

It could even be worse :
I leave the belay without having placed a runner and then, 3 metres above the belay, I slip and fall (B). The friction of the rope burns the belayer's hands and he doesn't manage to stop the fall before the ledge which is several metres lower down...

When I'm the lead climber, I think of my partner and try to make the climb safe for both of us, especially on a big traverse ! (E)

Sometimes, a pendulum manoeuvre is needed. When the second arrives at the anchor point of the pendulum, he changes the way he is tied in so he has some slack rope to carry out the swing (D).

Why use a double rope ? (C)
- The risk of cutting through the rope on a sharp edge is reduced.
- The two halves of the rope allow longer abseils.
Once at the top, don't let the euphoria and the fatigue make you forget about the descent, whether this is done on foot, by downclimbing, or by abseiling. You must remember the basic rules, especially when abseiling : back-up protection for the descent, knot at the end of each half-rope, separation of the two halves of the rope, good placement of each half of the the rope when leaving the anchor-point.

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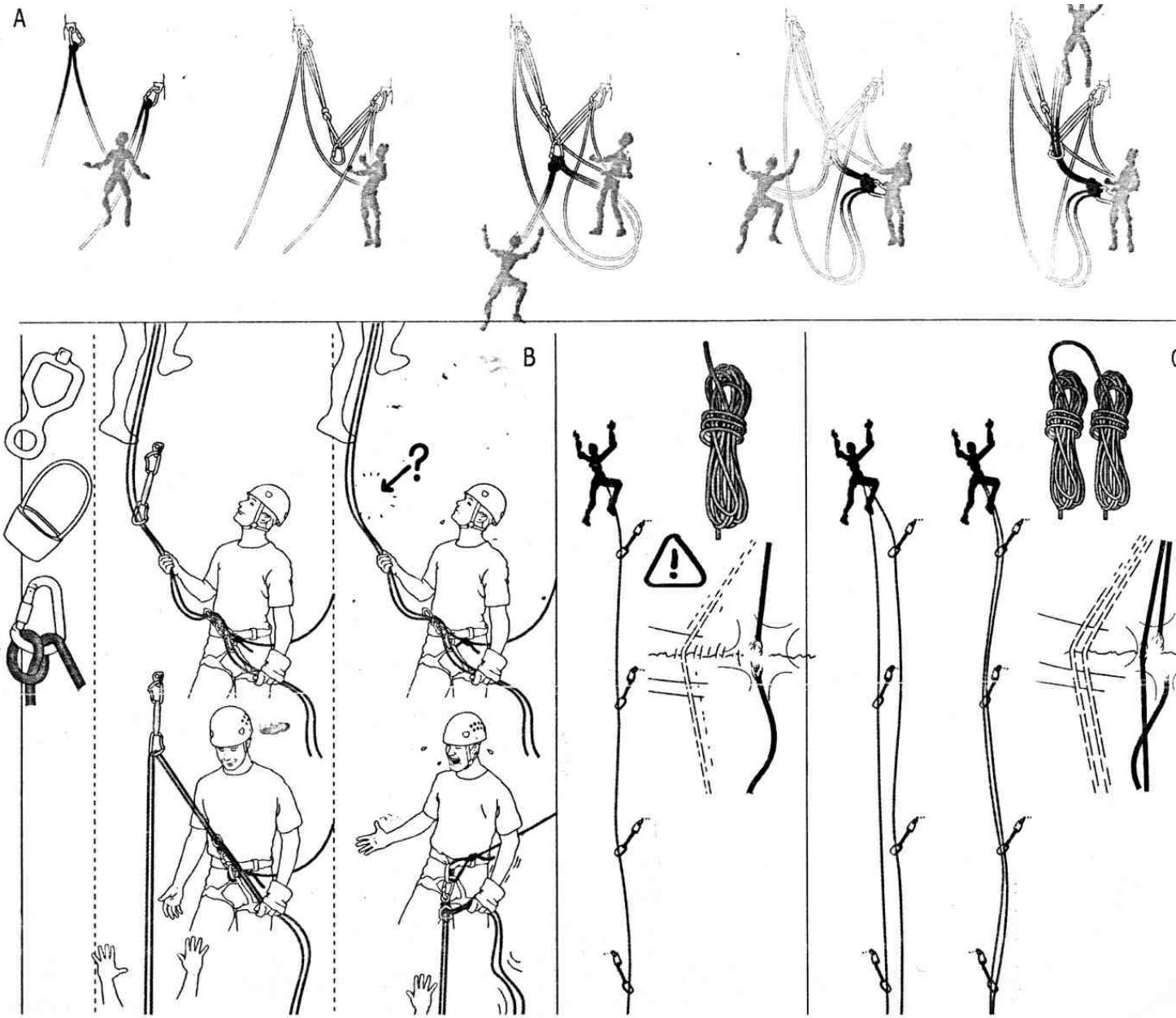

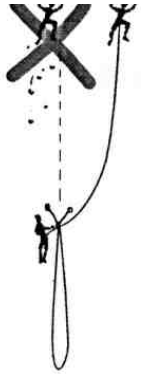

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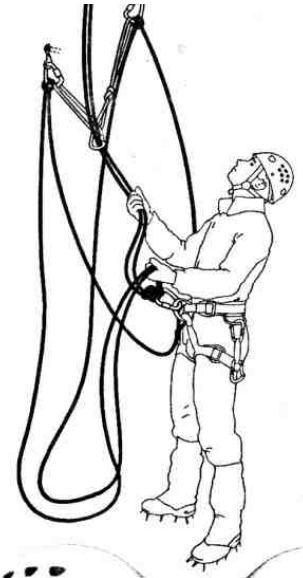
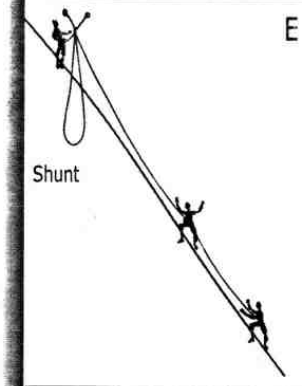
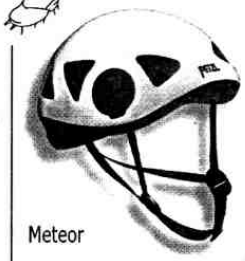




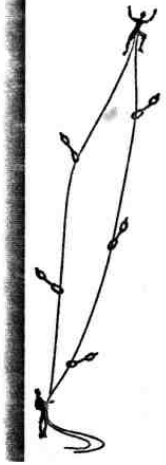
E

Shunt

Ecrin



Meteor



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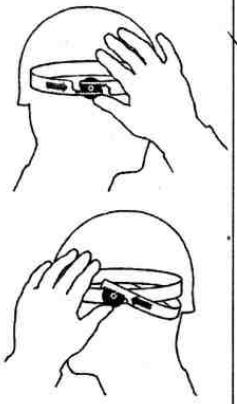

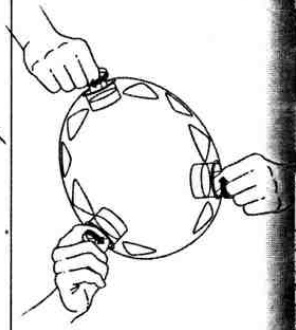

On winter waterfalls a new element appears, ice, with all its infinite nuances of blue, and myriad shapes : drainage lines in big couloirs, the narrow perspective of gullies, cascades of columns and slender icicles, sculpted curtains and baroque mushrooms. Amongst the crystal heights, the feel of the ice-axe in different types of ice is quickly learned : sorbet ice, full of water, bottle-hard translucent ice, bubbly ice, fragile and unreliable.
And on the ephemeral walls built by freezing, the exposure takes on another dimension, as if it too was ephemeral and dependent on the cold. Climbing becomes completely ecological : freezing nights to come will remove all trace of the passage of climbers.

The relative fragility and sometimes the thinness of the ice require a committed and technical style of climbing.

To set up a belay on an ice slope, some rules must be observed :
- The belay must be off to one side of the direction in which the lead climber is moving (D).
- The angle between the anchor points must be acute (B).
- The belay must allow for dynamic belaying ...

On ice, I always try to arrange the running belays to avoid rope drag. To do this, I clip the ropes alternately (F).

If the ice is of poor quality, I use an energy absorbing quickdraw, or I place two ice screws joined by a sling (A). In this case, I clip in the rope using a screwgate carabiner to be sure that the carabiner won't open if one of the screws fails during a fall : an open carabiner has only one third of the strength.*

To set up a reliable anchor point for abseiling, an effective technique is to make connecting holes in the ice using an ice screw, and to thread them with a piece of rope (C).
Be careful of the angle between the two holes. It could be a good idea to make two threads !

