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ELLIS CARR,

MEMBER OF THE ALPINE CLUB.

LONDON:

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1893.

PREFACE.

TOWARDS the close of last summer I was asked to contribute to the All-England Series a practical guide for would-be climbers. In accepting the task I was chiefly influenced by the consideration that many preliminary matters of interest and importance to beginners have hardly received a fair share of attention at the hands of previous writers.

As it was necessary to limit the size of the book, the length of each chapter required careful consideration; and it is not without intention that less space has been allotted to matters which can only be learned by actual practice amongst the mountains, than to those which, though of less intrinsic importance, are more easily explained in writing. The fact that the book is addressed to beginners is, I hope, in itself, sufficient to justify some disproportion in the treatment of the more elementary and the higher branches of mountain craft, and to account for the omission

of all reference to mountaineering in snowy ranges beyond the Alps.

The work has been done entirely in spare moments, and I have had to make the most of a very limited amount of leisure. My best thanks are due to several of my friends and fellow-climbers for their kindly help, and I wish especially to thank Mr. G. H. Morse and Mr. J. H. Wicks for many suggestions and invaluable criticism. I am also deeply indebted to Mr. Ellis Carr for the care, time, and trouble he has expended on the illustrations, which add so much to the interest and value of the book.

C. W.

TUNBRIDGE WELLS,
May, 1893.

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TWO A.M.

MOUNTAINEERING.

CHAPTER I.

INTRODUCTION.

THERE is a marked feeling prevalent in responsible quarters that the present is a suitable time for emphasizing the fact that mountaineering is a serious matter. Five or ten years ago my first object would have been an attempt to prove, I think with some success, that the dangers inherent in climbing are not greater than those to which the devotees of other sports, such as hunting, shooting, or yachting, are exposed. Now, however, a prudent writer will better serve the cause he loves by insisting that his favourite pastime shall be treated with at least as much respect as is accorded to the more familiar pursuits just instanced. The halo of mystery, which for so many years surrounded the great mountains, is passing, or perhaps has passed, away; and, in its place, there reigns a feeling of easy familiarity which is very apt to degenerate into contempt. As a result of this, the canons of mountaineering have been more often violated, and the opprobrious term, "Foolhardy idiot!" so often applied unjustly in the past, has, of late years, been more and more frequently merited. A feeling, in fact, is abroad that liberties may be taken with

the mountains, and men of some experience, as well as misguided beginners, have run risks for which the term "foolhardy" is by no means too severe.

A perusal of the above paragraph might lead an unbiassed critic to conclude that this is not a favourable time for the publication of a book which could, by any possibility, tend to swell the number of Alpine climbers. I trust that I am right in thinking such a critic wrong. Mountaineering is one of the finest and healthiest exercises in the world, and, as such, it must command a continuous supply of recruits: the important point is that those who do enter, and will continue to enter, its lists, should understand the principles which alone make it a justifiable recreation.

A great change has, of late years, taken place in the character of the best known mountaineering centres, and quiet and secluded villages, once familiar only to the more adventurous tourists, have been converted into colonies of vast hotels, crowded by a class of trippers who rarely travel except by rail. This change has made it more difficult for a would-be mountaineer to secure the help of which he stands in need. A beginner could, in former years, generally obtain both information and advice from men of wide experience and repute at any of the great centres. Now, while he is perhaps more likely than ever to find his way to Grindelwald or Zermatt, there are comparatively few of the older school of mountaineers who care to spend much time at places which have altered so much beneath their eyes. The mountains are, of course, the same, and no doubt, to those who go there for the first time, Grindelwald and Zermatt must always have great attractions; but they have lost much of their charm for the generation who knew them when they were tiny unsophisticated hamlets, and consequently those climbers, whose advice would be most useful,

are neither so easily found, nor, if found, so communicative, as was the case in days gone by. The beginner must necessarily fall back upon a class of advisers who are always in evidence at such places, and always ready with advice—a class consisting mainly of men who, on the strength of having accomplished a few of the more difficult expeditions with the assistance of good guides, pose as experienced mountaineers, and do not hesitate to recommend beginners to attempt similar excursions without due probation. Such unwise counsel, though occasionally tendered by men who ought to know better, comes as a rule from members of the above category, who, rushing in, both in maxim and in practice, where angels fear to tread, are only too eager to get hold of any one who will listen to their mischievous and boring babble. It will be well, therefore, to cherish a wholesome suspicion of advice offered gratuitously or too freely, and to accept such only as comes from some reliable source.

It must not be thought, from the somewhat sombre tone which has been adopted, that our pastime is one which we habitually think of with long faces. The great Alps have solemn associations in more than one relation, which few of us are likely to forget; but, looked at from a more familiar standpoint, Switzerland is simply the playground wherein we find relaxation, pleasure, and health; and, believing that most of those dangers, which we are supposed by some to risk so freely, are avoidable, we endeavour to carry on the pursuit of mountaineering under conditions of safety fairly comparable with those prevailing in other branches of sport. It is not with feelings of dread and gloom that we walk over hidden chasms; properly roped, with due regard to the condition of the snow and the lie of the crevasses, we are in no danger. "How many crevasses did ye cross on

the Col?" asked a worthy Celt one day at Courmayeur. "Would it be more than fifty, think ye? and a guide's fee is only fifty francs, they tell me. Mon! it's ridiculously cheap —a franc for each time the puir fellow risks his life!" And so, indeed, it would be, if climbing were what this gentleman supposed. But it is not. In point of danger, mountaineering may be fairly enough compared with yachting; in each case grave risk may be incurred by the neglect of the precautions which experience has shown to be needful, but in each case it may be reduced by skill and knowledge to a minimum which the conscience admits to be reasonable. The same may be said of many, perhaps of most, sports; and if, in proportion to the number of its devotees, more accidents have been attributable to mountaineering, this has generally resulted from the unconscious or deliberate neglect of reasonable precautions, or the violation of some of the established rules of the craft. Turn a man loose on a spirited hunter before he is able to ride, or push him into deep water before he has learned to swim, or send him skating before the ice will bear, and we have examples of dangers, by no means inherent in the sports with which they are associated, but which are quite on a par with risks very frequently run in the Alps.*

To do justice to the charms of mountaineering would require a much more able pen than mine. The pursuit is one which offers to its votaries keener pleasures than they find elsewhere, which leaves enduring memories free from alloy, and which stimulates to the building up of plans for future years, rivalling in fascination the memories of the past. It is a pleasure which may be begun in youth, and enjoyed as long as any capacity for active exercise remains. Much has been written on this theme; yet I do not think

* See p. 22.

its charms will yield to analysis. Some would attribute the enthusiasm of its devotees to the excitement which mountaineering is supposed to entail. I submit that excitement, in the ordinary acceptation of the term, is quite inadequate in itself to explain the overpowering fascination of the pursuit: many of the least exciting days are the most enjoyable, and the most exciting ones are sometimes far from pleasant. "Why do you climb, then?" "What is there in it you enjoy?" are questions which mountaineers get tired of being asked. They can give no satisfactory answer; and it is perhaps wiser to reply with a similar question: "Why do you like cricket?" "Why do you like music?" The answers received are equally applicable to climbing, and, as valid reasons, are equally futile: "Oh, that's quite different." "Because I do." "Because it's such a splendid game." "Because it gives me pleasure." And so on. Some mountaineers think they have solved the problem by saying, "Because I never feel so well as when I'm climbing;" and this, no doubt, accounts for more than is at first apparent: but it is not all. Bourrit, more than a hundred years ago, attempted, in quaint language, a somewhat similar explanation. Mountaineers, said he, "éprouverent sensiblement les avantages de cet air pur et léger des montagnes qui facilite la marche, qui rend les corps dispos, légers, et sur tout qui donne une gaiêté qui ne vous abandonne jamais." * If we could really secure so phenomenal a result, there would be no need for further eulogy; but mountaineers, like the rest of the world, are occasionally sad; and it will perhaps be best, in taking leave of this matter, to merely give expression to a conviction that, after all has been said that can be said, there is an indescribable charm in climbing, which appeals to certain natures.

* "Nouvelle Description des Glacieres" (1785), p. 154.

I have spoken of mountaineering as a sport. It is nowadays commonly accepted as such; though there are some who, like Mr. Ruskin, would compare it to the meanest of athletic recreations,* while there are others who claim that the term "sport" is too frivolous for so dignified a pursuit. Mountaineering, say such, is a branch of travel which, beside offering to those who will see them, glimpses of almost more than worldly beauty, is itself replete with moral teaching and ennobling influence. I confess that I would much rather subscribe to this than to the Ruskinian view; and, in so doing, I should be in most excellent company. But, after all, for most of us, climbing *is* a sport, and, in our opinion, the best of sports; though if we fail to get some lasting good, as well as mere enjoyment, from its pursuit, the fault assuredly lies with us and not with our snowy friends the everlasting hills.

CHAPTER II.

HISTORICAL.

To give, in the space of a few pages, any outline of the history of mountaineering, would indeed seem a hopeless task, and, in a work of this compass, any attempt at completeness would be out of the question. The subject has been dealt with by writers of various nationalities, and all that will be now aimed at is a short account of a few leading incidents.

In searching for records of ascents in early days, one has, of course, nothing to do with the Biblical references to Ararat and Sinai; and, though ancient and classical literatures

* "Sesame and Lilies," p. 74.

contain a few allusions to the ascents of minor hills, there would seem always to have been some utilitarian object in view. The earliest record of mountaineering for the love of the thing is only four hundred years old; and it was not until the latter half of the present century that the pursuit made any real headway.

It is curious that the first feat of climbing, with any sporting element in it, should have had no interest, so far as we know, for the actual climber. In 1492, King Charles VIII. of France commanded his chamberlain to ascend the Mont Aiguille, near Grenoble, a mountain probably unique in form, having an extensive flat top covered with verdure and very steep rocky walls all round. Although there is a great extent of cliff, there has as yet been discovered but "one well-hidden and intricate way" to the summit, and even this would seem to be impassable without the assistance of either ladders and ropes, such as were used in the first ascent, or the chains which have recently been fixed. Beaupré got up because he was "commanded to," and, having made good use of his opportunity by remaining for a week on the top, came down; and for three hundred and forty years the Mont Aiguille was left alone. Mr. Gardiner has written a most interesting history of this mountain.*

Conrad Gesner, of Zurich, the celebrated naturalist, was probably the first climber who really loved the exercise. He flourished in the middle of the sixteenth century; made, in 1555, by special leave of the Lucerne magistrates, the second permitted ascent of Pilatus;† and expressed an intention "to ascend divers mountains, or at least one, every year, so long as God should grant him life."

"The true heir of Gesner," says Mr. Coolidge, "was

* *Alpine Journal*, vol. xiv. pp. 215–217.

† Various ascents of Pilatus had been made, but until 1518 the climbers, if caught, were promptly imprisoned.

Scheuchzer," who made between 1702 and 1711 "nine extended journeys through his fatherland." * He is better known to English readers than many who preceded or came after him, as his "Itinera Alpina," though rightly regarded as one of the most charming curiosities of Alpine literature, is not excessively rare.

It was not until the eighteenth century that any snow mountain was ascended, though long before this certain snow passes had been used for religious and trading purposes. "It seems certain," said the late Mr. Wm. Longman, "that before the middle of the sixteenth century many snow passes were traversed which subsequently fell into disuse." † The first snow mountain to be climbed was the Titlis, the ascent being accomplished, in 1739, by a monk of Engelberg, whose name seems to have been lost. This feat does not appear to have borne fruit in stimulating either the mountaineer himself or others to undertake similar tasks. Next came the Buet, climbed in 1770 by the brothers Jean and Antoine de Luc; but this ascent was the direct outcome of the interest in the mountains awakened by the visit of Windham and Pococke to Chamounix in 1741.

William Windham, of Felbrigg, in Norfolk, may, though he never climbed higher than to the "Top of the Mountain," ‡ *i.e.* the Montanvers, be justly regarded as the father of modern mountaineering. "Had he lived a hundred years later," said the late Principal Forbes, "he must inevitably have been the first president of the Alpine Club." § The "Pierre des Anglais," || where Windham's party is supposed

* "Swiss Travel and Swiss Guide-Books," pp. 13, 14.

† *Alpine Journal*, vol. viii.; "Modern Mountaineering," p. 43.

‡ "An Account of the Glaciers or Ice Alps in Savoy" (1744), p. 8.

§ *North British Review*, March, 1865, p. 139.

|| This stone was unfortunately split by a fire lit upon it about forty years ago.

to have lunched, is still to be seen, though daily passed unheeded by crowds of tourists.

The effects of this excursion to Chamounix were marvellous; and to it may be traced, directly or indirectly, the rise and growth of modern mountaineering. Martel followed, in 1742; then came De Saussure, scientist and explorer; Bourrit, the first artist of the mountains; the de Lucs, mountaineers pure and simple; and Jacques Balmat, the guide who, in 1786, was the first to reach the summit of Mont Blanc. The flame that had been kindled spread, and mountaineers arose in many districts. Mont Vélan was ascended by the Prior of the Great St. Bernard, in 1779; the Col du Géant was crossed by Bourrit in 1787; the Jungfrau was climbed in 1811: and the Finsteraarhorn in 1812. During the first half of the present century several high passes were traversed, a few more peaks ascended, and a series of ascents of Mont Blanc were effected, most of which have been described in special monographs. The last of this class was the renowned ascent by Albert Smith, in 1851, and three years later Mr. Justice Wills, then a rising barrister, inaugurated a new era by climbing the Wetterhorn from Grindelwald.

In the winter of 1857–8, the Alpine Club was founded. Messrs. William and C. E. Mathews, with Messrs. E. S. Kennedy, Chas. Hudson, T. W. Hinchcliff, Alfred Wills, and John Ball, may be named as among those who had more or less share in the formation of the Club—an institution which quickly made headway, and which had on its roll, within a year of its inception, nearly a hundred members.

How mountaineering has developed since then may be faintly indicated by mentioning that, at the present day, all the important peaks in the Alps have been climbed, many

of them by several routes; that Norway and New Zealand, the Caucasus, the Andes and the Himalaya, have all yielded some of their giants to swell the list of conquests; that the Alpine Club has now upwards of five hundred members, while its Continental followers, founded between 1860 and 1880, number collectively between thirty and forty thousand members, all interested in mountaineering, and many of them active climbers.

Although the Alpine Club has been before the public for five and thirty years, and though more than one writer has devoted some space to a description or criticism of its methods, very curious misconceptions would seem to prevail regarding it. Some suppose that every member must have been up Mont Blanc; others that any one who ascends the Matterhorn is promptly hunted up and pressed into the Club. Again, there are those who have exaggerated notions as to the difficulty of gaining admission, while others think that any one can "join" who likes. To correct such impressions can surely do no harm, and I propose, therefore, to devote a few lines to a plain statement as to the constitution and nature of the Club as it exists at present.

The Alpine Club exists for the mutual benefit of its members, all of whom are interested in mountaineering. It has a habitat in the neighbourhood of Trafalgar Square, where its meetings are held, and where is situated its excellent library of books, maps, and photographs relating to mountains in all parts of the world. The Club meets, to hear and discuss papers read by members, six times during the year; it dines in public in December, and in seclusion in June; it treats its friends once a year to an exhibition of Alpine pictures and appliances; and it publishes the *Alpine Journal*. Qualification for membership is essentially based upon a true love of mountaineering, but exceptions have been

occasionally made, and a few members admitted by reason of their devotion to Alpine art or literature, or their researches in matters immediately connected with the mountains. The vast majority of the members have, however, entered the Club on what is called a "climbing qualification." There has never been any cut-and-dried rule to the effect that every candidate must have been up so many peaks, or must have been climbing for so many years. The first dispute which ever moved the Club was on the question as to whether a certain definite rule of this sort should be introduced, and it was negatived; and attempts to revive the same spirit have always been quashed by a majority of voters. As a matter of fact, a large discretion is left to the committee; and the stringency with which the prerogative has been exercised has varied from time to time, though the general tendency has been towards making the qualification more severe. A candidate for admission to the Club must, as in other clubs, be proposed by a member who knows him personally, and be seconded by another; a list of his expeditions is sent to the secretary, who submits it to the committee, and, if considered eligible from a mountaineering point of view, he is balloted for at a general meeting of the Club.

With these few lines anent the Alpine Club, this short chapter must be brought to a close. It should not be forgotten, though, that the bulk of the true history of mountaineering refers to what has been done during the last forty years, of which almost nothing has been said. The material from which such a history could be written is to be found in the pages of the *Alpine Journal*, in the publications of foreign Alpine Clubs, and in the many volumes which have emanated from the pens of individual mountaineers. To make a few extracts would be invidious, and to do more

would be impossible ; as all the space at my disposal will be needed for matter which can, in one way or another, be turned to some practical account.

CHAPTER III.

MOUNTAINEERING IN GREAT BRITAIN.

It may fairly be questioned whether the term "mountaineering" can be properly applied to the walking and scrambling which are to be enjoyed among the British hills. The word has become, in one sense, almost limited in its application to climbing above the snow-line ; but many of the general principles of mountaineering may be learned in our own islands, and the term is here employed in its older and more general acceptation.

Mountainous districts are to be found in each of the four divisions of the United Kingdom, and one or other may be reached from any portion of these islands within a day. It is in Scotland that the grandeur, as well as the height and number of the mountains reaches its maximum ; but with the exception of the island of Skye, which will be referred to later on,* the general character of the work in all four countries is practically the same, and what is said of one may be looked upon as applicable to all.

The little corner of England, known as the "Lake District," is unsurpassed for its own peculiar form of beauty. It is comprised within a small area, and could be enclosed by a square having a side of twenty miles. The district can be reached in seven or eight hours from London, in four or five from Edinburgh or Glasgow, and in two or three from Manchester or Liverpool. The one-inch Ordnance map

* See p. 19.

represents the country very accurately, four sheets covering the district,* and there are several guide-books which might be praised. Baddeley's and Jenkinson's are probably the two best, and Prior's, as a small one for the pocket, is excellent. There will also be published shortly a guide, by Mr. Haskett-Smith, to the rock climbs of the district; and a book of this sort, by the first authority on the subject, cannot but be a boon to climbers wishing to make the most of a short holiday. It is to be hoped, however, that it will not tempt untrained beginners into situations which are dangerous for any but practised cragsmen.

It is beyond the scope of the present volume to give any guide-book information as to routes, inns, roads, or paths; and this chapter is merely concerned with the English hills as a school for mountaineering, and a stepping-stone to things higher. While the majority of pedestrians who visit the Lakes learn little or nothing which would be of use to them elsewhere, there is, nevertheless, much to be learned; and the man who will go often enough, and trust to his own guiding powers in all seasons and under all conditions of weather, will assuredly gain some practical and useful knowledge of hill-walking, route-finding, and rock-scrambling, and even of step-cutting and glissading, which will serve him in good stead among any mountains he may visit. To be of any use, though, this knowledge must be the outcome of experience, and all that can be done here is to offer a few hints, in the hope that they may help those who are quite beginners, or who have not acquired sufficient confidence in their own powers.

Some of the advice given in this chapter is quite at variance with what would be sound counsel in the Alps;

* New Series one-inch Ordnance Map of England and Wales Sheets 29, 30, 38, 39.

the character of the work being so different that many of the lessons the English hills have to teach are best learned under conditions which would be very dangerous in higher ranges. My general advice, then, is this : go at all seasons, and climb in all weathers; never take a guide; pay little or no attention to guide-books during your actual walk; and, if you cannot find a companion, go alone, but in this case your aspirations must be confined within moderate limits.

If new to the work, it will be wise, while avoiding high-roads, to rest content with tramps along the tops of the hills; such walks can be devised in infinite variety, and will be found as full of interest as of beauty. Get off the roads as soon as possible, and look with suspicion on every foot-path, unless you *know* that it leads in the right direction. When the ground is steep, kick your toes (not necessarily the tips) in going up and your heels in going down; and, if traversing or descending a slope, do not walk with your alpenstock below you, but hold it with both hands, more or less transversely (see Figs. 1 and 2), and but little harm will result, even if your feet should slip. Learn to kick steps up, and slide down, every little patch of hard snow you may find, and to run fearlessly, and with ease, down steep grass slopes and screes of loose stones. Use your map and compass frequently in clear weather; and, when a short halt is called, try by their aid to distinguish the many hills in view; endeavour also to obtain an insight into the character of the ground around you, by comparing what you actually see with what is delineated on the map. By this means you will become familiar with the use of these aids, and will be better able to employ them with advantage when fog or storm comes on. If by any chance you should get hopelessly lost, simply go down hill, prodding in front with the stick, if dark or foggy, to make sure you walk over

no cliff. In most cases, you will come to a valley in less than an hour, and, by following the stream, some farmhouse will in time be reached; miles away, perhaps, from where you originally wished to go, but you will be safe. Here may be encountered the greatest danger of the day, in the shape of sheep-dogs, which, however aggressive, will probably retire if you pick up, or even pretend to pick up, a stone.

Fig. 1.—RIGHT.

Fig. 2.—WRONG.

For such a tramp a very small kit is needed. A tweed shooting suit, stout boots with a few nails in the soles, a strong walking-stick or ash alpenstock not more than four feet long, a map, a thoroughly good compass, and a knapsack or rücksack containing dry flannel shirt and stockings and whatever odds and ends you may require. Slippers can, except at crowded seasons, be borrowed at the inns; and, if wet through, you can retire to bed, or, perhaps,

appear in borrowed raiment, much more gorgeous than your own modest attire.

There is no doubt that to thread one's way in and out among the hills of Cumberland gives self-reliance, and teaches hill-walking and route-finding. It gives, too, a general insight into mountain form and topography, and teaches in the best and safest manner the uses of a map and compass. In using a compass, remember that a knife or an ice-axe may influence the readings, even if not in actual contact with it, and that magnetic rocks are not unknown.* The first source of error can, however, be easily eliminated, and the last, being one of rare occurrence, is, in a fog, practically best ignored. Should the compass appear to indicate wrongly, as may often happen when surrounded by fog, recollect that the probability is much in favour of the fault being yours rather than that of the instrument, as it is easily possible for a man to turn through forty-five, or even ninety degrees, of a circle, unconsciously, in less than a minute. This fact shows the importance of consulting the compass very frequently, and one which can be strapped to the wrist like a lady's watch,† though unfitted for rock-climbs, would be useful on easy ground both at home and in the Alps. It is not too much to say that a climber must learn to trust implicitly to the compass readings; and my own feeling is that the best and quickest way to gain this confidence is to make a few excursions in thick weather quite alone. Mr. Pilkington prudently advises pedestrians not to ascend out-of-the-way hills without companions: "a knee can easily be twisted or an ankle sprained."‡ This, no doubt, is true; but still, if one merely walks, eschewing all temptation to

* *Alpine Journal*, vol. xiii. pp. 439, 440.

† See p. 180.

‡ "Mountaineering" (Badminton Library), p. 331.

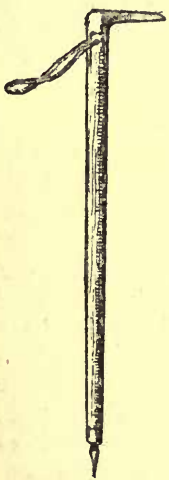
climb rocks, it should be possible with care to avoid all such mishaps.

In connection with finding the way in thick weather, a word or two should perhaps be said as to routes marked by cairns. There are several such in the district, and in fog it is often helpful to find the way up or down by this simple means. Always be cautious, and make quite certain that you are on the right route by means of your compass. Two or three cairned routes meet on the top of Scafell Pike, and three such lines converge upon Esk Hause: unless this is known, it is easy to go wrong. Similarly, walls and railings do not always run as might be expected. An apparently easy way from the top of the Pillar Mountain down to Windy Gap is suggested by following the railing; but the railing does not go to Windy Gap, as those find out who try.

As soon as a man feels fairly at home among the hills, he may begin to climb the rocks, and it is wise for him in this case to have suitable companions. The work is entirely different, and to many it is more enjoyable than mere walking. Look out at first for steep sides of the hills, especially where the ground is broken: ascend Coniston Old Man from Goat's Water, the Langdale face of Bow Fell, or the Eskdale side of Scafell Pike. From mere scrambles, a man is soon led on to attempting passages which may be more properly called rock-climbs; and the cliffs of Great End, Mickledore, and the Pillar Rock, offer easy as well as difficult routes. This is work which requires regular mountaineering boots, well nailed, and it is well to be supplied with a sufficiency of Alpine rope. Beginners had better use this even on fairly easy rocks; and those who may be called practised cragsmen ought not to leave it behind, for they are not likely to rest long content with the easy ways.

The more difficult rock-climbs of the English Lake District are not to be lightly undertaken. They should be attempted only when free from ice, and by a party of carefully selected mountaineers. There are, no doubt, short bits of difficult rock, up which two good climbers may drag any one without much danger; but for some of the longer climbs, such as may be found on the Pillar Rock, Scafell, or Dow Crag, there should be no novice in the party.

A winter visit to the Lakes is a novel experience to many who know the aspect of the country only when the weather is warm and the trees in full leaf. It may reveal the hills sparkling in the beauty of frozen snow, or all may be slush and rain. In any case it is as well to be equipped with a fairly complete Alpine outfit. Gaiters and stout woollen gloves are needed, and it is sometimes wise to put a Shetland jersey into the sack along with the provisions. Some climbers take a thick ash walking-stick with a metal head, as being less ostentatious than an ice-axe; but, if there is any considerable amount of hard snow about, a regular axe is more useful. Sometimes the gullies are filled with snow so hard that no impression is made by kicking with heavily nailed boots; and to ascend them, half an hour of continuous step-cutting may be needed. At other times snow is met with so soft and deep as to make the hill-tops practically inaccessible.



MODIFIED AXE FOR BRITISH HILLS.

In North Wales the conditions of mountaineering are quite similar to those just discussed. The Cader Idris region, south of the railway from Bala to Barmouth, has

much of interest to offer; but the grandest scenery and the finest climbing lie within a five-mile radius of the Pen-y-gwryd inn.* Here we have expeditions both easy and difficult, and many excellent rock-climbs, of one to three hours' duration, may be made on the Snowdon ridges alone; the best of all being found on the splendid precipice which forms the north face of Lliwedd, and on the cirque of rocks which shuts in the head of Cwm Glas: these, however, are not places for beginners. The Snowdon district may be reached from Port Madoc, from Llanberis, from Bangor, or from Bettws-y-Coed. It is so near to London, that it has been found possible to dine in town on Saturday evening, lunch on the top of Snowdon on Sunday, and be back at work in London by ten o'clock on Monday morning.

The Irish hills are known to comparatively few English climbers, but the Macgillicuddy Reeks,† which rise from the west shore of the Lake of Killarney, are, to some of the residents of the Emerald Isle, what the Cumberland and Welsh hills are to us.

To name, even, the principal ridges and ranges of Scotland would be no easy task. There are many excellent scrambles within the confines of the "Queen's Park," and I have indulged in one of the longest glissades I can remember on the east slopes of Ben Lomond. In many districts both walking and climbing may be had equal to, but not surpassing, that to be found in England or in Wales.

Before closing this brief sketch of mountaineering in the British Isles, something must be said of Skye. Those who best know the Black Cuchullins (pronounced Coolins) agree

* New Series one-inch Ordnance Map of England and Wales. Sheets 94, 106, 119.

† One-inch Ordnance Map of Ireland. Sheets 172, 173, 183, 184.

that they offer finer mountain scenery, richer colouring, and better rock-climbing, than are to be found elsewhere in the United Kingdom; for they are rugged peaks, with splintered ridges and deep clefts, quite different from the rounded hills found in other parts of these dominions.

There are two objections to the Island of Skye as a field for mountaineers—the time required to reach it, and the fact that there is no centre of operations in the heart of the mountains. Sligachan is distant some twenty-five hours of constant travelling from London, and in distance is as far away as Grindelwald; further, as it is situated quite at one end of the range, camping out becomes necessary for an attack on some of the remoter summits. A refuge of the Alpine hut order on the shores of Lock Coruisk would be a boon to climbers visiting the island.

Those who have any thought of visiting Skye, with a view to mountaineering, are recommended to read two admirable papers on the subject, written respectively by Mr. Charles Pilkington * and Mr. Clinton Dent.† The former gentleman deserves the thanks of all lovers of mountains, in the first place for having enabled them to speak of, as well as to think about, the "Coolin" hills, and secondly for having very largely corrected the defects of the ordnance sheet representing the Skye mountains, and published the result in the shape of an etched map on a two-inch scale. ‡

In taking leave of Skye, I say my last words on the subject of climbing in Great Britain. The whole subject may be thought trivial, and possibly out of place in so small a book as this; and yet I am not alone in believing that frequent visits to the British hills form a very important

* *Alpine Journal*, vol. xiii. p. 433.

† Ibid., vol. xv. p. 422.

‡ This map is sent post free, on receipt of sixpence, by John Heywood & Co., Deansgate, Manchester.

element in the education of a mountaineer. It is, I think, a very significant fact that those climbers, whether English or foreign, who have won for themselves the reputation of being good amateur guides, have, in almost every instance, had a great deal of practice among hilly districts below the level of perpetual snow.

CHAPTER IV.

DANGERS OF MOUNTAINEERING.

As the art of mountaineering is largely concerned with the avoidance of danger, it will be advisable to obtain, at the outset, a clear idea of the nature of the risks incurred by mountaineers, and the means at their disposal for reducing them to a minimum.

In the first place, there are a series of so-called minor dangers, such as cuts, bruises, sprains, sunburn, snow-blindness, and, worst of all, frost-bite.* These, and kindred subjects, are dealt with in another chapter,† and all that will be needful here is to point out that such mishaps may sometimes have grave consequences, and merit, perhaps, a passing mention in connection with the subject of Alpine dangers.

The real dangers of climbing must be spoken of in very different terms. Alpine accidents are, as every one knows, of only too frequent occurrence. They may eventuate in nothing worse than crippling; but they frequently, perhaps generally, result in the death, often the absolutely sudden death, of one or more human beings. "There is," says Mr. Cunningham, "something inexpressibly sad in hearing of

* "Frost-bite," or local freezing, is entered as a minor danger, because it does not primarily endanger life.

† Chap. XI.

those who are in all the heyday of sound health, at the very moment when they are enjoying to the full some of the best and most lasting pleasures nature can give, being suddenly struck down."* Then, again, it is noteworthy that about half the accidents which have marred the history of climbing have proved fatal to the whole party; and the fact that the carelessness or mistake on the part of one of us, may entail such widespread misfortune and distress, should surely stimulate us to do our utmost in avoiding risk; and, if we do our best, we shall not often be in serious danger.

While the dangers of mountaineering have been treated of by various writers in various languages, it is to be noted that no two authorities would seem to have adopted precisely the same classification. That there should be a diversity of opinion as to what really constitutes an Alpine danger, and what is to be looked upon as merely an accessory circumstance, is hardly to be wondered at, since most accidents have been due to the co-operation of several factors, and authorities may often differ as to the true cause of a catastrophe. The list of dangers which will be found appended is the outcome of considerable thought, and yet it is probable that it will not meet with the approval of every competent critic. It may be considered too formidable, and perhaps such is really the case; for the seven headings comprised in the first division might have been omitted altogether, seeing that they refer more to the follies of which mountaineers have been guilty, than to sources of danger in any way inherent in the sport itself. Self-made dangers are, however, most efficient causes of accidents; and, as they have been accountable for the loss of many valuable lives, they deserve, in my opinion, a prominent place in any list of this sort which aims at being useful or complete.

* "The Pioneers of the Alps," p. 47.

I. Self-made dangers (which should never be incurred) —
- Want of training.
- Incompetence of one or more members of a party.
- Two on a rope.
- Climbing alone.
- Dangers connected with the rope (including climbing unroped).
- Climbing out of season.
- Climbing in bad weather, or too soon after it.

II. Dangers to which all climbers may be exposed, but which can be avoided or provided for—
- A Slip (on ice, snow, rock, or grass).
- Bad guiding.
- Falls into crevasses.
- Falls through cornices.
- Falling seracs and ice-avalanches.
- Snow-avalanches.
- Exposure.

} Usually due to bad guiding.

III. Dangers which are sometimes unavoidable.
- Sudden storms (including thunder-storms).
- Falling stones.

It will be noticed that "difficulty" finds no place in the above category; for, though the non-climbing world is apt to think that difficulty and danger are, when applied to Alpine matters, synonymous, mountaineers are accustomed to draw a very distinct line between the two; and, before proceeding to discuss in detail the individual items in the preceding list, it may be advisable to draw attention to the recognized distinction between these terms in their relation to mountaineering. Mr. Whymper, speaking on this subject, says, "The line which separates the difficult from the dangerous is sometimes a very shadowy, but it is not an imaginary, one. It is sometimes passed unconsciously, and

the consciousness that it has been passed is felt too late. But (according to my opinion) if the doubtful line is crossed consciously, deliberately, one passes from doing that which is justifiable to doing that which is unjustifiable, because it is imprudent."* We shall, probably, all agree with Mr. Whymper; but, whether the line be crossed unconsciously or deliberately, the danger arises from the same source, and, consequently, I am not quite sure that we are right in making a hard-and-fast distinction, though the danger that results from difficulty *per se* should be extremely rare. Places are occasionally met with where there is an excessively difficult bit of rock to be overcome, so situated that the other members of the party could hardly hope to check a fall; and I am not prepared to say that such a risk should *never* be run. An accident in a place of this kind may be entered under the heading of a "slip," but might suitably be regarded as due primarily to the extreme difficulty of the situation. The disaster on the Meije, in which Dr. Emil Zsigmondy lost his life, a few months after publishing his book on "Alpine Dangers," might not inappropriately be entered under such a head; though in this case there were several other factors at work. The distinction between difficulties and dangers is, however, a useful one, and I have not entered the former in my list of the latter.

