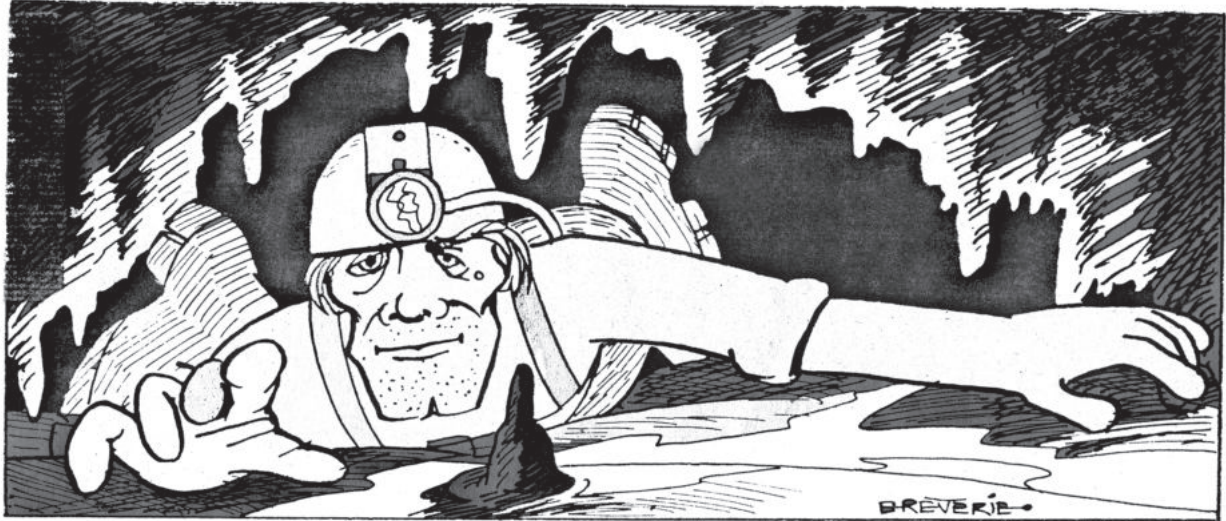


CREEPING®



HOW TO OVERCOME
NARROW PASSAGES IN CAVES

FROM FIRST DEGREE
TO SPORTING EVENTS

M. Häusler 1985

English Edition 2013
Reprint 2009 with a Preface by Eckart Herrmann

Mike Häusler, 1985

Creeping

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Mike Häusler 1986

I held a typed copy of yellowed Club News in my hands. On its cover it read SCHLIEFEN in bold letters, inprinted 1985, author Mike Häusler. I had discovered the slightly damaged issue in 2003 during the lunch break of the training course for caving guides in Obertraun near Hallstatt. While browsing the serious speleological literature I could not resist the headstrong, slightly musty aura of the booklet. Obviously it had passed many cavers' hands. First thing I noticed when leafing through were the loving, naive drawings. Contents and text bore witness of a very idiosyncratic view on this sport. This guy Mike had the brilliant idea to classify crawling in levels of difficulty, as in climbing techniques. Did he really mean all this?

I just had to get ahold of this OPUS – too bad, it was out of print. The author had died in a fatal avalanche. Lukas Plan then put great confidence in me, he lent me his one and only copy without a time limit. So I took the great task to heart to decompose Mike Häusler's standard work, to scan each page and to get rid of its yellow patina. In the year of 2009 the Speleological Society of Vienna and Lower Austria had it reprinted.

10 years later, after a geological nanosecond had passed by, the English version appears. I hope you have much fun reading and wish you good luck with the practical implementation! May Mike's humor and technical knowledge of this criminal sport be passed on to many generations of cavers!

Karoline Glitzner-Meiberger

Prologue to the English Edition:

In the year 2009 I participated in the 15th ICS- congress in Kerrville, Texas. It was the first time in my life I visited such a giant caving convention, the first (and perhaps only) time I saw the wonders of water table caves in Texas, the huge pits of the Golondrinas- area, the cataracts of the Rio Galenas near Aquismon. Tenthousand bats swarming out from misty deeps in the warm evenings and uncountable swallows hissing like arrows from the deepblue sky hundreds feet down into this mystery shafts. I often remember the legendary nights in the camps on Schreiner University in Kerrville or in Aquismont (Mexico): discussing, joking and drinking with cavers from all over the world. At the same time in Vienna some guys from the local caving club published a reprint of Mike's little book about crawling. The original edition was poorlywritten on a typewriter and given from one hand to another, duplicated sometimes by use of a laser copier- a brand new technology and without the reach of common people in 1985. The author, Mike Häusler (read more in the following chapter), was the center of many legends. Stories were silently told in dodgy tavernes after caving or during gatherings in the (dodgier) cave club. Getting to know Mike in person was an honour I didn't have: he died many years before I heard the call. A call which urged me to explore the world below our feet- the mighty halls and mazy corridors, the deep pits and filigree flowstones. A call which pushed me out of the cosy home, into the cold, wet, dark and dangerous environment of stones, clay, water, bats and crystals. However, with his unconventional nature and his fabulous caving skills, Mike was some kind of an idol for me and for others. Unfortunately my fate was almost similar to Mike's: I had a bad caving accident in 2010, which I barely survived. Off this background and recognizing the scientific and morally benefits of Mike's heritage I knew, something had to be done. The German reprint wasn't enough. Everybody should learn about Mike and about crawling, cavers from everywhere should profit by the scientific approach to one of the most urgent problems every human being has, usually already while his/ her birth: passing bottlenecks. However I wasn't able to edit the english Edition alone because this would have taken years and the result wouldn't have been satisfying. So I conserved my plan in some deeper parts of my brain for the moment. In the year 2012 the needed help came: Eva Meiberger translated all parts except my preface and her daughter Karoline adapted the graphics and made the final layout, as before in the German reprint.

Emily Middleton, Andrea Zeitler and Ron Rutherford did their proofread ok, the Association of Speleology in Vienna and Lower Austria finally enabled the print. Many thanks to all protagonists whose patient efforts made the publishing of the English Edition possible!

Dedication

Squeezing through narrow passages isn't only part of the locomotion techniques a small group of people called cavers uses to practice. It is much more than that: it can be understood as allegory to our lives. Sometimes it is necessary to squeeze through a tiny hole if we want to continue. The alternatives are getting stuck or reverse. But if we are daring and pass the obstacle, we can find ourselves in huge chambers with lots of continuations, if we are lucky. We enter new, fantastic and unknown regions, there are new possibilities and further decisions can be made. Once passed the bottleneck, we resume our way. There is one great wish which goes along with this booklet. Let me introduce Mike Häusler as an idol, as a figurehead for all of us to live our lives as every day would be the last one. This is my experience and think I know what I'm talking about. There is a high risk that something unexpected may happen, that circumstances occur which force us to change our lifestyle dramatically from one day to the other, or even to say goodbye forever. We can and should try to decrease the risk of injury or death but we cannot eliminate it. The only thing we can do is to make the most of the moment, to fill the short time we have with substance, like Mike did it. The worst thing which can happen to a man is to recognize, that there hasn't been much more than everyday life.

Let Mike, Gor, the Bockermändln, Barbie™ and me spark a fire- fill the gaps, power off your TVs, go out, push the frontiers, besiege the thrones of mortality!

Good luck down there!
Dieter Sulzbacher

Annotations for reading:

Our editorial team consisted of two native Austrians and two colleagues with English mothertongue and caving background. They ensure that the flair of the German text is by and large reproduced in English. Should you still find inconsistencies, please turn to the very last lines of the very last page.

For people who are no native Austrian speakers, there seems to be a vocabulary which is necessary but not to find in common dictionaries, because it's really specific. I'm talking about the word „Schlazz“: in Austria and parts of Germany used for the well known caving suit, in Switzerland called „Puff“.

And now: read and have fun!

D. Sulzbacher

Prologue to the 2009 edition by E. Herrmann

When Michael „Mike“ Häusler lost his life in an avalanche 22 years ago - looking back it seems to me an unbelievably long time - a new era started for Austria's speleology, too. No doubt, he was to be expected to be stirring. No stone would have stayed in its place but something great would have emerged. Within the short time he was granted to live as a (hyper-) active researcher, he left clear traces in the land- register and in the heads of his fellows. The reprint of his unique publication „Creeping“ is the most striking evidence of his caving passion- and this is just one of many others. Some highlights of the extraordinary personality of Mike Häusler will make the reading matter more comprehensible.

Oddly enough his first - not too seriously meant - insight was, that bottlenecks could be assessed like climbing difficulties. This could even be a lasting benefit for speleology, because overcoming bottlenecks could even be made a training focus - which might be the most important and lasting creation of this thoroughly scientifically oriented person.

The matter took its course, when several researchers (especially females) had their „specific creeping factor“ calculated according to their body measurements. Endpoints were extreme experiments, to wrest tiny holes a couple of decimeters or meters. Of course this implied broken ribs and extensive abrasions on nude bodies, but finally the management of the seventh degree.

But all this only inspired Mike to develop indispensable innovative equipment for today's sport squeezers like the Speleo- broken ribs girdle, Grabohack 2000 (annotation: a special tool for digging in narrow, clay- filled passages), and Teflon™- powder. His post surveying activity of whole areas was feared, when he virtually explored the definition of a cave downwards: where was it possible to creep for maybe five more meters, which had been overlooked by the forebears? Today all this is socially acceptable.

Mike should not be imagined as a cranky small cave crawler, he felt like a home from home in numerous giant caves, too. He neither spared climbing extreme ascents nor deep shaft descents, and this with manual carbide lamp and Hiebeler Terminals. They were even then frowned upon as being life-threatening, but for a student of biology they were affordable at garage sales and clearances. He neither was afraid of any dangerous water caves nor of endless stooping trips through tunnels and halls. But for him creeping was ultimate caving, the essence, religious contemplation.

Together we invented the sport to discover new land in the shortest possible distance from the entrance in well-known giant caves, where daylong marches were already required to advance to the endpoint of research. The objective was to measure how few minutes it took to reach the newly discovered continuation to the „most beautiful new land“: in the Dachstein Mammoth Cave it was not even one minute and provided clear 100 meters. In the Raucherkarhöhle, too, we caused the locals to shake their heads and wonder in the beginning. But at the latest since 2007 it was clear, that at that time we found exactly the right way to the transit of the Northern Passage- we only did not follow it far enough. Mike undoubtedly was the mastermind of such activities.

His home had less furniture. His cabinet was a mixture of a student's room, laboratory, material storage and café. Piano and guitar were obligatory, he expertly accompanied his vocal performances. However, he was rarely seen at home. Underway in wintry mountains and at night on Salzburg's Cathedral Square: a simple trumpet - his „Tröte“ - had to serve as an instrument. A fanfare at the beginning of the downhill track at an icy peak in Gastein cost him the tip of his tongue, the one on Cathedral Square gave us a frantic run from the police, who was unfortunately stationed right round the corner.

Back to creeping: Mike discovered the competitive potential of the creeping discipline and invented the „International Creeping Competition“ (disciplines: individual creeping, his and hers competition and triple team). During the first contest the athletes were partly not able to meet the requirements: they did not reach the destination and got stuck. A mighty trophy for the winner annually changed hands. Somewhere along the way it got lost and today it is forgotten.

He annoyed many a team official with his radicalism. He commented and caricatured regularly in the „Rauchspalten News“ on such topics. Yet he definitely respected extraordinary achievements, even that was to read in this underground magazine. One of his cartoons for instance shows the elite of the young cavers working with drill and pins in a funnel and the free climbing cadastral clerk Willi (with manual carbide lamp on his thumb) overtaking them. Beneath it read: „And then we were frustrated and went home“. „We“ naturally included himself, of course. At that time drills started to be in, and in the „Geldloch“ they drilled in the „Schlot- (Funnel-) monster“ with quite varying success.

Reflecting upon the fact that Mike died at an absolutely safe spot - in a moment virtually free of any risk - buried under meter high masses of snow, appears in retrospect as contradictory as his whole nature. Because everything he did was risky: physical, mental, judicial, political. There was no fitting label for him. Mike was at the same time an imprisoned excavator of amphorae and an energetic cave protector, at the same time a fraternity member and a left alternative environmental activist - one of our first common activities was to participate in the occupation of the Hainburger Au (annotation: a successful attempt to protect a floodplain forest).

But at the same time he definitely had self conscious views on his own environmental behaviour, was proud of his first scooter rides though Dietrichshall etc. He was the best scholar of Hermann Nitsch's („To be lukewarm is the worst“) and he could have died a hundred violent deaths. He treated his body as if he knew there would not be much time for him. At last his shoulder was so worn out that he dislocated it in the most impossible situations, but routinely straightened it again over the back of a chair or a rock edge.

The reprint of the „Rauchspalten News“ would be a worthwhile training of our atrophied muscles for laughter as well as to learn occasionally more about Mike's alpine, social and speleological adventures - mostly „hopeless but not serious“ - but this would distract us from creeping. Therefore I want to conclude with a third stolen quotation: „Always look on the bright side of life!“ No matter if this takes one quarter or three quarters of a ten-millionth part of the universe.

Salute to Gor and the Bockermann!
Eckart Herrmann

„My special hatred met the cavers, who had the temerity to plant their disgusting performances on the front pages of magazines. The ambition to meet „point -800“ at the risk to get ones head wedged in a crevice (a siphon, how these mindless fools call it) seemed to me to testify a perverse and abnormal character. The whole thing had something criminal.“

Albert Camus: *La Chute*, 1956

Good luck (deep down)!