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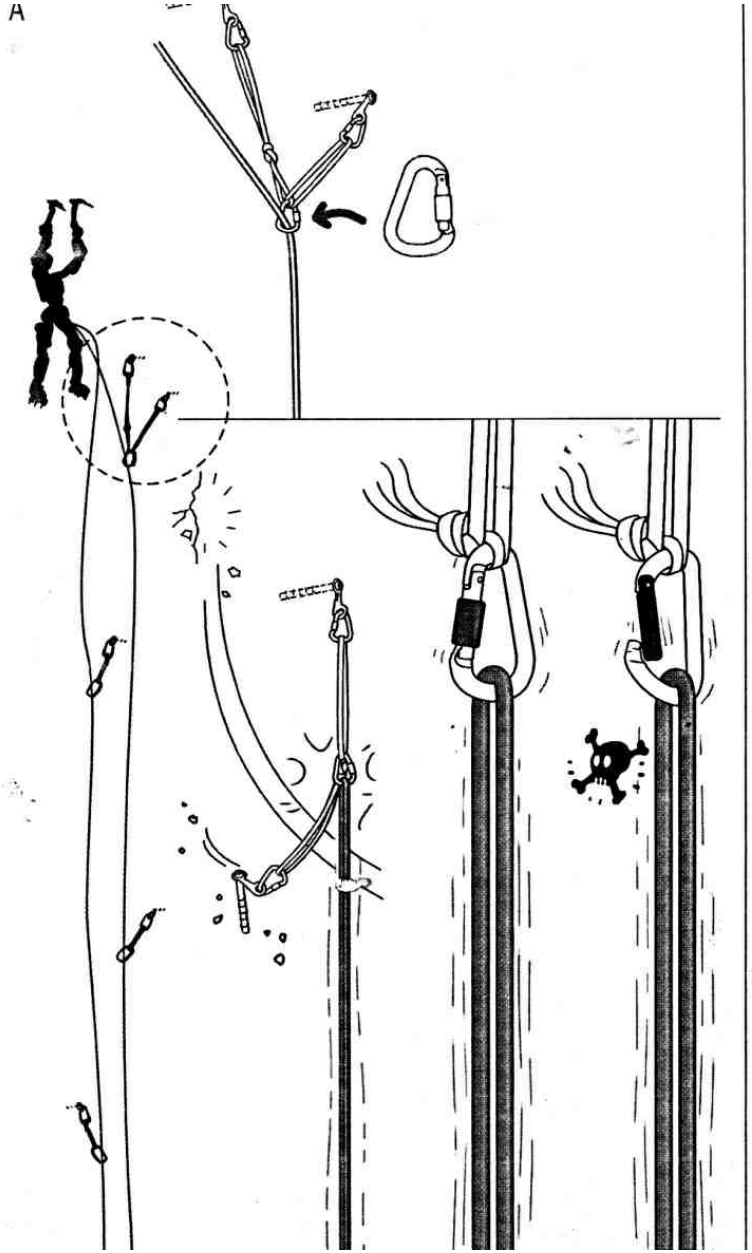
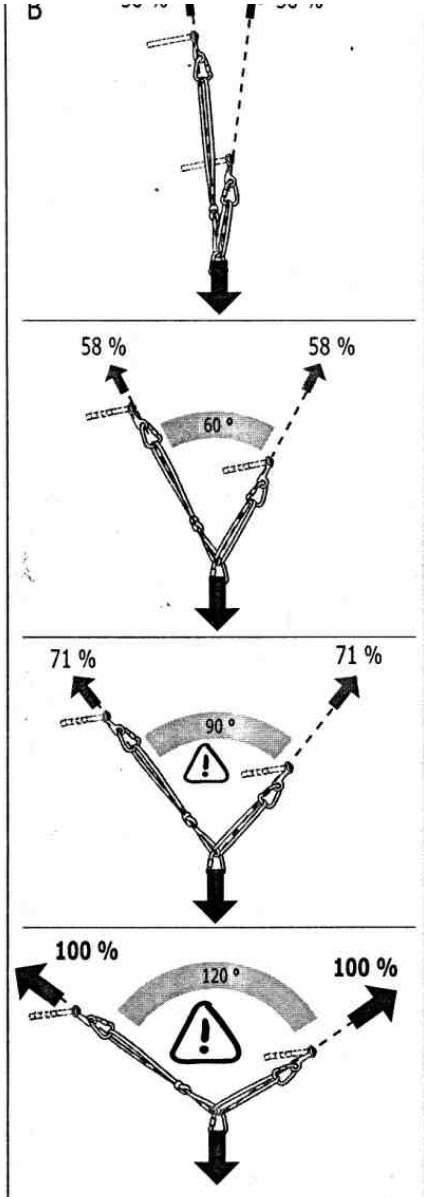
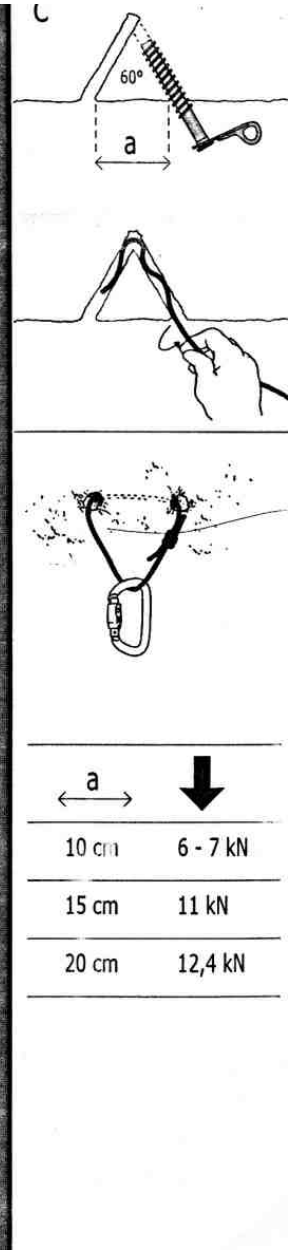
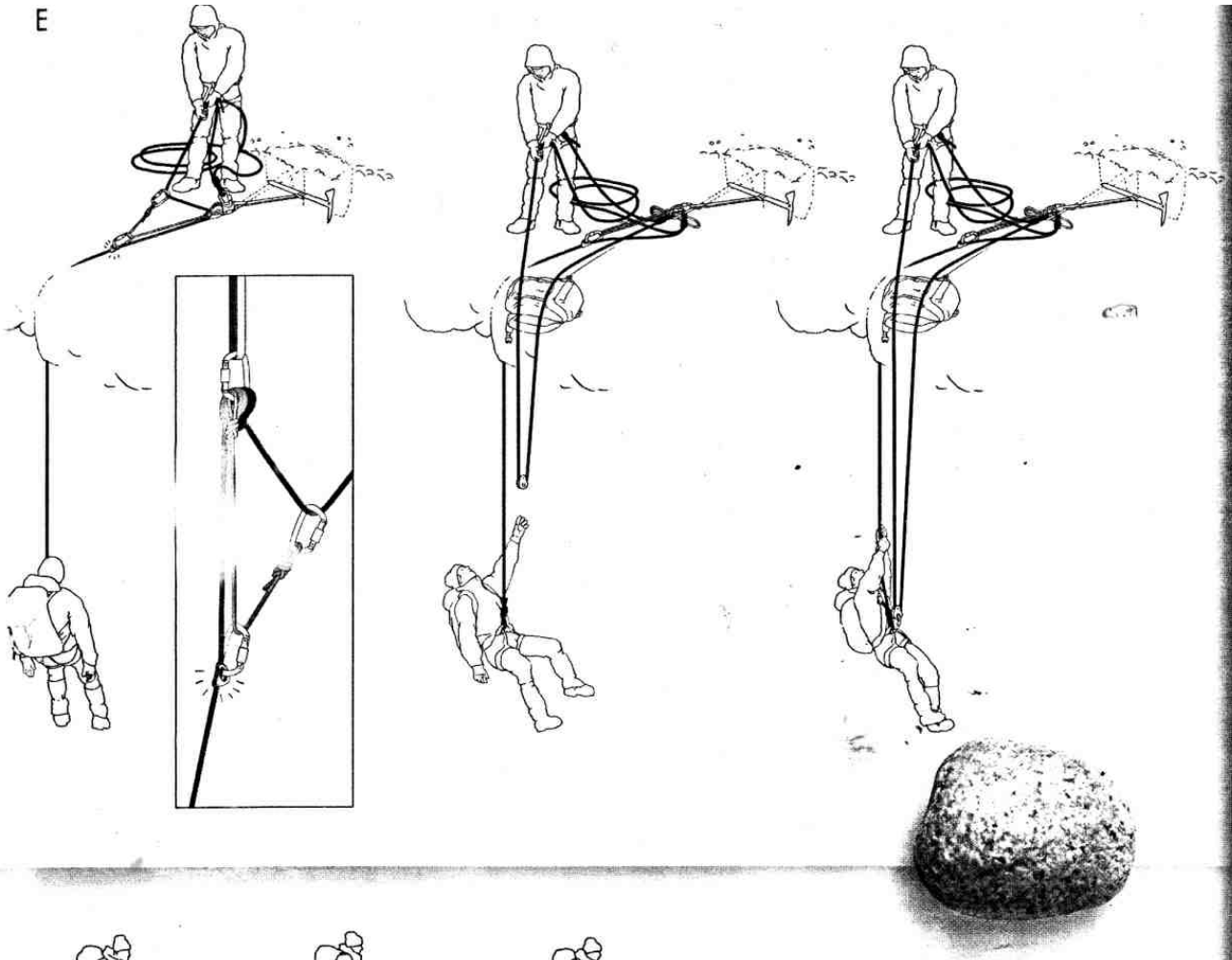


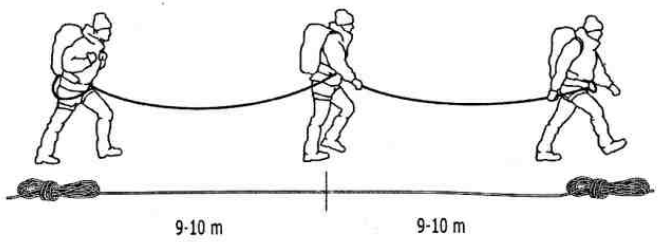


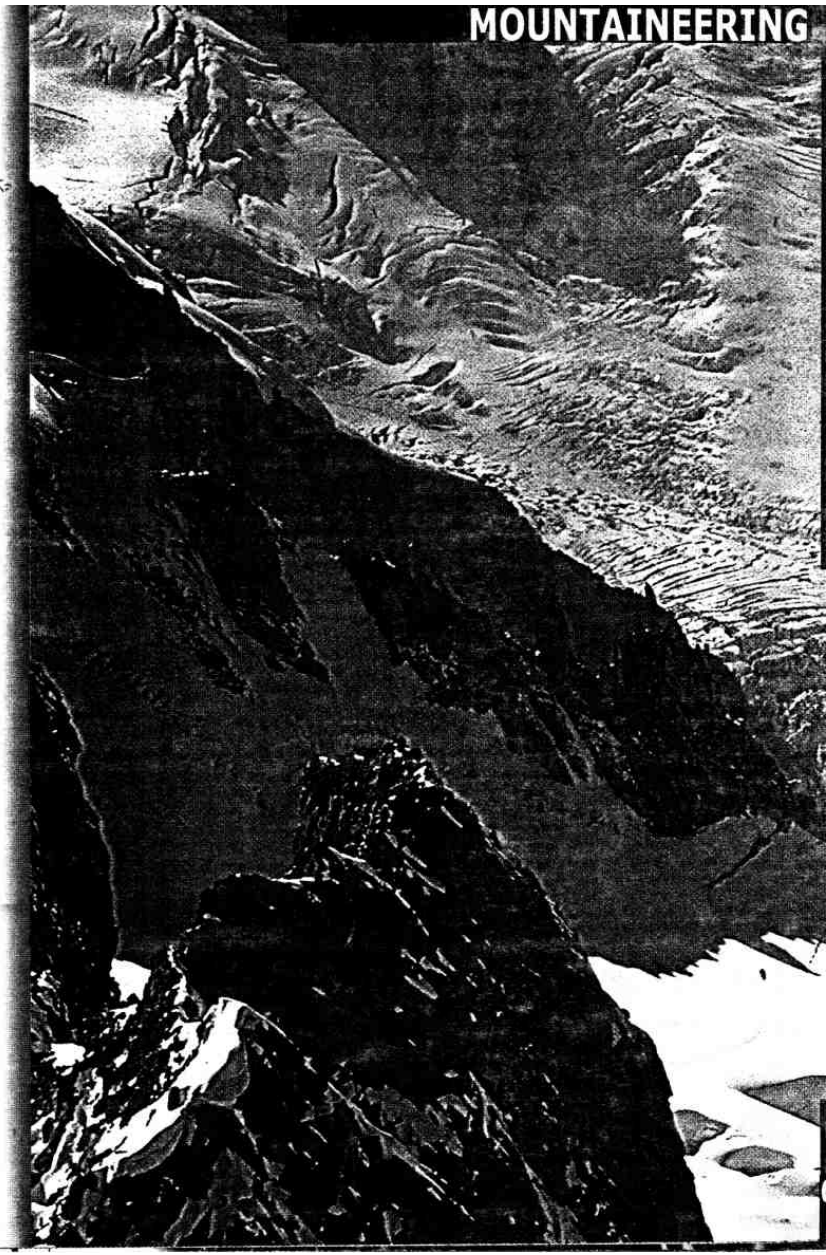


a ⟷	↓
10 cm	6 - 7 kN
15 cm	11 kN
20 cm	12,4 kN

E







Whether the route is on rock, ice or mixed ground, mountaineering is first of all about climbing a peak, and ascending into the wild areas of the mountains. The altitude and the frequent complexity of the summits require a commitment and capacity for endurance worthy of the high mountains. As the route is usually less well marked, the alpine climber must develop a feel for the terrain which will allow him or her to find the weaknesses of the face and join them to find the best route of ascent.

In mountaineering, self-reliance counts above all else. And safety is firstly an individual thing : the holds must be tested, anchor points must be checked whether you place them or they are found already in place, and if in any doubt, must be backed up.

Safety also depends heavily on the equipment. But speed is a factor in safety as well. As this depends on light weight, equipment must be found which is a good compromise.

- On a glacier, the risks are many : collapsing seracs, falls into crevasses, sliding falls. Experience allows many of the traps to be anticipated and avoided. Falling seracs can occur at any time and the danger can only be avoided by not passing under the serac.

A fall of a climber into a crevasse can be stopped as long as the team is roped up, and as long as sufficient space is allowed between one climber and another (C). A useful tip is to tie knots in the rope. As the rope cuts into the lip of the crevasse, the knots slow down the running of the rope. Once the fall is stopped, you need to tie off the rope and release the tension (D). But the system used to tie off the rope must be releasable, so that the fallen climber can be lowered if he or she is injured, and if it is possible to lower him or her to a snow bridge.

When rescuing a climber from a crevasse, there are two possibilities (E):

1/ The climber is uninjured : this is the simplest case. He or she will either be able to climb out unaided, or to assist the person who held the fall. In the second case, the pulley - rope clamp / grab is lowered to the fallen climber, so that only half the weight has to be lifted. Also, he or she can help by pulling on the rope.

2/ The climber is injured : the situation is more complex. In this case, the victim must be pulled out using a hauling system. Different techniques exist. The "Mariner" system with an extra cord sling allows 1/6 of the weight of the climber to be lifted.

In spite of everything, it sometimes becomes very difficult to lift the victim because of friction.

- On mixed ground or rock routes, the biggest danger is of a fall, which is rarely into free space. Blocks, ledges and sharp edges lie in wait for the climber... and the rope. To this subjective danger can be added the objective danger of rockfall. For these reasons, the use of double rope is preferable to that of single rope.