Want of Training.

Though few, perhaps, would consider want of training, unless want of experience is included, to be a source of danger, I am of opinion that it has played a part in the causation of many accidents. To climb the great peaks of the Alps, a man must be very "fit," and an absence of

* "Scrambles amongst the Alps," p. 113.

this fitness may prove a danger in at least three different ways.

It may produce *general* exhaustion, which, besides being a possible cause of permanent disease, may occasion a party to travel so slowly that they are overtaken by darkness and obliged to pass the night high above the snow-line—a most undesirable experience, attended by many risks.

Secondly, it may prove dangerous by producing *local* exhaustion. On slopes of ice and difficult rocks, it is often necessary to maintain a strained attitude for a considerable period, and, if the climber is not in good condition, the muscles of the leg or arm may give way and occasion a fall in a very awkward place. There are many who think that the lamentable accident, in which Professor Balfour lost his life, in 1882, may be partly attributed to some such cause as this.

Lastly, want of training may cause danger by simply producing that carelessness which is born of fatigue. A man may slip from mere want of care, or he may, more probably and with greater risk, dislodge stones which he would never have done had he been on the *qui vive*. Exceptionally long days occasionally tire mountaineers even if in the best condition; but easy ground is generally reached before the tired, careless feeling overtakes them, and they have a small reserve of energy to call upon if needed.

Somewhat analogous to the danger due to want of training is that which arises when persons, who are physically unfit for arduous bodily work, undertake the ascent of Alpine peaks. Children, and those who are not physically strong and sound, should content themselves with less severe forms of exercise.

Incompetence of One or more Members of a Party.

This heading, again, may perhaps be objected to, as the immediate cause of any accident, in which incompetence is operative, is always to be found elsewhere. For instance, though incompetence undoubtedly played a part in the terrible accident on the Matterhorn in 1865, the real cause was a slip. In any case, the presence of a weak or doubtful member in a party attacking a difficult mountain is always a source of danger; though the other members, if thoroughly competent, would generally be able to hold him up, and the rope should not break, as it did in the historic case just cited. "No chain is stronger than its weakest link. The men are roped together to give the proverb point. As the security of the whole is the protection of each, so, conversely, the false step of one is the jeopardy of all. Too much caution cannot be bestowed on picking your comrades." *

If it be dangerous to have one incompetent member in a party, it follows that it is more dangerous to have two; and the maximum risk under this heading is reached when a party of novices venture together, without guides, upon the high snows.

Two on a Rope.

This is a true cause of accidents, though a slip or some other mishap is needed to give it force. The rule that a party should consist of not less than three on a rope is founded on the theory that if one slips or falls into a crevasse, two can hold him up and pull him out; whereas one probably could not. The truth of this is plain, and

* "Dangers of Mountaineering," *Temple Bar*, Feb. 1878, p. 224.

most mountaineers have been members of parties where some one has got into trouble which he would hardly have escaped from without the assistance of more than one comrade. It is, I suppose, unanimously acceded that two is an improper number to venture upon snow-covered glaciers; but there are some mountaineers of exceptional skill who claim that, on rock mountains, two are as good as three, provided both are good climbers. Though two can go more quickly, I must confess that I prefer to be on a rope of three *anywhere;* and the places are few where I should recommend a party of four to split up into twos. This is, however, a different matter from two going alone; as, in the latter case, even if a mountain be found, in the ascent of which there is no element of snow, a slight mishap to one may compel the other to descend *alone*, leaving his disabled companion exposed and solitary for hours, perhaps until next day. I should have said even less than I have done on this point had not the habit been a growing one; and, "whatever number is right, two is unquestionably wrong." *

Climbing Alone.

Sound reasoning appears to be quite lost on those who seem bent upon climbing alone. They are worse than the kleptomaniac, who knows it is wrong to steal, yet cannot help stealing; for they know that they are doing wrong, can help it, and still do it. "I suppose," said Mr. C. E. Mathews, in 1882, "that it is an obvious truism that no sane man should undertake an expedition, even of the third or fourth order, unaccompanied by friend or guide;" * and, at the end of a paper which has since become classical, he most earnestly and eloquently appeals to mountaineers to do

* *Alpine Journal*, vol. xi. p. 81.

nothing which could bring discredit on their manly pursuit.* Yet the vagary which, up to that time, had caused eight deaths, has been responsible for at least an equal number since, and the folly goes on unchecked. Were it a very difficult thing to do, one would suppose the practice must be the outcome of a spirit of ostentation. Any one, however—and there are plenty such, both amateur and professional—who can lead up and follow down, could, if he liked, go up alone. Let us trust that the true spirit of mountaineering, which in the long run is bound to win the day, may speedily put an end to this unenviable form of distinction.

Dangers connected with the Rope.

Some space will be devoted in future chapters to ropes and the manner of using them.† What is needful here is to point out that there are three ways in which danger may arise.

(*a*) *Climbing unroped* can hardly be said to be a danger *connected* with the rope; "unconnected" would be a better word; but it is convenient to name it here. It is obvious that the man who climbs unroped is exposed to most of the dangers which solitary climbers incur. The slips which killed Mr. Elliot on the Shreckhorn, and Dr. Mosely on the Matterhorn, would doubtless have had no serious consequences if these gentlemen had not insisted on being unroped.

(*b*) *Improper use of the rope* may hamper its beneficent action in a variety of ways. Unless used intelligently, the rope may, indeed, add to the danger; as, instead of checking a slip, it may pull the whole party over, or it may

* *Alpine Journal*, vol. xi. p. 85.

† See pp. 92, 178.

displace a loose stone, endangering those below. The climber must learn how to use the rope in various situations, and must remember that, if improperly used, it may become useless or actually mischievous.

(*c*) *Bad rope.* It is astonishing how many accidents have been attributable to the use of rope too thin, too weak, or too old. It is, perhaps, more strange that the number is not still greater, considering the quality which is sometimes used. The English Alpine Club rope is justly prized by the guides, some of whom cling to pieces which have been given to them, and use it for years after it should have been relegated to the clothes-posts. Two years ago I saw a guide with a shocking bit of frayed and worn-out rope on board a Lucerne steamer. I asked him where he lived, and how it was he had not got a better one. He said he came from Engelberg, and that it was the best that could be got—a piece of Alpine Club rope, which had been given, some twelve years before, to his father, who, on becoming too old for active guiding, had handed it on to him: he had used it that morning in crossing a pass in the Tödi district, and was on his way home.

Climbing out of Season.

Later on, when speaking of snow-avalanches, allusion will be made to the accident on the Haut de Cry, in which Joseph Bennen, a guide who had won himself a great name, perished in 1864. Were Bennen alive to-day, he would rarely attack even a second-rate mountain on the last day of February. By such mistakes we learn. Summer is the season for climbing in the Alps; and, for the great peaks of the central group, there is usually little more than two months available. July, August, and September may be

said to be the mountaineering months; but such peaks as I refer to are not often in good condition, except between the middle of July and the middle of September. Minor points, and peaks in warmer districts, may be climbed in June or in October; but the monarchs of the range pour down avalanches of melting snow all through the first-named month, and have already got their first coat of wintry paint by the beginning of the latter.

Next to midsummer, probably the best time for mountaineering is mid-winter; and in the clear, frosty weather, which may last for many weeks at a time, the ascents of many mountains can be accomplished. The snow is often in excellent order, but the days are very short, and there is more danger of frost-bite.

Climbing in Bad Weather, or too soon after it.

The frequency with which bad weather is experienced in the Alps is one of the drawbacks to mountaineering as a sport; and it is also a serious danger. Few climbers get, annually, more than from three to five weeks in the heart of the mountains; and, if a good half of this time is, as often happens, spoiled by bad weather and its consequences, the margin left is small, and the long looked-for holiday is over with disappointing results. Many climbers think that August is habitually finer than July. Personally, I have had, on the whole, better luck in July than in August; but the weather in both months is very apt to be unsettled. It is a mistake to expect too much, and the man who goes out every year will probably find that, out of every four years, he will have one very fine season, one very wet season, and two average ones; these last may seem but poor at the time, but, on looking back, are found to have yielded fair results.

The danger which results from climbing in bad weather might be resolved into a number of sub-headings. There is the danger of getting lost, the risk of frost-bite, and the chance that the weather, already bad, may get worse and end in storm. Indeed, the risk can hardly be over-estimated; and, to deliberately start on an expedition in threatened storm, or when snow is falling, is out of the question. In very good climbing weather, doubtful mornings are, however, not uncommon; and a start may often be made with the full intention of turning back unless the day improves before real work begins. Early morning mists in the valleys are rather of good than of bad augury, and even drizzling rain may be quite local and precede a perfect day. It must, of course, be understood that starts made, under such conditions, are made only as experiments; and nothing but minor expeditions will be persisted in unless the weather actually improves; whereas, if it gets worse, it is right to turn back even from the easiest mountain climbs.

Although hill walks abound which can be undertaken at almost any time, mountaineering proper requires not only that the weather be fine or fair, but that it shall have been fine for some days previously; for, after a fall of snow, the mountains are pouring down avalanches in all directions. What is rain in the valleys is generally snow on the heights, and, with the exception of low passes and mountains of like calibre, new snow means difficulty and danger upon both snow and rock. The question of new snow lying upon old will be discussed later on,* but it may be well to pause here and dwell, for a moment, on the effects produced on rocks. The handholds and the footholds get filled up; and, as they are not found till the snow is scraped away, the time taken to climb a given piece of rock is trebled. Later, the snow

* See p. 44.

melts under the sun and seems, from below, to have nearly disappeared; but it has trickled as water into every crevice and over every slab, and next day each crack is found full of hard black ice, and the slabs over which, when dry, one may easily crawl, are coated with a thin but firmly adherent layer of ice. The fatal accidents which have resulted from a slip on rocks have, in many cases, been due to the presence of this "verglas," and it should be carefully avoided, if possible. Several days of fine weather are needed before the high mountains will be in a fit state for mountaineering; but it is not possible to give any exact rule, because much must depend on the quantity of snow that has fallen, on the amount and direction of the wind, and on sundry other factors applicable in divers situations: south faces, for instance, clearing much more quickly than those which face the north.

It must not be supposed that the fine weather immediately following a day or two of falling snow is necessarily spent in idleness. Many walks and excursions may be undertaken at once; and, as a rule, easy passes and not a few of the lower mountains, will be quite fit to climb within two or three days.

The danger of avalanches when a south or "Föhn" wind prevails will be referred to later;* fair weather with a south wind is good for nothing but pure rock peaks. The most delightful wind for the mountaineer is the north wind, which, in the Alps, always brings fine weather and good snow. In summer, however, the north wind seldom lasts for many days at a time; and the best fine-weather wind for lasting is that which comes from the east or the north-east.†

* See p. 47.

† The question of turning back in bad weather is discussed on p. 57.

A Slip.

A slip may occur on rocks, snow, ice, or grass; and it is one of the commonest causes of accidents. It may be the only cause: a slip on ice, or on glazed, or even simply smooth steep rocks, may pull a whole party down; and this has happened, more often perhaps in cases which have not ended seriously, than in those which have. But a slip has not often been the solitary cause of the fatal results attributed to it. Fortunately a slip, if it occurs, does not always entail serious consequences; for, provided the party be roped, and the rope be properly used, the progress of the fall is quickly stayed, if not actually prevented. Climbing alone, and neglect of one of the rules relating to the use of the rope, are the usual concomitants which help to make a slip disastrous.

A slip is perhaps to be more dreaded on fairly easy ground than in difficult places where every faculty is strained. Though every precaution should always be taken to nullify the effects of a slip, should it occur, it is fortunately very rare for a competent mountaineer to slip in a place that really matters.

How, it may be asked, shall a man learn not to slip? The late Mr. Ball declared that "the quality of surefootedness depends upon two habits, both easily acquired: first, that of lifting the foot well from the ground, and bringing it down at once; secondly, that of observing the spot on which the foot is to rest." * I am inclined to think that other considerations come into play, and that surefootedness is to be learned by a process more analagous to that by which a horseman learns to jump a five-barred gate without falling off his horse. To some it comes easily, and to others with

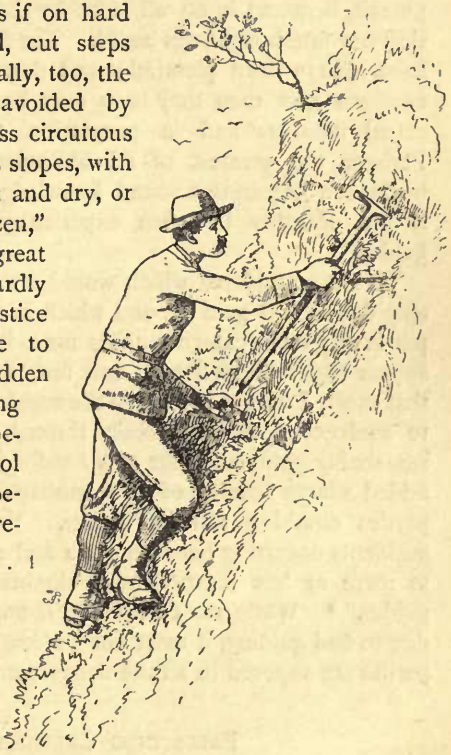
* "The Alpine Guide," Introduction, p. xliii.

difficulty; while some, perhaps, could never learn to be even fairly safe. Much may be learned by practice and by watching the masterly way in which a good guide goes about his work.

A greater danger than a true slip is to be found in the fall which may result from the sudden giving way of hand or foothold. In well-cut steps on ice this ought never to occur. On snow, apart from avalanchly conditions, which will be dealt with separately, such a mishap is usually due to bad climbing: the foot has not been well planted, or the body is not erect. On rocks of some kinds it is a very real danger, and there can be few mountaineers of experience who have not seen instances of this which have come perilously near to mishap. On every kind of rock care must be taken to test hand and footholds before trusting to them; but there are some rotten formations where nothing will bear severe testing, and others, even more treacherous, where a platform which allows one to jump on it, will, after ten minutes quiet standing, suddenly slip away. Even on such rocks real danger may generally be avoided by taking great care and unusual precautions. Such a place I know where a party of three experienced climbers, including one of the best guides in the Alps, took nearly two hours to get over a bit of very bad rock not more than a hundred and twenty feet in length: tons of rock were dislodged, but no harm came.

A slip upon steep grass is rather a different matter from any of those already discussed. It has often been attended with fatal results; but then, the canons of mountaineering do not ordain that a party shall be roped upon steep grass. On some such places possibly a party ought to rope: certainly they should if they have a novice among them who is timid about standing up; but, as a rule, good

climbers should not be in danger if they will only treat the locality with the respect that is its due, and, if it is slippery as well as steep, use the pick-ends of their axes as if on hard snow, or, if needful, cut steps into the soil. Usually, too, the bad bit can be avoided by taking a more or less circuitous route. "Steep grass slopes, with herbage either short and dry, or long and wet or frozen," certainly require great care; but I can hardly agree with Mr. Justice Wills that they are to be classed with sudden storms and falling stones, as being "beyond human control and occasionally beyond human foresight." *



STEEP GRASS.

Bad Guiding.

As the whole question of guides will be discussed fully in the next chapter, all that is now needed is to point out that bad guiding, contrary to the belief of the

* "Mountaineering" (Badminton Library), Introduction, p. xix.

uninitiated, is a very fruitful cause of accidents. The popular idea would appear to be that the man who takes a guide would be safe, were it not that mountaineering is a perilous pursuit, hemmed in on all sides by dangers which neither skill nor forethought can avoid. The fact is that bad guides have always been plentiful; and they are, I think, more common now than they have ever been, both in point of actual numbers and in proportion to the good ones. Perhaps the greatest of all obstacles in the way of a beginner's acquiring a sound knowledge of mountaineering is the difficulty he often experiences in securing good guides.

To those accidents which would seem to be unquestionably due to bad guiding, and which it would be difficult to put in any other category, there must be added some which appear under other heads; and few, I think, will question that most, I do not say all, of the accidents due to exposure, to avalanches, and to breaks through cornices, might be reasonably grouped under this heading. To these must be added a large number of those mishaps which have befallen parties climbing without guides. "One fourth of the accidents occurring between 1882 and 1892 have happened to more or less inexperienced climbers travelling without guides." * While most of these, if not all, were probably due to bad guiding, it must not be forgotten that guideless parties are exposed to all the dangers under discussion.

Falls into Crevasses.

Crevasses will have to be referred to again later on; † but, as they are a source of danger, something must be said here.

* *Alpine Journal*, vol. xvi. p. 22.

† See p. 103.

Fatal accidents have happened from falls into crevasses, both low down where they are visible, and on snow-covered glaciers where they are frequently concealed. Of the first I need say nothing; reasonable care, and an occasional helping hand, ought to render naked glaciers free from risk even for beginners; though, with a weak party, or in unusually intricate places, it is wise to have recourse to the rope.

On the higher fields of snow the rope, of course, should always be used; and if, as is no uncommon thing, one member disappears partly or even overhead into a crevasse, he is soon pulled up again * without any harm resulting. The crevasse, unless indicated by a concavity of the snow, when it may be rounded or crossed with great caution, is probably a narrow one; and, if crossed transversely, only one member of a party will be over it at a time. Should he fall in, he will almost instinctively hold his axe in such a way as to bridge the crevasse, and, if it is a narrow one, his fall will thus be checked. Great is the danger, however, if a whole party be over the same crevasse at the same time; and it was to this cause that the accident on the Brouillard Glacier, in 1874, was due.

If the surface be regular and unbroken, how are we to know how the hidden fissures lie? We cannot always tell, —sometimes a chasm at right angles to the rest surprises us— but, as a rule, the main-crevasses are fairly parallel, and they lie transversely to the direction of the fall of the land. The zigzag track marked in the diagram on next page shows the proper method in which to cross a snow-covered glacier from side to side (C to D); but if it is wished to travel straight up or down, a direct course will obviously be the safest (A to B). In either case only one member of a party is likely to be over

* See p. 105.

any particular crevasse at once. At the edges of glaciers,—where two glaciers meet,—or where the ground below the ice is hummocky, no such fast rules can be laid down; but the probable lie of the crevasses can generally be reasoned out. In any case, however, the surface of the snow must be most carefully scanned for any indications of hidden chasms, and the stock of the axe used freely as a probe. Chamois, though they occasionally break through snow bridges, are equal to the best guides in selecting a good route over the higher snows, and their tracks generally indicate a safe, if a sinuous, course.

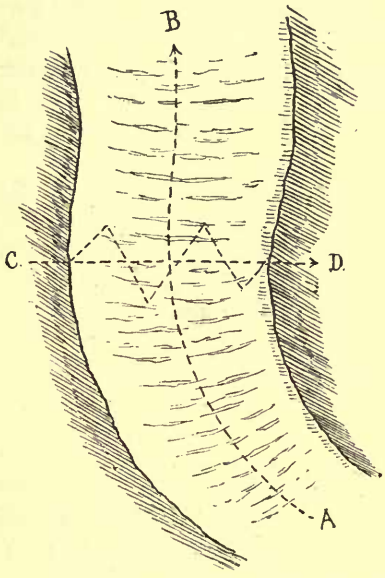


DIAGRAM OF SNOW-COVERED GLACIER. CREVASSES RUN FAIRLY PARALLEL TO THE LINE C–D.

Falls through Cornices.

Some of the most terrible accidents which have happened in the Alps have been due to this cause, the Lyskamm accident in 1877, in which two travellers and three guides lost their lives, being the most notable. Any ridge of snow may be topped by a cornice which overhangs either a slope of snow or ice or a precipice of rock. They are caused by the

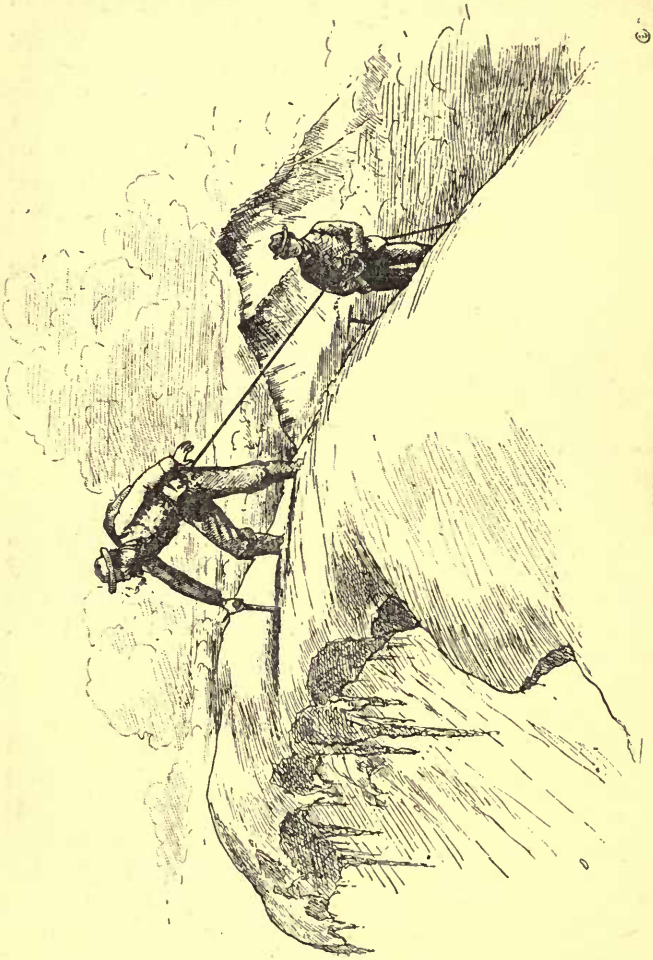
action of the wind, and miniature cornices may be seen in England on many a winter's day; while, in the hilly district of Wales and Cumberland, large ones are freqently formed.

In the Alps cornices are always present in some well-known situations, while in others they are sometimes present and sometimes absent. A small cornice may be here to-day and gone to-morrow, while long ones, which extend for several hundred yards, break off only in bits, and reform in these places before the rest goes.

Cornices may be a foot or two broad, or they may be thirty. Masses weighing hundreds of tons may fall spontaneously, or the addition of only a few stones of weight may be enough to start them.

As any snow slope which ends above in a ridge, crest, or col, may be found to overhang on the oppostie side, a traveller going up such a slope cannot, unless he has been able to reconnoitre, tell whether it overhangs or not. The illustration on next page shows a party in such a position. How are they to tell that the mountain does not slope down on the other side as it does on the side they have ascended? They cannot *know;* but they will be wise to assume that there is a cornice until they have proved that there is not one.

The greatest temptation to venture upon a possible cornice is met with where some distance of ridge intervenes between the point reached and the top. Suppose that, in the second illustration, a party have reached the point A, some feet below the ridge, and that the slope up which they came is very steep and hard; the problem before them is whether they can best reach B by traversing the ridge itself, or whether it is wiser to cut steps in the hard slope some little distance below the arête, a process probably costing much more time. If the arête is not heavily corniced, the former is the proper



A CORNICE.

route ; and, to find this out, they will anchor themselves and send the leader carefully on to, or over, the ridge to inspect. He must move with great caution, for should he prove to be on a bad cornice which gave way with his weight, some

PROBABLE CORNICE.

sharp bit of ice might cut the rope; and, at the best, his comrades would not easily be able to draw him up again. By looking up and down the arête he will generally find out whether there is or is not a cornice; and, if he can satisfy himself that there is one, or even if he fails to make sure,

the party must unhesitatingly follow the second and more laborious course.

If, through bad guiding or mistaken judgment, a party does get on to a cornice, and marches in single file along it, the climbers naturally know nothing of their peril.* Should any one of them hear a crack or see any sign of danger, he will jump to the side which he knows; and he may, as has happened more than once, hold the whole party up. The risk of all jumping at the same time and sliding down the slope is not great, and even this would give a better chance than going with the cornice.

Falling Séracs and Ice Avalanches.

Avalanches have been variously classified, but, for our purpose, it will be sufficient to consider that there are only three kinds. Of one, the enormous spring avalanches which sweep away forests and bury villages, the mountaineer should have no experience: no one should climb at that season. Only two sorts of avalanches interest us as climbers,—falling ice and sliding snow: the latter will be discussed in the next section; our immediate concern is with the former.

To be on the top of a cornice is to run the risk of falling *with* an ice-avalanche; but the danger of falling ice is usually understood to mean that of ice falling from above. This risk is obviously run by any one who ventures under a cornice; secondly by the man who passes along the base of a cliff the top of which is overhung by a projecting fringe of glacier; and thirdly by the climber who traverses below an unstable sérac. The moral is obvious, "Don't go under cornices; don't go under overhanging

* For an instance in which a very strong party narrowly escaped destruction in a situation of this kind, see *Alpine Journal*, vol. vii. p. 300.

glaciers; don't go under toppling séracs." Such risks can certainly be avoided; and yet, were I to add a third to the two dangers which have been classed as unavoidable, it would be that now under discussion. Séracs are towers or pinnacles of ice, which abound in every considerable ice-fall. Though sometimes square and solid, they are often strangely fantastic in outline and unstable in equilibrium. Not unfrequently mountaineers are obliged to work their way up or down ice-falls; indeed, the opportunities afforded for the display of skill and guiding power render an ice-fall an attractive element in a climb. Fortunately a sinuous route can usually be found which avoids any obvious risk, but it is not always so: a doubtful sérac cannot be rounded, and the gauntlet must be run. If steps have to be made, no time is lost; if the ground is plain, it is best to run. It is like running across a railway line: unlikely though it be that a train will pass just when you are crossing, there is always a risk; and I do not think that I shall be contradicted if I say that there are not half a dozen members of the Alpine Club who have not incurred it. The danger is greater in the afternoon than in the early morning, and is vastly increased if the wind has been blowing from the south.

Although not so frequent an experience as passing among doubtful séracs, it is occasionally necessary to traverse under a cornice or other projecting mass of ice. If there is any appearance of imminent insecurity, if there has been a day or two of south wind, or if there is any possibility of rounding the danger, the risk will not be run; but, when it is the only route, when the wind is north, and when the distance to be traversed is inconsiderable, it is probably a justifiable thing to do. The Wetterhorn, the Grandes Jorasses, and the peaks surmounting the Glacier des Nan-

tillons occur to me as ascents which are rarely accomplished without some risk from one or other of the above-named sources. To deliberately cross gullies, down which large avalanches habitually pour, is a different affair altogether, and can never be right.

Snow Avalanches (Sliding Snow).

If the risk from falling ice may be almost classed among the unavoidables, since a mountaineer, unless he only plays at climbing, is almost compelled to run it now and then, the danger from sliding snow is much more insidious, and has resulted much more frequently in disaster. The great risk here is that the snow, on which you are standing, will slide and carry you with it; and fresh snow, lying a foot or two deep, upon a steep slope of ice or of hard snow, is very apt to slip. Many such avalanches fall over cliffs, or slide into crevasses; while others, where the slope simply eases off, gradually come to a standstill. Any party of climbers, who happen to be on snow of this kind when it starts moving, or who are unfortunate enough to be in its track, are obviously subjected to the gravest peril; as, even if they escape the more apparent danger, they may be crushed to death by the snow crowding down from above, as poor Bennen and his companion were in 1864.

In course of time the new snow slides off, or becomes, through the alternate action of thaw and frost, welded to the subjacent surface. How long this process takes it is difficult to say; but that which remains after four or five days of fine weather is probably safe. During this period, which must be utilized for small excursions, the danger is at its height. It is common for fresh snow, which in the early morning is in excellent order, to become soft, and in the

highest degree "avalanchy," by midday. Such snow may slide spontaneously, or it may be set in motion by the vibrations imparted by climbers who venture upon it. It should be avoided by every possible device; but, if there is no alternative, there are certain precautions to be taken which vary according to the situation.

If the subjacent surface is *snow*, the stock of the axe should be plunged into it as far as possible, and firmly grasped while steps are kicked through the new, and into the old surface beneath: if it be *ice*, the new snow must be cleared and steps cut. Broad snow slopes in this condition will never be ascended, but they are occasionally met with on the way down; and, if there is no alternative, the safest plan is to walk in long and very narrow zigzags, so that, if the snow slips from being disturbed by some one's foot, the whole party will be above, or able to step above, the line of fracture. Again, it may happen that the only way down is by a gully or couloir floored with ice on which the new snow lies. Here every island of rock and every projecting handhold must be utilized to insure the safe position of at least one member of the party, and the last man, at all events, should coil his rope round any firm projecting point of rock that may present itself. Such couloirs are often best negotiated by clinging fast to one or other wall; and, if handholds are sufficiently numerous and the snow fairly deep, they may often be descended without much step-cutting (see illustration on next page). If, as sometimes happens, the dangerous slope of avalanchy snow is situated in a position where none of the devices alluded to are applicable, and where, should it slide, the result must be disastrous, it is almost better to spend the night out and descend in the early morning.

What has been said refers to *fresh* snow only, but the

COULOIR. AVALANCHY SNOW.

south or Föhn wind may render old snow very soft and highly dangerous. It is only needful to mention this fact, as no one will dream of attacking snow mountains when this wind prevails.

Though it is comparatively easy to tell when it is certainly safe or obviously dangerous, the highest degree of technical knowledge is needed to say whether *doubtful* snow is really safe enough to venture on or not; and none but the very best guides approach to infallibility in this respect. Unless one is fortunate enough to have one of those *raræ aves* in the party, it is well to act always on the cautious side. In descending, stones may be thrown on to the snow in order to see whether they start small avalanches or not. If they do, the place is obviously dangerous; but it is wise to test with very large ones before concluding that the snow is safe.

If snow does slip when a party are on it, what are they to do? Should the slope end below in a precipice or crevasse, their only hope is that the subjacent surface may prove to be snow and not ice, as in this case they may be able to stop themselves by plunging the stocks of their axes deep into the snow: this failing, they may, in the case of a crevasse, try, by a jerk of the body, to shoot it. If, on the other hand, the slope eases off, the chances are more in favour of the party being able to extricate themselves. The best plan, in such a case, is to try to keep on the surface, and to right one's self if turned head over heels by the tumultuously moving snow, or by the rope catching round the feet. Some guides think it best to throw away the axes lest they should damage any one.

Exposure.

The reader who refers back to the list on page 23, will be reminded that this subject is bracketed with the four preceding

headings as resulting usually from bad guiding. Crevasse accidents on naked glaciers should be excluded, and, in each class, there have been exceptions where pure bad luck has been largely answerable for the disaster; but, in each case also, there have been narrow escapes which nothing but sheer good luck has prevented from ending seriously. On the whole, I take it that if we could sum up the disasters and the escapes from all five sources, we should find that at least nine-tenths were the result of bad guiding pure and simple.

The serious consequences which have so often followed exposure have almost invariably resulted, in the first instance, from spending a night on the mountain-side; and there are two ways in which bad guiding may be responsible for this. Granted that a given mountain is in good condition, and can be climbed between daylight and dusk, a party may, from missing the best route, get so much delayed that they are overtaken by darkness before reaching easy ground. Again, storms have frequently kept climbers out, and subjected them to the risks of exposure; and, though this may happen occasionally with the best of guides, it will occur much more frequently to the party whose guide does not treat with sufficient seriousness the signs of on-coming bad weather, or who, if suddenly caught, is not guide enough to keep a clear head and make quite the best of a very serious matter.

Exposure produces very different effects upon different constitutions. Only last year, for example, while Mr. Nettleship succumbed from the effects of one night in a snow cave on the Aiguille du Gouter,* M. Corra and his two guides passed through fifty-six hours of furious storm, without food or extra clothing, close to the top of the Pointe

* August, 1892.

des Ecrins, escaping with nothing worse than a stiff neck and three or four frost-bitten finger-tips among them.

It has been by no means an uncommon thing for mountaineers to be benighted; indeed, in the early days, when climbing was in its infancy, and when the local geography was unknown, it would seem to have been an experience familiar enough to be regarded with equanimity; and it is still an occurrence which causes but little comment.

A night on the mountains can never be agreeable; and, even if the weather is fine and not intensely cold, it may well prove dangerous, unless extra food and clothing have been taken. It is surprising, though, how well the experience is borne by most. Probably the enforced activity which follows, thoroughly warms the body, and prevents the incidence of ills which frequently result from much less severe forms of exposure. The risk should, however, always be regarded as a serious one, and it should certainly be looked upon as preventable. Do not climb in bad weather; turn back if bad weather comes on; or, if there is risk from slow-going or from having missed the way, of not being able to get up and down in daylight, leave the top alone. Never waste time: every delay may be serious.