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Preface

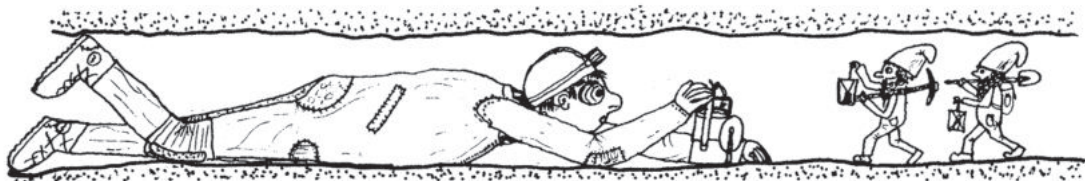
Rock climbing, ice technology, mountaineering, single rope technology....there is always some booklet or something else teaching interested newcomers the secrets of the matter, explaining the techniques and identifying hazards. But most of the time even the experienced climber can learn some tricks and artifices he or she has not known so far.

This booklet wants to fill a gap because there is no profound and summarizing literature about creeping. Own experience is the best teacher, it is not possible to achieve mastership by theoretical studies about creeping. It is very hard to learn by personal experience, most of the time you become wise by injury. To keep this damage as small as possible is one of the aims of this booklet. In order to get better insight it is enough to make a mistake just one time and subsequently give everybody the chance to learn from it without suffering any damage. In many big caves numerous corridors, shafts and chimneys are known and surveyed, yet the bottlenecks mostly stay unnoticed, even if they possibly conceal much new territory.

Speleology developed in various phases:

inspection of easily accessible, large- scale parts
frequenting shafts with wire rope ladder or rope winch
application of the single - rope technique (SRT)

The consistent application of these techniques alone leads consequently to exploration and survey. Here the extreme technique of creeping is able to wrest new territory. In this sense it is quite reasonable to give the technique of creeping some consideration.



Fundamentals

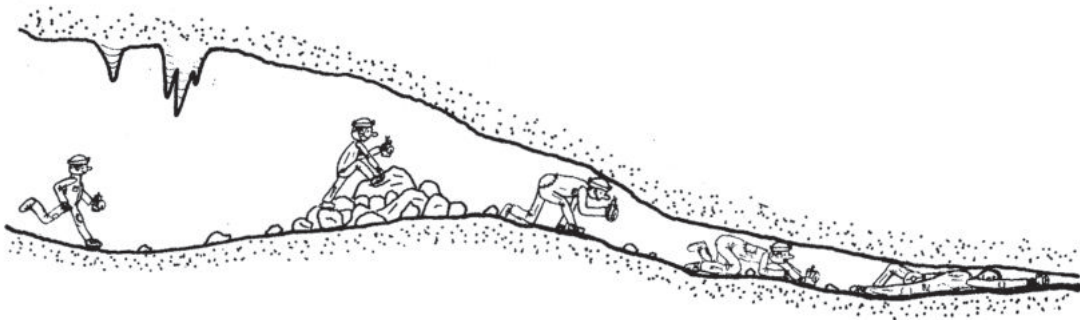
Definition of Creeping

The caver is confronted with different types of terrain in his work space, the cave. He adapts his mode of locomotion to the natural conditions: In large corridors he runs across sandy ground, he walks through halls on clay soil, he climbs over breakdowns and steep wall crashes, shafts require sophisticated rope- or ladder technology.

Even in cave diving you need elaborate devices to overcome the difficulties. A special inherent problem is the bottleneck or Schluf, which forces the caver to invent techniques to get past this obstacle. Just as the free climber on steep cliffs has to master the problems without technical aid using only his own power and skills, the caver waives equipment, tools and devices - he depends only upon his abilities. We talk of a bottleneck, if the dimensions of the room or corridor are such that it is impossible to walk or climb upright.

This is the case if the height of the room measures is at least less than the length of a human body over a longer distance, or the width of the corridor is less than the width of his shoulders. We call it a „Schluf“, if the room over a longer distance (at least the length of a human body) does not allow a person to walk upright.

Creeping as a mode of locomotion has to be learned, trained and mastered like the pit technique or rock climbing: a mistake can be fatal. Creeping is no activity for the reckless or daring, it requires prudence and experience!



Evaluation of Difficulty

As it is appropriate for rock climbing, white water rafting and downhill skiing, where inherent difficulties are to be overcome, so it is useful to have an objective difficulty scale for creeping.

This assessment of difficulties makes it easier to compare bottlenecks and constrictions and to choose the cave or section of track according to one's capabilities. As in rock climbing there are seven levels of difficulty, I being the easiest and VII the hardest degree.

In order to specify the details, each degree is tripartite, marked with a minus before or plus after the value.

For example -III is easier than III, III easier than III+, III+ easier than -IV and so on.

Following the different degrees of difficulty listed, each degree will be illustrated with a description of the difficulties to be expected, the presentation of a sketch and some examples. These examples are taken from caves of the Viennese field of work, especially the Rauchspalten 2871/34 (RS) and the Hermannshöhle 2871/71 (HH) exemplary for their high level of awareness.

I Bückstelle:

Kneeling down is or to pass laterally is required sometimes. No contact with rock. Slip bag is carried (fig. 1). Examples: Sandtunnel (HH), Ludlloch (2911/1), Teufelslucke (6846/3)



Abb. 1

II Crawling:

On hands and knees. Slip bag is dragged behind. Rarely rock contact (fig. 2). Examples: parts of the Lehmkluftlabyrinth (HH), Hexenkessel (HH), Hohlensteinhöhle active part (1831/1), Güntherhöhle sandy part (2921/2), Brunnenhöhle entrance part (1911/8), Schachernhöhle convent corridor (1866/9) Chaotisches Zeug (RS), Altaquelle new part (2871/1)

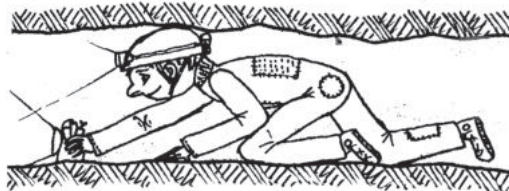


Abb. 2

III Creeping part:

Creeping on elbows and belly, stretched legs are dragged behind or bent sideways. Little rock contact with back or shoulders (fig.3).

Examples: Fuchsenluke, Eingangsschluf (1911/14), Schachernhöhle Alter Teil (1866/9), Dreidärrischnhöhle, Schluf direction of Thusneldahalle (1914/4), Tropfsteinhalle (RS), Schachernhöhle, Poseidonschluf(1866/9)

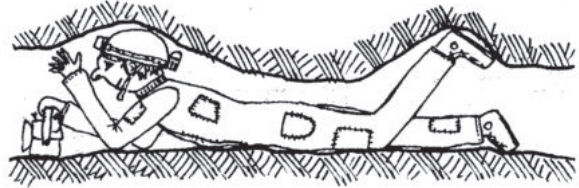


Abb.3

IV Narrow:

Route is managed by shoving on belly and chest. Rock contact with parts of body cross-section. No exhaling necessary. Limit of touristic use (fig. 4).

Examples: Bäckerloch, Wodlfenster, Scharfes Eck, Angströhre (HH), Gaisberghöhle (1915/6), Schachernhöhle, Rippenquetsche (1866/9)

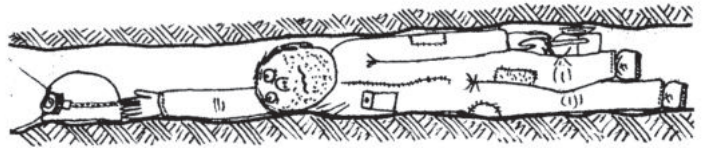


Abb.4

V Very narrow:

The whole body crosssection has contact with rock, arm posture and position are very important. Partly

exhaling is necessary. The helmet is a hindrance. Body control and skills are necessary (fig. 5). Examples: entrance Tropfsteinparadies, Sinterfahnenlabyrinth (HH), entrance, Schluf in the last part, Schluf in SCM- Dome, Beißzange (RS)



Abb.5

VI Utterly narrow:

Only possible at full exhalation and extreme power exertion, in most cases impossible with helmet, several attempts necessary.

Reserved for trained and experienced cavers (fig.6). Examples: slippage to the new parts, Antonshöhle (2871/2), two passages in Sandbergshalle (HH)

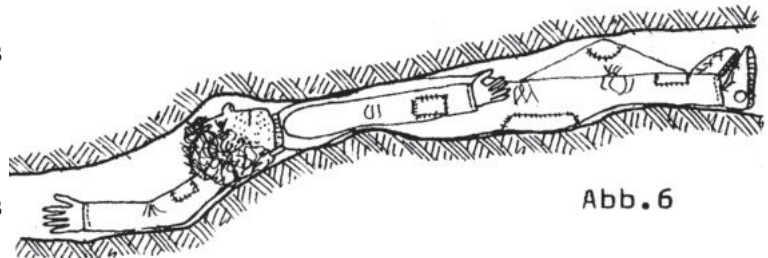


Abb.6

VII Extremely narrow:

Reserved for the elite, many attempts, highest concentration, physical top form and mental preparation focussed on creeping problems are needed! Partly only possible with mates' help, sometimes only with the risk of injury (Fig.7).

Examples: Lieblingsschluf last part, chimney in the(RS), Ringhoferhöhle, bottleneck in the rear parts (2871/33)

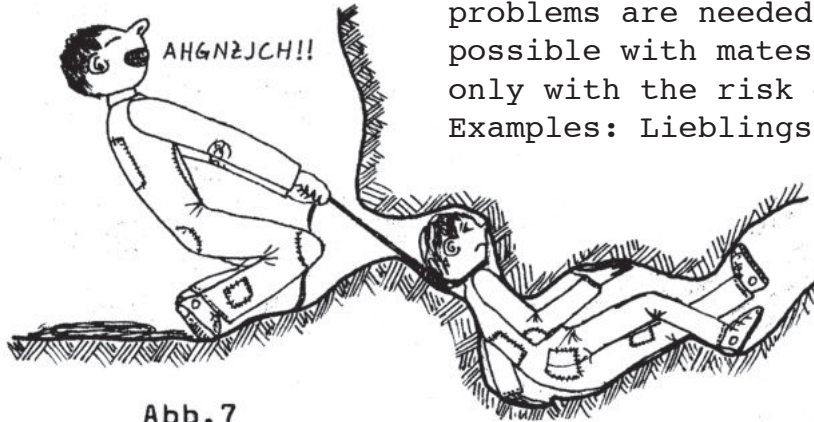


Abb.7

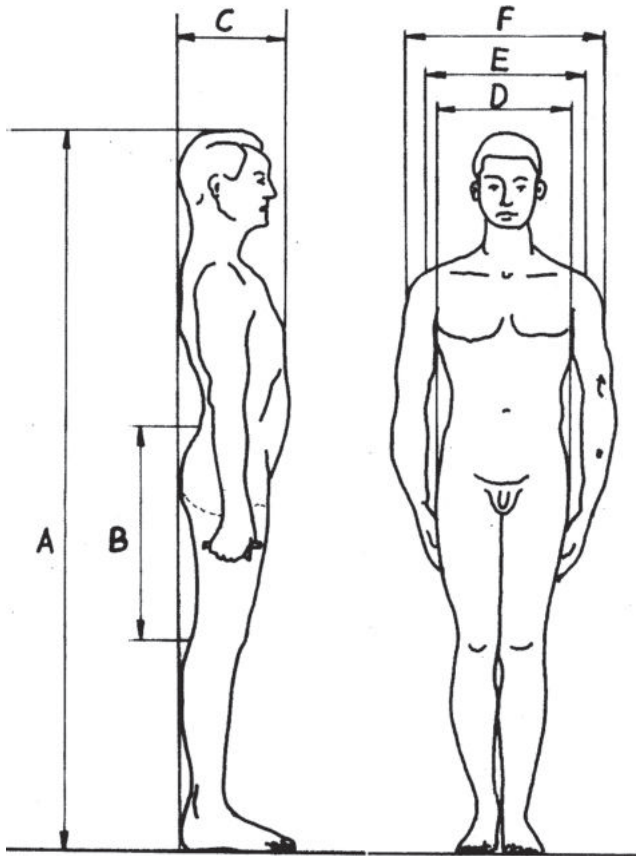
The ability to move forward depends considerably on the size and dimensions of the explorer, thus it is urgently necessary to relate the assessment to a standard caver, whose shape corresponds at best with the average caver. The installation of this standard is indispensable to grant an objective assessment.

This standard speleologist was established according to the ÖNORM 8060 for body measurements and refers to a male speleologist, the mean was taken from the age group of 16 to 60 years to achieve a wide dispersion.

The values refer to the middle 90 % of all data obtained, the extreme 5 % above and below were not considered in order not to distort the results. The following crucial measurements for creeping abilities are to be taken as standards (fig.8):

- A: body height.....1733 mm
- B: buttocks- knee length (kneecap to bottom, seated)
.....599 mm
- C: body depth (hull front - rear fuselage)
..... 276 mm
- D: hip width (distance taken from outer side of the hips)
.....344 mm
- E: shoulder width (distance over the acromies)
.....398 mm
- F: width over the elbows (distance over the surface of the elbows, measured when seated)
.....451 mm

Unless otherwise specified, all values are measured while standing relaxed.



It is very important to compare ones own measurements with these standards. If you are stouter than the norm- speleologist, you will run into more difficulties than in the assessment referred to: a passage with assessment IV will have to be overcome as if it was a -V or V. If you are thinner, you will consider the site less difficult.

Grade IV will be regarded as -III. How many 1/3 grades have to be added or deducted depends on the negative or positive deviation from the standard dimensions - the Schluffactor cs - and has to be determined individually.

Abb.8

When assessing passages it is evidently necessary to apply norm measurements and not their own grades. A slim speleologist will assess a -IV site of his own evaluation rather as IV+ or even a -V, because of his negative deviation from the norm measurements. A stout or tall speleologist will have to evaluate the passage lower than he perceives it personally.

It should also be noted that the inclination of the passages has a great influence on their difficulty. Level passages ($N=0$) are of the same difficulty, regardless which direction you go. An inclination of 30% means a difference of 1/3 grade of difficulty, 60% means a deviation of 2/3 grades, 90% means 1 grade.

Of course a speleologist going downwards takes advantage of gravitation and the passage is easier to overcome. Going upwards the passage is more difficult- depending on the inclination . The assessment of a passage at an inclination of 60% is downwards -IV, upwards a IV+.