In addition, progress is often complicated by the need to find reliable anchor points, or to find a better route (in general, rock is safer, snow and ice are faster). Beware of anchor points which come out during climbing because of zigzagging (A)!
If jammed blocks are used for progress or for protection, don't forget the possibility that they might move (B).

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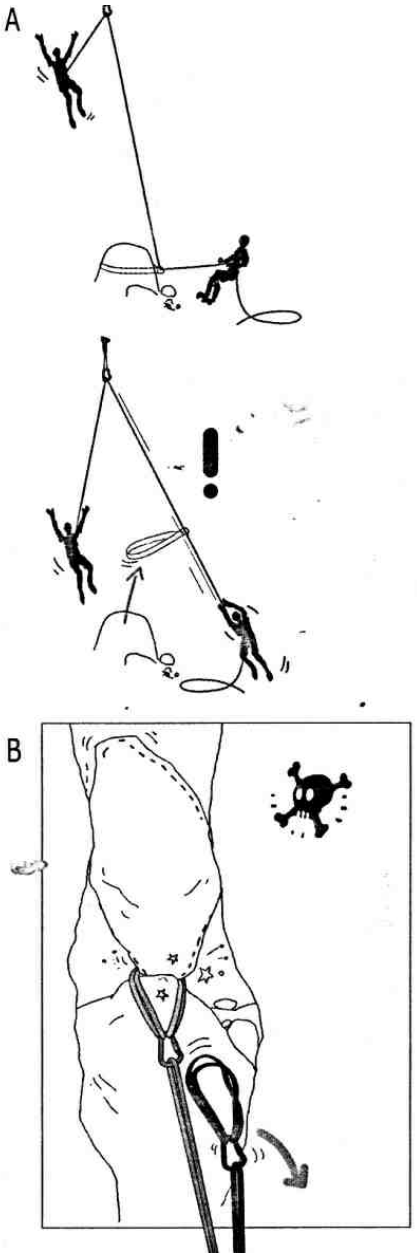
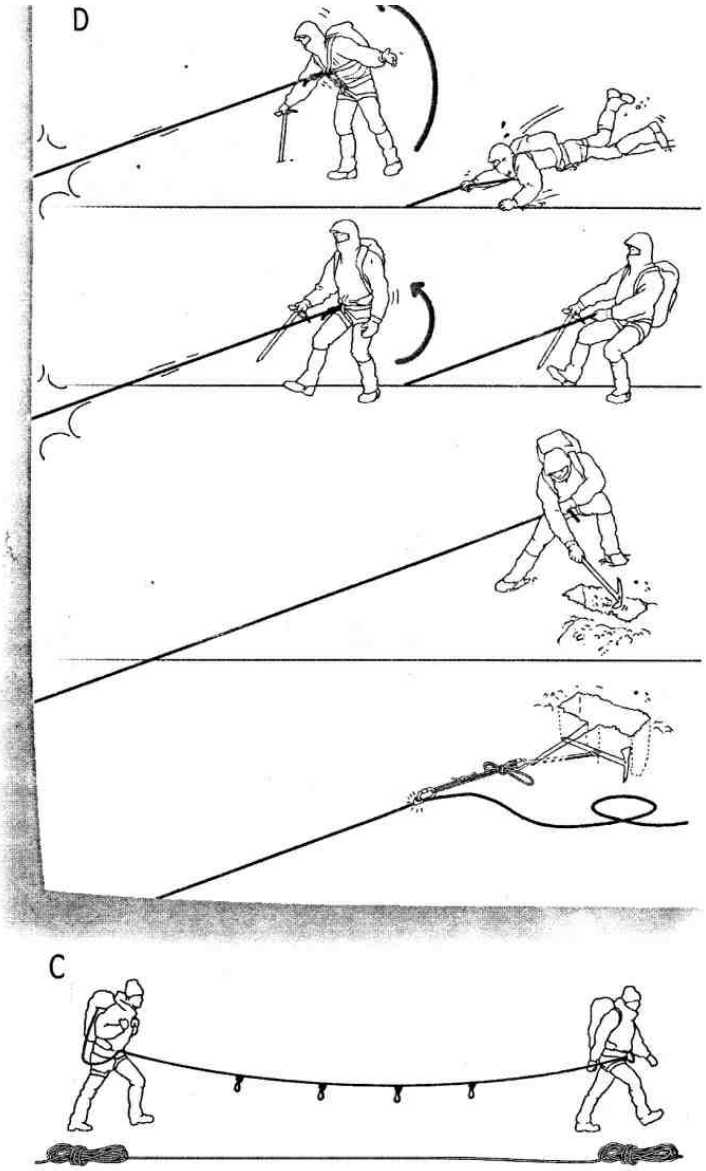
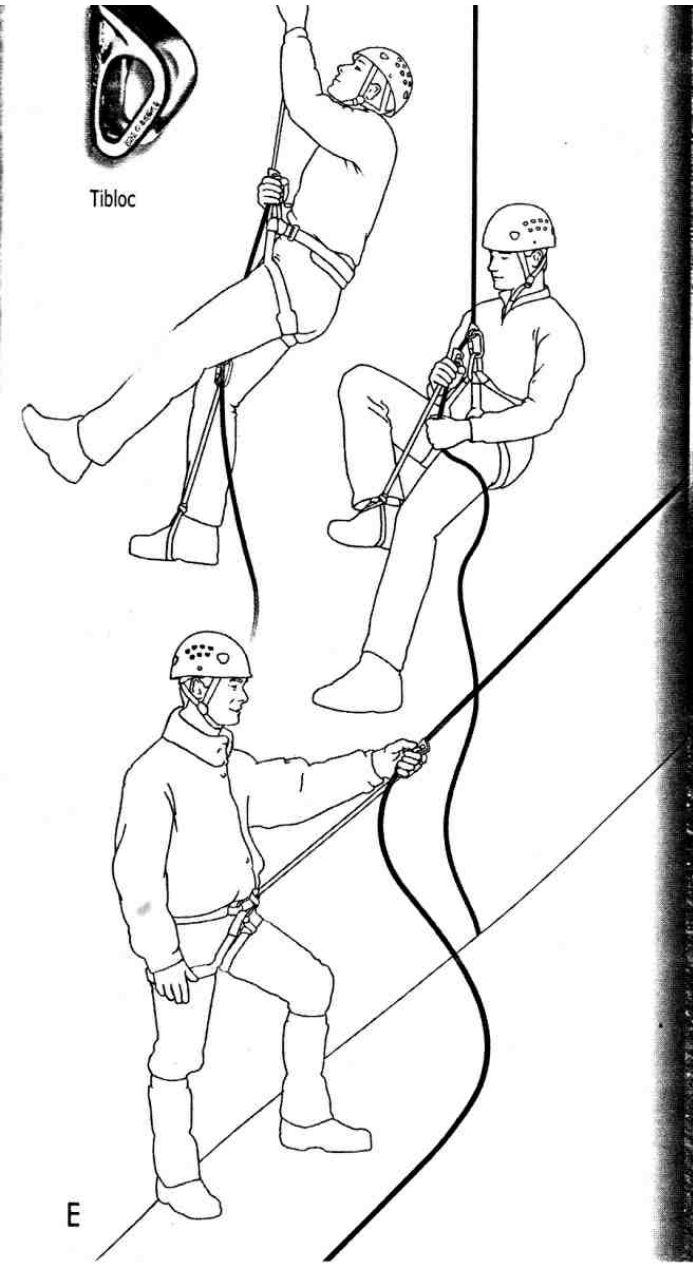






Tibloc

E

EXTREME SKIING

Steep slope, big atmosphere... extreme skiing is an activity where commitment can be at a maximum. Anticipating the descent route takes on particular importance.
This discipline is in fact subject to all the dangers of the high mountains : rock bands, falling ice or stones, avalanches. Amongst its participants are many who won't hesitate to use a helmet, a harness and a descender with a length of rope,... not forgetting a spade, avalanche cord and transponder.

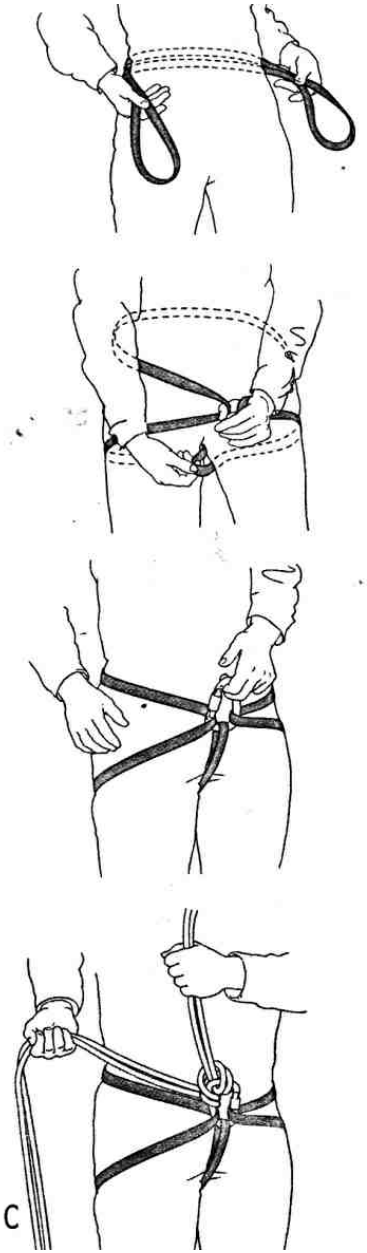
A hesitation, a bad route choice and here we are in rotten snow above a rock band. I set up a rope handline and we gain a slope which seems easier (A). We ski down a few metres, then we come to an ice slope, too high to jump. I set up an abseil. **We haven't all got harnesses, we're going to have to improvise.**
We can use the Dülfer method, remembering that if the ground becomes overhanging, this method, while remaining possible, becomes more critical (B).
For the less confident, I rig up a makeshift harness and lower them using an Italian hitch (C). At the foot of the tricky section, the tension eases a little ! Skiing is once again the order of the day.

When the bad weather closes in on these areas, it's not unusual to hear of extreme skiers becoming lost in the middle of nowhere ! While waiting for the weather to clear, the correct action is to protect yourself from the cold : choose an area which is sheltered from the wind and dig a snow cave, or use your equipment to make an igloo if you are caught in the dark (D).

One last piece of advice, don't forget your Tibloc !
It will help you out if, for example, you have to climb back up a rope (E).