If a party is so unfortunate as to be benighted, they must make the best of it. To get, if possible, out of the wind is the first thing. On snow, a hole should be dug, or shelter may be found in a shallow crevasse. On rocks, a suitable platform must be found, unless the party is so lucky as to happen upon some "gîte," in the shape of a cave or overhanging rock. Provisions must be eked out carefully, and stimulants are best left alone. Any extra clothing that has been taken will be quickly resorted to: a great point is to be dry, and any dry clothes are of especial service. It is generally recommended that the boots be taken off, and,

if the stockings are wet, they are better off too: both rück-sacks and paper will be useful to keep the feet warm. There must be no sleep, and frequent movement is essential; though no wandering about should be permitted, nor should the party on any account unrope. To sing songs and tell stories would seem to be matters of some importance.

Sudden Storms (and Thunderstorms).

Under the present head two sorts of meteorological disturbances will be discussed: storms, namely, in which wind, snow, and hail, are the only elements; and thunderstorms. Both sorts of storm are properly classed among the dangers of climbing which *may* be unavoidable; for, though both may gather by degrees, both occasionally break with startling suddenness. "I do not think it possible," says Mr. Justice Wills, "for any one who has not felt it to have any idea what very bad weather means in high places, even in places by no means the highest; or to imagine the rapidity with which, under unsettled atmospherical conditions, the destructive forces of nature can be raised, and the worst assaults of the elements delivered." * Short of a storm, the wind may rise to such a height that, during the strongest gusts, it may be necessary to lie flat down and cling on to well-planted axes; and there is little doubt that, in a storm, the force of wind may be sufficient to blow men off a mountain top like bits of paper. Fortunately one has hands; and, unless on ice, can generally anchor, and probably climb to leeward and there wait. Driving, blinding snow or hail may come on with or without a really fierce wind, and more than one party has been lost under such conditions upon the trackless wastes of snow on Mont Blanc.

* "Mountaineering" (Badminton Library), Introduction, p. xix.

If the storm is terrific, the object should be to shelter, if possible, while it lasts; but, unless the atmospheric conditions are such as to render locomotion actually perilous, no time should be lost in beating a retreat. How can the way be found in driving snow, with all the tracks obliterated? There are two means at our disposal; knowledge of the locality, and a map and compass. Guides who know a district are quick enough to recognize any landmark, and I have seen them exercise their ingenuity by shouting till a distant echo told the position of some cliff which should be near. On wastes of snow, however, there may be no landmarks at all; and, in any case, there is no doubt that a compass, in the hands of one who knows how to use it, is often worth a kingdom. Every amateur should be thoroughly grounded in the use of this invaluable little instrument, for few guides understand its indications. Brains, too, may help one here as in other emergencies; and the general lie of a glacier, with its transverse crevasses, may serve to indicate the route.

Thunderstorms. Most guides consider that thunderstorms are very dangerous on the tops of peaks and on exposed arêtes: low down, on fields of ice or snow, they care little about them. Is their estimate right? Are those who think that thunderstorms in the mountains are always dangerous to be believed? or are we to agree with Mr. Dent in thinking that their danger has been much overrated, and that, "though very impressive and dramatic, there is nothing very terrible in a thunderstorm in the high regions." * I am not aware that any one has been killed † by lightning in the high Alps, and yet I cannot but think that, when the air is charged

* "Mountaineering" (Badminton Library), p. 212.

† Zsigmondy ("Die Gefahren der Alpen," p. 77) cites the case of a certain "Oberstlieutenant" who was thus maimed for life.

with unstable electricity, and the points of the ice-axes hiss and sparkle, there is a real danger very near, and one against which we can do nothing. In venturing to differ from so eminent an authority, I am, perhaps, influenced by the vivid recollection of a storm I was in some twelve or thirteen years ago, which I always look back upon as an occasion of the gravest danger. In addition to the risk of being killed by lightning, the danger from falling stones was very great. Masses of rock were frequently split from the mountain side, and the continuous whirr of stones flying past our ears was as alarming as the frequent electric shocks we all experienced. Mr. Tuckett's graphic account of his experiences on the Roche Melon * gives a very good idea of what a thunderstorm can be, even on a sub-alpine peak, where accessory elements of danger do not come into play. The question is whether the danger is greater among the mountains than on the plains. I think it is.

Falling Stones.

Falling stones constitute a risk which has been characterized by Mr. Leslie Stephen as "the most unavoidable of all Alpine dangers." † There can be no doubt as to the justice of this estimate: a stone falling from above may "knock out the brains" ‡ of one of the party before any one is aware of its vicinity. While this is true enough, it must not be forgotten that two of the most frequent occasions of this risk are avoidable and ought to be avoided. One is to deliberately court danger by climbing in localities where stones are known to fall; the other the dislodging of loose stones by one member of a party to the risk of those below,

* *Alpine Journal*, vol. vii. p. 191. † Ibid., p. 313.
‡ Ibid., p. 311.

a matter which will be discussed in the chapter on rock-climbing.*

Falling stones are naturally most common in gullies, and some gullies are notoriously dangerous in this respect; they may be plainly recognized by the dirty appearance of the ice, by the screed lines in the snow, or by the barrier of *débris* at their base. Steep snow slopes, again, at the foot of the cliffs, are frequently scoured by stones. To such places as these an extra risk attaches; but, except on purely snow mountains and true arêtes or ridges, falling stones may be met with anywhere, and they constitute a danger which must be kept in mind even in surroundings which do not seem suspicious. Stones fall more freely when a south wind prevails than when the wind is from the opposite quarter, and they are most of all to be feared when fresh snow and ice are melting. They are of all sizes; but a comparatively small stone may be as surely fatal as one which weighs a ton.

Falling stones are now and then met with about day-break; but it is after the sun has gained some power that they become more numerous. Later on in the day, when the snow has become soft, a stone, which would in the early morning have crossed one's track, may become arrested higher up by plunging into a mass of snow. This chance is, however, more than counterbalanced by the greater number of stones dislodged or liberated by the melting process.

Among the many fatal accidents that have happened in the Alps it is perhaps a little curious that so few have been due to falling stones; and, reasoning on this point, some have maintained that the danger is not so great as it is represented to be. Still, the fact remains that deaths have

* See p. 120.

been attributable to this cause; and it is only by good luck that the many, who will assuredly own to having been struck at some time or other in their climbing career, have escaped with nothing worse than a broken rib or a cut head.

Often enough but little can be done to guard against any consequences which a falling stone may bring: it hits you, or passes you, before you are aware of the danger. On the other hand, the cry, "Look out! Stone!" is familiar to most climbers, and it may need only a little coolness to stand one's ground and let it pass, or successfully to dodge it.

In concluding this chapter I cannot do better than quote two justly famed aphorisms laid down more than twenty years ago by Mr. Leslie Stephen.*

I. "There is no mountain in the Alps which may not be climbed by a party of practised mountaineers with good guides, in fine weather and under favourable conditions of the snow, with perfect safety."

II. "There is no mountain in the Alps which may not become excessively dangerous if the climbers are inexperienced, the guides incompetent, the weather bad, and the snow unfavourable."

These two short sentences condense and crystallize the whole question of mountaineering dangers, and sum up on this matter what must always be the truth. They should be carefully studied by all young beginners; and those who lay to heart the implied lesson of prudence will rarely run grave risk.

* "The Playground of Europe," pp. 302, 303.

CHAPTER V.

GUIDES.

He who would learn the art of mountaineering must learn from guides. Some learn so well that they are able, after due probation, to dispense with professional assistance altogether; but the majority of amateurs of experience, as well as all beginners, are entirely in the hands of their guides; and it must not be forgotten that the safety of a party may depend, not merely on their having guides, but on their having good ones.

While the importance of securing good guides is obvious, the difficulty in doing so is by no means sufficiently appreciated. A guide is obtained, in whose company two or three excursions are made. There is no mishap, the man has proved pleasant, and in his "book" the beginner writes a eulogistic account, ending up very likely with a few neatly turned phrases enumerating all his virtues, so that the man shuffles off smiling and well satisfied, with his book in one hand and his "Trinkgeld" in the other. The amateur does not reflect that, at this stage of his career, his eulogies are quite worthless; and that, while perfectly competent to judge whether the guide is civil or rude, pleasant or disagreeable, he has no right to speak to his qualities as a mountaineer. Such is, however, what very commonly happens; and very poor guides may consequently present themselves with excellent testimonials.

Apart from mere beginners, there are many amateurs of considerable experience who can hardly be regarded as

competent critics, and this is largely the result of a habit, in many ways estimable, of climbing year after year with the same guide. If he is really one of the very best, his good qualities are patent to every employer, be he easily satisfied or severely critical; and the man who can command such services, though aware that he is exceptionally fortunate, may unconsciously develop an exaggerated notion of the perfections of guides in general. On the other hand, it is common enough for an amateur to become attached to a more or less inferior man, whom he regards, from lack of wider knowledge, as being all that a guide should be; and one is often surprised to find climbers of three or four years' experience contentedly following in the wake of obviously second-rate guides, of whose failings they are quite ignorant, and from whom they can never learn to be good mountaineers. Such do not know what a good guide really is, and their judgment is consequently worth but little. The inference is that it is desirable to climb with different guides at different times, and so to become acquainted with several, before finally settling on the one to be regularly employed.

The guides have made the art of mountaineering what it is, and the best of them are much superior to the most experienced amateurs; while the worst, though inferior to amateurs of only ordinary attainments, are looked up to by beginners, who, very naturally, repose in them implicit confidence. It follows that the guide almost always takes the lead, and, if any question should arise, his opinion is generally treated with the respect due to that of an expert. This leads to the consideration of a matter which appears to have been left in a somewhat unsatisfactory state by writers of eminent authority, who are at one in placing the final responsibility as to the general, as distinguished from

the technical, conduct of an expedition with the traveller and not with the guide.

The great majority of guides, even the best, have two weak points: they hardly ever understand the uses of a map and compass; and they do not know, or will not say, when to turn back in case of threatening weather. The first is a fault which education should tend gradually to remove; the second a responsibility which should, I think, have been always forced upon the guides. This has not been done, and there are, no doubt, reasons why guides have shirked, and amateurs been willing to assume, responsibility in this direction. Failure to complete an ascent may make a pecuniary difference to the guides, who, in the opinion of many, might thus be sometimes tempted to press forward against their better judgment. Again, the weather sometimes plays such unaccountable freaks, and the guides are so sensitive about ridicule in case of failure, that they like, should the threatened storm pass over, to be able to say it was the "Herr" who gave the order to retreat. Rightly or wrongly, the decision as to proceeding or returning rests with the traveller; and it is well this should be kept in mind, as it is probable that lives have been lost from mere ignorance as to where the responsibility lay.

The beginner will recognize that, in this matter, he may be placed in a position of great difficulty: he is incompetent to form any opinion himself, and he cannot trust to his guide. Fortunately he can be given plain directions. Ask your guide whether you should turn back or not. If he says "No; at any rate, not yet," there need be no doubt about taking his advice. If, on the other hand, he hesitates, and especially if he turns the responsibility away from himself by saying, "That is for you to decide, I am prepared to go on if you like;" then be in doubt no longer: turn

back at once. After this, should the weather improve, do not regret your decision. In one case out of ten you may have made a mistake, but in the other nine the result will justify the course adopted.

There are two classes of professionals who accompany travellers above the snow-line in the Alps—guides and porters. Porters are paid at a lower rate of tariff, and are often younger men than the guides, being, in fact, the class from which the latter are recruited, though many never reach the higher grade.

Guides, in all the main districts, hold certificates licensing them to exercise their calling; and the various bodies which, after more or less examination, grant these diplomas, exercise also a surveillance, actual or nominal, over their licensees. In the Chamonix district there existed, from 1821 until the present year,* a State-regulated "Société des Guides," which exercised these useful functions, and others of a less desirable nature. It amounted to a trades'-union which aimed at keeping outsiders away, and securing more or less equal work and pay for its members. A traveller, wishing to engage a guide at Chamonix, was obliged, unless coming under the privileges of one of the bye-laws, to take the next man on the roll. The system did not prove satisfactory to travellers, and it is thought to have been operative in producing the deterioration of Chamonix guides as a class. In the Oberland, each guide merely receives, with his license, the testimonial-book already referred to, in the beginning of which are inserted particulars as to his name, age, height, weight, colour of eyes, hair, etc. In this book the testimonials of his employers are written, and these are annually inspected by the licensing authorities. Very similar regulations prevail elsewhere.

* "Bulletin Mensuel du Club Alpin Français," Feb. 1893, p. 29.

One may generally tell whether a guide is duly certificated or not by referring to the beginning of his book; but many self-dubbed guides and mere foot-path porters carry books of their own institution, in which they request their employers to write. I was once surprised by having such a book presented to me by a mere child, though a sturdy young ruffian, who had carried a knapsack up the latter part of the Gemmi. On glancing through the book I found one testimonial describing the urchin as a pleasant companion, an experienced mountaineer, and a brave guide, who showed to the best advantage in moments of great peril, and who had earned the lifelong gratitude and esteem of the writer. It was not till I had turned over the page and noticed that it bore the signature of one "Samuel L. Clemens" that I was fully able to appreciate the sarcasm.

A good guide must possess several distinct qualities, some of which are acquired, while others are largely the result of natural aptitude. Four headings will probably suffice under which to group them.

1. Personal qualities.
2. Ability in selecting new routes.
3. Ability as a leading guide.
   (*a*) In following a route chosen.
   (*b*) In actual climbing powers.
4. Technical knowledge.
   (*a*) Local (geographical).
   (*b*) Of snow, ice, and mountaineering principles.

1. Personal Qualities.

It is unwise to engage any guide for more than a single expedition without knowing what sort of man one has to deal with. Many guides make very charming companions,

and this fact has led to their being treated, as a class, with great consideration by their social superiors. The process has spoiled some, and cases are not unknown in which climbers, who had engaged a local guide of repute in some remote district, have had all their plans shattered by finding him to be so overbearing and dictatorial that it was impossible to work with him.

A guide with whom one is to associate for some time must be both honest and agreeable, and, beside possessing those qualities about to be discussed, must have sound judgment and ready resource. The last five words imply a great deal, and it is the possession of these in a greater or less degree which constitutes one of the main differences between good, bad, and indifferent guides. Readiness of resource in case of danger is indeed a matter of the utmost importance, when prompt action, and prompt action only, may mean safety. It is in this attribute more than any other that a first-rate guide shows to the best advantage.

2. Ability in selecting new Routes.

This is a quality possessed in great prefection by the best guides. Some, however, good in other respects, are very poor hands in this; and there are many amateurs whose power of selecting practicable routes is decidedly superior to that of the average guide. To a beginner, who ought to be content with easy and well-known expeditions, this quality in his leading guide is naturally of but little importance; still, it is well to bear in mind that it is unwise to take a guide away from his own district unless he is known to be a good route-finder, and it may further be remembered that to find a route previously followed or described is quite a different thing from selecting an entirely new one.

Ability in selecting the details of a route is a somewhat different matter, and the power of hitting off a practicable way up difficult and unknown rocks, of threading with certainty and speed an intricate ice-fall, or of crossing fields of broken névé by the best route, apparently fortelling the position of unseen bridges over crevasses, are some of the attributes appertaining to only the best of guides; and possibly they unconsciously reason out present probabilities from previous experiences in similar situations.

3. Ability as a Leading Guide.

(*a*) In following a route chosen.

(*b*) In actual climbing powers.

The two sub-headings in this case refer to very distinct qualities which do not necessarily co-exist. I have in my mind a guide who, under the direction of another, accomplished some of the most brilliant pieces of rock climbing which have ever been effected, but who was hopelessly bad at finding the way. Sent out one day as a sole guide to take a party up a minor peak devoid of snow, a matter of about seven or eight hours, he kept them out till midnight, and they returned to their hotel after an absence of nearly twenty hours without ever having been near the top.

The ability to keep to a chosen route, or to follow one previously traversed, is a quality which can be greatly improved by cultivation; but the gift in embryo must be already there, and there is little doubt that to excel in this particular requires a man to be more or less what is often termed "a born guide."

Ability in actual climbing powers implies the possession of various attributes. To be absolutely sure-footed, to avoid displacing loose stones, to be skilful at scaling difficult rocks,

to cut steps easily and quickly in snow or ice, are some of the chief items: and the man who is good at them all is a good climber; but not necessarily a good guide.

4. Technical Knowledge.

(*a*) Local (geographical).

(*b*) Of snow and ice and of mountaineering principles.

Knowledge of field-paths and short cuts, of landmarks, and of the minute details of the ordinary excursions, naturally makes a guide of greater service in his own district than elsewhere; but a really good guide is very quick at picking up geographical and topographical knowledge, and very clever at remembering it. There are a few guides who may be said to know almost every district of the Alps, but many waste a good deal of time in regions with which they are not familiar: and all are less likely to go astray on mountains well known to them if surprised by fog or storm.

A thorough knowledge of snow and ice and mountaineering principles implies a great deal, and the want of it will easily account for the great number of bad guides. A beginner may, by reading, obtain a fair idea of the general principles of mountaineering, and, if he sees his guide transgressing them, he may at once put him down as anything but first rate. On the other hand, he will be unable to form any just estimate of a guide's knowledge of snow or ice work until he has himself gained considerable experience and can no longer be called a novice.

Having considered briefly the qualities which go to make a good guide, it will be readily understood that the combination of all of them in perfection is a very rare occurrence.

There are many very good guides though, who are fair in all respects, while excelling in only one or two.

Alpine literature abounds with references to first-rate, second-rate, and third-rate guides. The division is arbitrary, and not very definite; still, some such scheme will be of use in helping a beginner to estimate the various grades and qualities of guides, and I append the following classification, in the belief that it may answer the purpose.

Guides. (*a*) First-rate.
(*b*) Good.
(*c*) Indifferent.
(*d*) Bad.

Porters. 1. Good.
2. Bad.

(*a*) I would restrict the term "first-rate" to only the very best.

These are few in number, probably not more than twenty all told, and few novices can hope to secure their services, as they are generally engaged for months beforehand. Until, however, an amateur has travelled with one or more members of this class, he will not appreciate the marvellous perfection to which every detail of mountaineering art can be carried.

(*b*) It is from this class that the beginner must hope to get his leading guide. They are inferior to the first rank only in degree, lacking the neatness of finish so noticeable in the great guides, possessing generally less experience, and being less reliable in cases of great doubt or sudden emergency. Still, they are perfectly competent to take the lead and management of any expedition, and a party under the charge of such a guide may certainly be congratulated.

(*c*) There are many guides who can only be ranked as indifferent. They are lacking in most of the qualities necessary for the leader of an expedition, and the only place for which

one of this class is fitted is that of second guide, in which position he may be only a trifle better than a good porter. Still, many such guides have had considerable experience, and, if an easy expedition is in contemplation, they may acquit themselves with credit and prove useful as substitutes when better guides cannot be found.

(*d*) The bad guides are, numerically, at least as strong as all the others taken together, and it is self evident that a beginner could not possibly do worse than learn his mountaineering by following such leaders. Some of them may be expert climbers, but they are bad mountaineers, and they lack the essential qualities in such a degree as to make them very dangerous companions. They are often most plausible, and frequently do as well, financially, as their superiors; so that it is difficult to estimate them properly.

When choosing a guide, a beginner should find out all he can, either from the landlord of his hotel, or from older climbers staying in the place; but, if left to his own resources, he may generally consider that a guide who refuses to leave his own district, or who is shown by his testimonial-book to confine his attention mainly to some three or four expeditions, is a man to be avoided. If a man of this sort is engaged by those able to judge, it is either because they can get no other, or because they think his knowledge of these few particular excursions is sufficient to justify them in employing him to make up the complement on the rope over ground with which he is well acquainted.

With regard to good and bad porters not much need be said. All that is required of a porter is that he should be a fair climber, sure-footed, and able to carry well; and these qualities are not uncommonly found. A bad porter is obviously bad: he shuffles about, requires assistance in

easy places, and generally refuses to proceed when there is any real difficulty.

The number of guides required for an expedition is the question which next demands a few words. In the Chamonix district the matter was, until the close of last season, decided by the laws of the Société des Guides; but, as a rule, travellers and guides settle it among themselves. The maximum number ever now taken is two guides for each amateur, and a solitary climber will want two guides, or a guide and a porter, for every expedition; but two companions, who are fair walkers, will never need more than three guides between them, and, after a very little practice, they ought to be able to dispense with the third. Two experienced mountaineers can, if they are prepared to do their share of carrying and step-cutting, travel with a single guide; while, as has been already said, a stage is reached by some when professional assistance may, if desired, be dispensed with altogether. Whether a couple of friends should take two men or three will depend on their own powers, and on the nature of the intended expedition. No rule can be laid down, but one may probably say that, for their earliest efforts, which should be directed to expeditions both easy and short, two guides should suffice; while they will be wise to take a third on their first really difficult excursion, and either retain or discard him afterwards as they think best.

The beginner wanting a guide should do all in his power to make sure of securing a good one, and the leader, once obtained, can be consulted as to what further measures should be taken. Unless, however, the guide engaged is known to bear a high character, his suggestions as to taking further assistance should be received with a little caution, as he may have relatives or friends to whom he will be very willing to do a good turn, and who may be bad mountain-

eers or undesirable companions. In the same connection, a guide's advice as to what expeditions to make may be influenced by the amount of the tariff, and guides, quite as much as travellers, are responsible for the fact of such mountains as the Rothhorn and the Matterhorn being selected by untried beginners without due probation.

Mountaineering is commonly reported to be a very expensive pastime. Compared with yachting or with hunting it is cheap; with rowing or with fishing it is dear. A walking tour in the English Lakes costs little enough; and, railway fares excepted, the same class of thing may be done for much the same money in the Alps. If, however, the best hotels are patronized, more will be spent in Switzerland: further, if real mountaineering is contemplated, there will be the additional expense of the guides, and this, it is true, may be considerable. It is useless for any one who wishes to become a mountaineer to make only one or two excursions in a year: six or eight at least should be aimed at, and a leading guide's account after three or four weeks climbing may amount to anything between £15 and £30. Two companions travelling together will, of course, effect a very considerable saving, and it is easy to select mountains to which moderate tariffs are affixed. For instance, a solitary aspirant who hires two guides to take him up Mont Blanc or the Matterhorn will have a guide's bill of £8, and, what with his gratuities, provisions, and so on, the single ascent will very likely cost him £12 or £13: two companions taking a guide and a porter up Monte Rosa, can, on the other hand, complete the expedition for £2 apiece. The tariffs for individual ascents vary considerably, and may be anything from fifteen to a hundred and fifty francs. If the guide-book of the district fails to give the information, the charge for any particular expedition can

be easily ascertained from the landlord of the hotel, or from the printed list of tariffs in use at most centres. Tariffs are supposed to depend upon the length and difficulty of the expedition, but are not by any means proportionally the same in different districts, while some few ascents have, by their history or tradition, acquired a market value far beyond their deserts at the present time.

If a guide is engaged for a series of expeditions, it is usual to make an arrangement with him, and this is generally found satisfactory both to guides and to employers. Some guides are exceedingly grasping, and will avail themselves of a beginner's ignorance to make bargains very favourable to themselves: others again, a class no longer common, have been so single-minded and ingenuous as to accept most inadequate remuneration from those mean enough to take advantage of their simple nature. The arrangement usually made is to pay a guide so much for every mountain ascended, so much for every snow pass crossed, and so much per off-day of idleness or lowland travel. Different guides have different ideas as to their worth, but many of the very best will take fifty francs for a mountain, twenty-five for a pass, and eight to eleven francs per off-day. A young guide wanting an engagement will often go for less than this, and, if a second guide or porter is engaged on the same system, a smaller sum will be offered; say forty, twenty, and seven for the former, and thirty, fifteen, and six for the latter. Ten francs a day and his keep, whether you use him or not, is, in the Dauphiné, the regular charge for a porter if engaged for a week; and some similar arrangement can generally be made in other districts.

In some places the hotel-keepers entertain the guides during the season, giving them bed and board free; while

in others they charge a pension of one to four francs a day. Hence a guide, who will be satisfied with eight francs per off-day if at home or in any cheap centre, may demand more when travelling or when stationed in what is to him an expensive district.

It is well when making arrangements with a guide to be very explicit. Let it be clearly understood, for instance, that if you pay ten francs per off-day, the guide is to provide his own board and lodging; or you may offer seven or eight and say that you will be responsible for these. Again, it is wise to have a clear understanding as to what you are to pay if you traverse a peak, going up from one place and down to another; or if you combine a peak with a pass, or cross two passes in a single day. Many guides will agree to take the pay for a peak in the first two cases, and that for a single pass in the third, provided it is stipulated for beforehand: otherwise they may demand more. In any case one can give a little extra if the difficulty or fatigue has been excessive. Whatever the details of the arrangement made, the main point to bear in mind is that a definite understanding, to include every possible contingency, will be found conducive to general harmony and mutual satisfaction between guides and employers.

It is always understood that the employer pays all railway and coach fares, and, if an appointment is made to meet anywhere, the engagement begins on the date on which the guide has to leave his home or last employer, and terminates similarly. On mountain expeditions, or when camping out or sleeping in huts, the employer caters for his guides as well as for himself, and, when travelling by road or rail, he will often defray his guide's expenses at the wayside inn or restaurant.

One word further with regard to money matters: a

"Trinkgeld" or "pourboire" is always expected, and, unless a traveller is actually dissatisfied, he will always give it. Amateurs are more or less generous in this matter, and beginners are often quite at a loss to know what will be a suitable sum to offer. A hint on such a subject must be taken as a hint and nothing more; but, if a traveller is well satisfied with his guide he will, perhaps, offer five francs for a single expedition, or possibly ten if the guide has "saved his life" half a dozen times; and, at the end of a successful engagement, a sovereign or two sovereigns, according to its duration and the degree of satisfaction evoked, is usually considered enough.

Before bringing the present chapter to a close, I may, perhaps, add a hint on the general treatment a guide should receive at the hands of his employer. A guide who is in a traveller's pay is at his master's service all the time, and will make himself useful in many little ways; besides, he is generally an agreeable companion if company be needed at any time. Still, it is undesirable to spend all one's spare time in guides' society, though it is right to treat them more or less as comrades, and to show them the same kindly and courteous consideration which the best of them always show for us. Some guides, however, have not fine feelings and may be easily spoiled; and he is no friend to his guide who will permit undue familiarity, or submit to be dictated to on any matters not immediately connected with the conduct of an expedition which may be in hand.

CHAPTER VI.

GENERAL CONSIDERATIONS.

THERE are a number of more or less incongruous subjects, not easily grouped under any characteristic heading, on which a beginner who proposes to make a few excursions above the snow-line, will require information and advice. To discuss these questions is the aim of the present chapter, and, before proceeding to matters more purely technical, a few words may be said on the general planning of a tour.

Plans. Individuals differ greatly in their ideas of making plans. One man will take a ticket to Geneva, and allow his subsequent movements to depend upon the chance of meeting a friend or making an acquaintance by the way; while another will draw up a detailed scheme, and give out, perhaps two months beforehand, that he will "cross the St. Bernard and arrive at Turin on the 16th, in time for dinner, leaving again next morning by the 9.42." Neither of these alternatives can be recommended, but many courses lie between the two extremes. A married man, who takes his wife abroad, will often prefer to settle at some fairly comfortable centre, will engage his rooms beforehand, and make a point, perhaps, of not being away for more than a day or two at a time; while a pair of young college friends are more likely to decide upon covering a large area of country. Much may be said, indeed, much *has* been said, in favour of both these "ideals," viz., stopping in one place and moving about; and there is no occasion to add to the edifying literature which is growing up around the subject: but, in any case, it is a mistake to make plans so inelastic

as not to admit of modification should circumstances arise to render this desirable. The advent of bad weather at some particular resort is an incident which often leads to a reconsideration of the programme, and, while avoiding any criticism of the pros and cons, it may be well to emphasize the importance of acting decisively in one way or the other. It is by no means an uncommon experience with many to wait at a mountain inn through some days of fog or rain, only to obtain, after leaving disheartened, fine weather and a glorious view of the mountain group they had waited to explore, while travelling to another district in a carriage, train, or steamboat. Disturbances of weather, due to storms, are often only short lived, but if a steadily falling barometer, with a bad wind and sky, seems to indicate a spell of wet, the best way to economize time is to leave at once, thus utilizing the bad weather for lowland travel, and perhaps finding that the atmospheric disturbance had been quite local.

Training. It is always well to employ at least two or three days in taking training walks, before undertaking any mountain excursions; and any Swiss guide-book will indicate numberless mule-path routes, the scenery of which is nearly equal to anything which the higher snows can show. Start with easy days and make them gradually longer; go very slowly at first; beware of short cuts, even if obvious, until you are in good condition; and carry your knapsack yourself after the first day or two,—it is an excellent trainer.

When first you meet or engage your guide, begin with easy excursions, and take care that they are not too long. Accustom yourself gradually to the air of the higher altitudes, and make sure in harmless places that you are proof against giddiness. This, indeed, is a subject which demands per-

haps rather more than a passing notice, as a liability to it is considered by many to be an absolute bar to their ever venturing on the mountains. There is no doubt that mountaineers frequently find themselves in places where an attack of giddiness might be followed by very serious consequences, and, if the tendency to this affection is really strong, it is unquestionably right to eschew all thoughts of mountaineering. It often happens though that a little practice will overcome this failing, and that the actual predisposition to giddiness is not so great as was at first supposed.

Provisions for Mountain Excursions.*

Discuss this question with your guide, and then order the provisions yourself: do not give him carte-blanche, as beginners so often do. This advice will, I feel sure, be endorsed by all those climbers who have had an extended experience of the professional class, on grounds of prudence as well as of economy. It is no very uncommon experience, for instance, to discover in the hotel bill allusions to sundry half bottles of brandy, for the supply of which no order has been given. A small flask to be kept for emergencies is all that is necessary; and, with this exception, the less spirits taken the better.

There are two methods of meeting the commissariat requirements: one, the best, and by far the cheapest, is to take out one's own tinned meat and jam from England,† and merely to purchase bread and accessories from the hotel: the other alternative is to depend for provisions entirely upon local resources. If it is decided to spend the whole of a holiday in crossing passes and traversing peaks, never stopping for more than a couple of nights in the same hotel,

* See also "Sleeping Out," p. 80. † See p. 187.

the latter will be the only available plan, and some, indeed, prefer it on all occasions. Cold meat, cheese, honey, and perhaps a fowl are commonly chosen: the first is dry and unappetizing, and the last often adds too severely, by the demand it makes on the muscles of mastication, to the already arduous exertion of the day: in any case it is dear at nine francs. Sardines and cold beef-steak are infinitely better fare, the latter being particularly good, though rarely forthcoming unless ordered beforehand.

Be careful to take enough bread. It is astonishing what a quantity of bread a party of four will get through in the course of a day; and guides, as well as amateurs, sometimes miscalculate the amount needed. It is the mainstay of a meal on the mountains, and the potted meats and jam are mainly valuable as "vehicles" for bread. Two kilos (4 lbs.) among three men is a good allowance for an ordinary day.

Butter and cheese will generally be included in the list; and, if you have no tins of jam, by all means take some honey, or, at any rate, something sweet: otherwise you will hardly be able to eat as much bread as is desirable.

Biscuits are easily stowed away in the pockets, and by far the best sort are English made gingerbread nuts. However many of these are taken out, it is very rare for any to be brought back.

Chocolate is pleasant as a dessert course, and, like biscuits, may be carried in the pocket as a stop-gap between meals. A small supply of Kola biscuits or chocolate should be kept for emergencies, there being no question as to its value in supporting strength and warding off hunger when provisions become scanty and require careful husbanding.

Raisins are much liked by some climbers, and dried prunes (Fr. *pruneaux*, Ger. *Zwetschen*) are useful when the mouth and throat get dry from prolonged trudging over fields of snow. The juicy plums in glass bottles are by far the most pleasant, but, to allay thirst, the dryer they are the better. The right sort can always be obtained at Alpine inns. One chews them for ten minutes before coming to the taste, another twenty before the stone is denuded of its firmly adherent and leathery surroundings, while a further half-hour or more is profitably spent in sucking the stone. Acid lemon drops answer the same purpose and are preferred by some, but, to my mind, they do not last long enough to be of much use.

The question of what to drink on the mountains is one on which opinions are divided, and the latest fashion would seem to be not to carry anything at all in the way of drink, but to take a few lemons and suck one now and then. Thirst is largely a matter of habit, and the ability to make long excursions with very little to drink is convenient and saves porterage. Still, it is wholesome as well as pleasant to drink at meal times, and, as water is not always to be found, some provision must be made.

Both cold tea and cold coffee are excellent and thirst-quenching drinks, and the latter deserves more patronage than it gets: it should be made with milk, and a small quantity of sugar may be added if desired. Cold tea is much more often used, but it is rarely made in the most approved manner. It is "infinitely superior when made with cold water instead of hot; indeed, it is difficult to credit how great the difference is. The relative quantities of tea and water are the same in either case, but in cold water it has to remain soaking for several hours." *

* "Equipment for Mountaineers," p. 12 (*Alpine Journal*, vol. xvi.).