This fact is especially important when crawling downwards close to the personal power limit and the way back is impossible without buddy aid- because the V+ downwards becomes a VI+ and you cannot master the difficulty any more.

This rating scale of passages has not yet been internationally accepted, but is already implemented by Viennese speleologists with great success. It is to be expected that other groups of researchers will also use it within a short time. On cave plans the assessment is put in Roman numbers outside the space boundary next to the respective spot, perhaps the spot will be indicated by an arrow, if it is not quite clear. Arrows are also used with longer passages to indicate the exact place of difficulties. An arrow next to the assessment pointing upwards means it is valid for the passage upwards, just as it is the other way round when it is pointing downwards. Very steep passages as well as passages with a great difference for other reasons in the assessment upwards and downwards (clay, moon milk...) will show both assessments.

Equipment

As soon as we enter a dangerous and extreme situation we need certain facilities to protect ourselves or allow the penetration into foreign environments at all. In the Schluf we have so much more contact with the harsh and cold rocks than in any other place. In addition to which we move in the hostile area of the cave. Only high quality equipment can ensure our survival!

Professional outfit:

The Schlaz

The special suit, in short called „Schlaz“, serves to save us from direct contact with the rock. On the one hand it protects us from the mechanical impact of sharp rocky crags on our skin, on the other hand it protects from moisture and thus from hypothermia. In direct contact with the cold rock the body would lose much warmth and hypothermia always leads to a loss of power. The big question is: textile schlaz or superschlaz? It all depends on the kind of cave. In water-bearing caves it is rather advisable to use waterproof material, in dry cave systems you will save your expensive superschlaz and rather risk one more hole in your textile schlaz. Most plastic suits are exquisitely suited for crawling, especially the Meander®- model, without zip in front and without pockets. In addition to this the material, usually soft PVC, has excellent sliding features. Among the textile schlazes, overalls of the Kanas®- brand are particularly reliable. They are characterized by partly high tensile strength and good workmanship. With any other work- overalls not specially designed for the cave, some changes have to be made.

Particularly troublesome are (Abb.9):

1. Hammer loops and all kind of other loops often manage to get tangled up amazingly with tiny rocky crags. Simply cut tabs and use as patchwork fabric.

2. Press studs and buttons of all kinds, especially on chest pockets. Many crawlers seem to have dots tattooed on their chest, but to tell the truth, they come from these very press-studs.

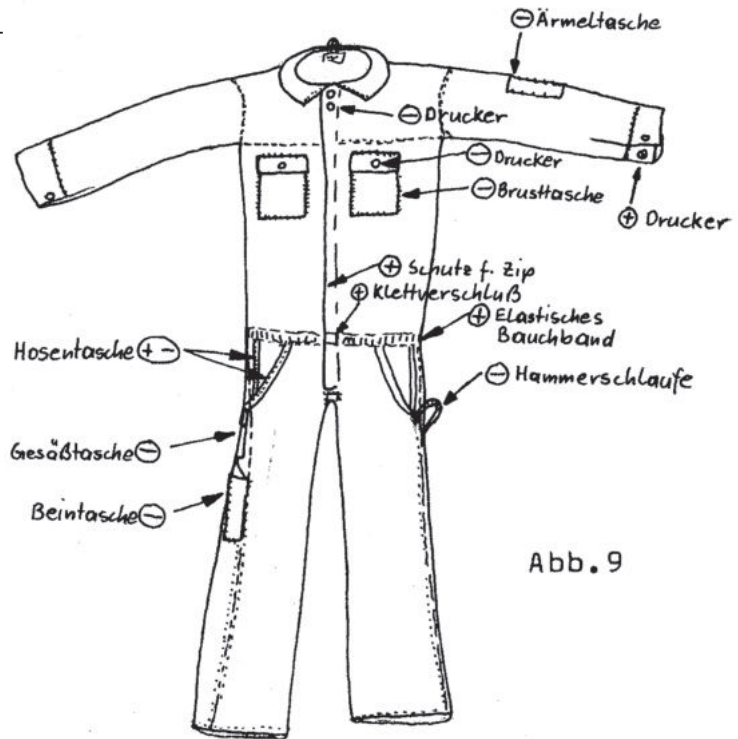


Abb. 9

3. Chest pockets insofar as they have no overlapping flaps. It is better to do without chest pockets anyway when crawling. Otherwise each item left in the pocket will leave a lasting impression!

4. The zipper is a necessary evil. Take good care that the slide does not rest on the sternum, but on the neck. The zipper should be protected in all cases by a fabric fold because a bare and exposed zipper will be abraded, twisted and ruined very quickly. It is advisable to clean the zip regularly with a wire brush and treat it with sewing machine oil and solid oils, as jamming zippers in case of an emergency may lead to very embarrassing situations. (Abb.10)

Therefore zips which can be opened or closed from both sides with slides from above and from below are preferable.

5. Pockets at the rear are absolutely unnecessary and cumbersome. They should be sewn at the top and serve as double bottom pants. All removed material should be stored and used for patching. The textile schlaz is always patched from within, so that the otherwise protruding outward edge of the patch is not a target for rocky crags. The tear itself will be covered by the machine as often as possible, so that these repaired places will never tear again!

The PVC-superschlaz is glued with patches of the same material which should have a rounded shape and be at least an inch larger than the tear or the hole in order to provide sufficient bonding area. The roughened bonding surfaces are coated with special adhesive for soft PVC, put together and pressed for bonding.

For more details look at the instructions for the adhesive material. It is very important to repair any minor damage immediately because even a small tear may cling to a rocky crag and thus causes damage of the whole schlaz.

Very important are the ends of the sleeves: here is the very place for press-studs or similar closures to prevent an unpleasant and dangerous pushing up of the fabric.

The legs of the overall should either be tucked into the shoes or tied with a ribbon. There is nothing as embarrassing for the male explorer as when the legs of the trousers are pushed up and the soft parts are in danger of getting crushed (fig. 11). A belt or anything else will drive the caver crazy because it will get caught at each and every possible occasion. If you have to pass very narrow passages (grade V or VI) no objects may stay in your chest pocket: no lighter, no reserve batteries, no keys. Ribs have already been broken in this way! Regardless such objects will leave lasting impressions on the caver concerned.



Abb. 10

The schlaz should not be washed after each trip, only hung up to dry. The washing process causes aging of the material. The suit needs washing only before sewing is necessary or if soil is part of the game. Humic acid, tannins and other natural compounds attack the tissue, the treatment with soap is the lesser of the two evils. The dirty schlaz should either be transported in a plastic bag or turned inside out. The damp schlaz should not be left in the plastic bag for too long, otherwise an excellent fungus culture will grow (mildew).

The schlaz is the most important utensil for the crawler. It provides contact with the rock like the friction shoe for the climber. At the same time it protects him.

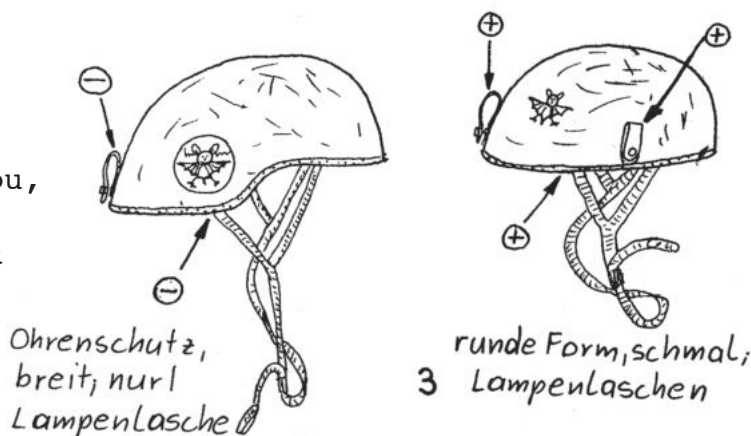


Abb. 11

The Helmet

does not protect from stonefall in the cave, but in first instance prevents the head from contact with the grown rock. Even in large-scale areas you can come into rough contact with stalactites or crags if you stand up or turn around. How much more in narrow passages where you are much closer to the rock! The helmet is often a nuisance when creeping but to leave it behind is nonsense, to which many a bloody head testifies.

When passing very tight spaces from the IV grade on you just take off the helmet and push it along in front of you, until after the passage when you put it on again. While you are not wearing the helmet you have to move very slowly and carefully.



Ohrenschutz,
breit, nurl
Lampenlasche

runde Form, schmal,
3 Lampenlaschen

Abb. 12

But most of the time this will be the case anyway. The form of the helmet will decide, from which grade onward it is better to move without the helmet.

Helmets which cover your ears usually are wider and less flexible than round and smooth models (fig. 12). The material as a rule is of synthetic substance or fiberglass reinforced polyester. Which material we choose for our purposes does not matter much. We do not have to consider rockfall like climbers, unless we want to do shaft climbing. For this purpose fiberglass reinforced polyester is preferable. Care should be taken that the helmet fits well, does not slip and its weight is light.

An important detail is the fastening tabs for the headlamp. For creeping they are inadequate most of the time. Here you have to help yourself with your own design, eg. additionally riveted leather straps or aluminum sheet tabs for attaching the lamp head- band. For helmet with ear protection the headband can be hooked behind it to prevent the lamp slipping back. In any case it is important that the headlamp is easy to take off and be used as a handlamp, thus do not use fixed headlights!

The Light

A caver without light moves as if it were dark night (Old saying). To light narrow parts of the cave is always a problem. Much light is reflected by the closely spaced cavity walls, so only a little light is necessary to illuminate

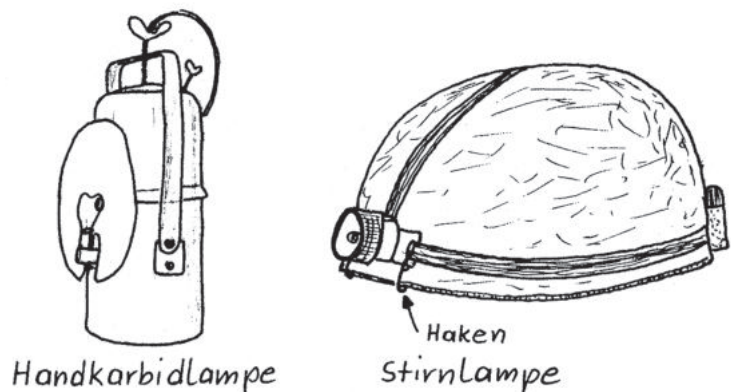


Abb. 13

the entire room. Basically there are two types of lamps in use: (fig.13) X The electric light (headlamp)
X The acetylene (hand karbide light)

The Headlamp

It will be fastened to the helmet by the provided tabs. At the first use you will notice that it constantly slips from the helmet, which can be very annoying. The problem is to fasten the lamp tightly on the helmet and at the same time make it removable.

Fixed to prevent it from sliding down; removable to make it possible to carry it in the hand at very narrow spots without helmet on the head. Even when surveying a mobile lamp is important to read the instruments. Mounts with adhesive tape are not useful, because once they have been solved they no longer hold.

The thoroughly tested Petzl® lamp has two hooks in front on its latest model, by which it can be hung easily to the helmet. You can apply such hooks with some skill to mount elderly or similar models yourself. The use of a headlight as a handlamp is very important if you want to throw light through a gap inside a continuation.

You extend the arm holding the lamp as far as possible into the continuation, in order to prevent self blindness (fig 14). It is favourable to master the removal and replacement of the lamp with one hand and in different body positions; a skill which is needed very often in real life and which may be trained at home easily.

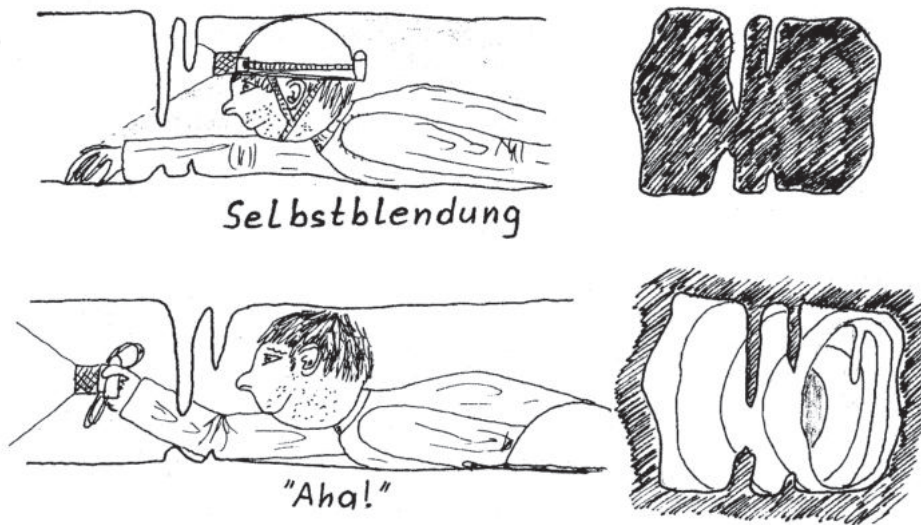


Abb.14

The Carbide Light

It can only be used as a hand lamp. The carbide canister is a great obstacle, in addition it requires a belt; the acetylene hose is always where it bothers you most, whereas the electric lamp is always fixed. In addition the acetylene flame on the helmet causes ugly black marks on the cave ceiling. Carbide canisters and carbide helmet lights are used in shafts and large scale cave systems, but not in narrow passages. The hand carbide lamp can always be set aside or hung up by a hook, if it is a hindrance. The lamp is usually held over the head with extended arm. Anyway, a passage is regarded as feasible, if the lamp passes this way. For spanning waterborne points or steps in the passage the lamp can be used as a crutch in handrail support, which is quite handy. While climbing hang the lamp with the hook in front of you or hold it with the thumb on the hook or on the bracket. It is very sensible and practical to connect the hook with a 5cm ring of accessory cord to the screw.