A


B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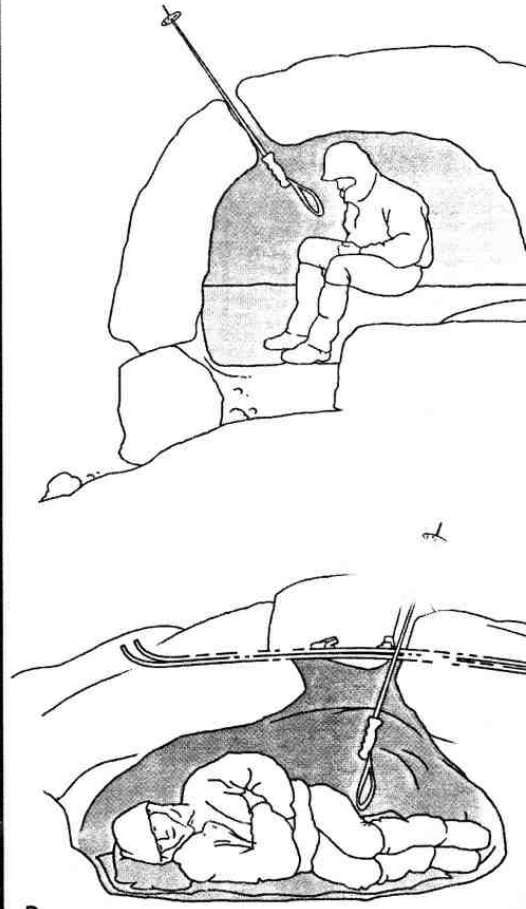
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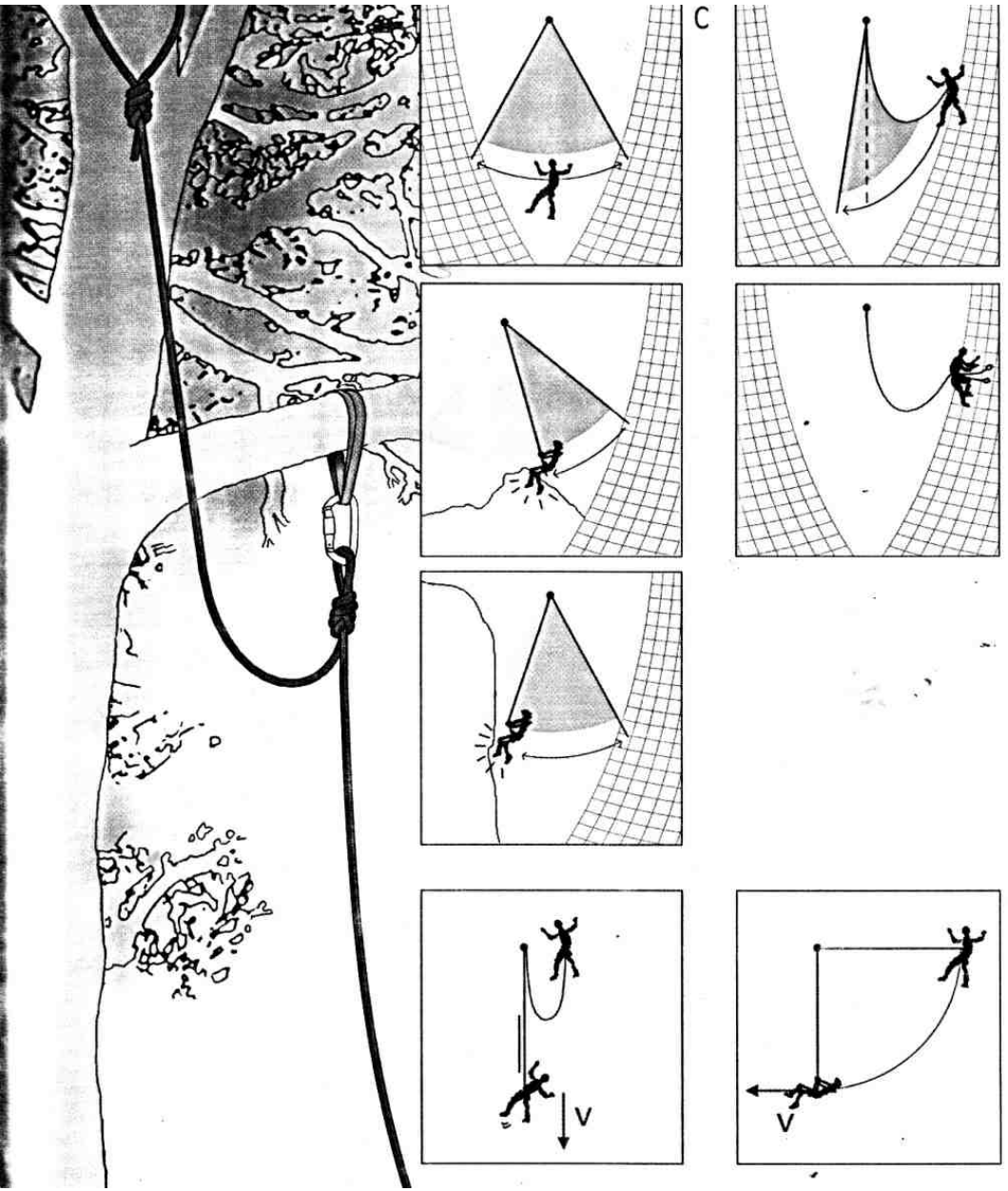
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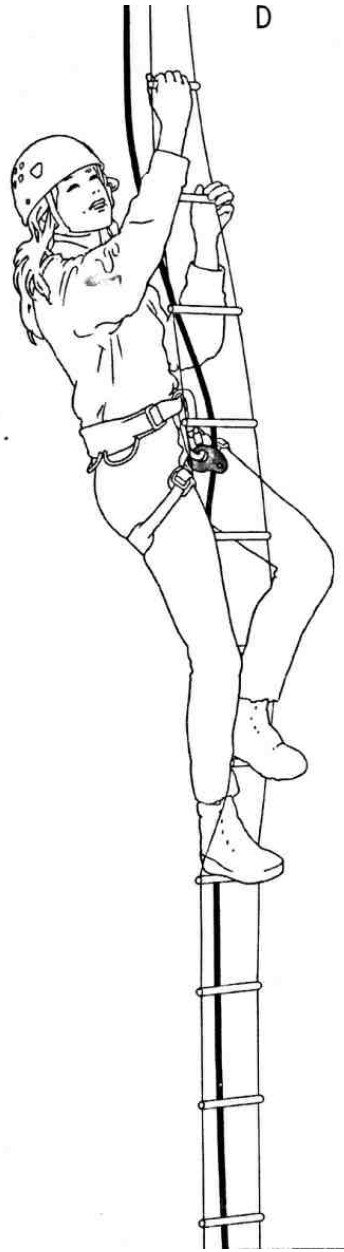
D


FUN

Fun

Climbing and the feeling of being above a drop can become a pure game in which we relive all the dreams of the child we once were, the child to whom everything seemed immense and who climbed trees to get lost in the green world amongst the branches. Adventure parks let us imagine ourselves as both the hero of an adventure film and Tarzan in the middle of the jungle.

Sliding, crossing a tyrolean traverse, swinging, playing on a rope bridge: the pleasure of the game must not make us forget that a minimum of care, of physical fitness and of technical knowledge are necessary...

On a bridge, balance is precarious and it's easy to become dizzy. I must not forget to protect myself (B).

On a tyrolean traverse, I always use two ropes and I test the installation before I throw myself onto it head-first (A). In certain cases, a braking system may be necessary.

When swinging on a rope (C), be careful ! The fall is converted to a pendulum motion, so the horizontal speed is equal to the vertical speed of the fall. Suffice it to say that it's important that no trees get in the way ! After the swing, I climb up the rope ladder. The rope which was used for the swing gets more and more slack. Look out for the impact force if you fall !
So I use a self-belay while I climb. And if finally I choose the caving ladder, which allows me to easily climb to the top of the tree, I have to remember to use a safety system in case I fall.
A Mini Traxion and a rope will do nicely (D).

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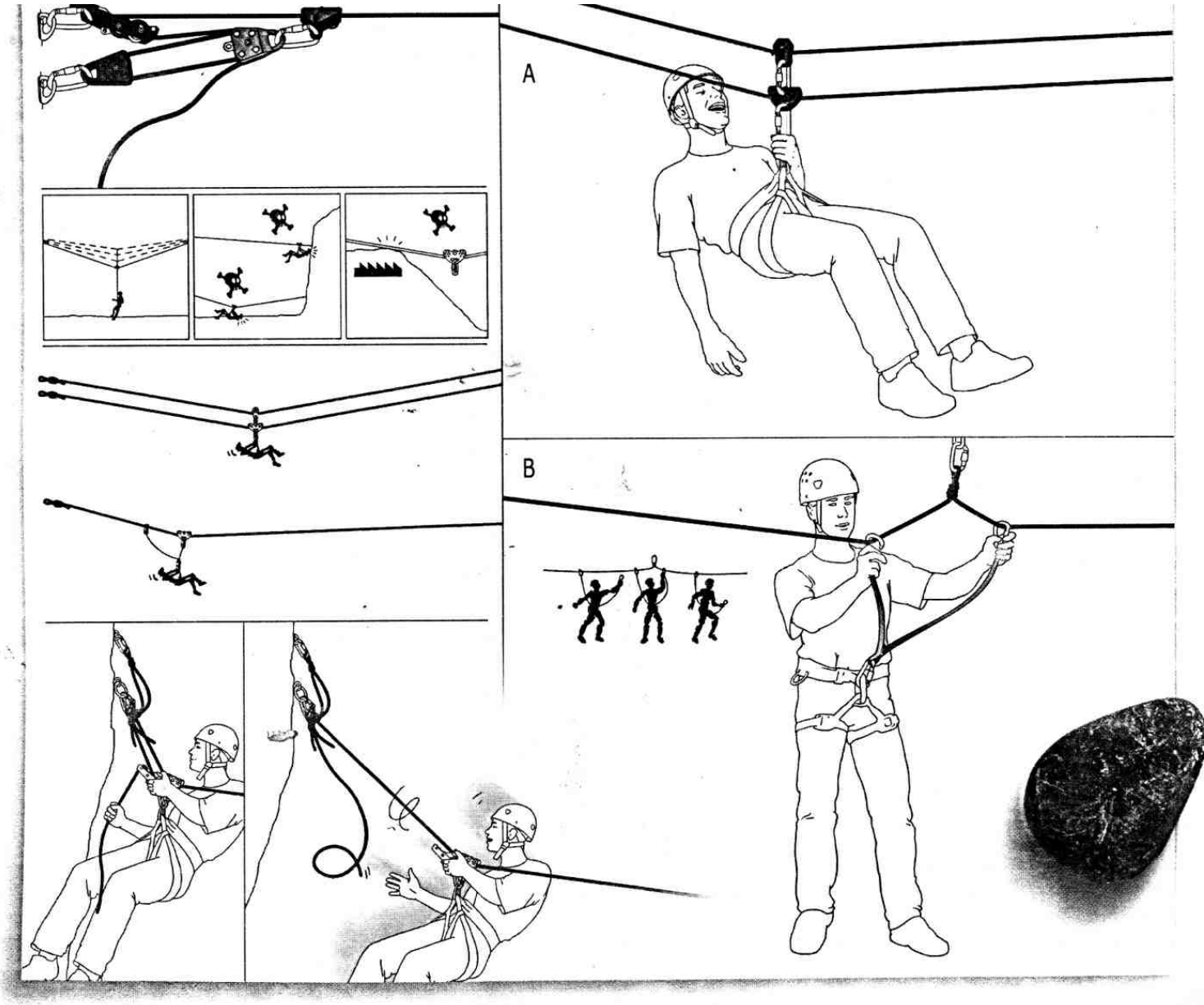