The beverage most commonly carried is wine, either red or white, and each colour has its advocates. The great advantage is that, while it can be drunk undiluted, it is freely miscible with water, and the addition to this mixture of a little sugar and lemon juice makes a very refreshing and agreeable drink. A suitable cup (Dampfschiff),* should be taken out from England, and a horn spoon or a small stick will be found most useful for the purpose of mixing. Strong "acidulated lemon essence," though not easily procured, is a good substitute for lemon juice, and half a tea-spoonful of this is about equal to the juice of one lemon: its use saves time, trouble, and pain; for it is no joke to cut and squeeze a lemon after climbing on sharp rocks.

Whatever the beverage chosen, it is well to take a wine-bottleful per man per day, though this is certainly a liberal allowance.

It may not be amiss to conclude these remarks by giving a list of all the provisions that are likely to be wanted. Any one can omit what he does not himself require, and a glance at the list may prevent some things from being forgotten.

Meat.	Biscuits.
Fowl.	Gingerbread-nuts.
Sardines.	Kola chocolate or biscuits.
Tinned Meat.	Raisins or prunes.
Tinned Jam.	Sugar.
Bread.	Salt.
Butter.	Lemons or lemon-essence.
Cheese.	Wine.
Honey.	Cold tea or coffee.
Chocolate.	Flask of spirits.

* See p. 184.

Preparing for a Start.

All preparations for an expedition should, if possible, be completed on the previous day. The provisions must be ordered, and, as far as possible, secured, and, with them, the following articles may be given to the guides to pack:—

Rope.	"Dampfschiff." *
Gaiters.	Horn-spoon.
Shetland jersey.	Lantern and candle.

Early Start.

In order to complete any Alpine expedition in a day, it is generally necessary to start very early in the morning. Expeditions vary greatly in length, and the time taken depends as much upon the condition of the mountain and the strength of the attacking party, as on the distance to be covered and the difficulties to be overcome. Eleven hours would count as a short expedition, and twenty as a long one; though neither of these figures represent extremes. If the excursion contemplated is short or of moderate length, it will probably be sufficient to start as soon as it is light enough to see; say, at four o'clock or half-past three; but, if a long day is anticipated, an earlier start must be made. A very usual hour is two a.m. and occasionally it is requisite to set out at midnight or even before. On such occasions it is generally necessary to proceed by lantern-light, but, if the air be clear and the moon full, there may be no need for artificial illumination. It is always well to be early rather than late, and, in case of divided opinion, to select the earlier hour proposed.

* See p. 184.

Whatever time is chosen for starting, an hour earlier will be fixed on as the time for being called. Do not imagine that less than an hour will suffice for dressing, breakfasting, and preparing for the start: it will not. You may be ready yourself in thirty or forty minutes, and perhaps the whole party may be ready; but the chances are that the provisions will not be, or that something will, at the last moment, be found to be missing. Any little omission or mishap may easily waste ten or fifteen minutes at this hour of the morning. On rising, take special care to avoid making any noise which may disturb others in the hotel; and, before leaving your room, make quite sure you have forgotten nothing, especially the knitted gloves and spectacles. Carry your boots down in your hands. Nothing will place you in worse odour with other travellers, climbers or non-climbers, than forgetfulness as to the sacred right to undisturbed repose. Practised mountaineers get up as it were by stealth (see illustration facing p. 1).

In connection with the early start, two things may be stated which are, generally speaking, true, but often unknown to beginners. The first is that, while it is advisable to go to bed early before an intended expedition, it really matters little whether you sleep or not. "It is very difficult to free the mind from all excitement on the evening before a grand expedition;" * and, even if this disturbing element is quite absent, the mere anxiety to obtain sleep is often sufficient to banish it altogether. "The goddess flies most shyly where she is most intensely wooed." † You will be much more likely to get two or three hours of unconsciousness if indifferent as to sleep, and there is no occasion for any anxiety at all: some mountaineers start almost

* Hinchcliff, "Summer Months among the Alps," p. 103.
† Tyndall, "Mountaineering in 1861," p. 45.

habitually without sleeping. It must not be supposed that sleepiness is a condition unknown when actually on the mountains: far from it—it is sometimes almost overpowering; but this depends more upon the situation than on the amount of sleep obtained before starting. A long but easy snow slope, a broiling sun, and an entire absence of wind, form a combination of conditions which will act as a powerful soporific even after a good night's rest.

The second point relates to the length of Alpine excursions. Many a pedestrian, fatigued perhaps by a walk over the Grimsel or the Col de Balme, thinks that he would be unable to manage an expedition which would occupy fifteen hours or more. As a rule, he would not find it much more fatiguing: for, I think it may be said that, if one is in fair condition, the time spent before eight o'clock in the morning does not count. In mountaineering the worst of the grind is over before the sun has any power to speak of, and the middle of the day is spent in the invigorating air of the higher Alps.

Meals and Rests.

Five meals is the usual number taken in the course of a day's climbing: one before starting, three out-of-doors, and a good dinner in the evening.

It is of importance to make a fair breakfast before leaving the hotel; and, as the appetite at two or three o'clock in the morning is generally conspicuous by its absence, it is worth while to find out what can be taken with least aversion. Some take tea or coffee, bread, butter and honey, with or without an egg or omelette. Some again prefer a cup of bouillon or other soup; while, to those who like it, nothing is pleasanter or better to walk on than a basin of hot bread and milk ("pain-lait").

Meals on the mountains are simple in their nature, and all partake of the same general character; bread, butter, meat, jam, cheese, and chocolate, being the usual constituents. While one member of the party opens tins, another cuts bread, and a third concocts the drink in the big cup. It is very desirable to halt for meals where water is procurable, and this can generally be arranged, except in the case of the midday meal, which is often taken on a summit or elsewhere high up, where water is not likely to be found.

The first meal "en route" has been dignified by the name of the "second breakfast." It should not be delayed for more than three hours after starting, while some climbers prefer to take it within two hours and a half. Most of the guides can go much longer without feeling the want of food, and, if they do not pull up within three hours, they should be stopped. After this, it does not so much matter, but it is best not to put off the next meal for too long. Be sure after each repast that nothing has been left behind; and some small article, such as a knife or the horn spoon, is the most likely thing to be forgotten.

A beginner does not, as a rule, know when he is hungry. He goes plodding on higher and higher, and, after two or three hours, begins to breathe a little quickly and to feel his heart beat; if he has any definite sensation, beyond one of general discomfort, it is a slight feeling of faintness. He thinks he is getting a little fagged, and very possibly attributes his feeling of renewed freshness and vigour after eating more to the rest than to the food; but he is wrong. A halt for breakfast should not occupy more than half an hour or forty minutes: on the summit, if it is fine and warm and not too late, an hour or more may very well be spent; while, on the way down, halts can be indulged in according to the time of day, the distance yet to cover, and the mood

of the travellers. At mountain meals, on the way up, it is advisable to eat as much as possible; and, as to drinking, I would say, drink as much as you want if you have sufficient with you: the idea that it is advantageous to limit one's drink is very questionable. On the other hand, I am sure it is well to drink nothing between meals, at any rate while going up. A man who drinks at every stream he comes to is always thirsty, but this habit of constant thirst can be cured by the exercise of a little self-control.

As of drinks, so of rests: one rests at meals, and, often enough, separate halts are needed for putting on or taking off gaiters and rope. On very long snow-slopes it may be wise to call a short "easy" now and then, but otherwise it is best not to stop between meal-times.

Sleeping Out. Huts, etc.

If an expedition is too long to be managed in a single day, the preceding night must be spent either on the mountain or close to its base; and, in the early days of mountaineering, the highest available châlet, or a camp in the open, was resorted to. Châlets, tents, and sleeping bags are in occasional requisition still, and a cave or overhanging rock is now and then made use of as a "gîte;" but the necessity for camping out in the Alps is growing every year less frequent. There are two reasons for this; hotels and inns are springing up nearer and nearer to the mountains, and huts, specially designed for the accommodation of travellers contemplating ascents, are being multiplied and improved in nearly every important district. These huts (Cabanes, Refuges, Clubhütte) are built and maintained by the various Continental Alpine Clubs, and, though they differ considerably in detail, they are, as a rule, well suited to supply the

want they have been erected to meet. Almost all huts are supplied with cooking-stoves, pot, pans, cups, plates, spoons and forks; all, too, contain something in the way of a primitive bedstead which usually takes the shape of a broad shelf to accommodate six, eight, or more travellers. A supply of straw for bedding may generally be counted on, and most huts are provided with blankets: occasionally there is a store of firewood.

The question sometimes arises whether to make use of a hut or not. If the hut is five or six hours from the inn, and the expedition usually occupies some eighteen hours, even when starting thence, there can be no doubt as to the wisdom of making use of the shelter. On the other hand, few would care to do so merely to save two hours out of a total of fourteen. Intermediate cases can be imagined, and, as a matter of fact, are very common. Individual climbers differ greatly in the view they take; some being always willing to shorten an expedition, while others have a great objection to sleeping out, and never do so unless driven to it.

If it is decided to sleep in a châlet, hut, or "gîte," preparations must be made accordingly. An extra porter will, as a rule, have to be engaged, and it will be necessary to ascertain whether the particular hut is supplied with blankets and firewood. If not, blankets must be taken from the hotel, and a halt made at the upper limit of timber to collect fuel. Additional provisions for two meals in the hut must be ordered and packed, together with extra shirt and stockings and a pair of slippers. Tinned soups, taken out from home, will prove most useful; but, if not supplied with these, some sort of soup can be made from ingredients bought at the hotel. Meat of some kind should be taken for supper, and raw beefsteaks, to be cooked at the hut, can be highly

recommended. These, with extra bread, butter, jam, sugar, salt, chocolate, wine, tea, and coffee, will complete the list of extra provisions.

It is well to start fairly early in the day so as to arrive at the hut during the afternoon; and it is desirable to change the shirt and stockings immediately on arrival, especially if the walk has been warm, placing those taken off to dry in the sun. The straw bedding of the hut may be similarly treated should it prove to be damp, as is often the case. The provisions are next unpacked, and what is wanted for the morrow's expedition is carefully put on one side. Firewood is chopped up, plates are cleaned, and everything made ready for the evening meal. The remainder of the afternoon can then be both pleasantly and usefully spent with a map and a telescope, varied by the ascent of such boulders as may be found near at hand. About six o'clock preparations for supper will be made. Soup, sardines, meat and jam, form, with bread and butter, the constituents of a substantial, if a simple, meal; while for drink perhaps some wine will be mulled. Pipes and music follow; if there is sardine oil the boots are greased therewith; and at bedtime, eight or nine o'clock, a cup of hot chocolate is, as the advertisements say, "grateful and comforting." The first part of the night is spent in more or less perfect sleep, according to the degree of bodily discomfort experienced, and the extent to which each individual is affected thereby; and then, about two hours before one actually gets up, the guides begin to strike matches and look at their watches, a process which is repeated at intervals of about fifteen minutes until it is really time to rise. A repeater watch is a pleasant possession at such times, for it must be admitted that, if one is lying awake, the temptation to occasionally ascertain the time is too strong for most natures to resist.

An alarum watch is said to be useful, and a good one doubtless would be. The only one I have seen belonged to a guide, but it was more remarkable for its magnificent proportions than for its reliability: it never went off at the right time, but used to startle its owner and his companions by making a noise like a rising pheasant at irregular intervals during the following day.

Breakfast with tea or chocolate is, after once the fire has been lighted and the water boiled, no very lengthy matter; and, when this is over, there comes the somewhat cold and cheerless duty of washing everything up, and putting the hut generally in a proper state for the reception of the next party. To leave a hut untidy is inexcusable.

For two or more parties to be on the same mountain at once is always objectionable, except in the case of the easiest expeditions. On rock mountains it is especially dangerous, as, unless the two keep quite close together, there is the risk of those above dislodging stones. If two parties chance to have fixed upon the same peak for the same day, and if, as sometimes happens, this day is likely, in each case, to be their last opportunity, it may be admissible for both to start even for a rock mountain. There must be a good deal of give and take, however, as they must keep together, and, where needful, wait for one another; so that more than the average amount of time will be taken. This ought, I think, to be regarded as the limit; and if so, one may say that for more than two parties to deliberately start for the same rock mountain at once is not justifiable: certainly every effort should be made to avert such a contingency. It is difficult in this case to lay down a rule so strict as those which refer to crossing avalanche tracks, or climbing unroped, but the matter should be re-

garded in the same light; and, if some arrangement cannot be arrived at, it is well for one's own safety, if for no other reason, to put up with disappointment and transfer one's energies to another field. When four or five parties start simultaneously for a peak like the Matterhorn, the assumption is that they all consist of inexperienced climbers who have yielded to the advice of grasping guides: otherwise such a state of affairs would indicate an amount of selfishness and folly difficult to credit. With snow mountains the case is different, and, if a mountain like Mont Blanc is in good condition, there is no reason why four or five parties should not follow in each others' wake, if they care to do so.

To make long expeditions on two or more consecutive days, a man must be in first-rate condition; and even then few will do it without some reason. While, however, alternate days of activity and rest probably combine the greatest enjoyment with the greatest advantage to health, a threatened change of weather may, among other reasons, make it worth while to climb on two days running. Very few can either enjoy or profit by a third day of hard climbing, and it should not be undertaken without due cause.

Speed Climbing. The beginner will not have been long at work before he will meet with some one who boasts of the short time he has taken in effecting certain mountain ascents. Now, though it is very desirable to be able to climb quickly as well as safely, and though every effort should be made to acquire a habit of not wasting time by needless deliberation, it should not be forgetten that the ability to go quickly is best reserved for occasions when some advantage will accrue from its exercise; and that, at all ordinary times, a moderate pace is much to be preferred. The man who habitually races sees but little of the beauties

by which he is surrounded, and to boast about the pace is as childish as it is vulgar: a second-rate guide can generally keep up with the quickest amateur.

Note Taking. Many mountaineers habitually take short notes, with remarks upon the weather, the state of the snow, and the time occupied in each portion of the excursion. The practice does not give much trouble, and the notes are often useful for subsequent reference.

All new work, whether in the Alps or elsewhere, should be very carefully noted and described at the time, and any ambiguous words, such as "right" and "left," should be studiously avoided, unless the context renders their meaning clear beyond possible doubt.

Sketching and Photography. To be able to bring back pictorial representations of the mountains is most delightful; and those who have the gift of producing rapid and accurate sketches are indeed to be envied. Something can be done, however, by those who have only a very slight talent for drawing,* and the camera-obscura ($10 \times 6\frac{1}{2} \times 6$ inches), made by Ross and Co. of Bond Street, will enable the merest novice to make accurate sketches. The objection to this, as to photographic apparatus, is the bulk and the weight. Fortunately, this has not deterred mountaineers from carrying their cameras into the very heart of the mountains, and the beautiful photographs, which have added so much to the interest of the more recent exhibitions of Alpine pictures, testify to the enthusiasm and energy of many mountaineers. It would be beyond the scope of this volume to enter into the subject of Alpine photography. The matter has been most ably dealt with by Mr. Dent, and beginners, wishing to photograph as well

* See "Mountaineering" (Badminton Library), chap. xiii. by Mr. H. G. Willink.

as to climb the Alps, are referred to the last chapter of the "Badminton" volume on Mountaineering.

Ladies and Mountaineering. Mountaineering is an exercise which has great attractions for some ladies, and while the number who climb is on the increase, the fair sex has always supplied some enthusiastic mountaineers since the days when the Alpine Club was in its infancy. It is no part of my business to pass an opinion as to whether ladies *should* climb; they do: nor shall I venture to address to them any advice not equally applicable to their brothers. On one subject only would this indeed be possible, and that is in the matter of dress. I am, however, informed that the controversy on the subject of clothes for lady-climbers is still so keenly contested that the recommendation of any plan of costume would be likely to excite great indignation amongst those whose views were ignored or controverted. The matter is probably not yet ripe for final treatment, and, in any case, it would be presumptuous on my part to offer suggestions to the ladies on a subject which every one will allow to be peculiarly their own.

The considerations which follow refer rather to the mountains themselves and the artifices of actual climbing, than to questions of a more or less preliminary nature, such as those which have just been discussed; and, first of all, it may be pointed out that mountains, though existing in such infinite variety of shape and form, may, from a climber's point of view, be looked upon as presenting two, three, or more faces or sides, separated from each other by an equal number of ridges. The ridges may be rounded and ill-defined, or sharp and narrow, in which case they are called "arêtes;" and the faces may be, in general contour, either flat, convex, or concave; the latter are, however,

usually divided irregularly so as to present a series of snow or ice slopes and rock precipices, or are split up by minor ridges into gullies or "couloirs."

Except in the case of wholly isolated mountains, every peak is connected with its neighbours by one or more of its main ridges, and the lowest point on the ridge between two adjoining summits is often, though improperly, called a "col."* In theory every col is a pass, and in many cases the actuality coincides, though, sometimes, the best route will take one a trifle higher than the actual lowest point. There are many cols which will never be converted into passes, and others which have been so converted but never ought to have been.

As mountain forms may be classed under a few broad headings, so may the practice of mountaineering be resolved into three primary actions—ascending, descending, and traversing; and the methods employed in compassing these ends differ according to the nature and steepness of the ground. In walking *uphill* it is always well to go slowly, with an easy, regular, and, to an onlooker, perhaps a rather clumsy swing. The steeper the ground, the shorter, as a rule, should be the strides, and a zigzag route is, in most places where it is possible, both the quickest and the easiest. When the ground is very steep, be it grass, snow, or rock, the hands will be called into requisition as well as the feet: in the last case they are used directly, in the two former through the medium of the ice-axe. It is here, perhaps, when hands as well as feet are required, that the line may be drawn between walking and climbing.

In reversing the process, the steepest places, on whatever kind of ground, are only to be safely *descended*, by turning the face to the mountain, and proceeding as if going down

* See Glossary.

a ladder. It is, however, not common for this mode of progression to be necessary for very long at a time, and generally the more ordinary attitude may be adopted. In descending it is usually best to travel in a straight line, where a zigzag has been employed in the ascent; and on snow, grass, or "scree" slopes, neither too gentle nor too steep, it is often easier to run than to walk. Unless the gradient is mild enough to enable one to dispense with it altogether, or steep enough to require its use as an anchor, the ice-axe should always be used as a prop or third leg, with the point behind, so as to have the action of a brake.

Traversing is generally either a difficult or a fatiguing process. To traverse for some distance on steep snow or grass involves walking on one side of the foot for longer than is pleasant, and, after half an hour or more of this exercise, all the muscles of the body seem to call out for some change of action. Beginners often exhibit a tendency, when traversing on steep ground, to lean towards the mountain. They may indeed have but scant foothold, but a very little reflection will show that this action must throw them more on to the edges of their boots, making a mishap probable, either from a direct slip, or by forcing off the outer edge of a loose foothold. Wherever you are, then, stand upright. Short traverses are often difficult: you ascend a gully, for instance, as far as possible; and, when progress by that avenue is quite barred, a traverse is undertaken to the left or the right. Had the rocks on either side been easy, they would probably have been taken to lower down, so that the likelihood of difficulty being met with becomes clear.

Reconnoitring.

Reconnoitring is no longer an important element in effecting the ascent of those peaks which are found round the well-known mountain centres of the Alps. Beginners are taken up the mountains by guides who know every step of the way; and, as these have no object in spending their spare time in scanning the surrounding ranges, with a view to selecting routes, the importance of doing so is not apparent. This is to be regretted, as the power of making a critical and useful survey is one which should be aimed at by every one who has any wish to become a competent mountaineer; and much practice is needed to make such observations of any value. It is well therefore to cultivate the habit of regarding mountains with a view to determining the best line of ascent, and afterwards to compare one's unaided ideas with what has been found to be practically the best. A useful habit may thus be acquired among very well-known mountains which will prove serviceable when unfamiliar regions are approached.

If it be desired to make the ascent of some untrodden peak, or to force a new way up one previously ascended, advantage will be taken of every other expedition made in the district in order to observe it from as many points of view as possible; and, in addition, a day, or perhaps two, may be set aside for the special purpose of reconnoitring. The faces, ridges, and couloirs of the mountain are studied, the presence or absence of cornices or overhanging glaciers is noted, and a plausible route, free from obvious danger, selected. The result of such a survey may be a feeling of absolute confidence, or one of great uncertainty; and whether certain places can be surmounted or not is often beyond the powers of even the best guides to say. Tele-

scopes are helpful in making out the details of the route, but a very great amount of practice is required to interpret properly the impressions they convey. As a good example of this difficulty I may cite a personal experience in Norway some eight or nine years ago.* Examining through a telescope a rock face on the opposite side of a valley, we (a party of four) came to the unanimous conclusion that, if we could reach a patch of snow about halfway up, our difficulties would be over. The lower rocks appeared to be very smooth, while the upper ones were cut up into terraces, and seemed to offer a natural staircase to the top. Two or three days later, when this peak was attacked, we found that our estimate had been quite wrong. The lower rocks were full of minute irregularities, and did not prove difficult, while the upper ones turned out to be unscalable, though they would have been easy work for a party of giants who could reach some fifteen or twenty feet. The first few terraces were climbed by standing on each other's shoulders and heads, but the higher platforms were too small to allow of any such manœuvres being continued, and, without some such means of counteracting our short stature, the task before us was hopeless. We eventually accomplished the ascent by a long traverse, which led round a corner and on to broken rocks, but not as the result of reconnoitring. This experience might be quoted by any one who wished to prove the uselessness of a telescope in selecting routes: my purpose, however, in introducing it, is to exemplify the difficulties, and show the need of constant practice with this instrument. The man who examines rocks habitually with the same glass, and afterwards tries to climb them, acquires in time an ability to appreciate the real proportions of the objects seen. Nothing but actual trial will finally decide

* *Alpine Journal*, vol. xiii. p. 158.

whether certain rocks are scalable or not, or if a given ice-fall can be threaded; but the general route to be attempted can always be determined from one or more reconnoitring excursions.

Number of Climbers in a party. In a previous chapter it has been stated that a mountaineering party should consist of not less than three members;* it must be added that it seldom comprises more than five. If six persons go together they will generally split into two parties of three each, and the question of two parties attacking the same mountain at once has already been discussed.†

Three, four, or five may then be regarded as the proper number to take part in a mountaineering expedition, and, while it is difficult to find fault with any of these numbers, it may probably be said that, for practised climbers, three is actually the best. The same will hold good for an incompetent fumbler; he will be best off between a couple of good guides: but the statement that three is the best number to climb together must always be read in the light of the strength of a party; and a couple of beginners, active but inexperienced, will be right in engaging not one, but two, or even three guides,‡ according to circumstances.

Every additional man tends to make a caravan move more slowly, and this means an increased chance of being benighted; otherwise it is probable that four, or perhaps five, would be universally regarded as the ideal number to take part in a mountain expedition; as there is no doubt that, in case of any mishap or illness, compelling one member to stop for an indefinite time, a party of three find themselves in a very undesirable position; one man being obliged to descend alone for assistance, while the other

* See p. 26. † See p. 83. ‡ See p. 65.

remains with the injured comrade. *Never leave a man alone on a mountain.*

Order of going. The order of going is generally a matter of great importance. It may be changed once, perhaps oftener, in the course of a day, and special exigencies sometimes arise which render a temporary alteration necessary; but a couple of rules may be given which are very generally applicable; (1) put the best man first going up and last coming down: and (2) place a weak man between two strong ones.

Going up, then, the best guide will generally lead, and it is rare for an amateur to get a chance of trying his hand as leader. In descending, however, there will be, in the case of a party consisting of two travellers and two guides, abundant opportunity for practice in choosing the details of a route; as in this case it is usual for the more experienced amateur to go first, followed by the second guide: the weakest member of the party will thus be placed between the two guides, and the leading guide will of course come last.

The Rope.—Knots, etc.

The rope is the safeguard which alone makes mountaineering justifiable; its practical value, when properly used, can hardly be overestimated; and the moral support it affords is of equal value with some of its more demonstrable uses. It is worth while to learn to use the rope to the best advantage, and it may be at once said that this is very far from easy.

It is not very often that a good rope is strained to anywhere near its breaking point, but ropes are chosen in relation to the strain that they will stand, and it is ridiculous to diminish security by tying bad knots. All knots weaken

a rope, but some much more than others, and it is therefore foolish to use those which needlessly diminish the strength; yet almost all guides, and most amateurs, often transgress in this respect. It is not only important to select the best knots, but these should be tied "with the lay" and, "with guides and amateurs alike it is usually a matter of chance whether the knot is tied with or against the lay." * One eighth of a rope's strength may thus be needlessly wasted, even when the right knots are used. It may be questioned whether an attempt to tie every knot "with the lay" would not in most cases result in considerable loss of time; but it is easy to learn the right knots and to tie them habitually.

DOUBLE OVERHAND KNOT.

The Double Overhand Knot, in spite of being figured in 1864, only "in order that no one may imitate it" † is still in constant use among guides. It has survived, because, perhaps, it is fit to survive: certainly it is not so bad as was supposed. No one, however, will urge that it is a good knot; and, if not *the best*, it should be discarded. This knot, besides unnecessarily weakening the rope, is, though so easy to tie, very difficult to undo after it has been drawn taut when thoroughly wet. So jammed indeed does it frequently get that much time is wasted in taking it off, and occasionally the problem of untying has proved quite insoluble.

The Simple Fisherman's Bend is perhaps the best all-round knot for Alpine use, inasmuch as it is applicable,

* Equipment for Mountaineers, p. 7; (*Alpine Journal*, vol. xvi.).
† *Alpine Journal*, vol. i. p. 325.

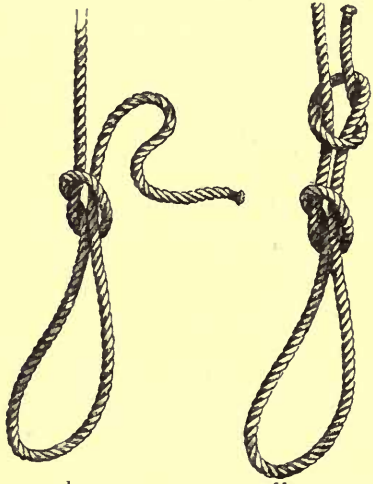
with slight variations in the method of tying, to the three chief cases in which a knot is required, viz.:

A. For the end loop.

B. For the middleman loop or loops.

C. For joining two ropes together.

For case B this knot is by far the best hitherto discovered, though not theoretically perfect, as it partakes to some extent of the nature of a slip-knot. Practically, however, this objection does not arise.



I. II.

FISHERMAN'S BEND
(For end loop)

The diagrams show sufficiently clearly the formation of this knot in cases A and C. In case B it is generally tied by making an ordinary loop in the rope at the point required, and a second loop on the free or running side of the one first formed. It can also be readily made in one operation, as shown by the accompanying diagrams. The rope is turned back on itself, as in fig. 1., making two bights; one of these is then laid partially across its neighbour as in fig. 2., and the knot is completed by drawing the cross-strand in the

FISHERMAN'S BEND
(For joining two ropes.)

direction indicated by the hook. Care must be taken, when drawing taut, that the two knots thus formed are kept separate. The loop can be passed over the head and arms of the middle man, and drawn through the first knot to the

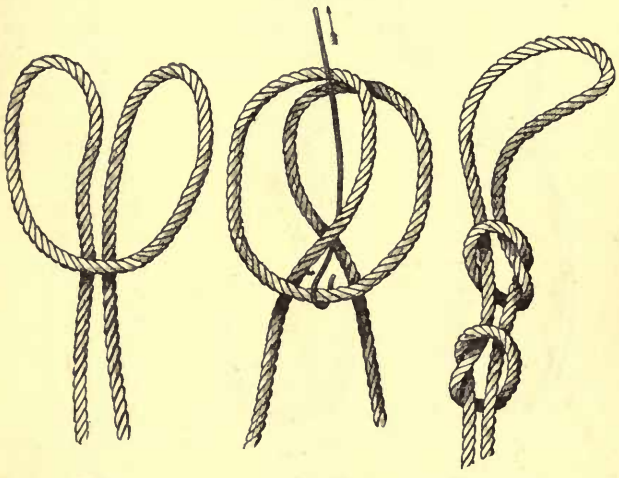


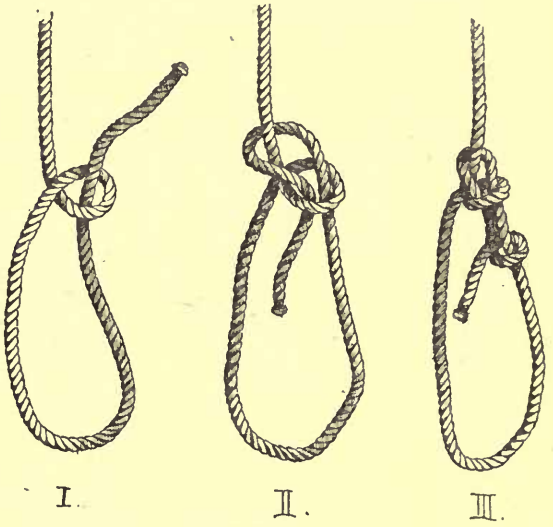
Fig. I. Fig. II. Fig. III.
MIDDLEMAN LOOP.

tightness required. The second knot is then worked down to keep it in place. For cases A and C, the following alternative knots have been found in each instance to be as good or better than the Fisherman's Bend.

The Bowline Knot (in case A) is, with a little practice, easily and rapidly made, and has the advantage in being, of all knots, the most easily untied. It is a little apt to work loose in a long day of intermittent strain, but the loose end bent round the waist strand, as shown in the diagram, will obviate all risk from this source.

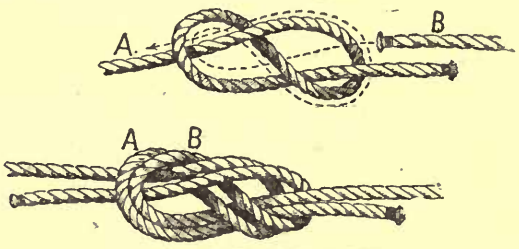
The Double Figure of Eight Knot (in case C, *i.e.* for joining

two ropes together) is best, because it is less likely to work loose in a long day's climb. If, however, the ropes have to be joined together for temporary purposes only, the simple



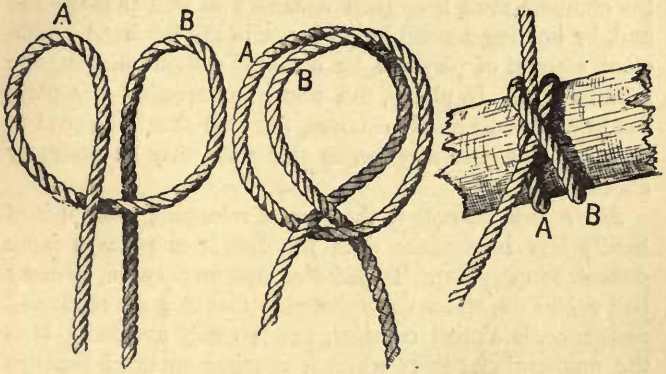
BOWLINE KNOT.

Fisherman's Bend is quite as good; and it should not be often that more than this is called for.



DOUBLE FIGURE OF EIGHT KNOT.

One other knot, the *Clove-hitch*, is useful in occasional situations.* The accompanying diagrams explain themselves.



I. II. III.

CLOVE-HITCH.

The care of a rope and the length to be allowed for each person is discussed in another chapter;† but it may here be said that from fifteen to eighteen feet is, under ordinary circumstances, a suitable length to allow between each pair of men.

There are many minor points in connection with the use of a rope which will be gradually picked up as experience increases, but one or two cardinal rules must be insisted on as important; and, while nothing but practice will enable a climber to carry them out properly, they must be known or they will not be aimed at.

Keep the rope taut is a well-known maxim, and, though easily said, is much less easily done. In all situations, however, where there is either danger or difficulty, this rule must

* See pp. 106–125, 177, 178. † See p. 178.

be looked upon as of the first importance; and it is a good habit to regard it as applicable everywhere. It must not be supposed that the rope is always to be at full stretch, but the climbers must keep their distances as well as they can; and, by holding a small loop of rope in the left hand a sufficient amount of play can be obtained without allowing the rope to drag. In places, too, where any member of a party has to wait while another moves, the rope should be paid in or out as the case may be, so that a slip may be promptly checked.

Never jerk the rope is the second rule, and, while it is of hardly less importance than the last, it is perhaps more difficult to carry out. To jerk the rope on purpose, as many bad guides do, under the impression that they are rendering assistance, is almost criminal, but is easily avoided. It is the unintentional jerks which it requires so much practice to avoid; and it is in descending ground unequal in its difficulties that the greatest care is called for. A good climber will look well after the man in front and the man behind; and, while doing all he can to keep moving without jerking either of his companions, he will be ready to warn either of them if a jerk seems imminent. A party of good mountaineers generally manage all this without much speaking; and, if there is one thing to be said about this matter more likely to be helpful than another, it is that one must remember, after descending any difficult place, to wait for the man behind, as he will be moving slowly over the same difficult ground.