First of all you will not drill the hook into your hand anymore, secondly you can pry open the often glued closure of the watertank by means of the hook, thirdly you can scratch remnants of the used carbide from the lamp with the so attached hook. A particular problem is the transport of carbide lamps in the slip bag because water leaks out regularly. Therefore the water must be poured out or transferred into a bottle. Ketchup bottles made of plastic prove here extremely effective, because they make it possible to absorb some drops of water from even the tiniest retention. Even a short rubber tube provides this service very well but you risk getting a mouthful of often not very clean water.

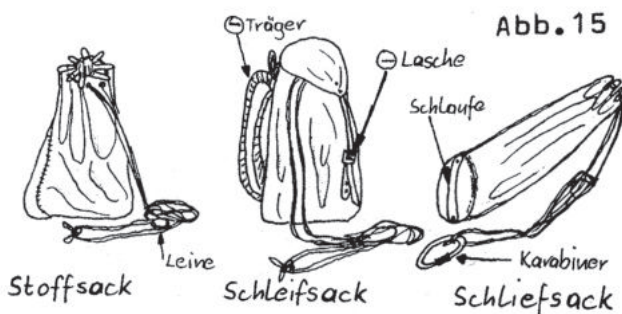
Especially in narrow passages a small burner brush is important, all too often the burner comes into contact with mud or water. The small brush hangs either on the lamp or by a thread in the battery container of the lamp, where it is better protected. A catastrophe easy to avoid is, if the brush breaks apart in the breast pocket of the schlaz and each strand of wire individually pierces the skin. The lighter for the hand lamp is put in the slip bag or is placed in the pocket of the schlaz, where it interferes the least.

The Slip Bag

The slip bag - most fondly called „shit bag“ - is the means of transport for all equipment except lamp and helmet, the only ones carried in the hand or worn on the head. Ideal are bags made of soft- PVC, which have the smallest possible cross-section and look like elongated sausages. The bag has no sling, loops, beams etc., which could get caught (fig. 15). The only disadvantage of such slip bags is that the material located at the bottom of the bag is not easily accessible. You have to empty the bag upside down.

Simple jute or linen bags are well suited, too. They are topped with eyelets and a cord through them or they are simply tied. These bags are relatively cheap but not as tear resistant and waterproof. An approximately 3 meter long accessory

cord loop serves to follow suit. The far end of the bag has a flap in order to lift it over steps and through bottlenecks. If this flap is located at the bottom of the bag, it can not get caught.



When creeping over distances you keep the end of the rope in one hand and move until the rope is tensioned, then pull the bag to you and so on. If the bag gets caught, the problem can be solved by wrapping the line around the foot and lifting the bag while pulling simultaneously. For short bottlenecks the end of the line is weighed down with an (old) carbine and thrown forward. You pass the point and pull the bag to you. It is useful if the preceding person pulls the bag while the man behind prevents it being caught or lifts the bag over the bottleneck. Nevertheless it remains a „shit bag“ and you should act according to the rule „take nothing with you“ and have only the bare essentials in the bag. These will be spare batteries, carbide, measuring tools and brandy.

Accessories

Gloves are not always pleasant to wear if you need sensitive fingers (changing batteries, untie a knot...) you should take them off. However, gloves are advisable for tender hands because hands suffer under the strain of crawling like everything else. After a caving tour, „apres grotte“, it is advisable to use a greasy hand lotion for hand care, because the muddy or sandy sediment acts as emery and the skin becomes dry and brittle. Gloves are essential for caulking and digging works, gloves belong to hammer and chisel.



Abb. 16

Knee Pads are very pleasant on stony or debris- covered ground, especially on longer passages of grade II or III. Volleyball or handball knee pads are worn over the schlaz, but usually do not have a long life. In very narrow, especially winding passages, the pads may affect the freedom of movement, limiting the buttock- knee clearance. Here you can possibly push them below the knees or drop them entirely. The very stable rubber protectors of the tilers are pretty chunky and actually may be used only in II or III grade passages, but they are very comfortable.

Unterschlaz: under the schlaz it is best to wear a cotton camisole and long underwear, no trousers with belt (buckle!), no shirt with buttons. Commercially available unterschlaze, especially designed for this purpose are usually too thick and too hot and also relatively expensive.

The Shoes: Chunky mountain boots jam easily. Light hiking shoes or sneakers are better suited for crawling, depending on the nature of the cave and difficulty of the climbing areas. Rubber boots are only of limited use because the ankle is not very flexible, which might sometimes be a hindrance. They will probably still be worn in active water caves. The so called trekking shoes, which are partly made of plastic show good results. They are relatively waterproof and bear the strain of crawling very well.

Tools: Sledge hammer and climbing hammer together with short chisels are suitable for expansion of narrow spots (fig. 17), they need to be short because there is usually very little room to take a swing. Hammers that can not be easily handled with one hand are generally unfavourable and recommended only in special cases. For plastic sediments (sand, mud, debris...) hammers with cross-standing edges are used and shoes with small, slanting blades. The stem should be too short rather than too long, because of the narrow space. Otherwise you can not work properly. Crowbars and other tools for clearing uptight debris complete the line. Explosives are not discussed here. Favorable are trailer loads with plastic explosives that are detonated by electric spark. For drilling blast holes a drill bit and hammer are used or an electric drill, in this case Donarit will be used to blast.



Abb. 17

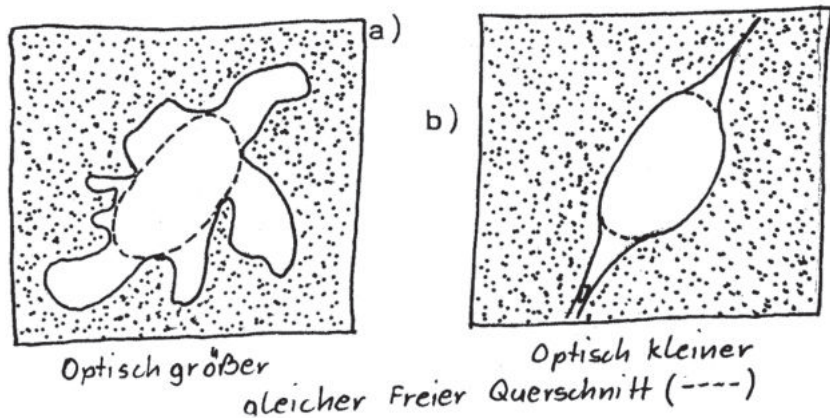
Warning on explosive Gases!! The nitrous fumes which are produced in the blast are highly toxic. There have been casualties already! Accurate knowledge of the ventilation relationships is necessary, explosions are generally the task of authorized and trained professionals.

Techniques

The Optical Range

A narrow spot is limited by its cross-section which can have various forms. It depends on this cross section if and with which technology the site may be overcome. It is a mental phenomenon that may happen, that invincible tight passages give the impression of being wider than simple ones. Our perception is based on a certain area of cross section profile and ignores that protruding spikes make progress impossible. Only by much practice can the eye be trained to assess passages realistically (fig. 18).

a) is optically wider than b), but the free area is smaller
b) seems to be smaller than a), but the free cross section is wider-the passage is easier.



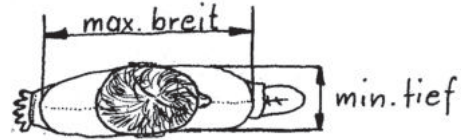
Profile and Technique

The fine art of crawling means aligning the cross section of the body with the cross section of the bottleneck or constriction. The essential elements of the technique are the position and orientation in the passage and the position of the arms and legs. Each passage, each profile requires a different position, a different technique. This is the excitement and variety.

The limiting measurements are body depth and chest width for men and hip width for women. If the passage shows severe corners, the length of the thigh (femur) is an additional limiting factor. Following is a list of the most important positions and attitudes, which can be but a rough directive. In real life one is usually forced to change positions in quick succession or use combinations of techniques.

O With the arms applied to the body the chest muscles (m. pectoralis major et minor) and shoulder muscles (m. trapezius, m. deltoideus) are relaxed, exhalation is relieved, the body is slightly low.

The lamp is carried forward, the bag is in the rear. (fig. 19). Application: in high canyons and narrow ravines.



0 If both arms are stretched high the body cross section width is minimal, the chest and shoulder muscles are a little tense, so the depth of the body is at maximum (fig. 20).

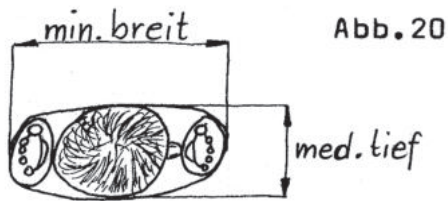


Abb. 20

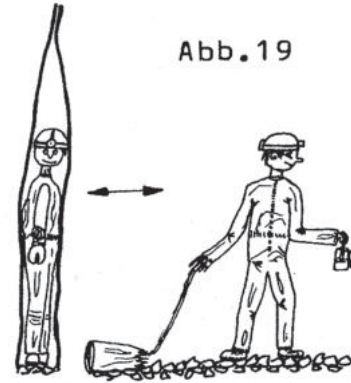
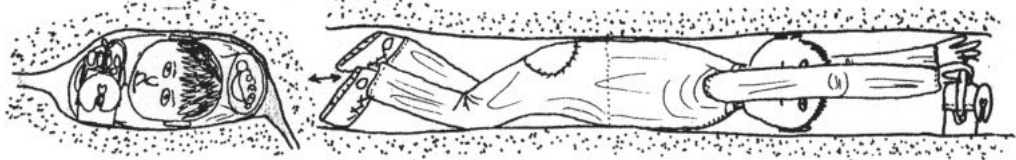


Abb. 19

Advantage: after passing through the bottle neck with the shoulder belt, the rest of the body with elbows and arms can follow suit. The hand lamp and the helmet may be pushed ahead with both hands. The bag follows with an extra long leash hand drawn, or the leash attached to the leg.

Application: in passages with approximately round or oval profile.



0 One arm high, one below: oval body profile, the side of the extended arm is deeper, the one of the indrawn arm is more shallow. Helmet and lamp can be pushed with the front arm, the bag follows suit (fig. 21).

Application: canyon profile, profiles with a wider and a narrower part, oval profiles. Ordinarily, this attitude is the best and most universal of all in use; here the stretched arm comes to rest

below. Thus body and arm form a straight line that glides perfectly on the unevenness of the surface (fig. 22). The arms may fit in the side slots of the profile. The front arm is used for tightening of the body, the rear for pushing.

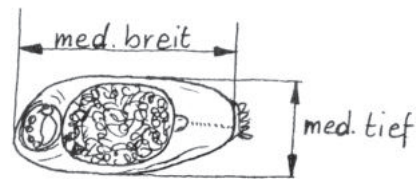


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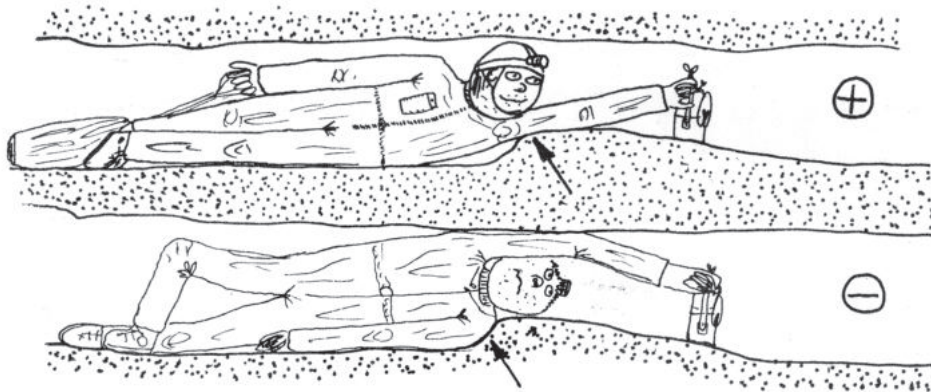


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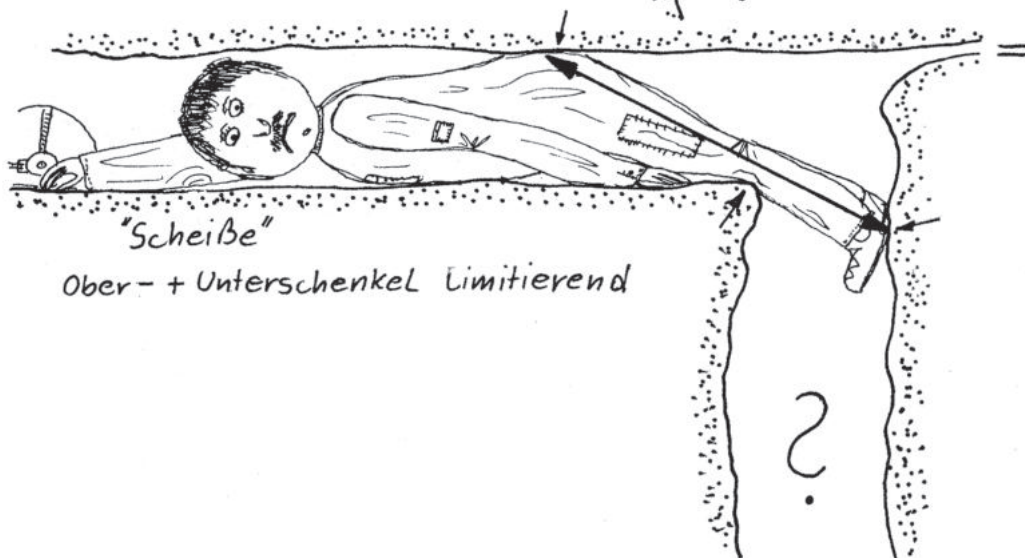
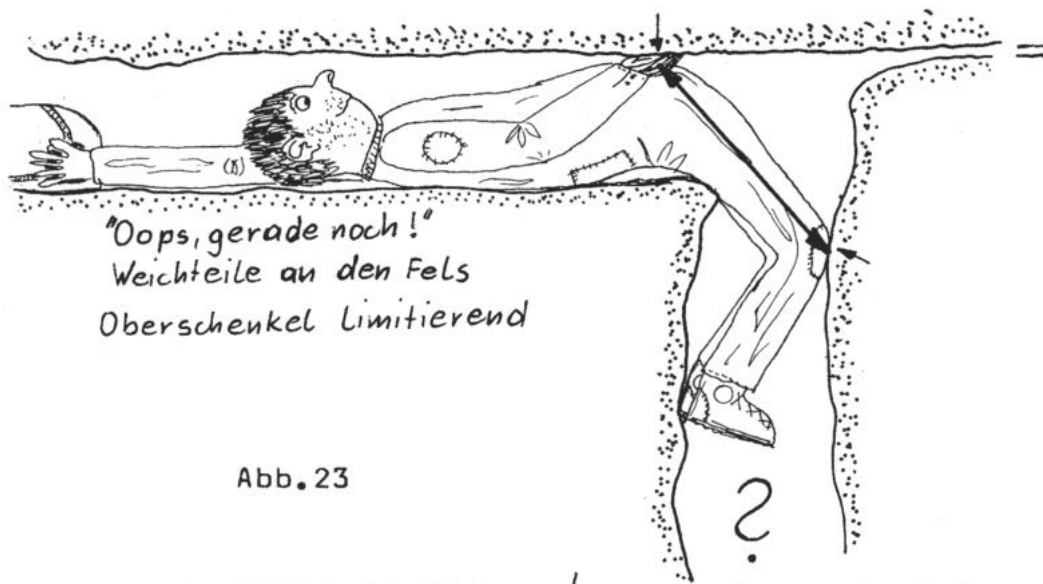
What comes first: Head or Feet?