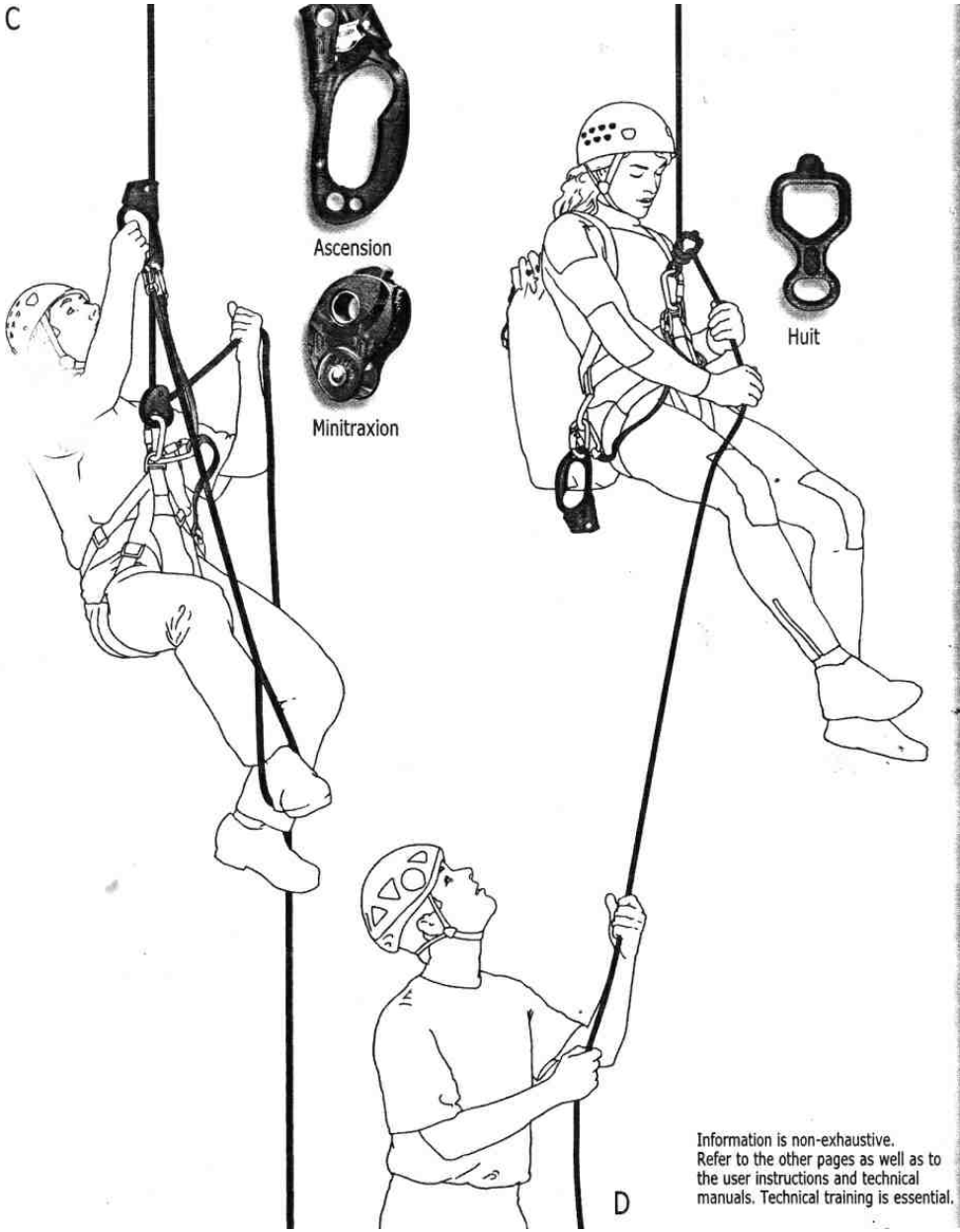

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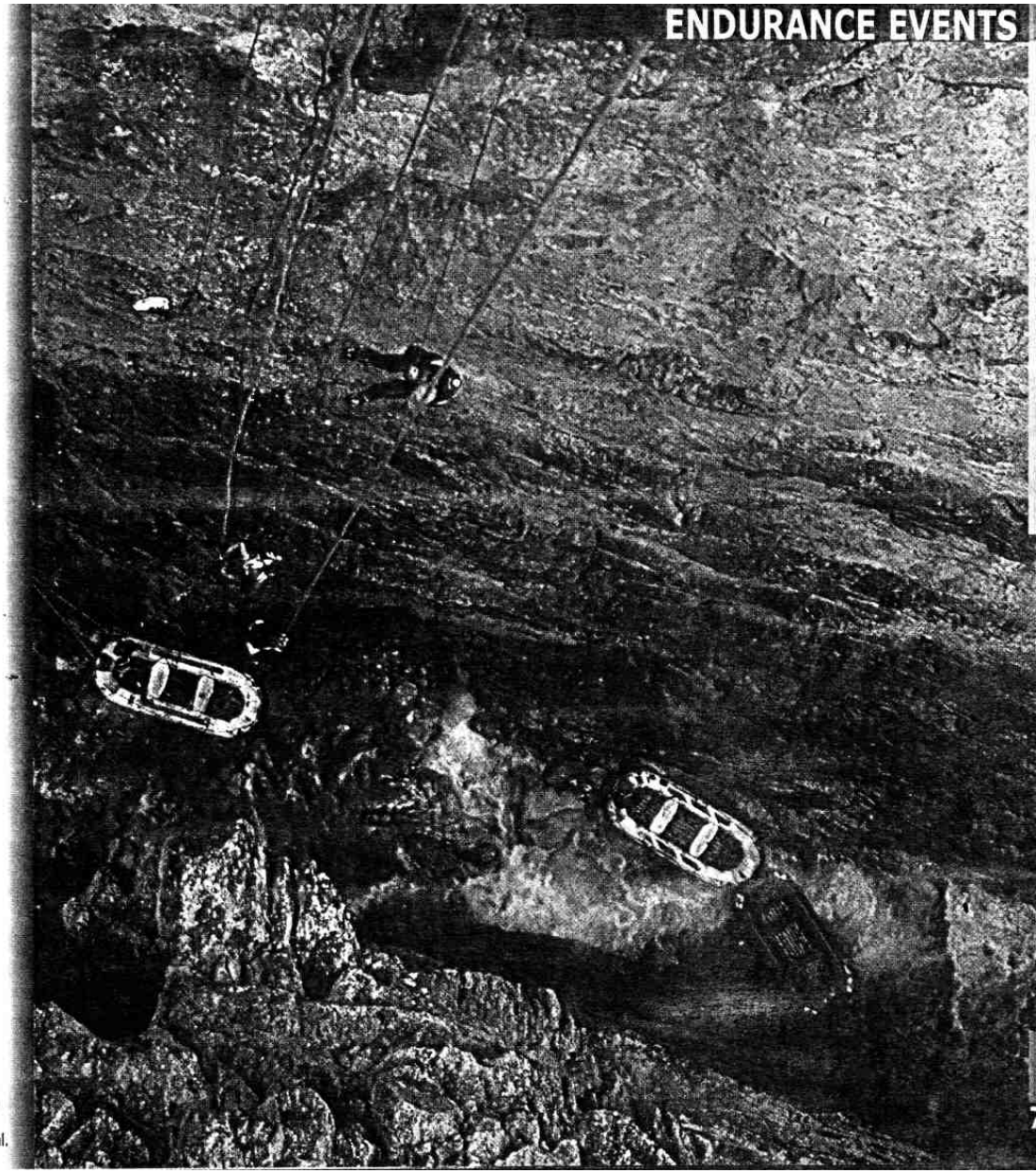
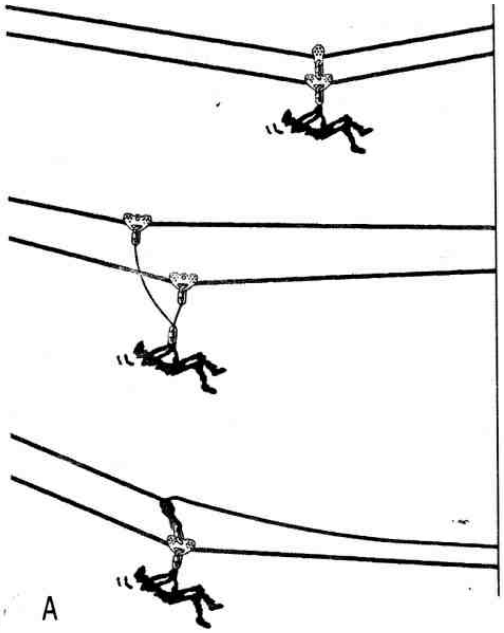
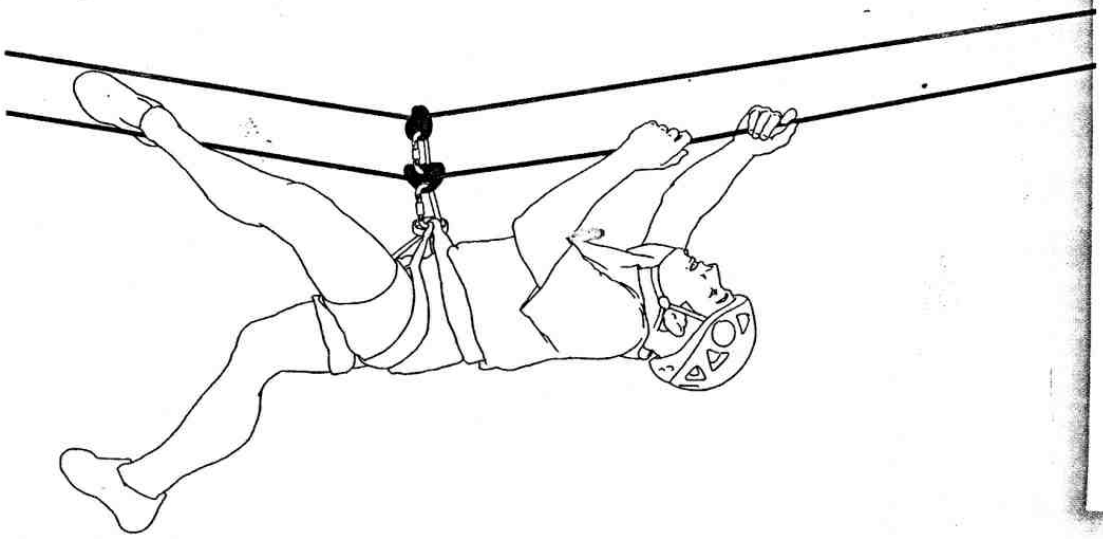


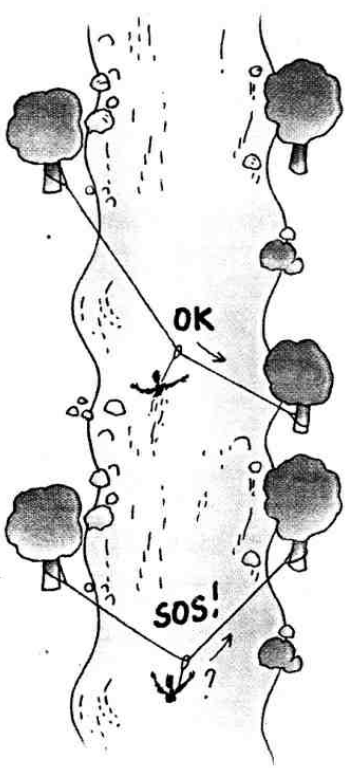
When I told him I was entering the event, he wished me good luck.
And he gave me some advice : "This kind of event is a mixture of adventure and competition. You need to be efficient, fast without hurrying, you have to have good endurance and keep a clear head. You need at least the minimum of equipment : an adjustable sit-harness, a helmet, a pulley-rope clamp / grab, a descender, a lanyard, some carabiners and a few rope slings.
When you get going, teamwork is essential for safety.
For example, when you're abseiling, the first down protects the rest of the team (D). If you need to get over an obstacle using a tyrolean traverse, always use two ropes and don't go too fast, and of course never use your hands to slow you down (A). To cross a river, it can be useful to stretch a rope across (Italian hitch tied off with a half-hitch) from one bank to the other (B). Depending on the danger (strong current, presence of a waterfall...), it may be better to clip to the rope with a lanyard or just to use it as a handrail. Keep some strength in reserve for climbing the rope (C). You need to keep going right to the end and not run out of energy in the middle : being suspended inert in a harness is dangerous.

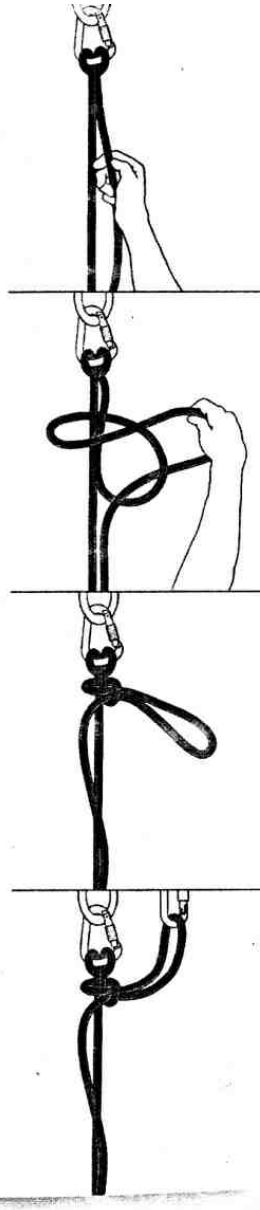
When abseiling, don't forget your gloves : they will protect your hands from burns. And try to descend evenly, without jerking, at a reasonable speed."

I tried to remember everything he said to me, and I set off a bit worried.
When I got back, he asked me how it went. I replied : "Very well ! Except for one thing : all your technical advice was no good to me. I had to improvise all the time !"
He smiled and said to me : "Well it sounds as if it was a good event ! But you know, those techniques you learned all on your own, you would never have worked them out without the techniques I taught you to use !"