To the above maxims two more may be added, simple and obvious, yet often disregarded—*See that the rope does not catch on projections*, and, above all, *that it does not dislodge loose stones.*

The amateur who wishes to become a skilful climber

cannot do better than lay these four rules of the rope to heart, and endeavour, in his early expeditions, to acquire a habit of attending to them; for they will assuredly serve him in good stead throughout the whole of his mountaineering career; and in nothing is the difference between a good and bad climber more noticeable than in the attention paid to matters such as these.

CHAPTER VII.

SNOW AND ICE WORK.

WHILE the purport of this chapter is to deal with snow and ice, and that of the following one with rock, considered from a climber's point of view, it must be apparent that only a certain amount of information on these subjects can be conveyed by speaking or by writing; and that much of the knowledge, and the whole of the skill, which go to make a mountaineer, can be learned only by practical experience amongst the mountains.

Snow and ice exist in the Alps in various conditions, and it is well to remember that, though the powdery substance which weighs down the branches of the fir trees is one thing, and the glassy surface on which skaters glide is another, the boundary line between the two is very shadowy; and that, at high altitudes, snow passes, by slow and imperceptible degrees into ice. The process of making a snowball exemplifies what takes place; and all ice met with in the Alps has originally fallen as soft snow, and been subsequently converted into ice by pressure and regelation, or by simple melting and freezing. Snow and ice, then, may be found in all possible consistencies: snow powdery or

granular, liable to be blown about in a wind; deep soft snow into which one sinks; snow which lets the foot in for an inch or two; snow as firm to walk on as turf; snow harder than the last, but in which steps can be kicked; snow too hard for this; snow which is almost ice; honeycombed ice, rotten in consistence; and finally, solid ice of all degrees of hardness, from that which is only a stage removed from frozen snow, up to ice which is hard black and transparent, like glass or crystal. "The condition of the snow," is a phrase constantly on the lips of mountaineers; and snow is said to be "good" when hard and firm, and "bad" when soft, powdery, granular, avalanchy, or crusted. Crusted snow is met with when a rapid thaw, succeeded by a sharp frost, follows on a fresh fall, and it presents a surface which, while hard enough to resist a certain amount of pressure, gives like a pie-crust when the weight of the body is thrown upon the foot. Walking under such conditions is exceedingly fatiguing; but it is still worse when the crust is of irregular strength, sometimes supporting the weight, but as frequently breaking through. In such places it is best for the heaviest member of the party to lead, and he should tread heavily to make sure of breaking the crust. Powdery and granular snow are found at high altitudes when there has been no thaw since a fresh fall: both sorts blow away in a wind, and often present from below the appearance of a little cloud floating away from a slope or ridge, or flying from the summit of a mountain like a long streamer. The expression, "Mont Blanc fume sa pipe," has arisen from an appreciation of the true cause of this appearance, and the phenomenon is one which should not be disregarded. It always means a high wind, and generally a cold one; a condition which may be fatal to the success of an expedition, and which will certainly introduce an element of danger, even in weather otherwise

perfect. Avalanchy snow has been dealt with elsewhere,* and the difficulty of knowing whether snow in certain states is safe to venture on has already been discussed.† I may add here that an equally difficult problem is sometimes presented: Will snow, which is in good enough condition for the ascent, be equally safe for the descent in the afternoon? If the previous three or four days have been fine, probably it will; but, if the question forces itself on the attention in a prominent manner, it is well to keep a look-out for an alternative route to descend by if need be.

Ice forms the entire bulk of the lower or naked glaciers, and the substratum of all the great permanent snow fields or upper glacier basins. Above the snow-line ‡ it is covered, as a rule, by snow which has become partially consolidated by the alternate action of sun and frost. This is, however, not always the case; and where the angle of inclination is steep, ice slopes, bare of snow, are common; more especially late in the season. In couloirs and gullies, more or less sheltered from the sun, ice may be found in large quantities; and this results either from the direct conversion of snow into ice, or from the freezing of running water produced by melting snows above. This last cause may give rise to a layer of slippery ice covering a large surface, or to icicles, sometimes of enormous size, hanging from projecting rocks. Icicles are also found depending from cornices, and from the eaves of crevasses.

The appearance presented by ice differs in various situations; and while hard ice in couloirs or on rocks frequently looks quite black, the same substance presents, in the interior of crevasses, the most beautiful play of blue and green colouring. On the low-lying glaciers, again, the surface of the ice generally looks white, and here it is often honeycombed and

* See p. 45. † See p. 47. ‡ See Glossary.

rotten. Such ice affords good foothold for nailed boots, and, if steps have to be cut in it, a very few blows from the axe will suffice for each. In the daytime there is water in its meshes and on its surface, but every cold night this freezes; and though, during the day, it may be possible to run over the surface of naked glaciers, any such liberties in the early morning will be likely to result in undignified tumbles. Under such circumstances a very moderate slope is difficult to ascend, unless steps are cut; but the stones, large and small, frequently found lying on the surface, and apt to slide if trodden on in the daytime, will prove, under just such conditions, to be so firmly frozen to the ice that they may safely be used as steps.

As already pointed out,* the great majority of Alpine peaks are built up of a series of converging ridges, separated from each other by the intervening sides or "faces;" and both ridges and faces may consist of snow, ice, or rock, or of a combination of all three. While, broadly speaking, this is true of mountains as a whole, it is to the upper stretches of the higher peaks that it is most obviously applicable. Slightly lower it is common to find that the bases of several of the final peaks converge in large fields of snow-covered ice (called "névé" or "Firn"),† which fill up the hollows between the mountains, and terminate below in naked glaciers. The pressure of the snow, which falls every winter in enormous quantities on the heights, forces these glaciers ever downwards; and the result is that, far below the line at which the snow lies, huge streams of ice force their way into the lower valleys and present the appearance so familiar to tourists visiting Chamonix or Grindelwald. These naked glaciers are constantly moving downwards, though the terminal portion or "snout" may, from causes

* See p. 86. † See Glossary.

which it is beyond my province to discuss, either "advance" or "retreat."

The rocks of the higher regions are continually disintegrating, and stones and boulders of all sizes fall upon the surface of glaciers, by which they are carried downwards. In course of time they either disappear into crevasses, accumulate at the edges, forming *lateral moraines*, or are carried on to the end where they form the *terminal moraines*. *Medial moraines* result when two glaciers join and proceed onwards as one stream. Old lateral moraines, from which the glacier has partially receded, are often useful to mountaineers as affording an easy, if a tedious, route, in places where the glacier itself is well-nigh or quite impassable. They vary considerably from a pedestrian's point of view, but the ridge or crest of many offers good walking. Occasionally old avalanche-snow, lying between the moraine and the mountain-side, affords still better going.

The aspect presented by the surface of a glacier depends upon the inclination of the ground over which it is moving. If this be level, the glacier's surface will be tolerably smooth, and the few crevasses which exist will be arranged in regular lines. The subjacent ground may, however, become steep or precipitous; and, as the glacier plunges over, or slides down, an *ice-fall* results. Here, as might naturally be supposed, a labyrinth of crevasses is met with; and one result of the irregular cleavage is that towers and pinnacles of ice, called *séracs*,* are formed. These, as they melt or change their positions, owing to the progress of the ice-stream, often become extremely unstable, and masses weighing many tons may fall without a moment's notice.

Crevasses result from cracks in the glacier due to the

* See p. 43.

unequal tension of its parts. If glaciers did not move, there would be no crevasses; and while all are to be ascribed to the movement of the ice, three facts may be remembered with regard to their causation. First—the most important—that the glaciers move downwards over sloping surfaces of varying inclination; second, that the centre moves more rapidly than the edges; and third, that the surface moves more rapidly than the deeper portions. Crevasses have been divided into "transverse," "marginal," and "longitudinal." * The first has been discussed; † the second are the result of lateral friction retarding the movements of the ice; and the last are rare except where a glacier spreads out after passing through a narrow gorge. While it is useful to bear the above facts in mind, it is a mistake to rely too implicitly on what may be expected; for one is occasionally surprised by an apparent anomaly; ‡ and a mountaineer, like a mariner, must be constantly on the *qui vive*, and never make the excuse that a crevasse or any other obstacle *ought* not to have been where it was.

On naked glaciers the crevasses are visible, and, if not too wide, can be stepped across or jumped. If too broad for this, the edge must be followed until they become narrower, or until a bridge of ice, or one formed by a boulder jammed in the mouth of the chasm, is found. Higher up, where the ice is covered by a layer of snow, the crevasses are either completely or partially concealed; and, while great chasms or *schrunds* are often to be seen, their presence, on the other hand, may be merely suggested by a slight depression in the snow, or there may be no indication whatever. The danger of walking unroped over such a surface is obvious, and the rule should be considered abso-

* Tyndall, "Forms of Water," 8th edition, p. 103, *et seq.*

† See p. 37. ‡ See p. 38.

lute to rope as soon as the névé is reached. It must be said though, that, in the very early morning, when the snow is thoroughly hard, there is not so much danger, and considerable progress over fields of snow is often made before roping. A first-rate guide may be generally trusted in this matter; but poor guides are apt to proceed much too far unroped, and it is safest to regard this rule as one which should never be broken. Having put on the rope, the party advances over the snow at right angles to the probable lie of the crevasses; the leader keeping a sharp look-out for any signs of open or hidden chasms, by glancing to the right and to the left, as well as straight in front of him, and probing with his axe to ascertain that the snow, on which he is about to tread, is secure. It is very important, in such places, to step exactly in the leader's footsteps, as his axe will often go through the crust into some hidden pitfall, in which case he will probe again until he finds firm ground. If the second man has allowed his attention to wander, and simply walks straight on, he may fall through into one of the very crevasses which the leader has carefully avoided. In such a case he may disappear to the knee, to the waist, or overhead; but, except in the last instance, he can generally crawl out by throwing himself forwards on his hands. If he is quite submerged, the rope must be held tight on one side of the crevasse (not both), when he will, with very little help, generally work his way out. Should this plan fail, efforts may be made to pull the unfortunate individual up; and, if there is any danger of the ice cutting the rope, an axe must be laid lengthways on the edge of the crevasse for it to slide over. If these efforts are not rewarded with success, the problem is indeed serious; and, though not likely to happen with a narrow crevasse, it may easily occur if any member of a party should, by any chance, fall into one of

the large open schrunds of the upper snow-fields. In such a case, an axe may be driven deep into the snow and the rope tied to it with a clove-hitch : * this will support the man's weight, and give his companions time to examine the situation carefully; having done which, they must act in accordance with the dictates of reason, and these will vary according to the precise nature of the situation. An extra rope may prove of use and may be employed in more ways than one. If the man in the crevasse can pass a noose of the second rope round his waist, his companions may haul at this, while he himself tries to climb up the rope already fixed to the axe.

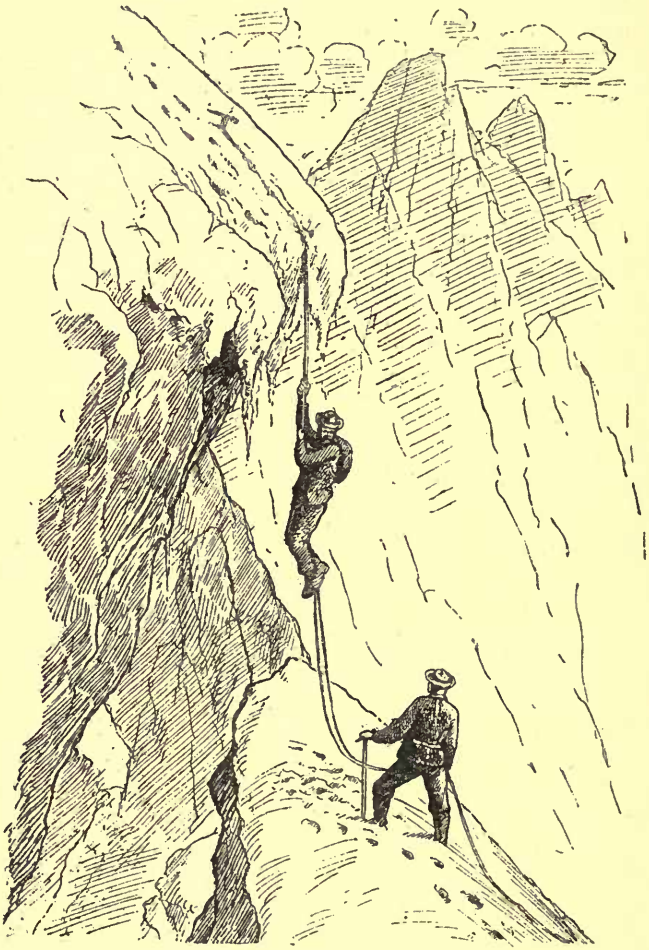
A good deal of winding backwards and forwards is often needed on snow-covered glaciers; for sound bridges must be found, and all crevasses should be crossed at right angles to their length. The course is more likely to be sinuous in descending, as the snow in the afternoon is soft, and fewer bridges are safe. Sometimes a jump may save a considerable detour, and, if the landing-place is lower than the take-off, it may be easy enough. It must not be forgotten though that both lips of a crevasse are apt to be corniced by eaves of snow, and these must be allowed for if a jump is resorted to. Sometimes a bridge of snow, not safe to walk upon, may be crossed by crawling upon the hands and knees, or by sprawling, and moving like a lizard; the idea being to spread the weight over a larger surface. On the descent the same kind of place may be shot with a slide. In this case the leader will slide down flat on his back, while his companions are anchored above, in case he should go through; and the rest will follow in turn. Unless a bridge seems fairly safe, a slide should not be attempted; and, in any doubtful case, the lightest member of a party

* See p. 97.

may be sent first, as being more easily extricated in case of a mishap.

Many peaks rise abruptly from fields of névé, and, where the steep slope of snow or ice joins the more level glacier below, one, or possibly two, schrunds of altogether unusual proportions, both as to length and breadth, may be expected. These are called *bergschrunds*, and above them it is not common to find any crevasses at all. Bergschrunds are crossed like other crevasses, by bridges, which are generally to be found, though often enough only after some search. Occasionally, however, especially at the end of a hot summer, no way across exists; and a party may have to turn back baffled. Coming downhill, a bergschrund will always be expected at the foot of every steep slope of snow or ice, and of every snow couloir which ends below by joining a snow-field. In such cases (in the descent of a pass, for example) it is, of course, quite necessary to get across; and, if no bridge can be found, a big jump may be needful. This must not be attempted unless a safe landing place in soft snow is assured; and if, as is not unfrequently the case with bergschrunds, the lower edge lies almost vertically below the upper one, each member of a party may be let down separately at the end of the rope. Those who have gone before may be able to make a landing-place for the last man to jump on to; but, if the height is too great, he must thrust his axe deeply into the snow, and, passing the rope round it, slide down; the rope is easily pulled after him, but the axe is lost.

Having dealt with naked and snow-covered glaciers, the moraines and crevasses which are associated with them, it remains to say a few words of the upper portions of the mountains, where these are left behind, and where other features claim attention. Here ice and snow exist on slopes



CROSSING A BERGSCHRUND (A LAST RESOURCE).

and in couloirs, as arêtes and as cornices. In couloirs a watch must always be kept for falling stones; and, if a couloir is an obvious or a noted stone-shoot, it should not even be *crossed* without good reason, and is best avoided altogether.* Snow and ice slopes may terminate above at the base of the cliffs, may emerge upon more or less level plains, or may end in arêtes, which may or may not be corniced. The danger of cornices has already been dilated upon,† and it cannot be too strongly emphasized; while of arêtes there is not much to say. The idea of walking along a narrow snow ridge, with precipitous slopes of hard frozen snow descending for many hundred feet upon each side, is rather alarming to the reader of Alpine travels. The actuality is found to be easy, and enjoyable, even by those who may never feel at home among the more difficult situations encountered by mountaineers. An arête of ice is rather a different thing, and, though short ones have often to be traversed when threading an ice-fall, it is rare to have to walk for any great distance along one. A high wind would render an ice-arête impassable, and a snow one will, under like conditions, be generally skirted to leeward.

The mode of progression adopted on snow and ice depends upon two factors; the inclination of the slope and the consistence of the snow. If the surface is fairly level, ordinary walking is all that is called for; but, as the angle increases, it will be found more and more difficult to walk without either kicking or cutting steps. It is needless to say that it is quicker work to kick than to cut them, and that this method will be employed until the snow becomes too hard. The leader makes the steps, and those who follow should place their feet carefully, so as to be secure, and to avoid damaging the steps. When the snow is soft the

* See p. 53. † See p. 38.

step is less likely to break away if the foot be driven home with some force and kept quite stationary till it is withdrawn. The axe will generally be used as a lateral prop; for most slopes are ascended by a zigzag, so that the position of the body is convenient for its use in this way. If, however, the slope is very steep, it is best to use the axe as an anchor, and which end of the head to employ for this purpose depends again upon the hardness of the snow. In hard ice little or no grip can be got even with the pick; and, if the place is one where a slip would prove serious, small handholds should be cut. On the other hand, if the snow is deep and soft, more purchase is obtained by thrusting the stock of the axe as far as possible into the snow just above.

The actual matter of cutting steps is one which will not concern the beginner, as this work will be done by his guides. It is well though to acquire the art; and practice may be obtained on off-days on naked glaciers, and on steep patches of hard avalanche snow, such as are often to be found quite low down. A good step-cutter is able to use the axe either right- or left-handed with equal effect, and this is a point to be remembered when practising. Another point to bear in mind is that step-cutting, like rowing, is apt to blister unused hands, and it is consequently wise to moderate one's zeal in the early days of a holiday. The fatigue attending the process is not very great, provided the work is properly done, and a little practice under the direction of an expert is worth more than a chapter of verbal instruction. The methods employed differ according to the consistence of the snow or ice, but, speaking generally, the "blade" * of the axe-head should be used for snow, and the "pick" for ice; and the following points

* See p. 174.

should be borne in mind. (1) The blow should be delivered with a swing of the body as well as of the arm; (2) the floor of the step should slope inwards rather than outwards; (3) the steps should not be too far apart; (4) they should be made with due regard to the fact that they are to be used for alternate feet, and very often too that they will be wanted later in the day for the descent; (5) the turning step of a zigzag should be an extra large one.

In snow, just too hard for kicking, steps may be "scraped" with the corner of the axe-blade, and one stroke will generally suffice for each; in harder snow they must be "cut." In ice the pick is used, and from two or three to perhaps a hundred strokes * may be needed to make a good step, according to the hardness of the ice and the position of the operator in relation to the step. To cut steps transversely across a very steep slope or wall of hard ice is the most difficult and tiring process of all, and a dozen such steps may cost nearly an hour's work. If an ice-slope or couloir ends below in a cliff, or if, from any other cause, a slip would almost certainly be fatal, unusual care and pains must be taken to make exceptionally good steps; and one out of every five or six, at least, should be of the "soup-plate," or even of the "coal-scuttle" order,—large enough to hold both feet easily. In such a place, as in all positions of exceptional difficulty or danger, only one member of the party will be moving at a time; and, if the others stand perfectly upright in the larger steps, and keep the rope taut,

SHOWS PART OF AXE USED IN SCRAPING STEPS.

* "Mountaineering" (Badminton Library), p. 170: "A *good guide* has been known to take seventy strokes to fashion a step."

they will have a very fair chance of stopping a slip, even while traversing an ice-slope. In crossing a gully of no great width, it is sometimes best to unrope the middle man, and let the leader cut right across. When he is safe on the other side he can untie, and the rope be drawn back for the second man to use. Thus only one member of the party will be crossing at a time; and his safety, in case of a slip, will be the more sure if the last man hitches the rope round some projection. This method often saves time, as the steps need not be so large as when made to allow for a possible pull on the rope; but its main advantage lies in the shorter time during which each member of the party is exposed to the risk of falling stones.

One more mode of progression needs to be alluded to, and that is applicable only in descending. *Glissading*, or sliding downhill upon the snow, is an exhilarating and delightful form of motion, but one which climbers rarely get enough of. Snow, to glissade upon, must not be too soft, and, while steep enough to slide on, not *too* steep. It must, moreover, be in such a position that it is certain there will be no mishap, even if the glissader should tumble or be unable to stop himself; and what is said of a single glissader applies equally to a roped party. Thus, such couloirs and snow slopes as are almost sure to end below in bergschrunds, must not be descended in this way, even though the base be in sight and no crevasse visible; and, as the slopes of snow-covered glaciers will rarely be safe, a glissade on them must never be indulged in, unless sanctioned by a good guide. On the other hand, patches of old winter avalanche snow, such as are often found at the side of a moraine, are excellent for the purpose, and many other slopes are available which cannot very clearly be defined. The hardness and steepness of the slope are points

which affect a glissader, after he has selected a suitable place. A gentle slope may be thus descended even if of ice, while a very steep one must be soft enough to admit of kicking steps in. The glissader stands with his knees straight, his feet flat on the surface, and his axe behind him as a break, its point cutting into the snow. By more or less pressure upon this he can regulate his pace with great nicety, so that he can either come to a standstill, or allow himself to travel at great speed. Should the pace become too great in spite of a firm pressure on the axe, a still greater amount of break power is gained by raising the toes and allowing the heels to cut deeply into the snow. If the slope eases off, or the snow gets too soft, a standing glissade becomes impracticable; but a further slide may sometimes be enjoyed by sitting down and thus distributing the weight over a greater surface; and a still gentler slope of soft snow can be utilized by lying quite flat upon the back. Should the slope again become steeper, it is easy to resume the standing posture without stopping. Glissading is very largely a matter of education; but, while it comes easily to some, others are, to the end of their climbing days, remarkably timid and clumsy.

A STANDING GLISSADE.

In bringing this chapter to a close, I should like to emphasize a rooted opinion of my own to the effect that the term "Snow-craft" includes a good deal of knowledge which is practically incommunicable. In all kinds of occupations, experience teaches many lessons which can be analysed and clearly understood; but, in addition to these, lessons of no less importance are learned, the value of which may be thoroughly appreciated, but which even experts are unable to formulate or to account for. An angler may judge, and rightly, that this or that, is a likely pool for a good fish, and yet be unable to give a satisfactory reason, or to communicate his power of judgment to a beginner; and, in like manner, an Alpine guide may conclude that one of two couloirs will prove in better condition than the other, without being able to account for his belief. No doubt, even in relation to snow and ice, what used to be called a "guide's instinct," is becoming more and more reducible to definite and orderly knowledge; but I think that the term, while not strictly accurate, must be looked upon as still representing a practical reality, though time and experience are gradually restricting the limits of its application.

CHAPTER VIII.

ROCK-WORK.

To award to rock-climbing its proper place in relation to mountaineering in general would be a very easy matter, were it not that, within the last year or two, some writers have apparently aimed at dissociating the sister arts of climbing upon rock and snow. It is true enough that those who

are fascinated by the rocks are inclined to devote too much attention to the exercise which brings them most pleasure; but a like remark applies to the devotees of ice and snow, and it is surely obvious that both branches of the sport require and merit an equal share of attention.

There are, amongst the guides, plenty of excellent rock-climbers who are certainly ignorant as to snow; and there are others who, although very good men on ice, are nervous about venturing upon difficult rocks. Neither class can be called sound mountaineers, and a good climber, be he amateur or professional, should feel equally at home on both. Many excellent mountaineers exist, however, who, though capable cragsmen, are unequal to the task of leading up the more difficult bits of rock which sometimes threaten to prevent climbers from reaching their goal. To be able to scale such places is a very desirable quality, and a properly constituted party should include at least one really expert rock-climber.

The kinds of rock met with in the Alps, or indeed in any range of mountains, may be considered from two points of view,—the geologist's and the mountaineer's. It would be wrong to say that a knowledge of geology can be of no service to climbers, for certain classes of rock present certain peculiarities, and knowledge that the general formation of a mountain group is one of slate, limestone, or granite will convey a very fair idea of the class of climbing likely to be met with. So much indeed do these classes of rock differ, that a man, though a good climber on hard rocks, may yet be quite at sea on crumbly slate. Again, the dip of stratified mountains may indicate the best side from which to attack an untried peak, or may suggest that the loose stones likely to be met with will be fairly stable or the reverse. This class of knowledge, however, is not of much assistance in

actual climbing. Most rock-climbers know nothing whatever of geology; and the learned geologist must begin at the very foot of the ladder, should he wish to become a mountaineer.

From a climber's point of view, rocks may be divided into firm rocks and rotten rocks; rocks with good holds and rocks with bad holds; rocks snow-covered and rocks ice-covered. The last two characteristics refer to what is called "condition;" and, just as good and bad condition have special meanings when applied to snow,* so have they when rocks are spoken of; "good condition" meaning, in this relation, freedom from ice, snow, or water. Any rocks which are firm and do not break away are called "good rocks;" in contradistinction to "bad" or rotten ones. Handholds and footholds are spoken of collectively as "holds" and when these are firm and plentiful, the rocks are said to be "easy." On "difficult" rocks the holds are scanty, or are so small, or so awkwardly situated, that it requires considerable skill to make use of them. Smooth sloping slabs, with little or no holds, are called in French "plaques," and in German "platten." If these lie nearly flat and horizontal, they can, of course, be crossed by walking; if vertical, they are unscalable; but, at various angles, they may often be climbed or crossed by methods depending on the slope and the position in which they lie. "Glacier-worn rocks" are always smooth, the projections from the surface having been worn away. They may present cracks or holds of the pigeon-hole variety; but they are frequently *very* difficult, and often impossible, to climb. In *de*scending a peak by a new route, it should never be forgotten that there may be great difficulty in passing from the rocks on to the ice; the glacier has very likely, at some previous time, stood higher than at present, and the lower

* See p. 100.

rocks may be polished and perhaps impassable. This point should be decided by careful reconnoitring before entering upon such an undertaking; while, if a rock pass is to be crossed by a route unknown to the guides, it should be borne in mind that there may be only one, and that not an easily found, way off the rocks; and inquiries from local sources often save much time and uncertainty.

Glacier-worn rocks are apt to prove even more difficult than they look; but, as already pointed out,* great care must be exercised in forming an opinion from any but a very close inspection; and, with regard to rocks in general, the opposite is, perhaps, more likely to be true. It would be easy to give numerous examples of mountains pronounced impossible by competent authorities, which have eventually proved to be climbable; none, however, could be more to the point than the case of the two northernmost peaks of the Aiguilles d'Arves. In 1864, Messrs. A. W. Moore, Horace Walker, and Edward Whymper, with Michel Croz and Christian Almer crossed the col between these peaks, and only gave up the idea of trying to scale one or other of them because the whole party agreed that both were obviously impossible. "Almer and Michel," said the late Mr. Moore,† "were strongly opposed" to making any actual attempt on the rocks, while Mr. Whymper tells us that Almer "volunteered the information that a thousand francs would not tempt him to *try* it." ‡ In spite of this decision, arrived at by such eminent climbers, both peaks have been ascended from this col, and neither has been found to present any unusual difficulties.§

* See p. 90.

† "The Alps in 1864," p. 12.

‡ "Scrambles amongst the Alps," p. 184.

§ It is only fair to add that Almer was the first guide to reach both of these summits; though one had been previously climbed, probably by a local chamois-hunter. *Alpine Journal*, vol. viii., pp. 69, 72.

With regard to rocks which are thinly covered by ice or snow, something has already been said;* and but little climbing will be deliberately undertaken when these unfavourable conditions exist. Still, bad weather may come on during the descent, and the rocks then become either glazed or snow-covered in an incredibly short space of time. All that can be said about climbing in such a case is that extraordinary care must be taken, and that progress must necessarily be very slow. Generally only one man will move at a time, and a spare rope, if available, will be freely used.

Rocks take the shape of gullies, slopes, walls, and ridges. Gullies, free from ice and snow, frequently afford excellent climbing, and, if wide, are often easy; those which are narrow and steep are called "chimneys," and the climbing in these may be very difficult. Sometimes the upper part of a gully is cut off from the lower by a vertical cliff which is called a "pitch," and this very frequently is most difficult to surmount, and at times is quite impossible. Slopes and walls of rock are met with in climbing the face of any rock mountain, and, while they differ so widely as to scarcely admit of any generalized description, they often afford very first-rate climbing. Rock arêtes or ridges yield some of the most interesting climbing possible; if the rock is firm, and the holds good, the work, though easy, is very exhilarating; and in no other situation is such perfect immunity enjoyed from risk of falling stones. Sometimes deep and cleanly cut gaps are met with on arêtes, and these may cause much trouble to the climber; again, great teeth or towers called "gendarmes" are not uncommon. It is not very easy to determine when and by whom this word was first used, but it was doubtless some guide who first likened

* See p. 31.

a rock tower, forbidding further progress by the direct route, to an officer of the law. The term has been scouted by Alpine writers as ridiculous and objectionable; but it is convenient to have some word for these rock-teeth, and the term has now got firm hold. "Gendarmes" often consist of hard smooth rock, with cleanly cut sides; and, while it is occasionally possible to climb right over them, they are, as a rule, more easily skirted, though this is often far from being an easy task. It is probable that the tops of many gendarmes are inaccessible, but when they present themselves on the very summit of peaks they are generally found, however unpromising in appearance, to yield to a determined onslaught. The northern summit of the Aig. des Charmoz consists of a broken ridge of "ten pinnacles." * All of them would, if they occurred lower down on the arête, be called gendarmes, and all have been climbed. It has been stated that rock arêtes sometimes offer easy climbing, and the ordinary routes up Monte Rosa or the Finsteraarhorn present examples of this class. Much more difficult work is, however, found on such peaks as the Gabelhorn and Rothhorn; while sometimes, notably in the Mont Blanc district, arêtes may be found to be quite impossible, being literally studded with formidable gaps and gendarmes.

Having thus briefly discussed, from a climber's point of view, the various kinds of rock and the forms which they assume, it is time to pass on to the methods adopted in rock climbing. Generally speaking, it may be said that rocks are climbed by means of the hands and feet; but there is hardly any portion of the body which cannot be of service in certain situations. To any one who is anything of an athlete, good rocks with plenty of holds are easy

* Kurz, "Climber's Guide to the Chain of Mont Blanc," p. 94.

work, the climbing being affected by the hands and feet alone, both being used in perfectly natural positions. A mere beginner may climb with ease upon such rocks, but this must not be mistaken for really good rock climbing. The differences are in reality great, and to some of them attention may well be drawn. It is probable that the beginner's movements are too spasmodic, that he uses his hands too much and his feet too little, that he does not test the holds sufficiently, that he jerks the rope both in front and behind, that he is never quite certain of not slipping, that he would be pulled over if one of his companions fell, and, last but not least, that he dislodges loose stones with his hands, with his feet, and with the rope. Great practice is required to overcome these faults, but progress will be much more quickly made if they are borne in mind.

The foot should never be put down or lifted suddenly; the first precaution makes sure that the hold, which is to be utilized, is secure, before the whole weight of the body is thrown upon it; and a neglect of the latter accounts for quite half the loose stones dislodged. A beginner will be wise to count his proficiency as a rock climber not so much in relation to his agility, as to his power of climbing hour after hour on average rocks without dislodging stones. This is a matter requiring *care* more than anything else, and it is quite astonishing what extraordinary care can do in the way of permitting movement among unstable rocks, which only seem to want a touch to start them. This degree of attention is not often demanded for long at a time; but care must always be taken, and any laxness is almost sure to eventuate in stones being dislodged. Except in occasional places, which are but seldom met with, spasmodic movement is invariably bad climbing; it increases the danger arising

from loose stones, and jeopardizes the security of the whole party; for a missed hold is sure to result in a fall, and an accidental jerk on the rope is not so likely to be successfully withstood.

The tendency to rely too much on the hands is very natural, and is common to almost all beginners. If really good handholds are plentiful, the rocks are easy, and are specially suitable for inexperienced climbers to select. The educational value of practice in such places is, however, somewhat marred by one fact; namely, that the obvious security afforded by such holds favours the idea that there cannot be much safety without them, and leads to more and more reliance being placed upon the hands. Various anomalous kinds of handhold are met with upon more difficult rocks; for instance, finger-tip holds, side-holds, and holds facing downwards—all requiring knack, practice, and training; but the use of ordinary handholds on good rock is easily mastered, and it is to acquiring the power of using the feet properly that the attention of a beginner requires more especially to be directed. Many of the easier rock mountains could be climbed, except here and there, without using the hands at all; and, while an attempt to do this would be anything but good mountaineering, this mode of progression may advantageously be practised on boulders in the valleys. Beginners often take long to learn that really good foothold should render a climber independent of handhold on any but the steepest rocks, and that the importance of learning to use the feet to the best advantage can hardly be exaggerated. Sloping slabs, with or without ledges, are, if not too steep, generally most safely climbed or traversed by boldly walking over them; and, while good handhold should never be despised, it is a mistake to lean towards the mountain, and thus throw more

weight on to the edge of the boot, for the sake of any but really first-rate hold.