The rule for horizontal, unknown passages says: always the head first. The feet have nothing else but corns (German: "chicken eyes"), which are covered by shoes. With the head you can assess the situation much better and discover a continuation easier. If you really can not turn around, it is nevertheless possible to get out in this position again. Whether you enter feet first and get back head first - or vice versa - requires the same effort. But if you crawl head first, you have the much better perspective. If it is possible to turn around, you can go in and out head first. For passages with inclination the rule says: go down feet first, go up head first.

Crucial is the fact that 30 degree slope means at least 1/3 degree difference in difficulty ascent and descent. Only if you can count on reliable buddy aid and carry the necessary rope along you can head into unknown passages in order to have better sight into them. In vertical crawling passages the body does not load automatically at the rock or sediment. The adhesion has to be generated active by using force and friction, with spine and foot, elbow, knee and hand as counter bearings- press everything you've got against the rock.

Vertices and Edges

If the passage forms a strong corner or step, it may happen that the longest, rigid part of the body, the femur (thigh) will not be accommodated. It can help to bend the leg and push it through along a diagonal. You turn your back to the edge and your belly to the corner, because for anatomical reasons your knee can bend only in one direction (fig. 23).



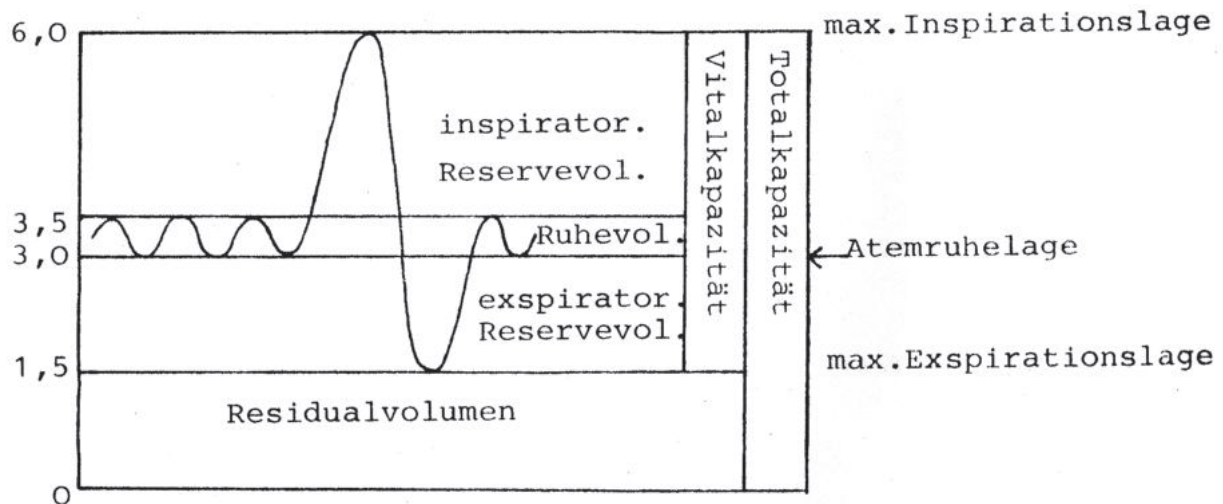
Otherwise the bare femur length would in a different position be replaced by the full length of the femur and tibia as a limiting size. The rule goes: „Soft parts to the rock!“ For overcoming corners often adventurous contortions are necessary. Beware of passages with moon milk or clay lining!

Even though the descent is just a grade III, the ascent may be impossible without the aid of the comrades because of the slippery walls, and the chamber will turn into a dungeon. If the lining is thick enough it sometimes helps to beat steps into the moon milk or the clay.

Breathing Technique

The chest in its depth is usually the limiting factor. It is therefore reasonable to reduce its size by the exhalation. Our lungs take in 5 to 6 liters of air. At rest a 0,5 liter of air per breath will be sucked in and discharged again (relaxation volume).

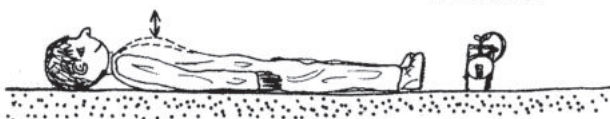
By deep inhalation (inspiration) an additional 2 to 3 liters of air are taken (inspiratory reserve volume) and by maximal exhalation (expiration) an additional 1,5 to 2 liters of air can be exhaled. Even after complete exhalation 1 to 1,5 liters of air still remain in the respiratory tract (residual air, fig. 24). These values vary naturally with age, height, gender, training status etc.



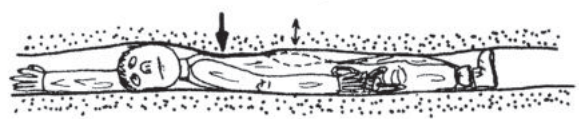
For us maximum exhalation is interesting. The chest loses 3 to 7 cm of depth, which is often very valuable. A person, however, does not only breathe with the chest - also with the diaphragm and the abdomen (fig. 25).

normale Brustkorbatmung

Abb. 25



Zwerchfellatmung im Schluf



This diaphragmatic breathing is very important. If pressed in a narrow passage fully exhaled you do not suffocate. By stretching or pulling of the diaphragm and abdomen your breathing is shallow, but still sufficient. Shortening of breath occurs only, if one panics and does not breathe quietly with the diaphragm, but attempts to breathe against the barrier of space limitation with the chest.

Even if a bottleneck can be done over long distances only exhaled (VI to VII), there is always the possibility of diaphragmatic breathing. The breathing is spasmodic, care must be taken particularly on exhalation. The psychological barriers are generally much larger than the actual physical ones. You can achieve a great deal by training.

Turning around

Turning around in narrow passages causes the crawler to make the most adventurous and acrobatic contortions and actions. Turning around is only possible if the profile permits curling or rolling of the body or is sufficiently wide, to ensure a smooth and reclining change of position. When turning around the length of the leg bones and possibly size of the shoes and the head is frequently limiting. It are the legs and the head- chest section that have to swap space. The best method is the somersault or embryo tactics (fig. 26).

The body is brought to the smallest possible volume - according to the dimensions of the passage which is accomplished by an embryo like attitude. When crawling the law of the smallest cross section rules. Turning around is dominated by the law of the lowest volume.

From a spherical position you start half a somersault which ends when the operation of turning is completed and the normal attitude of crawling can be resumed. Similar to crawling it is also convenient to use natural cavities and niches for storage of the extremities. You deviate from the egg shape and (as in crawling) adapt forward to the external environment.

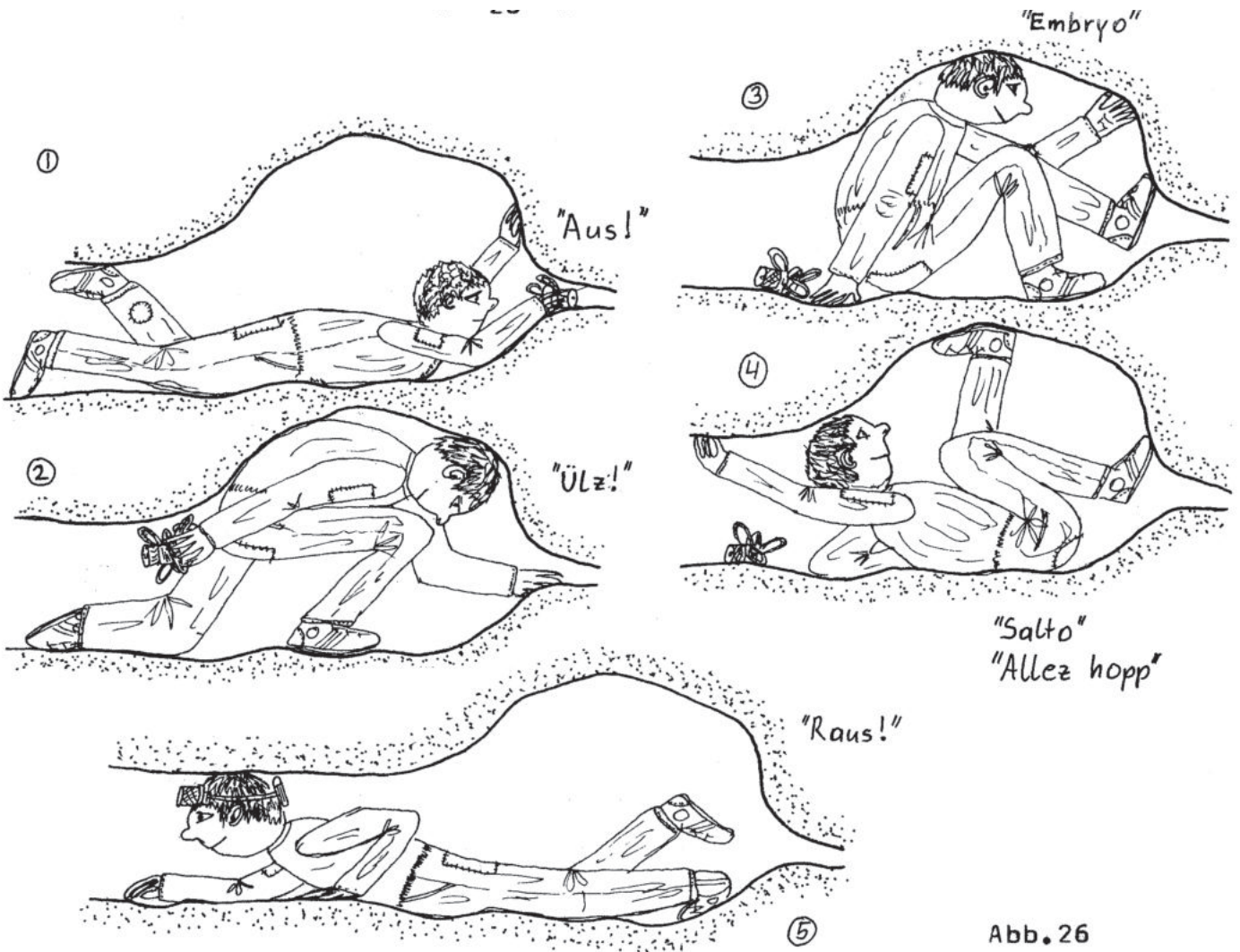


Abb. 26

Mates' Help

Buddy aid is not only a matter for emergency, for serious crawling enterprises it is an efficient way to pass a site. Especially here cameraderie is something very essential. The joint overcoming of a difficulty is always more important than the personally supplied performance.