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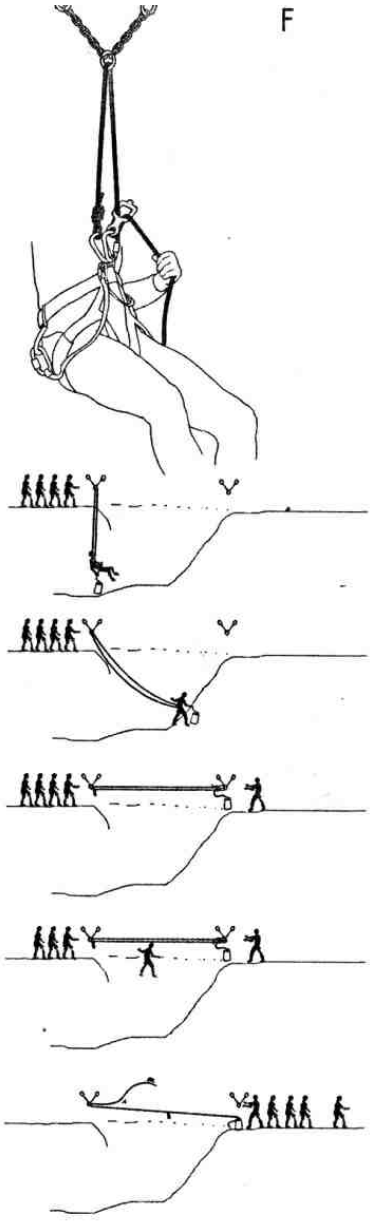
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CANYONING

We thought we were off for a day's playing and splashing about in a natural waterpark. And then, very quickly, we found ourselves in another world of tight shadowy gorges cut deeply by erosion, where the sound of waterfalls and their multiple echoes give the impression that man is trespassing, out of his element. The environment is difficult : the water, the strength of the currents, the cold, the complications of access, the compactness of the rock, all conspire to make this a technical sport. And especially, from the very first abseil or the first jump, we become aware that this is a one-way trip. Canyoning is a sport requiring great commitment and self-reliance, and serious training is essential.

It needs good knowledge of rope techniques and of the aquatic environment, confidence in the water, and good physical condition.

Just as for mountaineering and for endurance events, team spirit is essential...

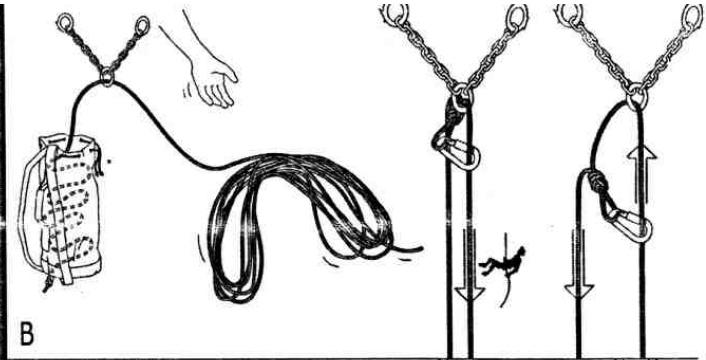
Before setting out, as I would for a mountaineering route, I find information on :
1/ The route : technical difficulty, commitment, vertical descent distance, time required.
2/ Possible escape routes.
3/ The weather forecast for the drainage area upstream.
4/ The stream levels and any possibility of artificial changes (release of water from dams).
5/ The necessary equipment.

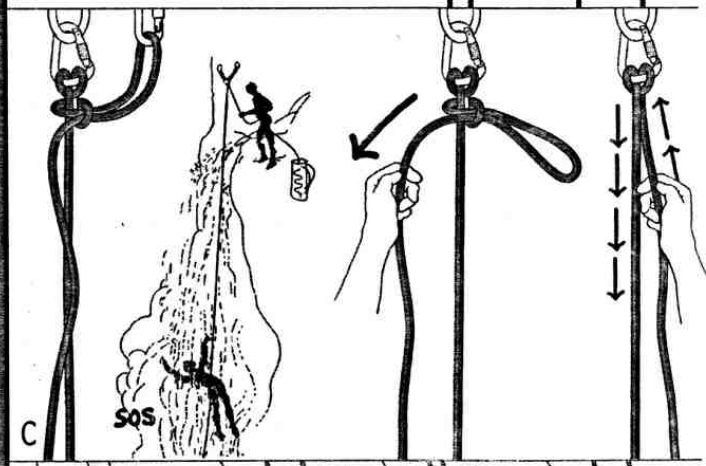
During the descent, I evaluate the condition of the equipment which is in place, the risks associated with water (abseils, swims, pools, sumps...), the water flow in waterfalls and waterslides, any submerged obstructions and the risks associated with rope manoeuvres.

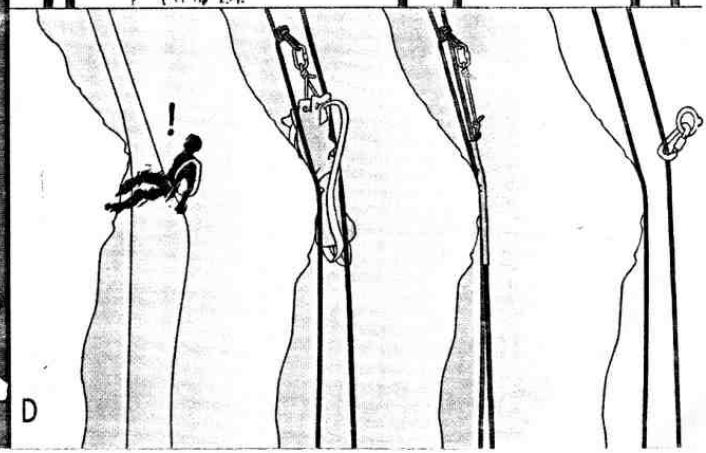
The minimum personal equipment consists of : a wet suit, a helmet, footwear giving good ankle support and grip, a sit-harness and double lanyard, a descender and a locking carabiner, a rope clamp / grab and a whistle.

As equipment for the the group, take : a rope at least twice as long as the longest abseil, a shorter safety-rope in case it is necessary to install a handrail, a rescue rope which is also twice as long as the longest abseil, some locking carabiners, equipment for replacing anchors (Hammer, drill, self-drilling anchors, hangers, pitons, nuts, slings), a knife, and a "self-draining" carrying sack with a waterproof container.
The emergency kit should contain : a first-aid kit, a diving mask, a lighter, a survival bag, minimum equipment for setting up a hauling system, and a waterproof head lamp.

(A) Abseil with supplementary braking carabiner
(B) Standard pull-down method
(C) Abseil with quick-release for wet descents
(D) Protecting the rope
(E) Protected descent
(F) Rope handrail







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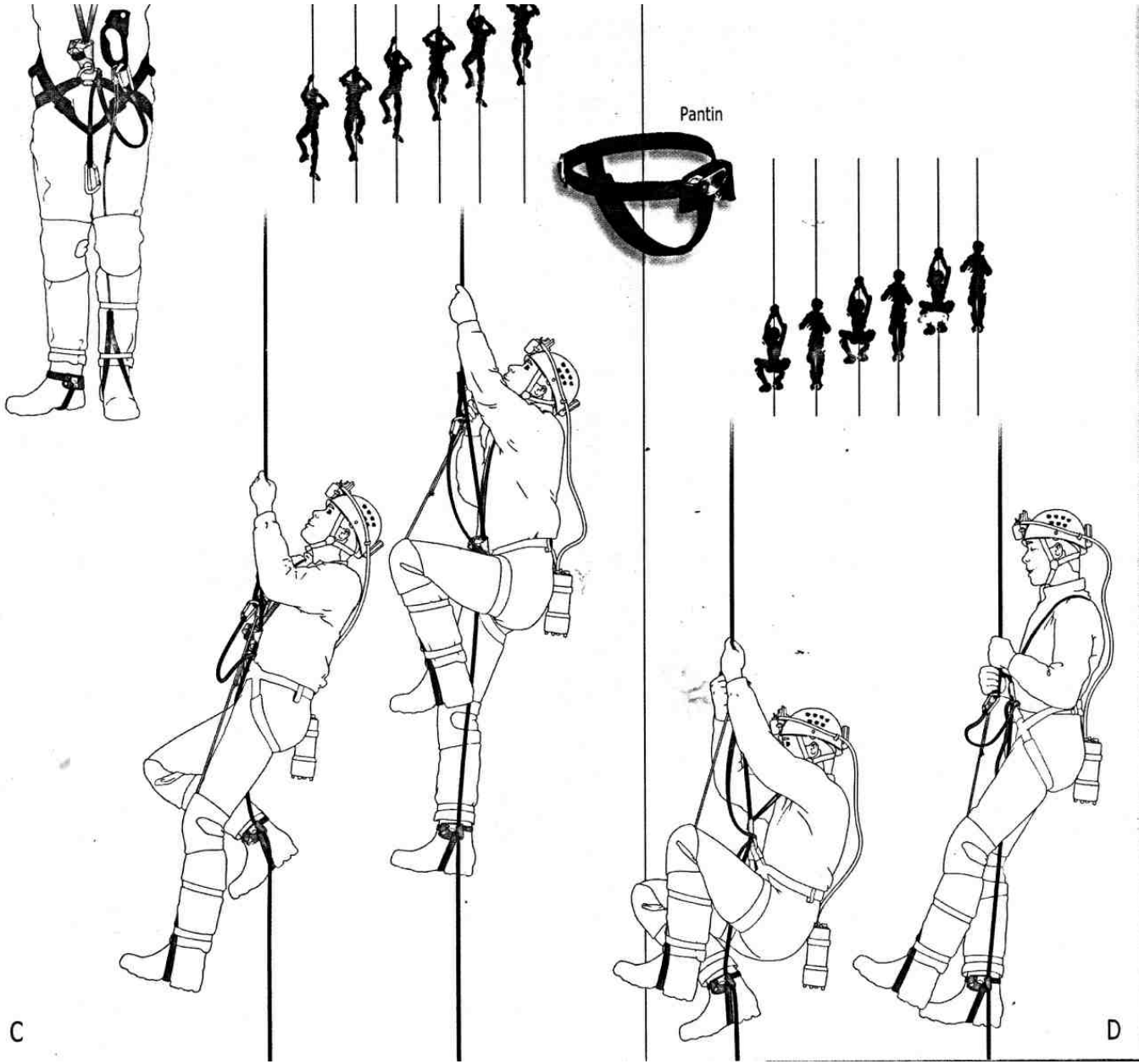

Pantin
C
D


CAVING

If you have learned to love the wide open spaces and natural light of the mountains, the exploration of underground passages may seem a strange pastime.
But all it takes is a trip with some devoted cavers. Once you overcome the anxiety which comes from the darkness and cold, damp conditions, you will discover a fabulous universe where the word "adventure" takes on its full meaning and where the visitor can only marvel at the natural beauty.

Access is often difficult. Chasms, pitches, squeezes, slippery climbs, underground rivers and sumps require a perfect technical mastery. Here, more than anywhere else, progress demands teamwork which must combine speed and efficiency.

Generally speaking, the descent comes first, and this must be possible even if the rope, still in place from the last exploration, is muddy. The anchors, the rope and its knots must, of course, all be checked !