Another point in the use of the feet in climbing rocks, is that, in approaching any bit of difficult rock, it is very necessary to carefully consider with which foot the first step should be taken: a mistake in such a case may turn a fairly easy passage into one of great difficulty, or may even render it impossible. On difficult rocks both handhold and foothold may be scanty, and, while much experience is required to ensure the best use being made of what there is, considerable training is needed before the tips of the fingers and the toes can be trusted to support a portion of the body's weight, for more than a few seconds at a time. Sometimes a man may get into an awkward position and find that it is difficult to move either up or down: he has perhaps very poor hold for the hands, and is standing on the tips of his toes. In such a case, if not in good training, his legs will be very apt to become affected with a quite uncontrollable form of trembling; and, if seized by a feeling of nervousness, this condition will be aggravated. Such a position should rarely occur; for a leader ought to be sufficiently experienced to be able both to gauge his own powers, and to select a route on which he can certainly either advance or retreat; while those who come after should be able to follow, either with or without a helping push or pull. Still, most climbers have experienced this unpleasant sensation, and from no cause more frequently than from starting a difficult passage with the wrong foot. It is in such positions that the moral support of the rope is most keenly felt, and this has doubtless prevented many a slip.

On difficult rocks alone is it that parts of the body other than the hands and feet ought to be called into requisition.

The knee, it is true, may often be used for a long step even on easy rocks, but it is only where hand and foothold are wanting that the climber discovers how many portions of the human frame are adaptable to the exigencies of mountaineering. The back, the knees, the elbows, the shoulders, and even the head and the nape of the neck, may occasionally prove necessary in climbing a difficult chimney or crack.

It has been stated that ordinary rock-work is effected wholly by means of the hands and feet, and so it is; but there is another element which must not be forgotten, and that is *balance*. Skating is, of all sports, the one in which balance reigns supreme; but it is hardly too much to say that there is, in climbing, almost as much scope for the cultivation of this quality. It is when changing from one foothold to another that the greatest call is made upon the balancing faculty; and, just as spasmodic movement is avoided by acquiring the ability to balance the body in all sorts of positions, so is balancing power gained by a fixed determination to move steadily, deliberately, and not in jerks.

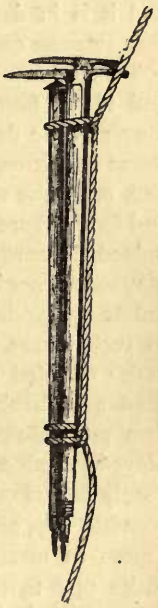
The *ascent* of rocks sometimes makes demands which cannot be met by the unaided effort of any single man; the holds being, for a time, too far apart to be made use of even by the tallest. In such cases, those below can often render most effectual service to the leader; and if a foothold low down is all that is needed, it can generally be supplied by the hands of a comrade. Again, the spike of the axe thrust into tiny cracks affords most excellent foothold; while the axe-head may prove useful to give a push to a man above who would otherwise be out of reach. Sometimes the leader will stand on the shoulders or head of the second man, so as to bring some hold within reach of his hands;

and, in very exceptional cases, he may climb up over a pyramid of two men, the one standing on the other. This last manœuvre will, however, very rarely be resorted to, and never unless starting from an ample platform. Stones with ropes tied to them are sometimes thrown so as to catch in cracks, and ropes are occasionally slung over projecting rocks a few feet out of reach. Weights attached to strong twine have been thrown over projections within stone-shot, the line being used to pull a rope over some distant knob; and rockets have been employed, with more plausibility than success, in the hope of extending the range of such proceedings. In any case in which a rope is fixed to aid in the ascent of a difficult bit of rock, a few knots tied in it, at intervals of two or three feet, give more effective handhold: they cannot often be used, however, as they would generally interfere with the fixing or unfastening of the rope; and, as a matter of fact, this manœuvre is rarely employed except in the *descent* of a short but perpendicular cliff which will have to be *ascended* later in the day.

In ascending rocks, the ice-axe is frequently a hindrance, and it is usual to sling it from the wrist or arm by a loop.* In some places, however, it is still a serious encumbrance, and sometimes all the axes belonging to the party are left behind for the last man to bring or send up. In most cases he will be able to bring them with him, as a friendly pull from above will render him less dependent upon his own efforts; but occasionally they must be drawn up separately, and for this purpose a spare rope will be let down, or the last man can untie and send the axes up, waiting for the rope to be returned for his own use. It is well to know how this business can best be managed, as the axes are often

* See p. 177.

clumsily tied, resulting in the occasional loss of one or more. If there is rope enough, they should not be tied at the end of it, but in the middle, so as to leave as much guiding cord as possible below; for the bottom man can most easily steer them and prevent the heads from catching in cracks. The axes should be tied together in a sheaf with a knot below the heads and another near the spikes; and, while a clove-hitch * is the best for the last-named purpose, a simple bend is all that is needed for the first. A common practice, in the ascent of rock peaks, is to leave the axes above the upper level of snow and ice, to be picked up again on the way down. One axe at least should, however, always be taken to the summit, as an unexpected patch of ice is often met with.



SHEAF OF AXES.

In the *descent* of rocks which are at all steep or difficult, the climber's face should always be turned to the mountain; and in almost every position which really requires the hands to be used as well as the feet, this is the workmanlike attitude to adopt. The toes can be inserted into cracks which will not take the heels, and the handholds and footholds used in going down are precisely the same as those employed in the ascent. To descend with the back to the mountain is, in any but easy places, dangerous as well as clumsy; for the eyes cannot see where the feet are being placed, and no grip can be got which would be of much use in case of a strain on the rope.

* See p. 97.

Even if the proper method is adopted, there are many short bits of rock where any sudden pull might prove serious; and it is in descending rocks, more than anywhere else, that extreme care is needed not to jerk the rope.*

To go down is, generally speaking, easier than to go up, and if it is found that any given part of a mountain takes longer in the descent, it is either due to the place being in worse condition in the afternoon, to the party being a weak one, or to the rocks being unusually difficult. When hand and foothold are very scanty and very small, the descent may, indeed, be more difficult than the ascent, and special measures may sometimes be resorted to. A jump must never be risked, unless the landing-place is obviously good, and it is precisely in such places that a spare rope is so useful for the last man: doubled round a firm knob of rock it may safely be used as a banister, or even to slide down on; and, if no firm projection is to be found, a "piton" † may be employed. Such a proceeding is objected to by some as being hardly fair climbing; but it is a safeguard in case of a possible slip, and, what is equally important, it often saves time. In arranging a spare rope, care must be taken to make sure that it cannot possibly slip off the projection over which it is hitched, and also that it can be easily detached by pulling one of the ends. If badly arranged, it may get jammed by the pull in some narrow crack, to the great annoyance of the last man, who will have to return to loosen it. In such a case it is bad mountaineering to cut it and leave an end hanging, both on the score of waste, and also because the loose end may prove dangerous to a subsequent party, who may mistake it for a "fixed" rope,‡ and make use of it as such. No rope should ever be left, unless designedly fixed in a way which neither wind nor

* See p. 98. † See p. 181. ‡ See below.

weather can loosen. Some prominence has been given to this matter of the extra rope; but, while it is well to appreciate its use, I do not wish to convey the impression that it is a device which should often be found necessary.

In many gullies, and in other difficult places on well-known mountains, ropes have been fixed by previous climbers; and the Matterhorn, the Aiguille du Géant, the Aiguille du Dru, and the Meije may be named among peaks which are more or less "roped." These ropes add an element of danger to the mountains, as they are often too old and rotten to be really trustworthy; they are objectionable also upon another score, namely, that they do not, as is the case when a spare rope is used, merely add to the safety and expedition of the descent, but, by making the *ascent* easy, they degrade the mountains and have a demoralizing effect by teaching mountaineers to be slovenly. To take away ropes already placed in difficult positions would be to assume considerable responsibility; and, unless done by some properly constituted authority, such an act would be most officious; but it is earnestly to be hoped that the fine rock pinnacles of the Alps which still retain, even among experts, the name of being difficult, will not be dethroned from their legitimate position by a process so unnecessary and so unsportsmanlike.

Having dealt with the various methods employed in the ascent and descent of rocks, it remains to say a few words about *traversing*. In traversing any rocks too steep and too difficult to be walked across, the body must face the mountain as in climbing up or down. Moderately good holds both for hands and feet are needed, or else there must be thoroughly good hold for either the one or the other. It is easy to edge along a shelf as broad as a mantelpiece without any handhold at all; or again, if

there is excellent handhold, the body can be slung along for a short distance without any steps for the feet. In difficult traverses, as elsewhere, only one man should move at once, and sometimes it is wise to throw or hitch a spare rope over some projection higher up, so as to afford support when hand and foothold are scanty or unsafe.

It has been pointed out that a beginner may climb rocks with ease, and yet that this by no means necessarily implies good climbing: further, a thoroughly unsafe mountaineer may even earn the reputation of being a *brilliant* climber. In what then does really good rock-climbing consist? In answering this question the thoughts naturally turn to those guides who are most expert in this particular branch, and of such it may be said that, while some are very brilliant cragsmen, others are not; and yet, those who work slowly but surely up difficult rocks are as good climbers as their more showy compeers. All, however, climb safely, smoothly, with deliberation, and with *finish*. The last term, though not easy to define, denotes a quality which should be aimed at by every mountaineer. Dash is very pretty if successful, but it is neither safe nor sound, and it quickly departs as years roll by; whereas careful, steady rock-climbing depends on a basis of slowly acquired skill, admits of improvement through a couple of decades, and is only gradually lost as age creeps on and joints become less supple.

CHAPTER IX.

CLIMBING WITHOUT GUIDES.

It is perhaps doubtful whether a chapter with the above heading should find any place in a volume which is avowedly addressed to beginners; but, in my opinion, no book on mountaineering would, at the present date, be complete without some allusion to a branch of the sport which has, of late years, assumed so prominent a position. Further, some information on the subject may perhaps be of interest, and may also prove useful, even to beginners, if it serves to impress upon them the desirability of not wasting their opportunities of perfecting themselves in the art of mountaineering.

The era of modern mountaineering may, as already stated, be said to date from the ascent of the Wetterhorn from Grindelwald, in 1854;* and it was only a year later that the foundation stone of the development with which the present chapter deals was laid by Messrs. Chas. Hudson and E. S. Kennedy, who were the leading spirits of a party which effected, in 1855, "an ascent of Mont Blanc by a new route and without guides,"† an achievement which must certainly rank as one of the finest performances of the decade to which it belongs. In the sixties, Mr. A. G. Girdlestone was an enthusiast in the same direction, and during these years he made more than seventy expeditions without guides.‡ Mr. Girdlestone's success was, however,

* See p. 9.

† "Where there's a Will there's a Way," Hudson and Kennedy, 1856.

‡ "The High Alps without Guides," by the Rev. A. G. Girdlestone, 1870.

of a doubtful nature, the risks he ran were great, and many of the difficulties he encountered were avoidable; so that when, in 1870, Mr. F. Crawford Grove invited the Alpine Club to "pronounce an opinion against mountaineering without guides," * it is hardly to be wondered that the club should have virtually accepted the proposition which he so ably laid before it. Between 1870 and 1880 Mr. F. Gardiner, with Messrs. Chas. and Lawrence Pilkington, commenced to practise unaided the art they had so well and so carefully learned, and the ascent of the Meije by these gentlemen in 1879 † has, in all probability, done more than any other single event towards dispelling the idea that amateur mountaineers are by nature, and must ever remain, so inferior to professionals as to be reckoned either criminal or insane if they undertake guideless expeditions above the snow-line.

Since 1880 many notable ascents have been accomplished by parties, both English and foreign, consisting of amateurs alone; and the view expressed by Mr. Dent, in 1885, ‡ to the effect that the level of the best amateur climbing was approximating much more closely to that displayed by good guides, has come to be virtually accepted.

Englishmen engaging in sports generally do so with a hope that they may excel; and while, in any branch of athletics, the majority soon find that they can never expect to exceed mediocrity, there are always a few who, supplementing natural aptitude by persevering practice, gradually work their way into the front rank. Mountaineering has proved no exception to the rule, and while no one has contended that any amateur can ever hope to equal in skill and technical knowledge the very pick of the profes-

* *Alpine Journal*, vol. v. p. 96. † Ibid., vol. ix. p. 411.
‡ Ibid., vol. xii. p. 289.

sionals, it is not too much to say that there are a few amateur climbers who have shown themselves possessed of qualities which would ensure for them an honourable position when compared with the general run of "good," if not of "first-rate," guides.*

No beginner should start climbing with the idea that he may one day wish to dispense with the assistance of guides; but this ought not to prevent him from learning all he can about mountaineering. Lest this warning be thought superfluous, I may add that there are, as a matter of fact, a large number of climbers who are content to simply follow in their leaders' steps, without attempting to improve themselves except in a few of the minor details of the art. This attitude may result from a lack of enthusiasm, but is often the outcome of an erroneous idea to the effect that the "guiding instinct" is quite unattainable, and consequently not worth striving after. Many sports are taught by professionals; and the best amateur cricketers or golfers, for instance, have generally had the advantage of careful coaching by men who, in addition to being accomplished players, possess also the power or knack of imparting their knowledge to others. In mountaineering the case is different; the guides are paid to do the work and not to teach the art; and an amateur can therefore only learn from them by observing their methods, and picking out the salient points for himself. This is a process requiring some natural talent and much attention; but something is gained when the fact is appreciated that a climber may do more than merely walk behind the guides, and do as he is told; that he may, in fact, learn from them the art of mountaineering.

It is not given to every amateur, however painstaking and assiduous, to become capable of satisfactorily replacing a

* See Classification of Guides, p. 63.

guide, even upon minor occasions; but all may develop into reasonably good mountaineers if they will do their best. Without taking pains, though, this modest result will not be achieved, and no climber, however brilliant, can ever be a right and proper person to take the lead, in even a very easy expedition, unless he has made a liberal use of his brains, as well as of his limbs, during his mountaineering apprenticeship. "But," says Mr. Dent, in the paper already alluded to, "in the course of eight or ten seasons, when he (the amateur) has climbed perhaps thirty or forty of the higher peaks, or traversed the same number of passes, then if he has not learned enough of the Alpine craft to make himself something of a mountaineer in the real sense of the word, it is because he has never tried to develop the art in himself, never given any real attention to it, and never recognized that there was anything he might learn." *

Under what circumstances may the practice of climbing without guides be regarded as justifiable? The answer must depend upon the class of work contemplated; but, in the case of Alpine expeditions proper, the following conditions should generally be fulfilled.

1. The party should consist exclusively of practised mountaineers who have climbed (preferably together) in the Alps for several seasons with good guides.

2. Every member of such a party must be a *safe*, as well as an experienced, climber; and each should be able to take his share of the work, whether as leader, step-cutter, or porter.

3. Every member should have been accustomed to act successfully as his own guide in all weathers among hilly districts below the snow-line.

* *Alpine Journal*, vol. xii. p. 295.

Provided the above requirements are complied with, there is no reason why a party, consisting of three or four friends, should not, if they wish it, select some quiet district, where the excursions are neither long nor difficult, and gradually proceed to more arduous undertakings. Still, it cannot be too strongly insisted upon that the majority of amateurs should never aim at accomplishing the more ambitious expeditions without the assistance of guides, and further, that these should not be attempted by amateurs qualified to climb alone except under quite perfect conditions.

To offer any hints to those mountaineers of some years' standing who may think of venturing upon guideless expeditions would be quite beyond the scope of these pages; but one or two secondary matters, on which amateurs often hold erroneous opinions, may perhaps be briefly discussed with advantage. It is probably not too much to say that the majority of amateur climbers think they would never be able to cut steps for an hour or two at a time, that they would never be able to dispense with porters at least to carry the sacks, and that they would never be able, even in fine weather, to equal the guides in hitting off the same route when descending as had been followed in the ascent. From what has been already said I feel I am in no danger of being accused of making light of guiding capacity, but minor matters such as these are, in reality, well within the reach of most amateurs of sound physique. Step-cutting is largely a knack, and is not excessively fatiguing; and, while guideless parties act wisely in replacing heavy articles by light ones whenever this is possible, weight-carrying is, after all, mainly a question of training, and after the first few days the weight of a knapsack is hardly noticed. With regard to the "guiding instinct" displayed in finding the same route down, it may be said that this depends primarily

upon the fact that it was the guide who, in the first instance, selected the line of the ascent; a process involving both the intentional and unconscious noting of any little landmarks on the way. The last man going up is not under the same necessity of remarking the precise line taken, and, unless he has trained himself to scrutinize all the details of a route, he will, when leading down, be very likely to mistake the way; his mistakes will, however, be promptly corrected by the leader, now descending last, be he amateur or professional. During the ascent, the last man *should*, of course, try to note the route himself; and if there is fog or mist, or even any uncertainty in the weather, it is well for him to spend his time, while waiting for those in front to progress, in building small cairns, when materials are available, in any places where a mistake in the descent would seem likely to be made.

In bringing this chapter, and with it that portion of this book which deals with the practical elements of mountaineering, to a close, it may be serviceable to briefly summarize the rules of climbing. These should be kept in mind by those who engage in any Alpine expeditions, but amateurs who climb without guides should lay them more especially to heart, and the present is perhaps a not unsuitable place to introduce them. I am not aware that any writer has hitherto thought it necessary to recapitulate, in the form of a series of definite rules, those injunctions which lie scattered though the numerous books, pamphlets, and papers, which deal with Alpine accidents and Alpine dangers; but the canons of mountaineering cannot, in my opinion, be too strongly insisted upon, or too clearly defined; and, as my excuse for a step which to some may seem bold, and to others unnecessary, I propose to quote a short passage from a letter written by Mr. Leslie Stephen to the editor of the

Alpine Journal in 1875. "I hold," said he, "that we can best promote Alpine climbing by enforcing with all our power a code of rules which will make it a reputable pursuit for sensible men."* Such a code the following will, I trust, prove to be; and, while it cannot be maintained that all the rules are of equal importance, not one of them should ever be consciously broken without a just and sufficient reason.

Code of Rules.

1. Begin your mountaineering career with short and easy expeditions, and progress only by degrees to those which are longer and more difficult.

2. Get gradually into training, and be sure you are in proper condition before undertaking any arduous or difficult excursion.

3. Never join a party which is insufficiently guided; and remember that guides, who may be all that can be desired for easy excursions, are not necessarily competent to undertake the conduct of more ambitious enterprises. This rule will, of course, apply equally to those who do, and those who do not, secure the assistance of professional guides.

4. Never climb any mountain if it is in bad condition. This rule should prohibit all cases of climbing out of season, or in bad weather.† It should also minimize the chance of venturing upon avalanchy snow.

5. Turn back if bad weather overtakes you, especially if there is any threatening of storm. The application of this rule often hinges upon a question of judgment, but bear in mind that it is your duty to turn back unless you can justify

* *Alpine Journal*, vol. vii. p. 313. † See p. 30.

both to yourself at the time, and to others subsequently, a decision to the contrary.* *If in doubt, turn back.*

6. Never climb with less than three on a rope.

7. Use the best rope,† and make sure, by frequent inspection, that it is in good condition.

8. Put the rope on as soon as you reach the lower limit of the névé,—or sooner, should you meet with difficulty.

9. Keep the rope taut, but never jerk it.

10. Avoid passing under cornices, avalanche tracks, and séracs; and avoid all couloirs known to be raked, or obviously raked, by falling stones. If the accomplishment of some ascent should hinge upon making some *short* passage involving risk from one or other of these sources, the question must be debated, and the expedition only persisted in if deemed justifiable after due deliberation.

11. Refrain from venturing upon any rock mountain if more than one other party is likely to be climbing it on the same day.‡

12. Never, by want of care, dislodge, either with hand, or foot, or with the rope, a single loose stone which could by any possibility injure any one below.

13. In all places where there is especial danger of a slip, or where a slip would be necessarily disastrous, only one member of a party should move at a time. The rest must anchor themselves as well as possible, and keep the rope taut, paying it in or out, and hitching it when practicable round some firm projection.

14. Be sufficiently clad, and take with you on the mountains a supply of extra clothing suitable to the expedition in contemplation.

15. Take sufficient provisions, and consider the chances of being benighted.

* See p. 57. † See p. 176. ‡ See p. 83.

16. Start early, and allow a considerable margin of daylight beyond the time expected to be taken.

17. Look upon every delay as important, and never waste time.

18. Always be careful.

CHAPTER X.

GUIDE-BOOKS, MAPS, AND ALPINE LITERATURE.

GUIDE-BOOKS.

IT would not be easy to say how many general guide-books to Switzerland exist. Their name is legion, and their number is ever on the increase; so I shall content myself with referring to three.

The two great rival guide-books published in English are "Murray" and "Baedeker," and both are very good. Murray devotes considerably more space to the history and institutions of the various localities, to out-of-the-way routes and by-ways, and to matters more purely Alpine; while Baedeker "is particularly strong as regards the frequented tourists' roads and paths," and is "unsurpassed for minute practical details," "so that a prudent traveller wishing really to study the country should provide himself with both." *

Murray's Handbook was published first in 1838; and, while it always aimed at setting and maintaining a high standard of excellence, the 16th edition (1879), the first published in two volumes, was a decided advance on those which preceded it; and the 18th (1891) again makes con-

* Coolidge, "Swiss Travel and Swiss Guide-Books," p. 77.

siderable strides under the editorship of the Rev. W. A. B. Coolidge, a gentleman whose knowledge of the Alps is probably unique.

Baedeker was, when first published, in 1844, avowedly founded on Murray; but the obligation, though doubtless of great importance in the early editions, has become less and less conspicuous in the later ones, each publisher apparently aiming at a different ideal. Baedeker gradually outstripped Murray in popularity; but the latter is now once more coming to the front. The fact that Baedeker is not increased in bulk by the admission of advertisements, has no doubt often led travellers to select it in preference to its rival; but the device of dividing the book into two volumes has enabled Murray to make his guide more handy for the pocket, in spite of sixty pages of advertisements. The latest edition of Baedeker (the 14th) was issued in 1891.

There would be no occasion to name any other general guide-book to Switzerland, were it not for the existence of a very excellent one which comes under quite a different category. Murray is published at 10*s.* and Baedeker at 8*s.*, whereas "Paterson's Guide to Switzerland," originally issued at 1*s.* but now (7th edition, 1892) at 1*s.* 6*d.*, is handy and portable, and exceedingly good for the money.

Of guide-books written especially for mountaineers, the "Alpine Guide," by the late Mr. John Ball, the first president of the Alpine Club, and originally published in three volumes (1863, 1864, and 1868) is the only book of its kind. It possesses the great advantage of being a book which is always pleasant to read; and from its pages a student can very easily obtain a good idea both of the early history of modern mountaineering and of the general topography of the Alps. The Alpine Club has undertaken to

issue a revised edition of this admirable work, and it is to be hoped that this will prove worthy both of the book and of the Club.

In 1881, Mr. W. M. Conway published a local mountaineering guide-book which he called "The Zermatt Pocket-Book;" and so useful did this prove to be, that several pocket guide-books of the same class have since appeared. They are books which interest mountaineers, and mountaineers only; noting, in a definite order, every peak and every pass on each successive ridge, and giving concise information as to all routes followed up to the date of publication. The Zermatt Pocket-Book went out of print, but it has reappeared, enlarged and brought up to date, in two volumes (the "Central" and "Eastern" Pennine Alps). Guide-books of this class will probably, in time, be written on each of the important districts of the Alps; and seven have already been published by T. Fisher Unwin, under the title of "Conway and Coolidge's Climbers' Guides"*; "The Central Pennine Alps," by W. M. Conway (1890); "The Eastern Pennine Alps," by W. M. Conway (1891); "The Lepontine Alps," by W. M. Conway and W. A. B. Coolidge (1892); "The Central Alps of Dauphiny," by W. A. B. Coolidge, H. Duhamel and F. Perrin (1892); "The Chain of Mont Blanc," by Louis Kurz (1892); "The Mountains of Cogne," by George Yeld and W. A. B. Coolidge (1893); "The Adula Alps of the Lepontine Range," by W. A. B. Coolidge (1893).

Maps.

The maps of the higher Alps used by mountaineers are principally those published by the Governments in whose territories the mountains lie. These maps are by no means

* Price 10s. each.

of equal merit, but they are the best that can be got, and some of them leave nothing to be desired.

The Swiss Government issues two maps, the "Dufour" on a scale of $\frac{1}{100,000}$ (1½ mile to an inch), and the "Siegfried" which, so far as the Alps are concerned, is on a scale of $\frac{1}{50,000}$. The latter is the newer map, and is almost perfect, but both deserve to be very highly praised. Beyond the frontier General Dufour's map is not to be trusted; and the Siegfried map stops at the boundary line.

The Italian Government also publishes two maps on similar scales ($\frac{1}{100,000}$ and $\frac{1}{50,000}$). The latter should be chosen by those who propose to visit the Italian Alps.

For the Austrian mountains, the best map is that published by the Austrian Government on a scale of $\frac{1}{75,000}$.

The French Alps stand somewhat differently. The Government map ($\frac{1}{80,000}$) is the one which must be chosen by wanderers among the Maritime Alps, or in any out-of-the-way district; but, for the two great groups of French mountains there are special maps which are superior.

The Mont Blanc Massif is important in the history of Alpine chartography, and is especially interesting to Englishmen, as it was the late Professor Forbes who drew the first tolerable map of the chain, and the late Mr. A. Adams-Reilly, who, in 1865, completed the work which Forbes had begun, and published a most artistic, and, considering the time and means at his disposal, a most accurate map of the district. This beautiful little map (scale $\frac{1}{80,000}$) is, unfortunately, no longer obtainable, as it has been allowed to fall out of print; the reason no doubt being that Mieulet's map of the Massif of Mont Blanc was published in the same year (1865) by the French War Office, and is, on the whole, better. This map has the

advantage of being on a larger scale ($\frac{1}{40,000}$), but it does not include that portion of the chain which is in Swiss territory, nor quite the whole of the western end. This is the map most used by mountaineers, and, though inaccurate in places, it is the best obtainable. Another map of the same district by the French Architect, Viollet-le-Duc, is very pretty to look at, but very far from reliable. The scale is $\frac{1}{40,000}$. A new map of the chain, just completed by M. Imfeld, has been highly praised by competent authorities, and it is to be hoped that it will soon be published.

The Central Alps of Dauphiné have been mapped by their indefatigable lover, Mr. H. Duhamel, and a corrected edition of this map has been published in England by Fisher Unwin to range with the series of "Climbers' Guides." It forms a small atlas not larger than a leather pocket-book, and this arrangement, together with the fact that the sectional maps overlap one another, renders it, in spite of its small scale ($\frac{1}{100,000}$) one of the best maps hitherto offered to the mountaineering fraternity.

Other special districts in the Austrian and Italian Alps have been made the subject of special maps; but, with the exception of Mr. Reilly's map of the Italian Valleys of the Pennine Alps (scale $\frac{1}{80,000}$), and Mr. Yeld's map of the Eastern Graians ($\frac{1}{67,000}$),* they do not, so far as I know, exceed in merit the various Government maps already alluded to.

Finally, "The Alpine Club Map of Switzerland" must be alluded to. It was originally published in four sheets on a

* This map, which is founded on the Italian Government Map, originally appeared in the *Alpine Journal* for May, 1886 (vol. xii. p. 509). A corrected edition, a copy of which accompanies the Climbers' Guide to "The Mountains of Cogne," appeared first in the *Alpine Journal* for May, 1893 (vol. xvi. p. 400.

scale of $\frac{1}{250,000}$ (1874). An enlarged map in eight sheets (scale $\frac{1}{190,000}$) was issued in 1881, under the title of "The Enlarged Alpine Club Map of the Swiss and Italian Alps." These maps give a good general idea of a large portion of the great chain of the Alps, but the scale is too small, and they are not of much real service to mountaineers.

Alpine Literature.

A few words on the literature of mountaineering may prove acceptable to those who, with newly awakened interest in the mountains, are as yet unaware of the existence of an extensive and fascinating Alpine literature. Ten or fifteen years ago there was a good deal of difficulty in finding those mountaineering books which were out of print. Conditions are altered now, and volumes, which had to be sought for here and there, are collected by several booksellers. They are consequently more easily procurable, if at more "appreciative" prices; and any one can easily obtain a bookseller's catalogue which will give an idea both of the extent of Alpine literature and the cost of becoming a collector.

A useful list of Alpine books is to be found in Murray's Handbook for Switzerland,* and a "fairly complete Alpine bibliography" in Mr. Coolidge's book on "Swiss Travel and Swiss Guide-Books." †

I shall here content myself with giving a list of twenty books; confining myself to English authors only, and not naming more than one book by any one writer. Some of these books are easily obtained, while others are rarely procurable, even at the fancy prices they always command;

* 18th edition, p. 39. † Appendix, B; 241 numbers.

but the twenty would form a very fine nucleus upon which to build an Alpine library.

1. The *Alpine Journal*, by members of the Alpine Club. 16. vols. London Longmans, 1863–1893. Continued quarterly.

2. Badminton Library volume on "Mountaineering," by C. T. Dent and seven other members of the Alpine Club. Longmans, 1892.

3. Bonney, T. G., "Outline Sketches in the High Alps of Dauphiné." London, Longmans, 1865.

4. Coleman, E. T., "Scenes from the Snow Fields." London, Longmans, 1859.

5. Coolidge, W. A. B., "Swiss Travel and Swiss Guide-Books." London, Longmans, 1889.

6. Cunningham, C. D., and Abney, W. de W., "The Pioneers of the Alps." London, Sampson Low, 1887; 2nd edition, (altered), 1888.

7. Dent, C. T., "Above the Snow Line." London, Longmans, 1885.

8. Forbes, Jas. D., "Travels through the Alps of Savoy, and other parts of the Pennine Chain." Edinburgh and London, Black, 1843.

9. Freshfield, D. W., "Italian Alps." London, Longmans, 1875.

10. George, Rev. H. B., "The Oberland and its Glaciers, Explored and Illustrated with Ice-Axe and Camera." London, Bennett, 1866.

11. Gilbert, J., and Churchill, G. C., "The Dolomite Mountains." London, Longmans, 1864.

12. Hinchcliff, T. W., "Summer Months among the Alps." London, Longmans, 1857.

13. King, Rev. S. W., "The Italian Valleys of the Pennine Chain." London, Murray, 1858.

14. Moore, A. W., "The Alps in 1864." Privately printed in 1867.

15. "Peaks, Passes, and Glaciers," by members of the Alpine Club. 2 series, 3 vols. London, Longmans, 1859, and 1862.

16. Smith, Albert, "The Story of Mont Blanc." London, Bogue, 1853.

17. Stephen, Leslie, "The Playground of Europe." London, Longmans, 1871.

18. Tyndall, John, "Hours of Exercise in the Alps." London, Longmans, 1871.

19. Whymper, Edward, "Scrambles amongst the Alps." London, Murray, 1871; a second edition (altered), "The Ascent of the Matterhorn," do., 1880.

20. Wills, Alfred, "Wanderings among the High Alps." London, Bentley, 1856.

CHAPTER XI.

HINTS MEDICAL AND SURGICAL.

As the pursuit of mountaineering is occasionally attended by serious, and frequently by slight, deviations from health, a chapter with the above heading may, perhaps naturally, be expected in a book of this description. It is obviously important that all climbers should know how to deal with frost-bite, snow-blindness, and minor accidents; and, as such matters as sun-burn and blistered feet, though in themselves trivial, may waste time and cause extreme discomfort, a little knowledge as to their prevention and treatment is desirable.

Mountain Sickness.

This name embraces a variety of symptoms which differ somewhat in different individuals, but some of them are familiar enough to a very large proportion of mountaineers. The condition is especially liable to be developed in the course of the first long mountaineering expedition of each year, and it is popularly supposed to be due to the rarity of the air. There is no doubt that this is a factor not to be lost sight of, and the diminution of atmospheric pressure at heights of twelve and fifteen thousand feet above the sea must produce considerable effects; still, it may be said that, so far as the Alps are concerned, the liability to mountain sickness is purely a question of training.

The first symptom of this complaint, which almost invariably develops during the *ascent*, is a feeling of faintness and breathlessness, accompanied probably by some palpitation of the heart and throbbing of the arteries, so that slow pace, with frequent halts, becomes necessary. Severe headache and intense nausea may shortly supervene, and the attack may terminate in vomiting and complete prostration.

The older writers on mountain ascents used to describe symptoms of a far more alarming nature; and bleeding from the nose, mouth, and ears would appear to have been occurrences by no means rare. We can hardly suppose that all these phenomena were, like the dragons so carefully described and depicted by Scheuchzer,* mere illusions; but these incidents are, nowadays, not more common on the mountains than they are upon the plains, and no more need be said about them.

* "Itinera Alpina," pp. 366 to 397.

Individuals differ greatly in their liability to mountain sickness, some enjoying almost perfect immunity, whilst others never, in spite of careful training, get through the first week of a climbing season without a severe attack. It is very unusual for any one to suffer more than once in one season; and, if an attack does not yield to frequent halts, it can almost always be cured by turning round and descending. Various forms of treatment have been advocated, based upon various theories of causation, and perhaps the most curious is one recommended a few years ago by a learned professor (I wish I could give the reference) who, attributing the symptoms to anæmia of the brain, recommended mountaineers who suffered thus to stand upon their heads. This gentleman had put his theory into practice upon the slopes of Mont Blanc: he would have found more difficulty in doing so on many of the steeper peaks.

Snow-Blindness.