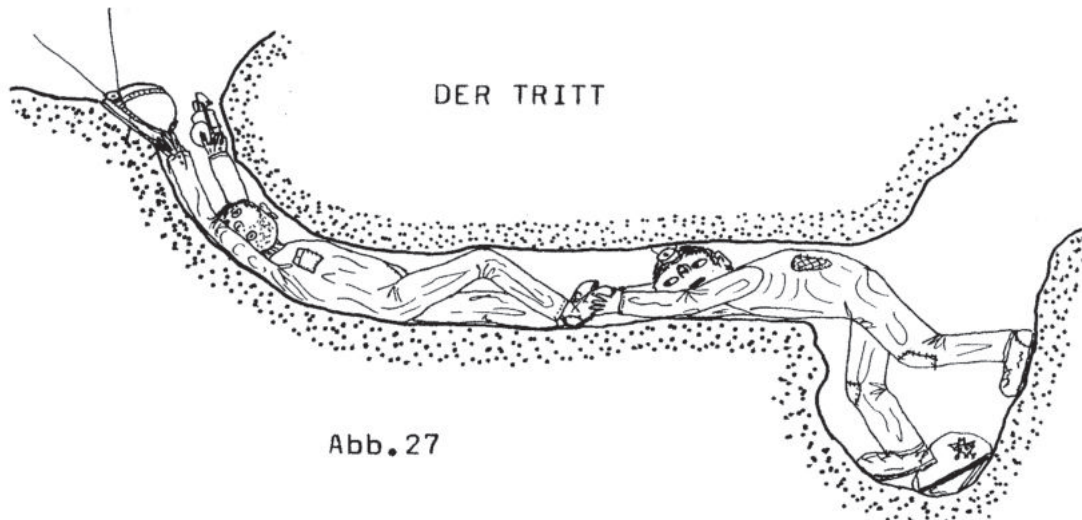
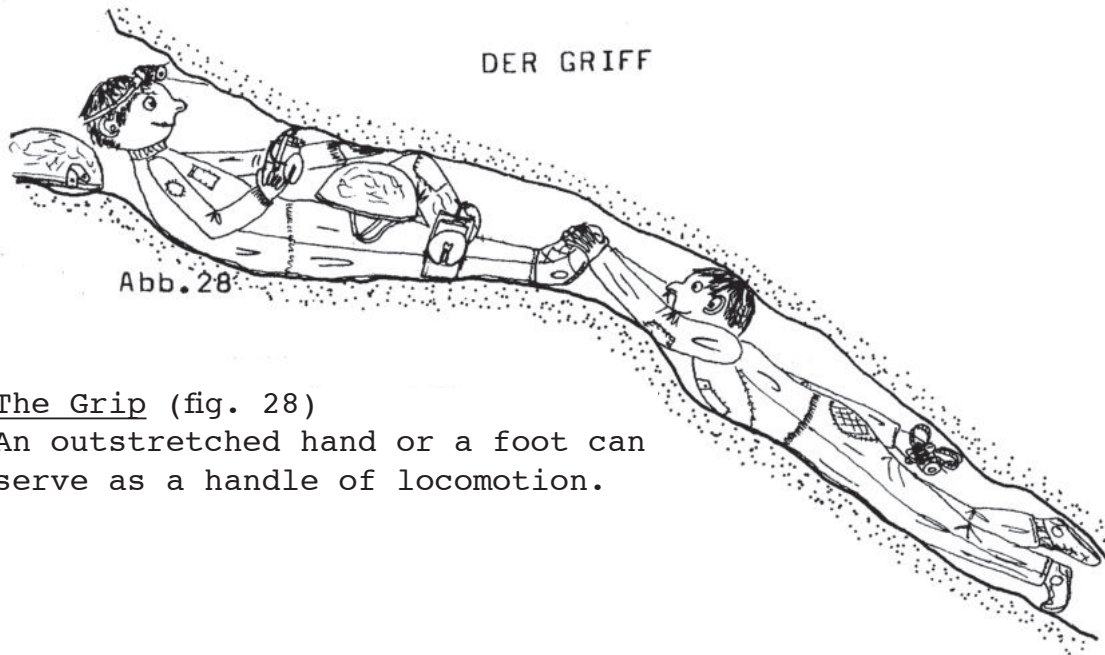


Abb. 27

The different methods are:

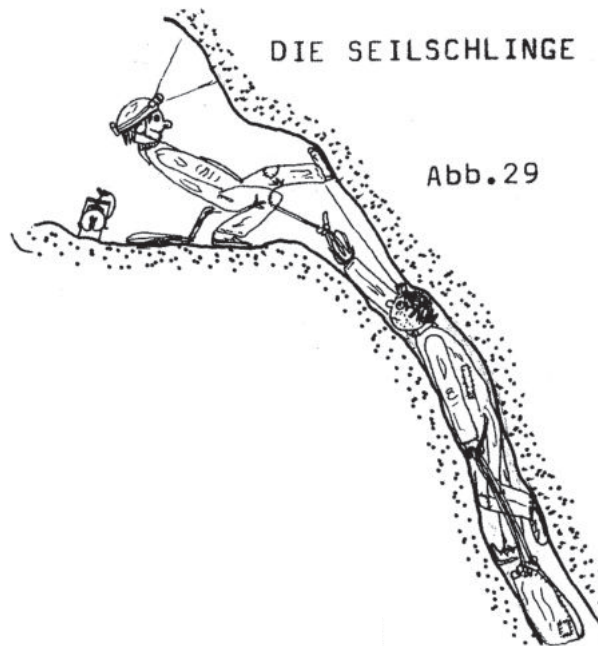
The Support (fig. 27)

The helper offers with his hands, feet, shoulders or head a support for pushing forward. Even the human climbing tree (predator head) is quite useful in climbing tight passages. The crawler has to move his legs very carefully and slowly not to damage the helper. A rope sling let down from the top can also be used as stepping loop.



The Grip (fig. 28)

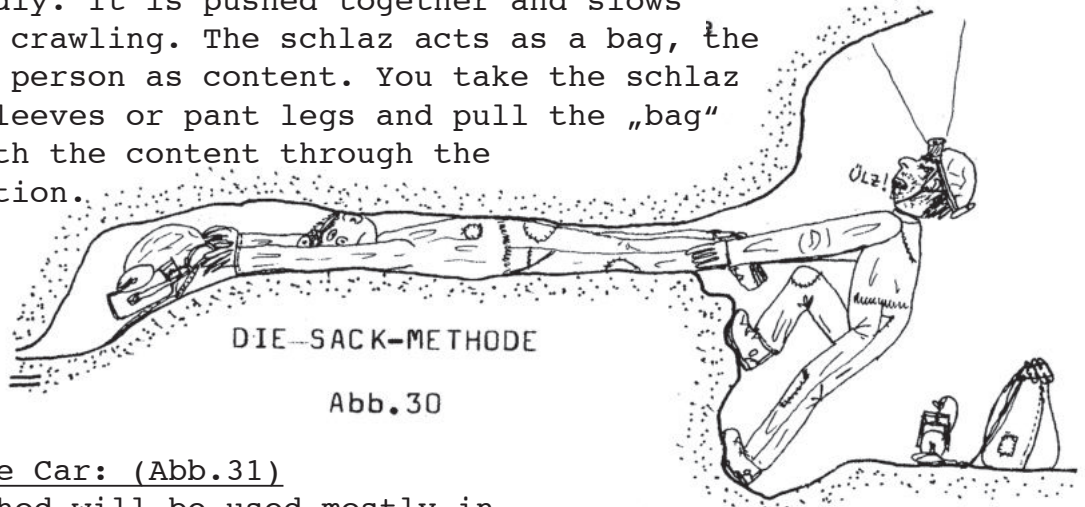
An outstretched hand or a foot can serve as a handle of locomotion.



Very handy is an end of a rope with a noose by which the crawling person is drawn (fig. 29). The same method is applicable with a noose around the leg.

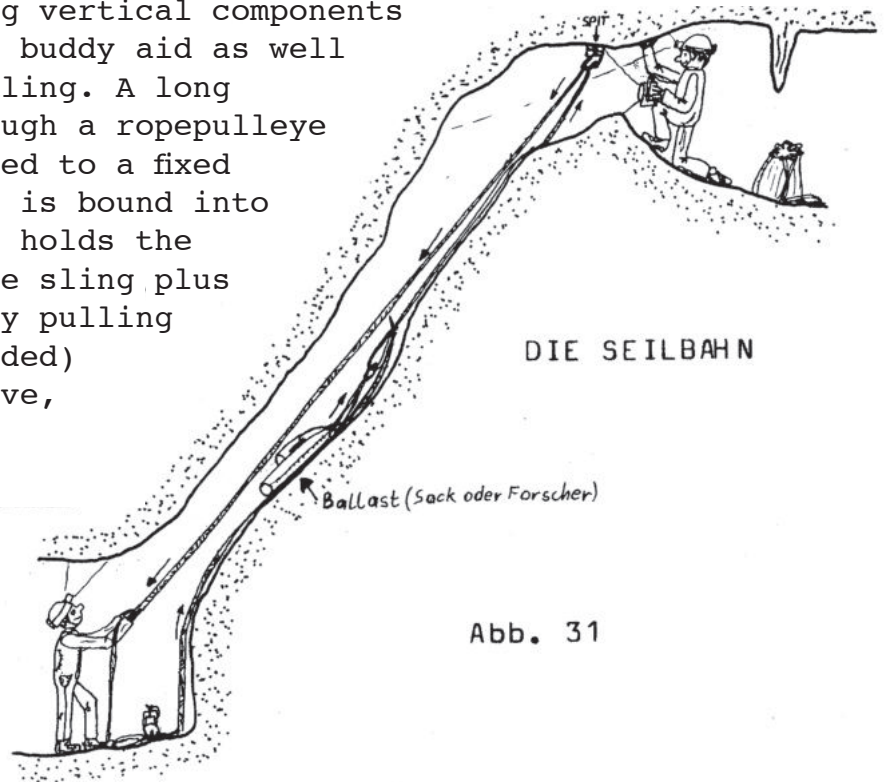
The Bag-Method (fig. 30)

This helper method assumes that it is usually the schlaz that slips badly. It is pushed together and slows down the crawling. The schlaz acts as a bag, the crawling person as content. You take the schlaz by the sleeves or pant legs and pull the „bag“ along with the content through the constriction.



The Cable Car: (Abb.31)

This method will be used mostly in passages with strong vertical components and is suitable for buddy aid as well as for baggage handling. A long cord ring runs through a rope pulley or a carbine attached to a fixed point. The slip bag is bound into a loop respectively holds the crawling person. The sling plus annex is drawn up by pulling on the other (unloaded) end, discharged above, dragged down, etc.



If you bind a fruit tray or similar container to the loop, you get a convenient means of transport for excavated material

Limitation, Risks and Dangers

The limits of crawling lie in our own body, both in terms of the degree of training and the bone structure. Obesity, beer belly, clumsiness and poor condition often set a limit for crawling against which we can fight, however. We can move to more difficult levels by self, discipline and training. Eventually the best trained, slimmest and most agile creeper meets the upper limit of performance. The bone structure is limited by the dimensions of chest and pelvis or by the length of femur.

In this case you only can make room for leaner and smaller competitors and try to keep your shape. If you can not squeeze through a grade VI in spring, which you managed easily in fall, it is time to cut the winter fat.

Each one of us has been asked before, if he was not afraid of getting stuck. This fear seems to be rooted in men since time immemorial. This risk is only of fictional matter. Whatever you get into, you can get out again, even if the schlaz is pushed together and everything seems stuck. However it is dangerous to panic because you can get hurt significantly by wild, uncontrolled movements. Anything can happen from sprains and bruises to lacerations.

The risk of a downward passage becoming a prison has already been mentioned. Another high risk represent breakdowns and loose material which is being crept through. The only way to really get stuck is if the profile changes dramatically during the passage creep, which can be achieved for example by tumbling or tilting blocks or loose material. Fatalities of this kind have already occurred. In one case a head- shaped rock was sufficient to wedge the unfortunate until his death from exhaustion in the constriction. If the spatial profile of a tight passage is very small, the airflow, if present, is much stronger than in the large- scale parts. Due to the constant drafts the heat loss can be significant, especially in wet clothes.


Hypothermia is always associated with a decline in performance, it can easily lead to exhaustion. Therefore warm clothing (unterschlaz) is important. If possible, collapses ought to be tested thoroughly for strength and stability before passing them, contact with the ceiling and the walls should be avoided. All caves, tunnels or earth stables in loose material such as sand or loess can become a trap, when parts of the ceiling break down. With some caution accidents of this kind can be prevented. Far more courage is necessary to turn around in front of a dubious narrow point, than to force a (maybe fatal) penetration!

In comparison to other high performance sports the health risks tend to be low. In addition to the usual cavity diseases such as colds, rheumatism, lumbago, sciatica and gout come from crawling abrasions, sprains, and in rare cases sternum contusions and rib fractures. Of possible chronic diseases the bursitis of the knee joint is to be mentioned, which can be avoided however, by wearing knee pads. Otherwise, crawling trains all the muscle groups of the boy and provides good physical condition and agility.

Mental Aspects

The above- mentioned psychological stress may be even more limiting for the individual caver than the body measurements. The fear of getting stuck usually plays a major role. Especially where the chest fills the whole profile and it is necessary to exhale, it feels as if the rock would move, the bottleneck will close and you will be crushed. Apart from collapses this fear can well be rationalized, because when crawling in the bedrock such movements are impossible. The fear of not being able to turn around will quickly disappear when trying to deal with a passage close to the personal limit of performance and to go into it head first and come out again feet first. You will see, it works! The right motivation is an important component.

The question „Why am I doing this?“ arises at least when you squeeze yourself through a constriction entirely dirty, soaked with a torn up schlaz and battered knees and your belly in a puddle of water.

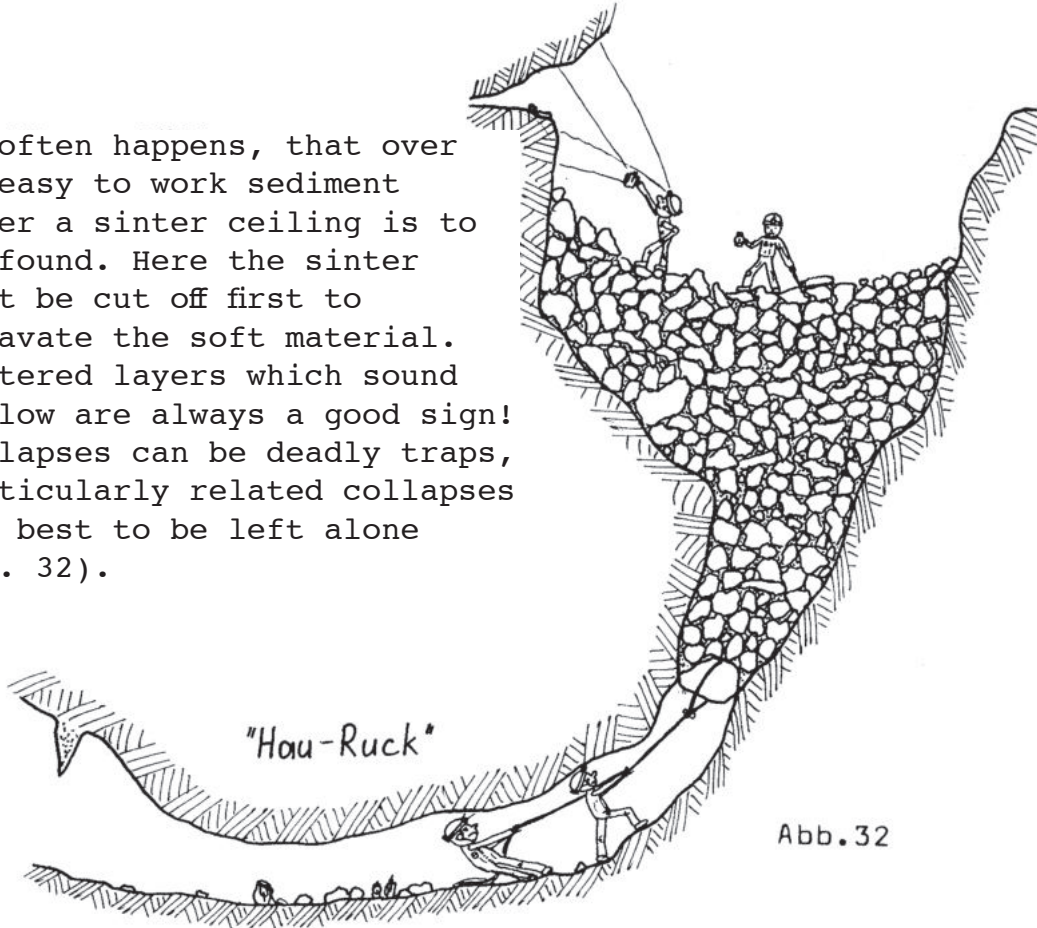
When the  bag gets stuck again and again. Here it's important to have good friends who inspire and motivate each other to keep going. The maverick will soon lose interest and turn around, while crawling partners say to each other that it really is not that bad, encouraging each other to creep on. Crawling on your own demands a lot mentally, because the assistance of the comrades falls away. The knowledge to rely on yourself with no other aid increases the risk but deepens the experience. In general however, to creep alone is not acceptable. The objective dangers are too great to manage without the help of a friend.