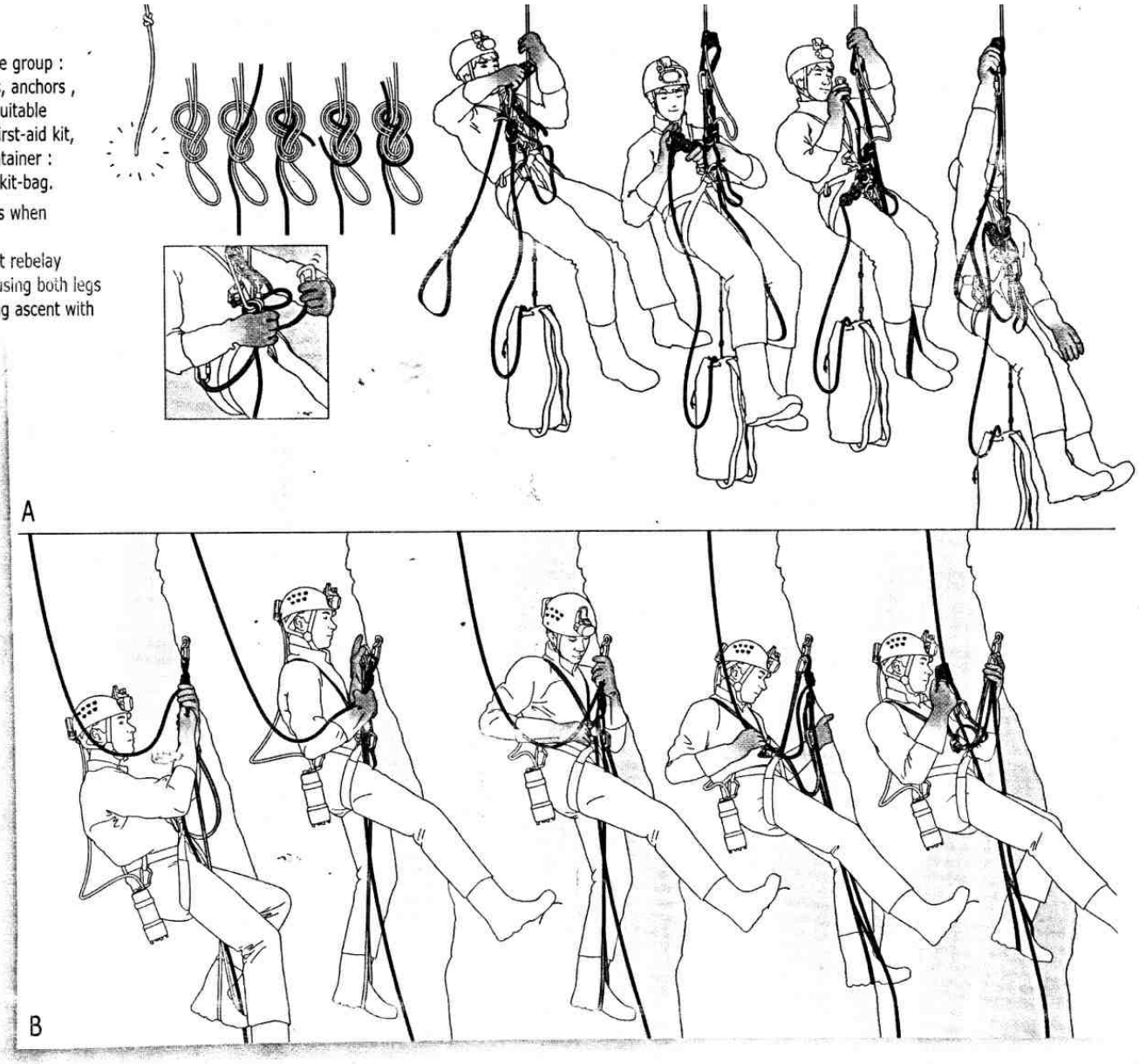
The aim is of course, to go as far as possible by installing a series of anchors and ropes. For carrying these, bags are used. Sometimes, techniques derived from mountaineering are used, and cavers become underground climbers.

Remember : except for "through trips", it is important not to forget about the return trip whilst going into the cave ! Rig tidily, and make sure that the rope will not rub on the rock when the ascent is made. Everything which is descended must be climbed again later. It is a good idea to conserve energy on the descent, so as not to become exhausted on the climb out. When climbing on fixed ropes, the Pantin foot-mounted rope clamp / grab or the Pompe with its built-in reduction system allow energy to be saved.

Personal equipment :
First of all, "cave" means "darkness" : so it is necessary to have reliable lighting !
The complete set of equipment consists of : helmet, electric and acetylene lighting, undersuit and oversuit which are suitable for the cave being explored, boots, sit-harness (weight, comfort, position of the body when suspended and positioning of the ventral rope clamp / grab are the key factors in making a choice), chest-harness, semi-circular maillon, abrasion-resistant asymmetric lanyard fitted with keylock carabiners, descender and automatically locking carabiner, braking carabiner, ventral rope clamp / grab, handled rope clamp / grab, footloop, a pulley, and a rope clamp / grab for emergencies.

Equipment for the group : semi-static ropes, anchors , belay device or suitable carabiner, drill, first-aid kit, survival bag, container : carrying sack or kit-bag.

(A) Passing knots when descending
(B) Climbing past rebelay
(C) Fast ascent using both legs
(D) Energy saving ascent with both legs



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If you thought only about having an accident, you would never leave the house. The force which pushes you towards a rock face or a mountain peak, towards canyons or caves is the imagination of the physical and aesthetic pleasures you will find there. But all the same, you need to envisage the possibility of an accident, and especially to be able to deal with all its consequences from the moment it happens.

Being unconscious while suspended in a harness, whatever the model, can cause serious physiological consequences after only a few minutes. (These problems do not occur with a person who remains conscious, of course, because he or she will continuously change the pressure points of the harness).

How can such a situation be avoided ? Wearing a helmet minimises the risk of a head injury. A comfortable harness, which is well-adjusted and suited to the user's body shape, reduces the risk of injury to the body in a fall. It therefore reduces the risk of fainting when suspended in a harness.
And once the fall is stopped, the determining factor will be the amount of time before the victim is rescued.

For each activity, a perfect knowledge of techniques for rescue and evacuation will allow the rescue to be completed as quickly as possible and under the best conditions. For all cases, some basic principles can be applied :

Evaluate the situation and decide between three alternatives : lowering the injured person, releasing him or her from the system, or lifting him or her upwards.

When belaying techniques are being used, I start by tying off the rope and releasing myself to consider the situation. The tying off of the rope must always be releasable to allow the injured person to be lowered.

This non-exhaustive series of diagrams should alert you to some possibilities. In each activity and according to the situation encountered, the techniques used for rescue can very greatly. You should be trained and practice the evacuation techniques for your own activity, so that you can fulfil your responsibility to your partner.

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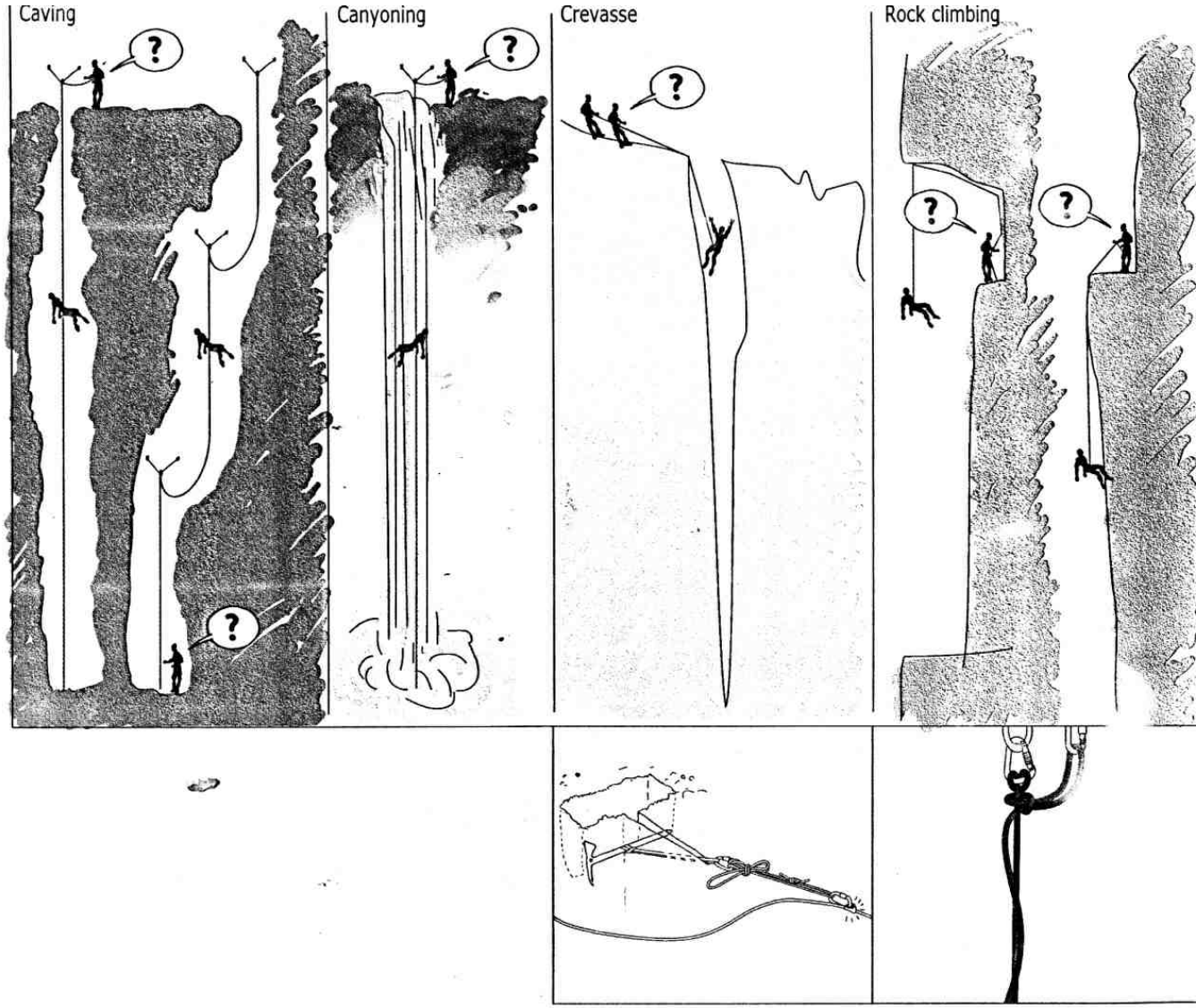
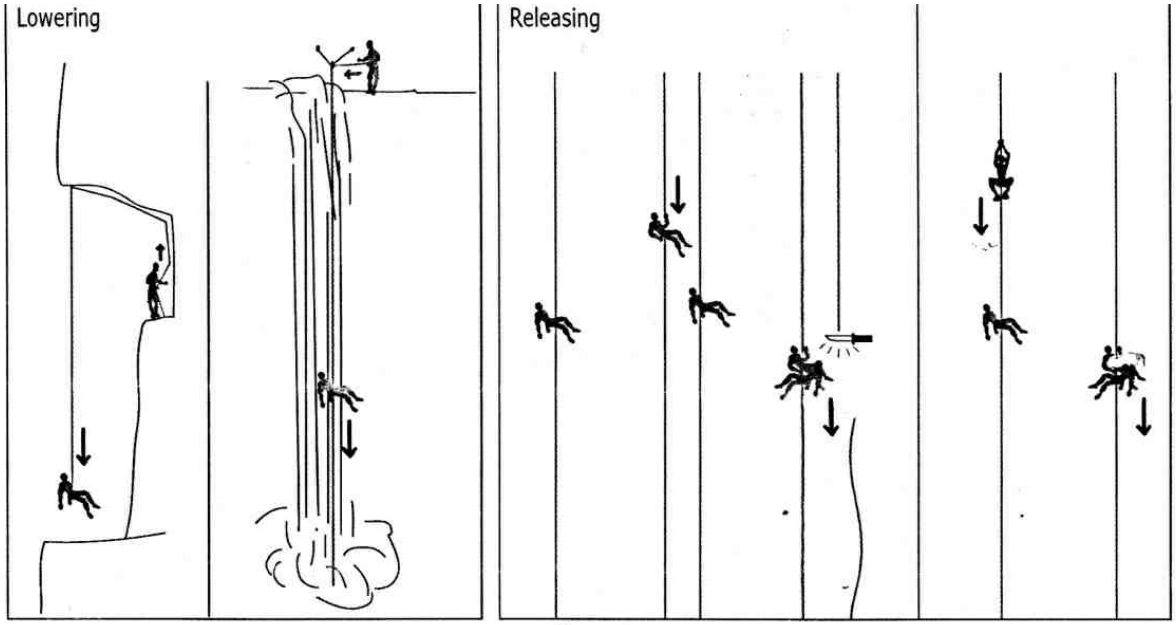
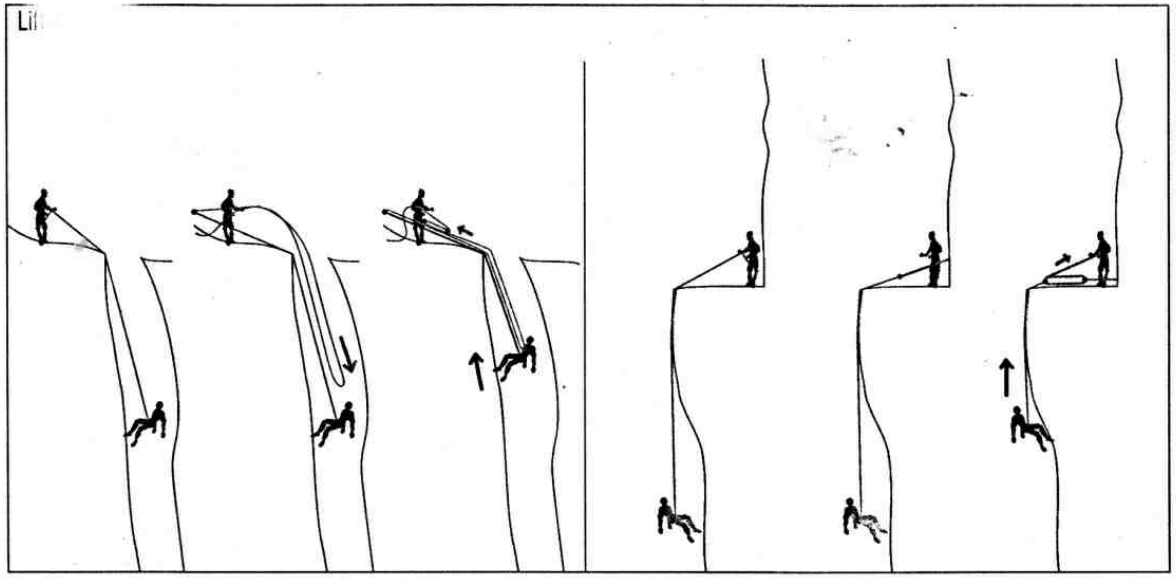