The term snow-blindness refers to two separate conditions. (1) An acute inflammation of the surface of the eyes, and (2) a loss of sight dependent upon inflammatory changes in the deeper parts. The two may exist separately or may be combined in varying degrees. In the affection, as commonly met with, the superficial inflammation is the predominating element. The symptoms are the following: pain in the eyes with a feeling of grit or sand under the lids; great intolerance of light; and varying degrees of imperfection of vision. These symptoms are associated with a bloodshot state of the eyes, perhaps some gluing together of the lids, and copious flow of tears. If nothing is done, the condition will probably last for some days, and

may result in defective sight and weakness of the eyes, which only disappear after some weeks or months. I am not aware that any permanent blindness has ever resulted.

Snow-blindness is due to the over-stimulating action of the sun's rays when reflected from the surface of the snow. The effect is much more intense in summer than in winter, is greatly aggravated by *freshly* fallen snow, and is rarely produced except at considerable elevations. Individuals differ greatly in their susceptibility to this condition, and practice does not seem to confer protection upon those who are easily affected. I have seen one of the oldest and best of Alpine guides laid up for three or four days from having made one short excursion without coloured glasses, and again mere beginners who were able to travel over glacier passes, sprinkled with fresh snow, without suffering more than slight discomfort either at the time or afterwards. The number of people who are liable to the condition is, however, much greater than that of their more fortunate confrères; and it is right for every one to take precautionary measures.

Snow-blindness may be prevented by protecting the eyes by means of coloured spectacles or goggles.* Green, blue, and neutral tint are the colours most generally used, and the last-named colour is by far the best. The glasses should be worn on the snows whenever the sun is shining, and it is well to remember that the presence of fog or mist by no means obviates the necessity for wearing them, unless it is thick enough to prevent the sunshine from diffusing through. Those climbers who are especially susceptible to this, or to other inflamed conditions of the eyes, are also advised not to remove their glasses even when climbing rocks at any considerable elevation.

* See p. 185.

If by any chance the glasses get lost or mislaid, it is always worth while to paint the lower eyelids and upper part of the cheeks with any dark-coloured pigment. Lamp-black can often be improvised by collecting the smoke from wax-matches on the lantern windows or on a watch glass, and transferring it to the face with the finger. Burnt cork would answer the purpose. If a glass is broken, an efficient substitute is a piece of card or wood in which a fine horizontal slit is cut. *

If the affection has actually become developed, active measures must be taken, and in severe cases a darkened room will be needful. Generally, however, the condition subsides very rapidly under appropriate treatment. This consists in the introduction beneath the lids, as often as the pain demands it, of a few drops of a solution of cocaine, which may be advantageously combined with some astringent. The following is a good prescription, Hydrochlorate of cocaine, 12 grains; chloride of zinc, ¼ grain; water, ½ ounce. In order to effectively apply this solution, the eyes should be shut, the tears wiped away, and the head thrown well back. A small quantity of the fluid may now be dropped into the hollows on each side of the nose. As soon as the eyes are opened, the fluid will gain entrance, and a momentary smart will be quickly followed by great relief.

If no cocaine is procurable, a solution of lunar caustic or sulphate of copper (one grain of either to two table-spoonfuls of water) may be used if obtainable; and this treatment may be associated with a darkened room and cold-water compresses applied to the eyes,—the two last-named measures being applicable even in a hut.

* "Mountaineering," (Badminton Library), p. 57.

Sun-burn.

Sun-burn is caused by, and occurs under, the same conditions as snow-blindness. Those persons most susceptible to the one affection are, however, not necessarily particularly subject to the other. The condition is one which may involve much pain and discomfort, and it is astonishing how much needless suffering is experienced by novices from want of a little knowledge on this subject. A couple of pedestrians are persuaded to leave the mule-paths and to cross the Strahleck or the Col du Géant. Preparations are made with some elaboration: ice-axes, gaiters, and goggles are purchased, guides chartered and provisions ordered; but no one thinks much about sun-burn. The excursion is made on a brilliant day, and the névé is perhaps found to be covered with a sprinkling of fresh snow. The climbers feel their cheeks burning a little during the day, but in the evening the pain becomes acute—sufficient very likely to keep them awake most of the night; and next morning the unfortunate sufferers find themselves objects of both pity and repulsion, with their faces swollen and blistered to an almost incredible degree. Those who engage in rowing and sailing know something about sun-burn, but the effect of a powerful sun reflected from the surface of the high snows, is much stronger than where water is concerned. Fair people suffer more than dark ones, and those whose faces are unprotected by moustache or beard more than those who do not shave. If climbing is persisted in, a certain degree of toleration is, ere long, acquired, and the guides soon get a skin which is proof against the effects of the sun. Practised amateurs, though rarely acquiring the complete immunity

enjoyed by well-seasoned guides, are careful about sun-burn, and each has his specific remedy which is a sure and certain preventative or cure. Ointments and powders are the two sheet-anchors, and while "Toilet Lanoline" is one of the best ointments that can be used, a bland dusting-powder made by Curtis of Baker St., and sold under the name of "Pasma" is one of the best powders, and is, for irritable skins, much to be preferred to ordinary violet or starch powder.*

Much may be done in the way of prevention, but it may be well to consider, first of all, what treatment is best if the mischief is already done. Different devices are found to suit different skins, but a traveller who has completed an Alpine expedition, without taking any precautions whatever, may be advised to bathe his face with the hottest water he can bear before retiring to bed, to dry it carefully, and then to dredge it well with "pasma;" or, if this is not at hand, with fuller's earth, violet powder, or flour; another plan is to apply zinc ointment freely. Great relief is quickly experienced and sleep procured, while the inflammation, instead of proceeding to the formation of angry blisters, quickly declines.

It is always well for any one who burns easily to carry out some such treatment after a day upon the snows, but the real necessity for them should be obviated by the adoption of proper precautionary measures. In the first place it is wise for those with fair complexions to refrain from washing the face before starting in the early morning. The feeling of discomfort arising from neglected ablutions soon wears off, and the precaution is one worth taking. When the higher snows are reached, two or three plans may be adopted. Most ladies, and some men, put on masks or

* See List of Addresses, p. 189.

veils; others smear their faces with vaseline, cold cream, or toilet lanoline; some again merely dust powder on their faces whenever they stop for a meal (it adheres to any part that is beginning to burn); while others use powder superimposed on grease. The most delicate and easily burned of all skins may be perfectly protected by smearing it with a stiff white paste made according to the following formula: R. zinci oxidi, grs. 160; ess. rosæ alb., q. s.; ceræ alb., grs. 80; vaselini pur., ad. ʒii; M. ft. ung.

The lips deserve a word of special mention. They often get chapped and cracked, and some ointment is almost needful to keep them moist and pliable. Good *lip-salve* is not procurable everywhere, but it can be obtained from Curtis and from many other good chemists. It is the best application for the purpose; and, as a little goes a long way, it may conveniently be carried in the small "impression boxes" used for impressions of seals, and obtainable from the heraldic stationers.

Frost-Bite.

Frost-bite means the local freezing of a part of the body. The condition is one which occurs in the extremities, and, while the nose and the ears have often been attacked, it is the fingers and the toes which mountaineers have to be especially careful about.

Three *degrees* of frost-bite are recognized by surgeons, and to explain these the fingers may be taken as examples.

1. The tips of the fingers gradually lose the feeling of discomfort and cold which has been experienced, and become numb and almost devoid of sensation. They may be pallid or slightly livid. This is a condition which most people have experienced in England on frosty days, and the

sharp tingling pain which accompanies returning sensation is consequently familiar to almost every one. Without passing beyond this first degree, the condition may go much further than is common at home, and in this case the pain accompanying reaction is more severe and more prolonged.

2. In the second degree of frost-bite the skin is, in parts, quite destroyed, and, in the course of a day or two, it rises in blisters containing blood-stained fluid; subsequently it peels off, leaving a raw surface beneath. This condition may result in perfect recovery or in more or less permanent injury.

3. The third degree of frost-bite is that in which not only the skin, but the whole of the subjacent flesh, and even the bone, is quite disorganized and destroyed: that is to say, the third degree of frost-bite corresponds to what is called mortification or gangrene. More might be said on this subject; but, as it is a state of affairs which urgently calls for the advice and assistance of a surgeon, I need not dilate upon it further.

All three degrees of frost-bite may exist together in different parts of the same hand, and, during the first day or two, it may be quite impossible to determine what degree will be reached, or how much of the hand will be involved.

A mild degree of frost-bite has been experienced by most Alpine climbers, but it is usually recognized whilst on the mountain, and a brisk rubbing with snow generally restores the circulation. In bad weather, when an hour or two of difficult rock-climbing is still necessary to complete the descent, the fingers are very likely to be frost-bitten; for there is of necessity continuous exposure, coupled with hard work for the hands, at a time when their lowered vitality renders them unfit to resist the effects of local injury. A

night spent out in some exposed situation is perhaps the commonest cause of frost-bitten toes. It is important to know that a low temperature is by no means the sole cause of frost-bite, and one or more of the following factors will usually be found associated with it.

1. *Feeble health.* This should, while it lasts, be regarded as a bar to mountaineering;* and only those of sound constitution should ever undertake long or arduous excursions.

2. *Insufficient clothing.* In this connection it should not be forgotten that an extra jersey or cardigan jacket, worn on the body, may prevent frost-bite of the fingers and toes.

3. *Wind.* This is a most powerful factor in producing frost-bite; and, in intense cold, every effort should be made to get to leeward.

4. *Damp and wet.* The importance of keeping dry cannot be over-estimated. Wet gloves are worse than no gloves when it is freezing; and, if benighted, wet stockings as well as boots should be removed.†

5. *Pressure and local injury.* The pressure of tight or frozen boots interferes with the circulation to the toes, and so becomes important; while, in rock-climbing, the scratches and bruises, to which the hands are subjected, lower the vital powers of resistance.

The treatment of frost-bite may resolve itself into very simple measures which produce the desired result in a very few minutes, or may be a most serious and tedious process, demanding constant care and attention extending over weeks or months. In all but the slighter varieties a surgeon's advice must be, if possible, obtained; but, in every case, treatment should be commenced as soon as possible, and no time lost in waiting for a doctor to be found.

* See p. 25. † See p. 49.

Friction with snow is the time-honoured and established remedy, and, on the mountain, it is readily had recourse to. In the case of the fingers, an equally good plan is to rub them through the hair, or on the clothes, if these are dry. The friction must be prolonged, but not too energetic. At an hotel snow is probably not readily procured, but friction may be applied with sponges or flannel dipped in cold water. After rubbing for some time, the fingers should be wrapped in cotton wool, or, failing this, in flannel. Another method of treatment, but not nearly so good, is to immerse the frozen parts in very cold water, the temperature of which is very gradually raised to slightly tepid (not *quite* cold), and to leave them soaking for hours at a time. In some districts the guides place great reliance on prolonged soaking in white wine, while in others great benefit is believed to be obtainable from dipping the frozen parts into slightly warm glue. Neither plan has much to recommend it from a scientific point of view. Blisters may be pricked, and the contents pressed out. For the rest, the diet should be light, and alcohol should, if the frost-bite is more than very slight, be altogether avoided. Anything likely to produce a too rapid reaction should be carefully abstained from, as this will most likely be accompanied by inflammation and perhaps by mortification. *Avoid using warm water: avoid holding the part to the fire: avoid the use of warmed flannel or wool: avoid all pressure, and too energetic friction; and, if bandages are used to keep the wool in place, let them be very loosely applied.*

Exhaustion.

A member of a mountaineering party may, from physical infirmity, from want of training, from temporary indisposition, or from other causes, arrive at his hotel in a state of great exhaustion. Such a person should be looked on, for the time being, as an invalid, should be put to bed, and fed on small quantities of easily digestible food. After a good night's rest he will probably be able to resume an ordinary diet; but he is, at first, quite unable to digest a heavy meal, and a plate of soup, followed by a tiny bit of chicken, or by some dry biscuits and a glass of champagne, will form a suitable repast. Biscuits, and some milk and soda water, may be placed by the bedside, so that he can help himself if awake during the night.

Exhaustion, whilst still on the mountains, must be met by frequent short halts, and such assistance as can be rendered. Small quantities of food, and especially preparations of kola,* will be of service, but stimulants should only be resorted to if there is a good prospect of reaching some shelter in a reasonably short time, or at any rate before nightfall.

Relief Expeditions, Exposure, Accidents.

Mountaineers may at times be called upon to join expeditions sent out for the purpose of discovering, and if need be relieving, some party of climbers whose return to their hotel has been unduly delayed. Many search expeditions have been prematurely and somewhat officiously organized, and the fact of a party failing to return by night-

* See pp. 73, 188.

fall is not, in itself, sufficient justification for the formation of one. If, however, the party were a weak one, the weather exceptionally bad, or the peak well known to be dangerous or in bad condition, the matter is somewhat different, and a caravan consisting largely of guides may perhaps be despatched; while in cases where there is positive ground for fearing that some mishap has occurred, there need be no doubt as to the proper course to pursue. No amateur should join such an expedition unless he is himself a competent mountaineer and able to dispense with assistance of every kind: otherwise he will be of more hindrance than service. Subject, however, to these limitations, no climber will fail to offer his services, if he thinks that his presence can be of any use.

An expedition of this kind may prove, after all, to be uncalled for, or it may find that there is no longer any help to be rendered; but it should be well supplied with extra ropes and other facilities for carrying an injured person, with food, and with first-rate brandy; and it should be ready to do anything that may be required of it. There is not room, without unduly extending this section, for special hints which must vary so much in different circumstances, but the possibility of mistaking apparent for actual death must be alluded to, as a man may be apparently frozen without being actually dead. Any one can feel whether the pulse is beating, and, if it is not, the heart-beat may be felt or listened for. As long as there is any evidence whatever of life, every effort should be made to restore animation, and gentle but continuous friction of the limbs towards the trunk is of use in restoring the circulation. The main effort may possibly have to be concentrated on performing artificial respiration. This may be done by following the subjoined directions. Lay the patient flat upon his back, with his

shoulders slightly raised on a roll of clothing, so as to allow the head to hang well back. Kneel, with the patient's head between your knees; and, grasping the arms just above the elbows, draw them upwards, with a slight outward inclination, so as to almost meet above the head; then, after a pause of about two seconds, bring them down again to the sides of the chest, against which they should be firmly pressed. After a pause of three or four seconds the process should be repeated, and it may be needful to persevere with it for an hour or more.

Cuts, bruises, sprains, or fractures, may possibly have to be dealt with in a temporary manner; and, while axes and ropes may, in one way or another, be utilised for splints or litters, handkerchiefs, neckties, and boot-laces, may serve the purpose of bandages. A broken or dislocated limb cannot be used, and a sprained one ought not to be, so that in any accident involving an injury to a limb, it is safest to *try* and get the sufferer home without permitting him to use the injured member. In all such cases a surgeon's advice should be obtained as soon as possible; and more explicit directions as to the management of broken limbs would hardly be of service here. Every one should know, however, how to arrest hæmorrhage from a cut, and it is pitiful to think what simple measures would have saved the life of poor Peter Egger, who perished from loss of blood below the Bergli

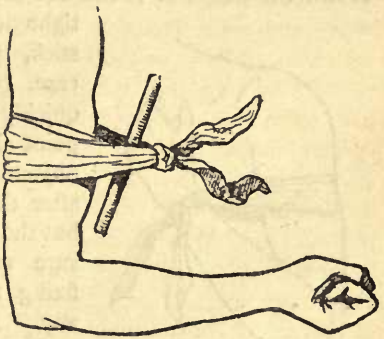


Fig. 1.

hut, in 1881.* If the bleeding be from a cut on the head or on the body it can often be stopped by the application of ice; or, if this fails, by direct pressure with the finger or thumb upon the bleeding point,—a means by which it is almost always possible to stop it. In the case of a limb the same methods are available, but it is often easier to apply pressure to the artery *between the bleeding point and the heart.* If a handkerchief be tied loosely round the thigh, or round the arm above the elbow, and tightened by twisting it with a stick, pocket-knife, or pencil-case, (Figs. 1 and 2) it will quickly arrest bleeding from any point beyond. There is no object in continuing the twisting after the bleeding has ceased, but the requisite amount of pressure must be maintained by fixing the tourniquet in some way. Bleeding from the hand or forearm may also be stopped by bending the elbow strongly and keeping it in position with a handkerchief which binds the wrist tightly to the

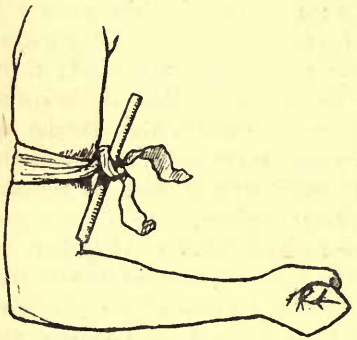


Fig. 2.

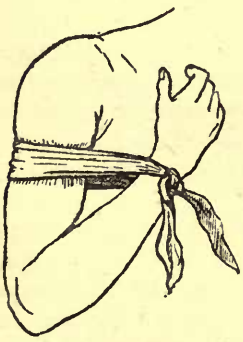


Fig. 3.

* *Alpine Journal*, vol. x. p. 421.

shoulder (Fig. 3). This plan acts by making a kink in the artery at the elbow.

Sprains.

A mountaineer may twist a knee or sprain an ankle or wrist. These accidents are not so common in climbing as might be expected, but they sometimes occur. Mr. Dent makes a very pertinent remark in the Badminton volume on "Mountaineering," * to the effect that "a man will never sprain his ankle when he expects that he may do so at any moment." The fact is not sufficiently known that when the muscles are on the alert a sprain is most unlikely; and that, consequently, steep slopes of loose boulders may be rapidly descended with very little fear of this mishap. On a mountain path though, or in any other situation where the ground is so easy as to allow the attention to wander, a false step may easily eventuate in a sprain, and a few words on sprains may consequently be of use.

The word "sprain," unlike "fracture" or "dislocation," is a word with a very indefinite meaning. The two latter terms refer to distinct injuries, but a sprain may mean anything from a slight twist, accompanied by no structural damage worth naming, to a severe injury involving the laceration of nerve fibres, blood vessels, muscles, and ligaments. One can hardly wonder, therefore, that, while some sprains are well in a couple of days, others require prolonged rest and treatment which may extend over several weeks. It is often impossible, even for a surgeon, to tell, at first, what the exact degree of the injury is, and it is consequently always wise to treat each sprain, at the outset, as if it were one of some severity. If it is found that, in

* Page 98.

the course of two or three days, the joint is practically well, it may safely be surmised that no very great damage has been done; but, whatever the nature of the injury, much time will be gained by appropriate treatment resorted to without delay.

The first point with regard to the treatment of any sprained joint is not to move it. If the accident occurs far from home it may be *necessary* to make use of the limb; but if near at hand, no attempt at walking or hobbling should be made. The victim should allow himself to be carried or otherwise helped indoors, and his garments should be removed with the greatest care, so as not to move the injured part. When the joint is free from clothes, treatment should be commenced at once. "Every moment lost makes a serious difference." *

The popular methods of treating sprains with arnica or vinegar are quite ineffectual except in the case of such slight injuries as would soon get well without any treatment at all. The only agencies of any real value are rest, heat, pressure, rubbing, and cold. Massage should rarely be attempted except under the direction of a surgeon, and pressure can, unfortunately, hardly be properly applied by untrained hands. Cold is easy of application but is powerful for harm as well as for good; so that heat and rest are the two agencies which may be most confidently recommended. The ankle is the joint most likely to have suffered injury, and, if it can be placed in hot water before there is any swelling to speak of, a great point will have been gained. The water should be as hot as can be borne, and fresh should be gradually added, as it can be tolerated. After about half an hour's soaking the limb may be taken out of the water and gently dried. It may then be very gently

* "Sprains," by C. W. Mansell Moullin, M.D., F.R.C.S., p. 96.

rubbed for a few minutes *from the toes towards the knee*, with a slight but firm stroking movement; and afterwards it should be packed in cotton-wool, lightly bandaged on, and raised on a pillow, to which it should be tied with handkerchiefs, so as to keep it elevated and prevent movement when asleep. The hot-water treatment may be continued twice a day for two or three days, and, if there is no medical opinion to be got as to the period when movement may be attempted, the patient must feel his way by very careful experiments, and only allow himself to use the limb when he feels certain he can do so with impunity.

A really bad sprain will quite spoil a holiday, and, if there is no marked improvement in the course of four or five days, the best thing to do is to go home, keeping the joint as much as possible at rest, and then to have it properly attended to.

Blisters on Hands and Feet.

Blisters on the hands are not among the common ills of climbing; but they may result from step-cutting.* Their treatment requires no special notice; but gloves may prevent them, or, at any rate, allow blistered hands to be used.

Blisters on the feet are a serious trouble, and may put an end to all walking for the best part of a week. Several precautions can be taken in the way of guarding against them, and no amount of trouble should be considered excessive in the case of a person whose feet blister easily. The first essential is to have thoroughly good thick stockings, and absolutely comfortable boots. As an extra precaution, socks or thin stockings may be worn under the thick ones, or thick felt soles may be slipped into the boots.† These

* See p. 110. † See p. 170.

measures will almost certainly prevent all blisters, but two other popular preventatives are useful, and may be employed advantageously, especially if the feet feel sore. To rub the skin with spirit tends to harden it, and to thoroughly soap the insides of the stockings lubricates them, and so tends to minimize the effects of friction.

If blisters have developed, they may be pricked with a large needle or with the point of a sharp knife, and the fluid squeezed out. In the case of a large blister on the sole or the heel, absolute rest for a few days is necessary, but a small one may be covered with soap-plaster spread on moleskin, and this may be applied over the loose skin. If the skin is much torn, it should be carefully cut away, and the plaster applied to the tender surface beneath; but in this case, rest is the proper course. Zinc ointment can be applied locally, or chamois-lard (Gemse-schmaltz) may be melted on with a candle. The last is a plan much recommended by many of the guides: it serves as a protection, but probably collodion brushed a few times over the surface with a paint brush, so as to form a good film, would do much better. When walking is again contemplated, all of the above named precautions should be adopted.

Sore Hands and Feet.

Rock-climbing often gives rise to cuts and bruises on the hands. This is especially the case when the hands are wet and the rocks sharp or of rough grain, and under such conditions the fingers may become so painful as to render another day of rock-climbing almost impossible. In such a case a pair of old dogskin riding-gloves are very useful, and all but the most difficult rocks can be climbed

without taking them off. A single day of stiff scrambling will generally ruin a pair. A supply of old glove-fingers will prove useful for more localized injuries, and, as an application to the sore places themselves, nothing is better than collodion or zinc ointment. Care must be taken to get all grit and dirt out of cuts, and for this purpose poultices may be sometimes needed. A pair of fine scissors will be found useful to clip off any loose projections, and to trim the skin around the nails, as this is very liable to "start" in climbing, as in other forms of exercise.

Sore feet are common enough; but, apart from blisters, they seldom prevent a mountaineer from climbing. Sore places on the front of the ankle, and on the back of the heel, just where the Achilles tendon joins the bone, generally result from defective boots. They may be dressed with zinc ointment spread on rag, and, though they make walking a very painful process for the first half-hour after starting, they need not be looked upon as a bar to exercise. Sores or tender places, if small, may sometimes be protected by ring-shaped felt corn-plasters.

Long tramps upon the highway make the feet swollen, painful, and tender, and this condition may extend upwards above the ankle. Hot-water soaking at night and cold-water soaking in the morning are useful remedies, and the addition of a little common salt to the water is perhaps helpful. If the feet are much swollen, it is well to raise the foot of the bedstead by placing its legs on blocks or books, so as to slightly elevate the feet, and thus allow gravity a share in removing the fluids which give rise to the swelling. This general foot-sore condition is rare except from road walking; and, as mountaineers seldom walk when they can drive, they do not often suffer from it.

Cramp.

Cramp may be suffered from on the march, or in the night. When in good training it is not likely to develop, so that it should not prove a danger by appearing suddenly while on difficult rocks or ice. The spasmodic condition of the cramped muscles must be overcome by forcibly bending the joint in the opposite direction, followed by the vigorous application of friction.

Inflamed Throat.

An inflamed condition of the throat is not uncommonly experienced by climbers, especially before they are in very good training. The uvula is apt to swell, and the whole throat may feel very uncomfortable. The condition is troublesome, but subsides within a day or two. A gargle of salt and water (a tea-spoonful to a tumbler) is useful. Smoking tends to aggravate.

Mountain Deafness.

A word on this matter may possibly be of interest. The partial deafness which is so often experienced by climbers when descending from the heights, and which generally disappears from each ear separately with a pop, is due to the imprisonment, in the middle ear, of the rarified mountain air. When the denser air of the valley reaches the ear from the throat, an event which is likely to happen when swallowing or blowing the nose, a little crack is heard, and sounds, previously unnoticed, become distinct.

Climbers are, of course, not exempt from maladies and

injuries which cannot be laid to the charge of the mountains. Of these I can say nothing, and must make no exception even in the case of those minor ills to which travellers generally are liable. This chapter has already exceeded the space I had originally allotted to it, and must be confined to matters which are strictly within its proper scope.

CHAPTER XII.

OUTFIT.

THERE is perhaps no branch of mountaineering lore in which a climber of experience can be of more use to a beginner than in the matter of equipment. During the last thirty years mountaineers have found out, little by little, the precise nature of their requirements, and how these may best be met; but, until very recently, the large amount of information acquired by individual climbers had never been collected or recorded. The committee of the Alpine Club were so sensible of this state of things that they appointed, in the spring of 1891, a sub-committee, to inquire into the matter; with the result that the "Report of the Special Committee on Equipment for Mountaineers" was published as a supplement to the 116th number of the *Alpine Journal*, in May, 1892. No pains were spared to make this complete, every member of the club being invited to contribute to, and finally to criticise, a provisional report; so that there is now an authoritative monograph before the public, which may be purchased

either with the above-named number of the *Alpine Journal* (Longman and Co., 2*s.*) or separately.*

Since the issue of this report the Badminton volume on mountaineering has appeared, containing, as might be expected, a carefully written section on the same subject; and there are, therefore, ample opportunities for beginners to make themselves acquainted with details which, until a year ago, had to be gradually accumulated by personal experience.

An ordinary pedestrian can procure, at any of the main Alpine centres, everything he will actually need, should he unexpectedly decide upon making a glacier excursion; but those who visit the Alps with the express intention of climbing are recommended to provide themselves with most of their requirements before leaving home.

Some of the articles which will be alluded to may be bought anywhere; but others, being of the nature of specialities, are only procurable at certain places, and a list of addresses, where reliable things may be obtained, will be found at the end of the chapter.†

Clothes.

Coat, waistcoat, knickerbockers, hats and caps, shirts, stockings, boots, boot-nails, rubber shoes, slippers, anklets, gaiters, gloves, knitted-waistcoat, muffler, waterproof coat.

Climbing clothes should be made entirely of wool. A flannel shirt, stout stockings, and a knickerbocker suit of tweed, suggest themselves as appropriate, and are worn by most climbers. The point to be remembered in ordering

* Apply, enclosing seven stamps, to the Assistant Secretary, Alpine Club, 8, St. Martin's Place, Trafalgar Square.

† See p. 189.

is that the linings and pockets should be made of some woollen material: the Jaeger Co. make a suitable stuff for this purpose, and tailors should be told to use this, or some light flannel. Cotton linings are objectionable for more reasons than one, but the mere question of comfort is quite enough to secure their rejection after once the all-wool system has been tried. Some climbers have had clothes made altogether of flannel, and a dark grey flannel-cloth can be bought which is, in many respects, admirable; nothing is so warm, and nothing is so cool; nothing is so light, and nothing dries so quickly. The objection to flannel is that it does not wear well, being easily frayed and torn upon rocks. A tolerably thick tweed, neither too finely nor too coarsely woven, fulfils most requirements, and its power of resisting wet may be greatly increased by dipping it, before being cut, into a solution of alum. I have never tried clothes thus treated, but am told that the process makes no difference to the comfort. The same clothes are destined to be worn both in great heat and great cold; and, though a medium thickness is no doubt best, it is wise to run the risk of being over- rather than under-clad. In ordering clothes, some odd scraps for patches must not be forgotten.

Coat. A Norfolk jacket answers very well. It should be well supplied with pockets; nine or ten are not too many, and all should be made to button. The inside breast-pockets ought to be large enough to take a folded map; and four outside pockets below the band, lined with mackintosh, are most useful. Two of these (the back ones) may be kept exclusively for the gloves, so that, when wet, they can be kept away from other things. Waterproof pockets must be turned inside out when the coat is dried. The collar of the coat, when turned up, should be fastened by a tab

buttoning under the throat. Similar tabs should be placed on the wrists, so that the sleeves may be fastened quite tight: these should be opposite the thumb, that is, well in sight when the coat is on, as they are easily torn off if placed underneath. The belt should be let into the coat, and not be merely passed through loops.

Waistcoat. Little need be said, but do not be persuaded that a wearer of a Norfolk jacket requires no waistcoat. Have four pockets outside, and one or two inside with flaps to button: this is the safest place for bank-notes and cheques, which should be enclosed in an oiled-silk case to keep them dry.

Knickerbockers are preferred by most amateurs to trousers, but, as is the case with golfers, the reverse is the rule among professionals. Two cross-cut or side pockets, two revolver pockets, and one or two fobs, are useful, all made to button, and all, of course, together with the waistband and any lining used, should be made of woollen material. The ordinary cloth strap at the knee is apt to let the stockings slip down, and some prefer a broad box-cloth band to button: this may be external, as in ordinary riding knickerbockers, or turned in, as recommended in the Equipment Committee's report.* In any case box-cloth is the best material for a strap, as tweed is liable to fray, and leather becomes hard and stiff after being wet. Some climbers eschew braces and rely upon a strap and buckle at the back, while others object to any tightness round the waist.

Hat. In the history of many sports, cricket, hunting, and skating, for example, a period has arrived when it was considered "de rigueur" to wear a tall hat. Many years ago a certain "Col. Shaw"† urged the claims

* "Equipment for Mountaineers," p. 14, *Alpine Journal*, vol. xvi.

† See "Hints for Pedestrians," by Medicus, 1843, p. 42.

of this form of headgear upon pedestrians generally, on the ground that "you can carry things in the hollow of a hat;" but, in spite of this recommendation, the practice has never become popular among mountaineers, and, unless we are to regard a recent utterance* as the thin end of the wedge, there are as yet no signs of fashion turning in this direction. Many sorts of hats and caps have been worn, but the general concensus of opinion is in favour of a fairly broad-brimmed soft felt as being the best of all hats for the purpose. A strip of flannel should be slipped between the leather and the felt, or an absorbent material may be substituted for the leather. A hat-guard of some sort is necessary, and a good one is sold by Silver and Co. Many climbers wear their goggles round the hat when not in use. These sometimes work off and get lost, but this mishap may be easily prevented by a series of three small inverted hooks sewn to the hat-band.

A closely fitting cap is most comfortable when there is much wind. So useful indeed is it, that many guides, though averse to carrying any unnecessary luggage, habitually take one with them. Such a cap may as well be made to cover the ears, and one with lappets to tie or button under the chin answers very well. The Jaeger Co. make caps of this description, and others which are almost equally suited to the purpose.

Shirt. Flannel shirts with turned-down collars are almost universally worn. The flannel should be thick and ought to be thoroughly shrunk before being cut.

Stockings should be hand-knitted and can hardly be made too thick. A soft wool is far the most comfortable, though the harder kinds wear better. One cannot be too particular

* "Mountaineering" (Badminton Library), p. 42.

in having the best stockings obtainable, and in only wearing them while they are in good repair, as climbers have often been laid aside for a week by blisters produced by stockings which had been darned. Two pairs of stockings may be worn, thin ones beneath thick ones; and some climbers habitually wear socks under their stockings; the latter are more liable to ruck.

Boots. It is needless to say that boots for mountaineering must be very strong. Laced boots not too high at the ankle are the best, and the tongue should not be loose but be sewn at the sides. The soles should project, and the heels should be low and come well forward. It is not easy for a bootmaker, unaccustomed to make for Alpine men, to realize the great strain his work will be expected to resist. The cuts from sharp rocks, the wear and tear of running down moraine and screes, and the alternate soaking, freezing, and baking, combine to make climbing the severest test that a boot can be subjected to. The boots, then, must be strong, and they must also be comfortable. If there is any doubt at all on this point, a second pair, old and tried, should be taken, in addition to the new ones. If one's feet blister easily, thick felt socks may be worn between the stocking and the sole. These can be rinsed in water after use, and dried in the sun. If used at all, several pairs should be taken.

Boot-nails. The soles and heels of the boots should be well studded with nails of the right sort. Nothing suitable can be got in England; and in some Alpine resorts, Chamonix for instance, the nails are poor. It is therefore well to get a supply, and to take some spare ones in the luggage.* Two sorts of nails are desirable, one for the

* I have made arrangements with a Swiss guide to supply nails to any one who sends him a foreign post-office order for 6*s*. For this sum

edges (A) and one for the middle (B). All should be made of wrought iron, and should have little projections from the head to give them a better hold on the boot.