Artificial Extension

Apart from blasting - which is a matter for experts - it is feasible to transform previously impassably narrow sequels by manual labor into passable tracks. The profile is modified with hammer and chisel until it is possible to get through. The fine art is to achieve as much as possible with minimal effort. To chisel in a tight passage is very tedious and exhausting, work gloves are essential to avoid bruised hands. Naturally, protruding prongs are knocked off before the laborious removal of the smooth, upcoming rock begins. Comfort yourself with the fact, that all medieval coalmines and the great Roman and Greek underground constructions were chiselled out by hand with sticks and hammers by slaves. It is much easier if you find soft, plastic sediment at the bottom of a narrow point.

It is essential to prefer such places. The sediment is dug with a hoe and deposited at a convenient location. For transportation of excavated material a cable car with a bucket or a fruit crate can be used.

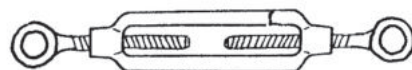
It often happens, that over an easy to work sediment layer a sinter ceiling is to be found. Here the sinter must be cut off first to excavate the soft material. Sintered layers which sound hollow are always a good sign! Collapses can be deadly traps, particularly related collapses are best to be left alone (fig. 32).



Finer material (frost debris) can be eliminated by hand or with a hoe, larger blocks are rolled away by hand and piled up on the wall. For very large blocks that need to be raised it is recommended to tie the end of a rope around the block and join forces to pull, while a person conducts the block on the right track. If blocks are unstable in steep passages, they are fixed on spits with wire ropes to prevent them from crashing.

Very heavy blocks can be moved with improvised hoists, winches and wire clamps (fig. 33-37) or you break them into manageable pieces.

With so much effort it is good to consider if it's worthwhile.



Drahtspanner

Abb. 33

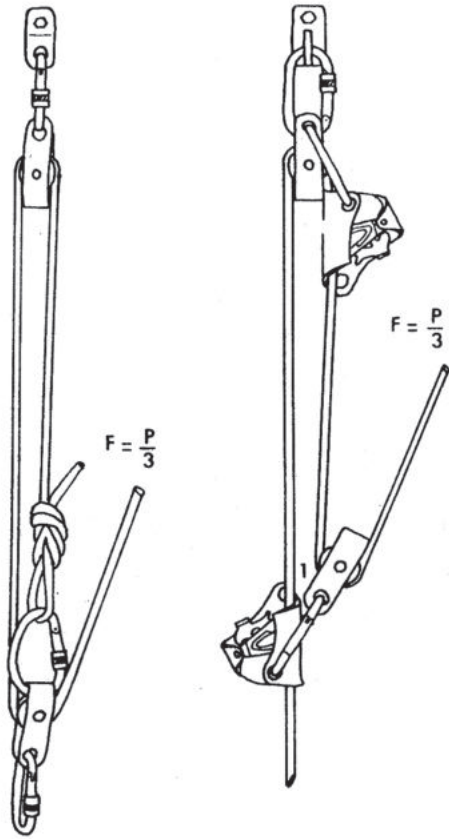


Abb. 35

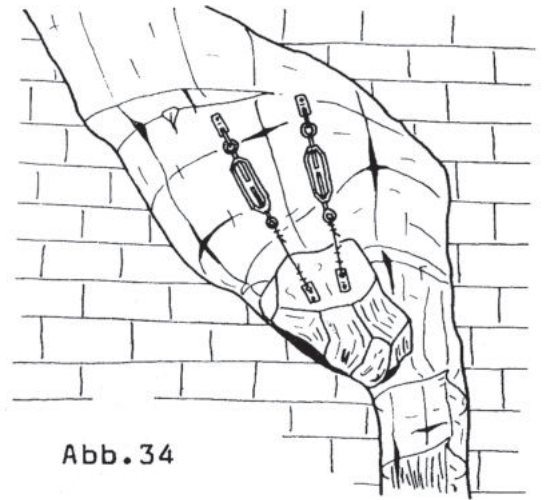


Abb. 34

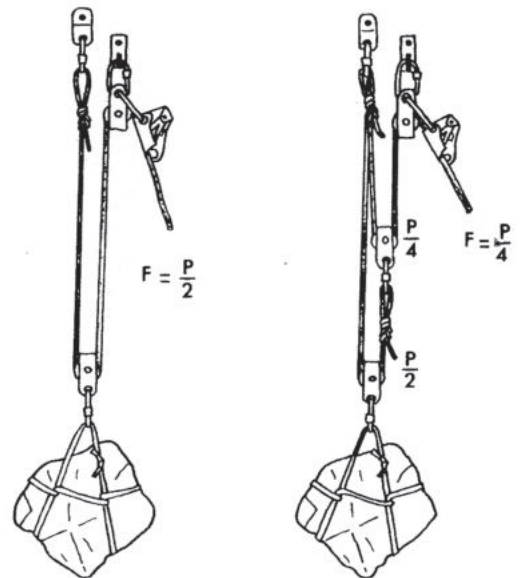
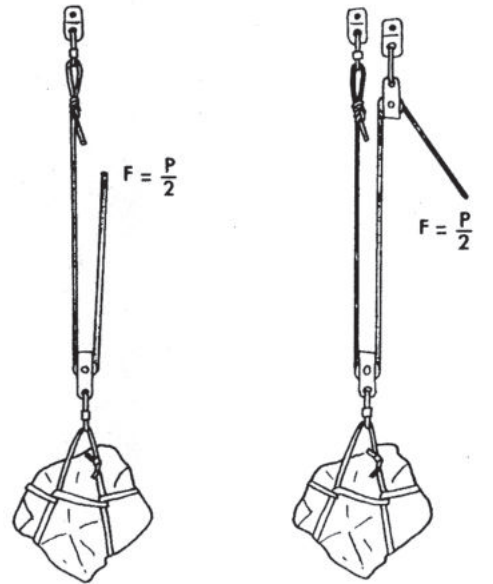


Abb. 37

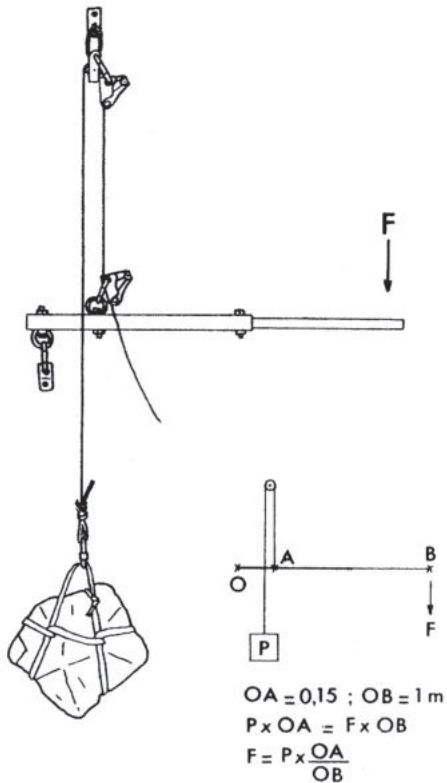


Abb. 36

Survey in Narrow Passages

The measurement in tight passages is one of the most adventurous and arduous enterprises underground. Bottlenecks can often be registered by a single polygon line, you can target from both sides easily and draw - not in a longer constriction! The tape is applied to the body. You can't turn your head to target and you are hopelessly entangled in a pile of tape, drawing portfolio, measurement tools and marking paint.

Often it is useful that the frontman precedes with his feet, targets and marks points while the person behind illuminates the points and holds the tapeline. Colour markings in tight passages are to be positioned in a way so that they can't be whiped away by the schlaz of the person following. Don't tend to put them on vertices and edges. Only in rare cases you'll be able to target the line between two measuring points.

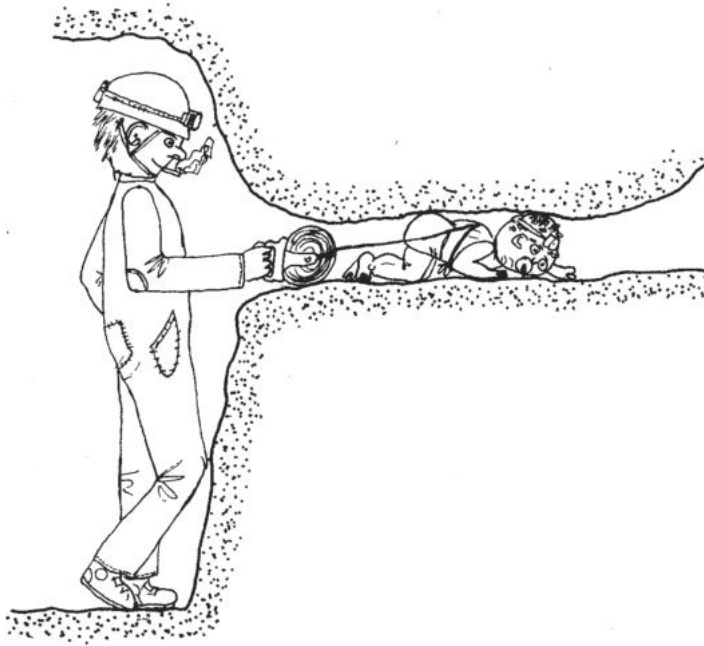
Usually you have to be careful that the head is somewhat on the measuring line, one point is behind your head, one is envisioned. The sketch book must not be too large-sized, otherwise it may not be possible to open it in the site.

Especially in a narrow passage, where everything happens in the smallest of spaces you have to make sure that the compass is not distracted perhaps by a carbide lamp. There is usually enough light if the person behind who does the drawing carries a torch for sighting the measurement point, while the targeting caver has only a headlamp. Whoever has the enjoyment to measure closer distances - where no polygon line is more than 2 meters long - will admit: there is hardly anything more arduous.

Sportive Crawling

In contrast to normal creeping the goal of this sport is not to explore new territory, nor to reach certain parts of the cave. It is crawling just for fun. This is not mere overcoming of a bottleneck. More parameters are taken into account. Either the time counts or a handlamp and slip bag have to be taken along. Sometimes the aim is to creep the maximum distance in a certain time. Sportive competition includes going solo or without light as well.

Sportive crawling is a young discipline but there are already competitions in which crawlers of all ages test their skill. Sportive crawling can either be seen as a distinct discipline or as training for ventures into unknown territory and the rapid economic movement through narrow parts of the cave. In any case the sportive crawling has high sporting values, the performance limit is driven up to the absolute maximum. Insiders are already discussing the eight' grade. To overcome still more severe bottlenecks soon toddlers and midgets are to be employed. Will that be music of the future?



Latest Findings

(Annotation: This chapter is taken from the original script as well, so „latest findings“ accords to the Year 1985) Since the first edition of this booklet the development has not stopped. With each caving tour we gain new insights about things that are useful, practical and worth knowing, each site helps to increase experience. Here are some of these new findings:

For Ladies

There are some special instructions for female cavers, in addition to their basin as the limiting factor: Ladies with larger bust sizes will not want to forgo a bra even when crawling. But since closures inevitably leave their marks when passing very tight spots, it is recommended to remove

the different brackets, hooks, eyelets and buckles and to simply sew the bra. The application and removal becomes more complicated, but there will be no blistering.

It is understood that ladies and gentlemen with very long hair store their curls under the helmet as braids or a knot. Brand new hairstyles with the carbide lamp can thus be avoided.

Another danger is getting stuck in V- shaped passage, especially with strong airflow. That has already happened a few times, usually with fatal consequences.

V- shaped profiles are characterized by the fact that they are passable in the upper part but beneath they are too narrow. The body which follows the laws of gravitation has the tendency to slip to this lower, very narrow part. If you can't exert enough resistance by supporting and wedging, you will inevitably slip into the lower part of the profile and often can't free yourself, especially if you are already exhausted.

In strong airflow and with wet schlaz there is a risk of perishing from hypothermia, particularly since the cold rock withdraws additional heat from the body (fig. 38). As a remedy, you ought to strive to stay in the upper part of the profile or once you slipped, to get back again immediately. You can also fill out the lower part using materials (ropes, slip bags, stones etc.) and ward off the danger of slipping down into it.