Lowering

Releasing


Lif


RESCUE

Falling, which climbers refer to as "taking a flier", is closely associated with the rise in standards in sport climbing.

Today, everyone knows about fall factors which allow the evaluation of the impact force generated by a falling climber (fall factor = length of fall / length of rope available) (A). In climbing, the highest possible fall factor is 2 because it is impossible to fall more than twice the length of the rope. Obviously, a fall of factor 2 generates the highest impact force on the falling climber, and an identical force is transmitted to the anchor point.
If there is a running belay which stops the climber, the fall factor is reduced and so is the impact force on the climber. But note that the running belay can be subjected to up to twice the impact force that the climber experiences. So imagine the force it is subjected to if the fall factor is 1.9 !

But the definition of fall factors belongs to the realm of theory if we completely forget about the height of the fall, the rubbing of the rope and the effects of belaying. To understand things better, let's talk about energy. Obviously, the longer the fall, the higher the energy which is generated.
Consequently, eventhough the impact force is equal to that of a small fall, it lasts longer (B) on all the links in the belay chain. For the climber and the belayer, that means a more severe effect.

What interests us is how to absorb the impact force.
The factors which come into play are :
1/ The elasticity of the rope. The length of rope available to absorb the energy of the fall depends closely on the amount of rubbing against the rock and in the running belays (whether the rope runs straight or zigzags) (C).
2/ The knot used to tie in.
3/ The deformation of the harness and the body of the belayer and climber.
4/ Slippage of the rope in the belay system :
- The slippage can be allowed to happen deliberately, but this is unlikely. The reflex of the belayer is to lock off the rope when a fall occurs.
- Slippage occurs involuntarily when the force generated exceeds the capacities of the belayer (the maximum force which can be held without slippage is 3 kN with the majority of devices).
This slippage absorbs a lot of energy, but the belayer, if not wearing gloves, will have burnt hands and runs the risk of letting go.

Finally, whatever safety manoeuvres are performed, the results can be contradictory ! (D)
Dynamic belaying makes arresting the fall gentle for the falling climber. And the running belay receives less force.
On the other hand, there are problems : the falling climber runs the risk of hitting the ground because of the slippage which increases the length of the fall. If the ground or a ledge is close, a compromise must be found between gentle braking which spares the running belay, and less slippage of the rope, which shortens the fall.

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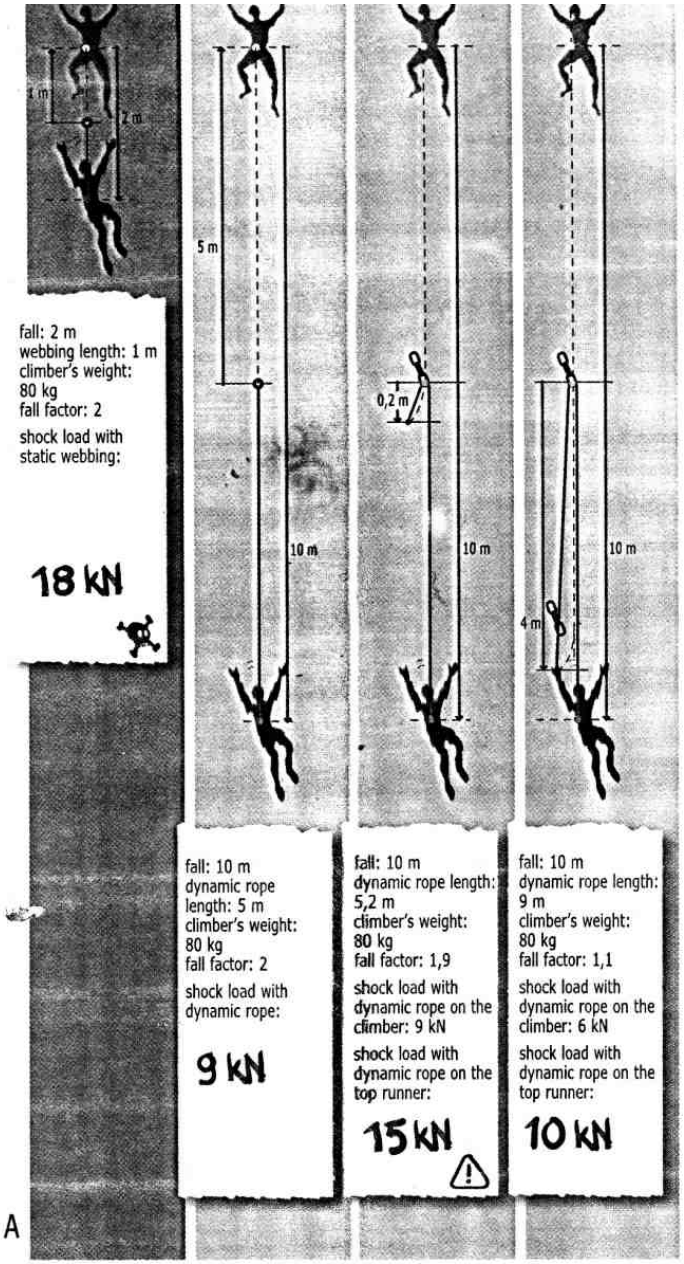
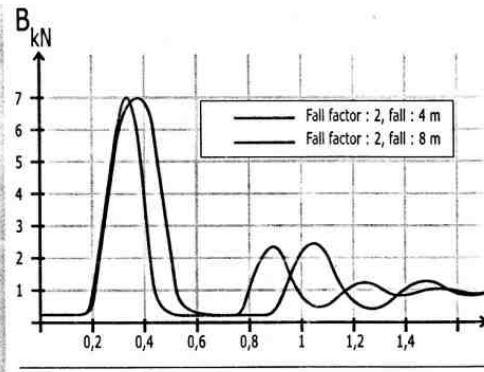
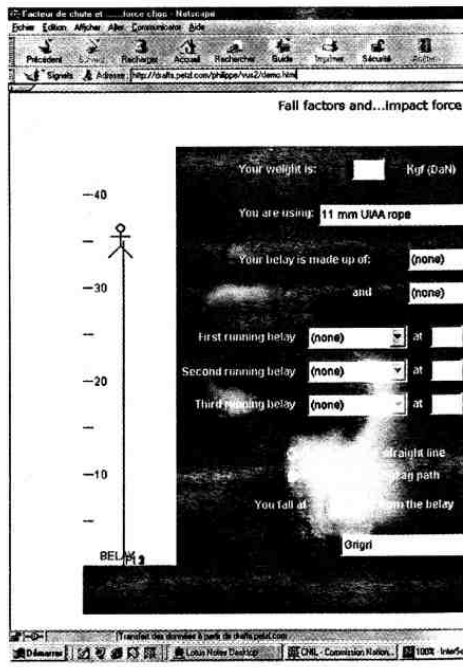
Refer to the other pages as well as to the user instructions and technical manuals. Technical training is essential.







http://www.petzl.com

C
D

FALLIN

harnesses

CLYDE C61	★★★	★★	★	★★★													325 g	4
								XS	S	M	L	XL						
							A	60→71	68→79	75→86	83→94	90→101						
							B	47	52	57	62	67						
BONNIE C63	★★★	★★	★	★★★													350 g	4
								XS	S	M	L							
							A	60→71	68→79	75→86	83→94							
							B	52	57	62	67							
JUMP C20	★★	★★	★	★★★													410 g	4
								XS	S	M	L	XL						
							A	60→80	70→85	75→90	80→95	90→105						
							B	47	52	57	62	67						
MERCURY C31	★★	★★	★	★★★													340 g	4
								XS	S	M	L	XL						
							A	60→80	70→85	75→90	80→95	90→105						
							B	47	57	57	62	67						
CRUX C62	★★★	★★	★	★★													275 g	2
								XS	S	M	L	XL						
							A	60→70	65→75	70→80	75→85	80→105						
							B	47	52	57	62	67						
GOUROU C27	★★	★★★	★★	★★													540 g	4
								1	2									
							A	65→95	75→125									
							B	47→62	57→77									
DIONYSIS C39	★★	★★★	★★	★★													450 g	4
								1	2									
							A	68→88	83→103									
							B	51→61	58→88									
CLUB C66	★★	★	★★★	★													375 g	2
								1	2									
							A	55→95	75→125									
							B	42→62	52→77									
8003 C05	★	★★	★★	★													655 g	2
								1	2									
							D	60→95	75→105									
							B	42→62	52→77									
CANYON C86	★★★	★	★★	★	★★★												676 g	2
								1	2									
							A	55→95	75→125									
							B	42→62	52→77									
NIAGARA C83	★★★	★	★★	★	★												458 g	1
								1	2									
							A	55→95	75→125									
							B	42→62	52→77									
SUPER AVANTI C12 **FRACTIO C16**	★★	★★★	★★	★★	★★												435 g 486 g	2
								1	2									
							A	60→88	75→103									
							B	43→60	50→72									
SUPERAPIDO C17 **ENDURO C19**	★★	★★★	★★	★★	★★												370 g 440 g	2
							A	50→95										
							B	42→65										

carabiners

OK M70	★★	★★	★	★	★★★	★★	★	
Am'D M17-M18-M19	★★★	★★★	★	★	★★	★★★	★★★	
ATTACHE M20-M22	★★	★★	★★	★★★	★★	★	★	
WILLIAM M24-M25-M26	★★	★	★★★	★★★	★★	★	★★★	
Lock	★★	★★★	★★	★★★	★★★	★★★	★	★★★
SpinBall	★★	★★	★★	★★★	★★★	★★★	★★	★★★
BallLock	★★★	★★	★★★	★	★	★	★★★	★

rope clamp rope grabs

CROLL B17	143 g	8 - 13 mm	X		X		★★★	★★★	★	4 - 6,5 kN	X	
BASIC B18	136 g	8 - 13 mm	X		X		★★★	★★★	★	4 - 6,5 kN	X	
ASCENSION B17	196 g	8 - 13 mm	X		X		★★★	★★★	★	4 - 6,5 kN	X	
POMPE B16	310 g	8 - 13 mm	X		X		★★★	★★★	★	4 - 6,5 kN	X	
I'D LOC B01	39 g	8 - 13 mm	X			X	★★	★★	★	4 - 7,6 kN	X	
MICROCENDER B54	162 g	9 - 13 mm		X		X	★	★	★★★	4 - 7 kN		X
SHUNT B03	188 g	10 - 11 mm 2 x (8 - 11 mm)		X		X	★★★	★★	★★★	1 - 8 kN		X