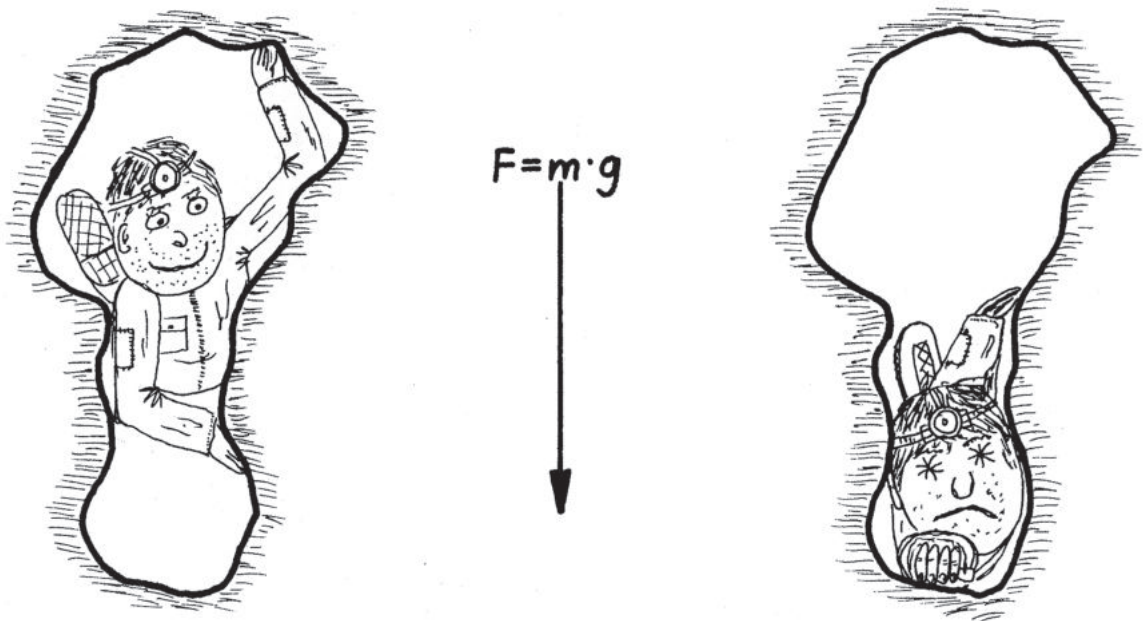


Abb. 38

Note:

Remove dead bodies from the constrictions within a week! Even in the cool air of the cave the rotting starts from within. The distension of the intestines develops the putrefactive gases, known as „stink damp“ in mining (especially hydrogen sulfide H₂S and methane CH₄). Thus the body is hopelessly jammed in the constriction, making it impassable. Experience shows that it takes 5-7 years until the site is passable again. Not to mention the bad smell! Decompose dead colleagues possibly in bagsized pieces!

Old cavers' proverb: „Don't look at all this too closely“



Personal Crawling Values

In several months of work and with the help of a large computer we have succeeded in setting up a mathematical formula for adjusting the valuation scale for constrictions to the individual body measurements. This compensation value is called Specific Constriction Factor (cs). To apply the formula you need the personal dimensions A....F. Now the difference to the standard values A_n...F_n has to be calculated with the equation $\Delta X = X - X_n$. These results (ΔA ΔF) have to be set into the correction term, that will lead to the form

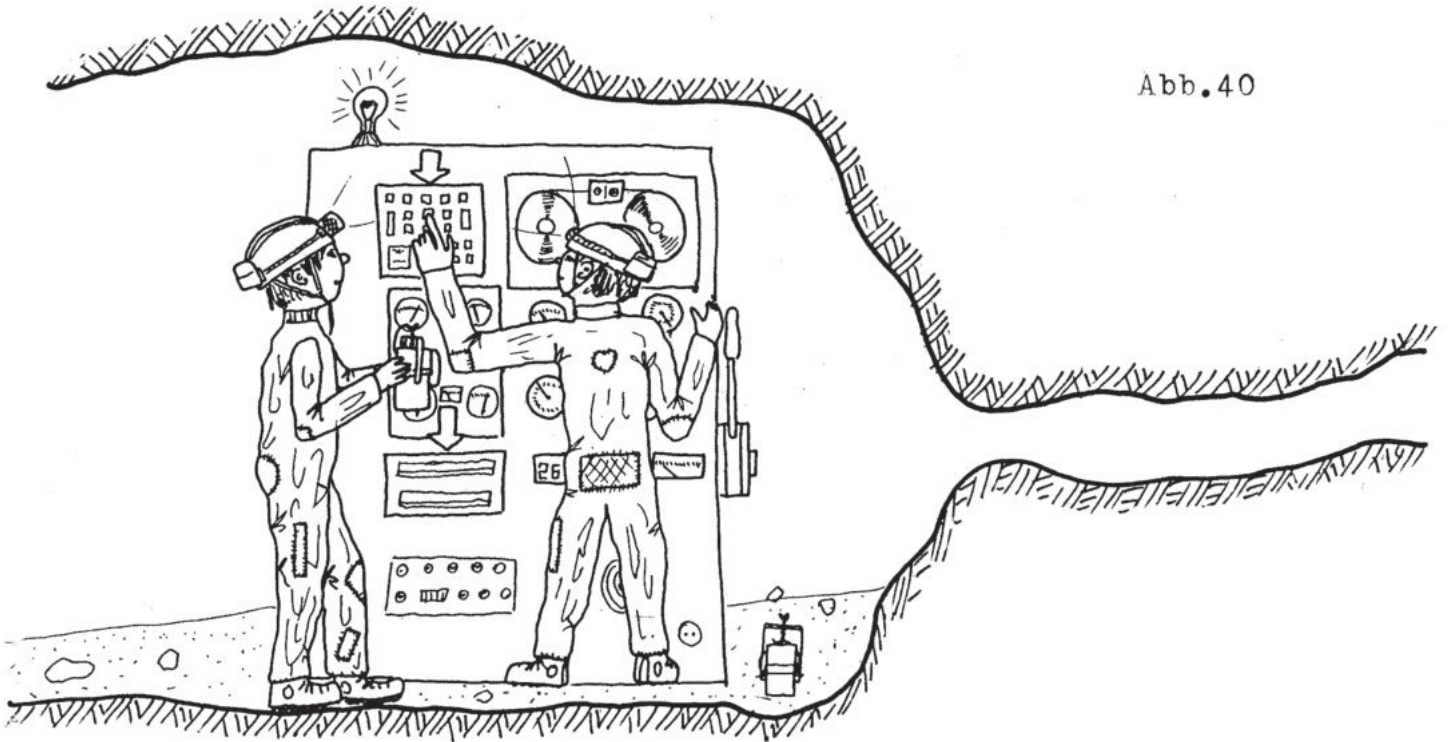
$$\text{INT} \frac{\Delta A + \Delta C + \Delta D + \Delta E}{150} + \frac{\Delta B + \Delta F}{200} = c_s$$

(INT: it is to be rounded to integer values).

Cs specifies the 1/3 degrees about which the personal difficulty degree N_p appears easier (cs < 0) or more difficult (cs > 0). Therefore the personal creeping difficulty N_p is given to:

$N_p = N_0 + 1/3 \text{ cs}$ (N₀: the difficulty in standard size)
(fig. 40)

Abb.40



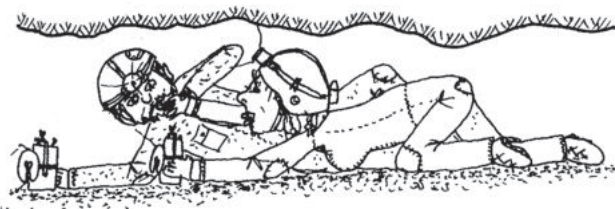
Good Behavior in Narrow Passages

As in all other situations, when crawling, the cultivated, well-bred gentleman differs from the ignorant lout. At least some basic and almost self-evident rules are to be noted:

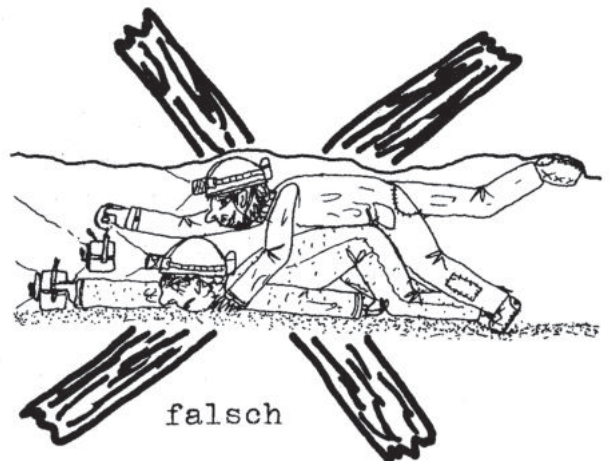
Ladies coming towards you always have precedence.

In crawling traffic law prevails. Thus oncoming persons pass on the right, you overtake on the left. (Note: in Great Britain, Australia, Ireland and some parts of Africa you keep left. In doubt it is advisable to consult the respective cave club of the country you are interested in visiting). If possible, overtaking and passing is done sideways, to avoid offensive positions. If the dimensions of the site do not allow a lateral passing, the lady or the elderly or infirm mate takes the upper path.

Überholen



richtig



falsch

Abb.41

If possible, overtaking and passing is done face to face. Unknown persons are to be welcomed with „Glück Schließ!“ (this means: happy crawling) For possible handkisses, always take gloves off. The helmet is not removed.

The Question: "What sense does crawling make?"

Crawling enthusiasts often are asked about the fascination of their sport. Usually ad hoc there is no satisfactory answer at hand. Treasures have not been found yet in a cave and since the average person can not imagine that it is fun, you are generally classified as a harmless lunatic, often even by (large cave-) colleagues.

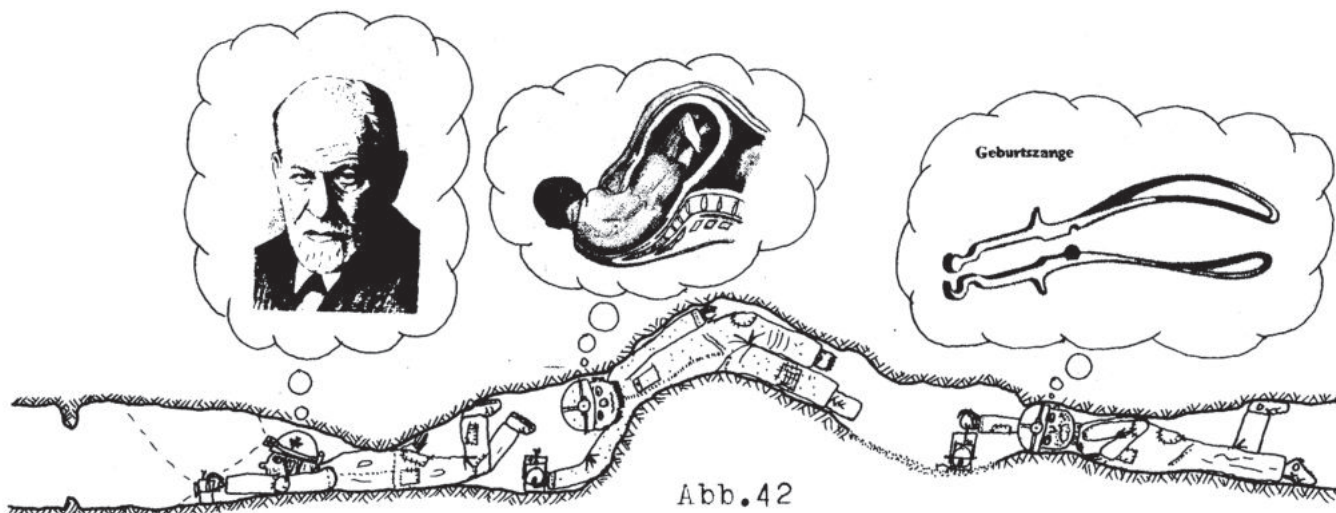
Subsequently the reader is given some solid arguments, that are pretty good responses related to curious questions. Of course it can happen that - by using the specific reasons - you are not regarded as a harmless, but as a dangerous lunatic.

Creeping is overcoming the trauma of birth

S. Freud (1909) described the traumatic experience in general as model of anxiety. O. Rank (1924) assumed the birth trauma to be the cause of all neuroses.

The experience of one's own birth is associated with intense anxiety, shortness of breath and a feeling of tightness. One way to overcome these traumatic inprinted fears is to accept situations that are similar to the birth process, just like slipping through narrow caves. Overcoming the bottleneck means recapitulating one's own birth. Overcoming the fear means overcoming the trauma also, you feel like newborn.

According to Rank (1924) you free yourself of neurotic dispositions and become a free person. (Note: This statement applies only to educated and sympathetic colleagues).



Creeping as longing for the security of the womb

A different but not contrary explanation is that the creeper wishes to reverse the process of birth and wants to turn again into the soft and warm safety of the womb, he was snatched away at birth in traumatic manner. Instead of the pleasant condition the crawler finds most contrasting conditions. It is cold and dirty and the rock is hard. Each caver will be frustrated in this regard after crawling for not having found the security expected. That he tries it again the following weekend regardless, suggests outrageous stubbornness and stupidity.

Crawling to purify from evil spirits

The faith is very old, that evil spirits cause all diseases as is generally known. They are stripped when the crawler is overcoming bottlenecks and don't bother him any more. K. Lukan (eg. 1979) describes these so-called „creep through stones“ which serve this healing purpose since ages. Whether and how far these evil spirits stick to the walls of the constriction and pass on to the next crawler is not known. It is certainly not unwise to get information from the predecessor about his evil spirits. Any transmission of AIDS in a bottleneck is unknown.

Happy Crawling!

What remains is to wish all crawling enthusiasts and those who are subject to beginning crawling fever, many wonderful cave trips and much new territory.

Happy Crawling

P.S.: The translators affirm the following request from the author:

Please put the enclosed commas in the places, where they are missing.

Remove extra commas, please!

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The author assumes no liability whatsoever for typing and printing errors or spelling and grammatical defects.