A

B

It is a great nuisance to find that the nails kick out, but this will seldom happen if the boots are kept for a year before being nailed. The nails, too, may be dipped in water before being driven in, so that they will rust into their places; and, if those on the edges are placed so as just to overlap, they will help to keep each other in position. If these precautions are observed, the nails will be much less likely to come out, but the heads may occasionally break off; and, after a season or two, they will become so worn down and polished as to be of no service. The boots must then be either resoled or discarded.

Screw-nails, somewhat resembling cricket screws, are used by some climbers. It is important that the screws should be five-eighths of an inch long, and the boot-soles must consequently be very thick. Two sorts are made by Hill and Co.

Dwarf trees, to be inserted as soon as the boots are taken off, will be found to repay what little trouble they entail; adding as much to the durability, as they do to the comfort, of the boots. It is hardly necessary to say that the boots,

he will have made, pack, and send off, post free, enough nails of both kinds to nail three boots: that is, enough for a pair and some spare ones. Any one wishing to take advantage of this arrangement may write to Ulrich Almer, Guide, Grindelwald, Switzerland. It should be remembered that during the summer months he is seldom at home, and further, that the blacksmith, who makes the nails only as they are wanted, is apt to take his time. In writing, put the name and address very plainly, and request a post-card acknowledging receipt of money.

when in use, should be well greased every day, and that in winter they should be seen to now and then, and similarly treated.

Tennis shoes with rubber soles, or shoes with soles of plaited grass or string, are used by some for climbing on smooth rocks.

Slippers should be strong enough to be worn, even in wet, outside a hotel or hut, and they should be large enough to carry a felt sock. This will be appreciated if one has to take the stockings off.

Knitted anklets, to cover the top of the boot, and prevent small stones and grit from gaining entrance, are such a comfort that, once worn, they will not readily be discarded. They can be made at home, or bought from the Jaeger Co.; or they can be roughly improvised by cutting the feet off old socks. They must be slipped over the foot before the boots are put on, and adjusted after these are laced. Stockings are sometimes made with these adjuncts permanently attached; but they are not suitable for Alpine work. Knitted anklets do not last long, and two or three pairs should be taken. Canvas anklets, to lace, answer the same purpose, but are less comfortable. Leather ones get hard and stiff.

Gaiters are always donned by mountaineers as soon as they reach snow into which they are likely to sink over the boot tops. Much thought has been bestowed on this article of apparel, and the very best form of gaiter has possibly yet to be evolved. The kind most generally worn is one which covers the upper surface of the foot, and is kept in place by a chain passing under the instep. It is fastened down the outer side of the leg by buttons, hooks, or laces, and a small strap at the knee tends to secure its position. As an extra safeguard against the

gaiter slipping down, this strap may be passed through a small loop of string depending from the knickerbocker buckle. No portion of the gaiter should be of leather; the whole should be made of some strong cloth, and box-cloth, the material now most recommended, is more durable and more waterproof than tweed. The gaiters must be carefully made to fit the boot and calf, and the chain should be fixed to the posterior half of the foot-piece, so as to slip on under the heel instead of the toe. This chain must be strong or it will break; and the chains sometimes worn under the instep by equestrians, though needlessly heavy, answer the purpose very well. Steel chain of any sort rusts, and, if thin, snaps; while any chain whose links are not soldered is apt to open and come undone. I have, for the last two years, used two pieces of german-silver watch chain, and this has lasted better than anything of the same weight that I have seen; but a brass chain, of the sort used for chandeliers, answers fairly well. It is wise to take some spare chain in case of mishap, and wire-cutters will be found useful for cutting it into proper lengths. Some experienced mountaineers wear leggings which, extending from the knee, cover the ankle only. If properly made they are said not to work up and so allow snow to enter the boot, though no chain passes below the foot.

Gloves for mountaineering are generally made of thick wool, closely knitted, and on the pattern of an infant's glove, with only two compartments, one for the thumb and another for the fingers. They are warmer if a piece of flannel is sewn inside over the back of the hand. Such gloves can be bought from the Jaeger Co., but the best of all are home-made.

A knitted waistcoat or Shetland jersey is a necessary adjunct. The latter is preferable, as being possibly warmer

and certainly lighter. It can be worn next the skin in huts, but it is so elastic that it can be slipped on over the waistcoat or coat, and is often useful at meal times if the air is cold. A *muffler* of some sort (wool or silk) must be taken, and some mountaineers consider a short *waterproof coat* or cape to be a necessity.

Implements used in Climbing.

Ice-axe, sling for ice-axe, rope, compass, maps, crampons, artificial aids.

The number of implements actually used in climbing is small. A map and compass help in finding the way, and a rope and ice-axe enable climbers to follow it. Other appliances are of minor importance.

Ice-axe (French "piolet," German "Pickel," or "Eisbeil"). The ice-axe has undergone many modifications of form. The earliest guides used to carry a long pole or alpenstock in the hand, and a small ice-hatchet slung in the belt. The two are now combined.

Ice-axes, such as are in use to-day, are all made on one general plan, though in detail they differ considerably. In speaking of axes, confusion may arise from the fact that two separate parts of the implement may be appropriately termed the "point." It is well, therefore, to avoid this term, and select others which are less ambiguous. An ice-axe consists, then, of two main parts, the head and the stock. The two ends of the head may be called respectively the blade (A) and the pick (B): the stock ends below in the spike (C). The head and spike are made of wrought iron, and may be tipped with steel. Great care is necessary in tempering, as, unless the blade is properly tempered, it is sure to be either chipped or dented if struck

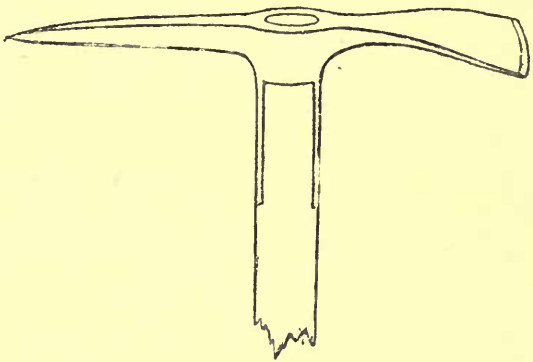
accidently against a rock. The stock is made of well-seasoned, straight-grained ash, split from the log and not sawn, and must be strong enough to stand a sudden strain. The pick should not be too much curved; indeed, in some of the very best Swiss axes, it is not curved at all, and leaves the stock at a right angle. There is not the same objection to a slight curve in the blade. English makers often roughen the under surface of the blade, under the impression that it gives a better grip in the snow. This is not the case, for the snow sometimes balls on it, which is a serious drawback; still, it is useful to strike matches on. Some makers cut a few jagged teeth in the under surface of the pick, on the supposition that they are of service in climbing rocks. They are in reality quite useless. Many again put a rim of thick leather, fixed on the stock, a foot or fifteen inches above the spike; or the wood is made bulbous at this part. The idea is to give a better grip when the axe is being used as an anchor, but the excresence is unsightly and needless, and it interferes with one of the functions of an axe, namely, that of a probe to ascertain the presence of concealed crevasses. One cannot have an ice-axe made too simply. The spike in Swiss-made axes is usually a very simple affair. In most English ones it is highly finished and often far too heavy.

ICE-AXE.

For a man of average size an ice-axe should be between three feet seven, and three feet ten inches long, and it should balance about thirteen or fourteen inches from the head. Many English axes are faulty in this important particular, and balance at a point some sixteen inches from

the head, this being mainly due to the absurd amount of metal in the spike. Some men like heavy axes, and some light ones, but if step-cutting is to be done, a good balance is essential. According to my own idea, three pounds is the right weight for an axe, but two of the best amateur step-cutters I know prefer heavier ones. Ice-axes may be bought in England or at any of the climbing centres in the Alps. The best

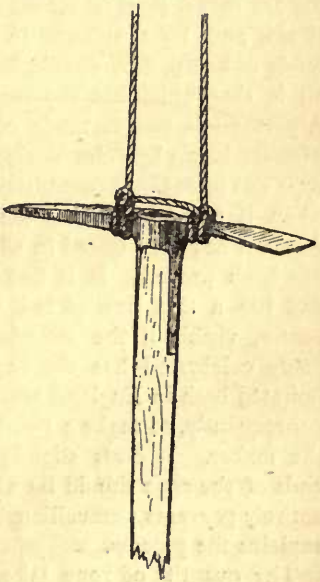
LEATHER CAP FOR HEAD OF ICE-AXE.



Swiss types are made in the Oberland and cost from fifteen to twenty francs. The English axes are generally much more highly finished, and cost, as a rule, thirty shillings or two pounds; some have, however, been recently made by Carter and Co. of Salford, at a pound. The patterns for these were furnished by Mr. Charles Pilkington, and they

bear much more resemblance to good Swiss axes than to those ordinarily made in this country.

With regard to the choice of an ice-axe a good deal might be said, but for a beginner the main point is to select a light one with a strong stock. By the time a man begins to think of doing any guide's work himself, he will have a very fair idea as to what sort of axe he wants; and, if he is inclined to be faddy, he will have one made for him. If his ideas as to detail are carried out, the result will very likely be that the axe will not *feel* right, just as a billiard cue, made to order, may prove disappointing. A better plan is to go to a good maker at home or abroad, and, from an assortment of half a dozen sound axes, select, as in the case of a cricket bat or a golf club, the particular implement which appears to be the best balanced and otherwise most suitable.



SLING FOR AXE.

It is convenient, for the safety of one's fellow-travellers and their effects, when travelling by coach or rail, to have leather caps to shield the points of the axe.

Sling for axe. This is a small but necessary item in a mountaineer's outfit. When climbing on rocks which are at all difficult the axe is a decided encumbrance, and a sling whereby to hang it from the wrist is the best remedy.

Thick string or blind cord answers the purpose well, but a sling made from an old silk neck-tie is the most comfortable. Some use a leather strap either detachable or permanently fixed near the head of the axe. This is a mistake, for leather, though pleasant enough when new, gets hard and stiff after it has been soaked and dried; and an appliance which is only occasionally needed should not be made a fixture. Whatever is used must be strong, and if attached by two clove-hitches it is perfectly secure and easily undone.*

Rope. The qualities required of a rope for Alpine climbing are that it shall be strong enough to resist any probable strain, and light enough to be readily portable. Ropes made of hemp, flax, or silk, have been used, but the best of all is that which has received the official sanction of the Alpine Club, and is made of three strands of the finest Manilla hemp by John Buckingham of Bloomsbury. This rope was tested by a committee of the Alpine Club in 1864,† when it was found to be the best for climbing purposes. Again it has been tested in 1892,‡ and again its excellence has been proved. It is known as "Alpine Club Rope," and has a thin line of red worsted running through its centre, visible if the strands are slightly untwisted. So justly celebrated has the rope become that it has been imitated both in England and abroad. Climbers are urged, consequently, to make a point of purchasing it direct from the maker. It costs slightly over a penny a foot. The ends of the rope should be whipped with fine twine, which entirely prevents unravelling. The accompanying diagram explains the process.

The quantity of rope taken will vary according to the

* For diagram of clove-hitch, see p. 97.

† *Alpine Journal*, vol. i. p. 322.

‡ "Equipment for Mountaineers," p. 5, *Alpine Journal*, vol. xvi.

number of travellers who are proposing to climb together, and the nature of the work contemplated. For ordinary work it is usual to allow fifteen to twenty feet between each two men, and four feet for each waist loop and knot. As it is well to have too much rope rather than too little, a party of three will generally take sixty feet, and a party of four eighty. Occasionally, on difficult rocks, it is convenient to have a greater length of rope, and it may be wise for a party of three to take eighty or even a hundred feet with them.

HOW TO WHIP A ROPE END.

A spare rope will be found useful in descending very difficult rocks; when hitched over a suitable projection it acts as a safeguard to the last man, and when time is of importance it enables a whole party to descend more quickly.* For this purpose the club rope is still the best, though a lighter one, also made by Buckingham, under the name of "one and a quarter inch fine yarn Manilla," answers the purpose almost as well. The reason why this slighter rope is safe for this work lies in the fact that only one man is ever using it at any one time, and that, as it is always kept taut, it is never subjected to a sudden strain.

A rope when quite new is unpleasant to use, as it tends to get into kinks. To avoid this it is well to soak it in water, and then stretch it well between trees or clothes-posts while it dries in the sunshine. Every time a rope gets wet it should be stretched and dried.

The lasting power of an Alpine rope depends of course

* See p. 126.

on the use made of it; but it is wise to be chary of trusting one for more than two seasons even if it shows no signs of wear, for which, however, a watch must always be kept, as half a dozen climbs on sharp rocks may so fray a rope as to render it unsafe though only used for a fortnight.

Compass. A good compass is indispensable. Many prefer one with a floating dial, and if this be a luminous one it can be used at night. The case, which should be strong, may advantageously open with a spring like a watch, and should certainly be so arranged as to lift the needle off its pivot when shut. If a wristlet compass * is taken, it should be in addition to, and not instead of, an ordinary one.

Mr. Conway insists strongly upon the advantages of the prismatic compass, and certainly his remarks upon the instrument are well worthy of perusal.†

Maps. A map of the district one is travelling in should always be carried in the pocket. A transparent oiled-silk case, obtainable at Stanford's, protects it against wet, both in the pocket and while in use.

Crampons (Steigeisen or climbing irons) are used extensively by Austrian climbers, both amateur and professional; but, though evidently in use when Simler wrote three hundred years ago,‡ they have been very generally scouted both by Englishmen and Swiss guides. They are now being spoken of in more respectful terms; and those who have really learned their use speak very highly of them as time-saving appliances. It is very important that crampons should be made to fit the boots with which they are to be worn. "They consist of a framework of the best steel, in two parts, hinged together under the instep, and

* See p. 16. (Sold by Hill & Son.)

† "Mountaineering" (Badminton Library), p. 267.

‡ Coolidge, "Swiss Travel and Swiss Guide-books," p. 17.

carrying ten large spikes. They will be made to order by the Albion Iron and Wirework Co. It is of especial importance that the two front and the two back spikes should come just under the edge of the sole. It is perhaps needless to remark that for crampons to be of any great use every member of a party must be provided with them." * Crampons are of most service on very hard snow, but are valuable also upon ice and ice-glazed rocks.

Artificial aids of various kinds have from time to time been used in climbing mountains. The term is one of opprobrium, and is usually considered to comprise all climbing appliances other than those discussed above, and crampons will be included by many. Ladders were probably the first articles of this class to be used, and they have been found of service in crossing crevasses and in scaling difficult rocks. Rockets have, as already pointed out,† been tried for carrying a rope over a crest, but not with much success. Iron and wood stanchions have been driven into cracks, and the rock has actually been bored and blasted in order to fix them. Mr. Whymper describes what he calls a "claw," ‡ an iron hook-like instrument, to which a rope is attached : it is thrown up, or pushed up on the end of an axe, to catch on a ledge of rock above the climber's head. Other special implements have been devised for special places, but none have met with any general recognition. One article, a "*piton*" must, however, be alluded to, as having proved very useful on occasions where the descent was both steep and difficult. This consists of a strong iron nail or spike some eight or ten inches in length, with an eye at one

PITON.

* "Equipment for Mountaineers," p. 10. † See p. 124.
‡ "Scrambles amongst the Alps," p. 110.

end through which a rope can be passed. In situations where there is no projection, over which a spare rope may be hitched, this may be driven into a crack with a stone used as a hammer; and those, at any rate, who contemplate trying a new route *down* a rock mountain, will be wise to take two or three pitons with them.

ACCESSORIES.

Knapsacks and rücksack, lantern, candles, gourds, spirit-flask, drinking-cups, pocket-knives, tin-opener, goggles, masks, telescopes and field-glasses, aneroids, clinometer, photographic, drawing and scientific apparatus, bags and boxes for provisions, etc., tents, sleeping-bags and cooking outfits.

Knapsacks and rücksacks of various kinds are used for carrying provisions and extra clothing. There can be hardly any doubt that, both for convenience of packing and comfort in carrying, the Willesden canvas rücksacks made by Silver and Co. at the suggestion of the Alpine Club committee on equipment, are the best yet offered to the public. Two sizes are made, but the smaller one (24 inches × 22 inches) is the more generally useful: it costs about 18*s.*

A lantern is needed for early starts and will be useful should the party be benighted. It is always well to have one's own lantern, so as not to be dependent on borrowing; and first-rate lanterns are made which fold into an incredibly small space. Two patterns only are now in general use, both of foreign manufacture, but both obtainable in England. The larger and more serviceable, known as the Italian or Excelsior lantern, can be bought in Italy for five francs, or at Hill's for about 8*s.*: it weighs, without the case, something under eight ounces. The smaller or Vienna

pattern is about half this weight, and costs proportionately less. Carriage candles, the stoutest the lantern will accommodate, should be taken to burn in it; for they are more satisfactory, both as to illuminating and lasting power, than candles bought abroad.

Gourds for holding wine, cold tea, or whatever drink is chosen, may be purchased at home or abroad. Silver's vulcanite felt-covered gourds are good, though bulky to pack. Nothing could be much better, however, for a gourd required to hold one quart or less; but, for larger quantities they are, like the tins and natural gourds used by guides, clumsy, because non-collapsable. The French leather bottles, made with the hairy side of the skin in the interior, are the best of all gourds for mountaineers. They are, unfortunately, very difficult to obtain; and the makers, from whom Silver and Co. will order them for customers, "often take three months to deliver." * I have had one on order now, for considerably over a year; and, until some arrangement can be made for ensuring a regular supply, they may be regarded as almost unprocurable. Those who are fortunate enough to procure one should consult the "Equipment Report" as to "curing" and preserving it.† Owing to the difficulty in obtaining these leather ones, Silver and Co. are making, at my suggestion, large indiarubber gourds covered with pigskin: I have great hopes that these will prove to be a success. They should, when new, be filled with strong coffee, with the grounds left in, and put aside for twenty-four hours; as this will remove the taste of indiarubber.

A small *spirit-flask*, preferably of metal or vulcanite, should always be taken by one member of a party; but its contents should be kept for emergencies only.

* "Equipment for Mountaineers," p. 8, *Alpine Journal*, vol. xvi.
† Ibid. p. 8.

Drinking-cups of two sizes are required—(1) A small pocket-cup of indiarubber or leather; (2) a large cup to hold a quart or more. The latter can be obtained in Geneva, made of leather, and of the same pattern as the small folding leather drinking-cup called in Switzerland a "bateau." One of these large cups was many years ago dubbed *dampfschiff* by Melchoir Anderegg, and the name has been generally applied by mountaineers to all large drinking-cups. "This is the only instance where a slang term has been applied to any of the 'fixings' of mountaineering." * The best of all dampfschiffs are those made of rubber. They can be bought at many of the indiarubber shops under the name of Alpine or Arctic drinking-cups: Pontifex is recommended as a maker by the Equipment Committee. These, when new, impart a flavour of indiarubber to their contents, and they should be treated with coffee, as already recommended in the case of gourds.†

A wooden or horn *spoon* is very useful to stir any mixture which may be put into the dampfschiff.

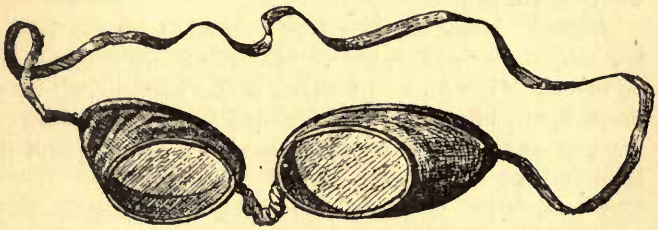
A *pocket-knife* for mountaineering must be strong, and should contain a long blade suitable for cutting bread, a corkscrew, a button-hook, and a thoroughly efficient tin-opener. This latter, at all events, ought to lock when open; and, if one is not accustomed to opening tinned meats, it is well to practise at home, as mountaineers engaged in the pursuit have often inflicted upon themselves very nasty gashes at times when they could ill afford to be maimed. A punch for boring holes in leather is a very useful adjunct, and a gun-pick "long enough to clean a pipe" ‡ will be found serviceable to smokers. Metal handled knives are preferred by many, and it is always

* "Pioneers of the Alps," p. 73. † See p. 183.
‡ "Equipment for Mountaineers," p. 10.

best to carry a knife attached to a string or chain, lest it be left behind after a meal. It is wise, however, to take out an extra knife in case of accident or loss.

Tin-opener. A heavier tin-opener than that in the knife may be recommended for use in huts and camps.

Tinted goggles are needed while on the snow,* and a neutral tint is the best colour. Two pairs at least should be taken; for, although cheap substitutes can be obtained



SNOW GOGGLES.

at most Alpine villages, they are in many respects inferior to those made in England. The rim of the metal which touches the skin should be bound with velvet, and the nose bridge should be made of, or covered with, the same material. Very good goggles are sold by Silver and Co., and mountaineers are recommended to get them there, as many opticians have given up keeping them in stock, and endeavour to palm off a more expensive article in a steel spectacle-frame as being "what is now generally worn." Goggles can be packed or carried in the pocket in tin boxes made to hold them, but they are often carried on the hat as already mentioned.†

Masks to prevent sunburn are worn by some; and the woollen ones made by the Jaeger Co. are recommended.

* See p. 147. † See p. 169.

A *telescope* or *field-glass* is a useful and delightful companion in the mountains. The former is preferred by most as, weight for weight, greater magnifying power is obtained. If you take one at all, take a good one. First-rate instruments are sold by many opticians and the "Lovat Telescope" (£4 10*s*.) made by Ross and Co. of Bond Street, and protected by a metal case, is suited to the rough treatment to which the exigencies of climbing will render it liable.

Aneroid. Many climbers take aneroids to Switzerland; few carry them up mountains. Mr. Whymper's monograph on the use of the Aneroid * shows pretty conclusively that much time and attention are needed to make the instrument of any real service in determining heights; still it is an amusing toy in bad weather.

A *clinometer* is useful for measuring angles, and *photographic apparatus*, *drawing materials*, and botanical or geological *collecting apparatus* will be taken by those who are able to make use of them. Several *linen bags* of various sizes to take loaves of bread, candles, and other articles, are preferable to paper for packing in the sack. Each bag should be labelled. Similarly *oiled-silk* or *jacanette bags* for sugar, prunes, raisins, or biscuits, are very useful, and a vulcanite *butter jar* with a screw lid, made by Silver and Co., is a great improvement on the glass tumblers generally used for carrying butter or honey. A small *wooden box*, also with a screw lid, is useful for salt.

Tents, *sleeping-bags*, and *cooking outfits*, are needed by mountaineers visiting districts where the expeditions are long and where huts or refuges are wanting. These are fully described in the equipment report already alluded to,†

* "How to use the Aneroid Barometer." 1891.

† pp. 17 and 25.

and the two forms of tent recommended, the "Whymper" and the "Mummery," are made by Benjamin Edgington. The latter is most likely to be useful to climbers in the Alps; the former to explorers in ranges beyond the confines of civilization. Beginners are hardly likely to require a tent during their first season or two; and as, by the time they think of buying one, they will assuredly have possessed themselves of the document referred to, it is unnecessary to say more on the subject here. The same remark applies to sleeping-bags and cooking apparatus.

Provisions.

Tinned meats, jams, fruits and soups, Kola biscuits, and chocolate.

One of the most marked changes which the last ten years has wrought in the habits of the average mountaineer relates to the provisions he takes with him on the mountains. Instead of the dry "fleisch," tough fowls, and sloppy honey, it is now very usual to rely largely upon potted meats and English-made jam, put up in small tins. To my own mind the modern plan is as superior from a gastronomic, as from an economical, point of view.

Tinned meats may be bought at home, or in any of the large Swiss towns; but no duty is charged by either the French or Swiss Governments,* and many English firms supply very good meats in great variety, both in sixpenny and shilling tins. Crosse and Blackwell, and the Cunningham and De Fourier Co.,† are good makers, and a

* I believe this statement is correct: it is certainly true of a few dozen tins taken as personal luggage.

† The preparations made by these firms must be ordered through a grocer.

preparation made by the latter under the name of "sardine paste," may be specially noticed as appetising. Fortnum and Mason also sell excellent tinned provisions.

Southwell's *jam* is packed in four-ounce tins, and sold at 2*s.* 3*d.* the dozen. It can be bought from Jackson and Co., next door to the Egyptian Hall, and should be ordered a short time before it is required, as this will ensure the supply of freshly made jam. It should be specially mentioned that the tins are to be soldered. Tinned peaches, apricots, or pears, are very acceptable; and, if a porter who is not overladen, be employed, there is no reason why such luxuries should not be taken to huts or on short excursions.

Soups, for use in huts and camps, will probably form part of a climber's luggage; and, if the self-cooking soups sold by Silver are taken, they can be used also upon the mountain-side,—the only objection to them being their weight. More portable soups are made by Lazenby and others; and pea-flour, put up in tins, is a useful addition to soups made from Bovril, Brand's essence, or other meat extract. It is well to pay attention to the directions given with the various sorts of condensed soup, as some require soaking in cold water or other special treatment. It should also be known how much water to add to each packet or tin of soup.

Kola biscuits and chocolate can be bought at Silver's, and, as previously stated,* are useful in allaying hunger and keeping up strength when provisions have to be husbanded.

Medicines and *medical appliances.* These form a small but necessary part of a climber's outfit. In the preceding chapter the uses of some were discussed, but they must not be forgotten when dealing with the various articles a mountaineer should pack to take with him abroad. Some powder or ointment for treating and warding off sunburn;

* See p. 73.

cocaine solution for snow-blindness; some laxative and opium pills; a small bottle of chlorodyne; and perhaps a few other simple medicines; plasters, a bandage or two, some cotton wool, and a small bottle of flexile collodion, will be found to meet all ordinary requirements. Burroughs, Wellcome and Co. have made up, at Mr. Dent's suggestion, two tabloid cases containing all that mountaineers are really likely to want.* The smaller case is called the "Alpine Emergency Case" (price 21*s.*), the larger, the "Mountaineer's Pocket Case" (price 30*s.*): they must be ordered through a chemist. Those who take bottles, powders, or ointments loose, are recommended to carry all of them in boxwood cases with screw lids. Some ointments—toilet lanoline, for instance—can be obtained in collapsable metal tubes.

List of Addresses.

Albion Iron & Wirework Co., Red Lion Street, E.C.—Crampons.
Almer, Ulrich, Grindelwald, Switzerland.—Boot-nails.
Buckingham, J., 194, Shaftesbury Avenue, W.C.—Rope.
Burroughs, Wellcome & Co., Snow Hill Buildings, E.C.—Medical Pocket Cases, Toilet Lanoline in tubes.
Crosse & Blackwell, 20, Soho Square, W.—Tinned Meats, etc.
Carter, J., & Co., New Bailey Street, Salford, Manchester.—Ice Axes.
Carter, Jas. S., 16, South Molton Street, W.—Boots, Gaiters, Rücksacks, etc.
Cunningham & De Fourier Co., 2, Duncan Street, Leman Street, S.E.—Tinned Meats, etc.
Curtis, 48, Baker Street, W.—Chemist, Pasma, etc.
Edgington, B., 2, Duke Street, London Bridge, S.E.—Tents.
Fortnum & Mason, 181, Piccadilly, W.—Provisions.
Hennig, 26, Coventry Street, W.—Ice Axes, Lanterns, Compasses, etc.

* "Equipment for Mountaineers," p. 31.

Hill & Son, 4, Haymarket, W.—Ice Axes, Lanterns, Compasses, Boot Screws, etc.

Jackson, R., & Co., 172, Piccadilly, W.—Potted Meats, Soups, and Jams.

Jaeger Co., 3, Princes Street, Cavendish Square, W.—Anklets, Slippers, Gloves, Gaiters, Caps, Boots, Sleeping-bags, etc.

Lazenby, E., & Sons, 18, Trinity Street, S.E.—Soups and other goods.

Macdougal & Co., 42, Sackville Street, W.—Shetland Jerseys, Stockings, Anklets.

Pontifex, J. H., 4, Holden Terrace, Victoria Street, S.W.—Drinking Cups and other Rubber Goods.

Respaut, Marcel, Successeur, Olette, Pyrénées-Orientales, France.—"Gourdes en peau de bouc."

Ross & Co., 112, New Bond Street, W. (Opticians).—Telescopes, etc.

Silver & Co., 29, Old Bond Street, W., and 67, Cornhill.—Gourds, Goggles, Rücksacks, Lanterns, Sleeping-bags, Soups, Kola Biscuits, etc.

Stanford, E., 27, Cockspur Street, Charing Cross, S.W.—Maps and Guide-books.

Luggage and Sundries.

Hitherto the present chapter has dealt exclusively with articles directly connected with mountaineering. It remains to say a few words on matters more concerned with travel generally. The clothes taken to wear when not climbing will differ somewhat according to the plan of tour contemplated, and a rather more extensive wardrobe may be thought needful when a crowded centre is chosen as head-quarters than what would suffice for a stay at a primitive and secluded village. In any case the selection of garments should be made with due regard to the extremes of heat and cold liable to be met with, and the luggage should be such as to admit of ready transit by mules or porters. Gladstone-bags, kit-bags, canvas sacks, and hold-alls, are the most generally useful forms of luggage; but, if port-manteaus are desired, it is better to take two small ones,

rather than one of larger size. Extra boot-laces, some string of various strengths, and other little odds and ends will occur to most, and smokers are not likely to forget their pipes, tobacco, vestas and fusees. A box of fusees or an English pipe are little things much prized by guides, and some odd ones may be taken for presents: the best pipes are those with covers. A small bath-towel takes up but little room, and is a great comfort; and a few books, a pack of cards, and a pocket chess-board, will be found useful on wet days. It is always wise to travel with a passport, and one's cheque-book should not be forgotten. The appended list is based on one which has been in use for years, and found useful to run over before starting, so as to make sure that nothing has been left out. Items not wanted can be crossed out, and others added in the vacant space, to suit individual requirements.

PACKING LIST.

Travelling Clothes.
Travelling Cap.
Overcoat.
Waterproof Coat.
Linen Shirts.
Underclothing.
Pyjamas.
Socks.
Boots.
Slippers.
Handkerchiefs.
Comb and Brush.
Soap and Soap-box.
Sponge and Sponge-bag.
Razors and Strop.
Shaving Brush.
Shaving Soap.
Tooth-brush and Powder.
Scissors.
Clothes-brush.
Air Cushion.
Bath Towel.

Climbing Suit.
Flannel Shirts.
Knitted Waistcoat or Jersey.
Stockings.
Gaiters.
Knitted Anklets.
Climbing Boots and Trees.
Rubber Shoes.
Slippers.
Climbing Hat and Guard.
Climbing Cap.
Climbing Gloves.
Felt Soles.
Muffler.

Knapsack or Rück-sack.
Gourd.
Flask.
Dampfschiff.
Pocket-cup.
Horn Spoon.
Tin-opener.
Bags for Provisions.
Ice Axe.
Rope.
Spare Rope.
Lantern.
Candles.
Goggles.
Knife.
Boot Laces.
String.
Sling for Axe.
Chain for Gaiters.
Wire Cutters.
Boot Nails.
Crampons.
Compass.
Aneroid.
Telescope.
Clinometer.
Camera, etc.
Collecting Apparatus.
Tent.
Sleeping-bags.
Cooking Kit.

PACKING LIST.

Tinned Soups.
Tinned Meat.
Tinned Jam.
Tinned Fruits.
Kola Chocolate.
Acid Lemon Essence.

Passport.
Money.
Cheque Book.
Books.
Guide-Books.
Paper-Knife.
Maps.
Map Case.
Playing Cards.
Chess Board.
Drawing Materials.
Note Book.
Writing Paper.
Visiting Cards.
Pens and Pencils.
Ink
Blotting Paper.
Labels.
Sewing Materials.

Ointment.
Dusting Powder.
Cocaine Solution.
Medicines.
Flexile Collodion.
Cotton-Wool.
Lint.
Bandages.
Plasters.
Safety-Pins.

Pipes.
Pipe Cleaners.
Tobacco.
Cigars.
Cigarettes.
Fusees.
Vestas.

ALPINE GLOSSARY.

After each term the language to which it belongs, or from which it is derived, is placed within parentheses. In the case of terms having a general, as well as a special meaning, the latter alone is given in this glossary.

ABFAHREN (German). To glissade.

ABGESCHNITTEN (German). Cut off. "Wir sind abgeschnitten" is a phrase used by German-speaking guides when they reach a spot on the descent from a peak or pass, from which further progress seems to be impossible. Often used with regard to rock precipices, but also as regards huge unbridged crevasses.

ABHANG (German). A slope.

AIGUILLE (French). A pointed peak, whether of snow or rock.

ALP (German). Mountain pastures. Never used of a peak, unless of one which takes its name from the pastures at its foot.

ÄLPLER (German). One of the cheesemakers or herdsmen, who inhabit the huts on an Alp in summer.

ARÊTE (French). A ridge; specially one of the main ridges of a peak.

AVALANCHE (French). A mass of ice or snow which is sliding or falling down towards the valley; used also of the remains thereof. More rarely used of a fall of rocks.

BAITA (Italian). A shepherd's hut or shelter; even a cave in the rocks.

BALM (German). A cave in the rocks.

BALME OR BAUME (French). A cave in the rocks.

BERGSCHRUND (German). An important variety of crevasse, viz. the large crack at the point at which the steep upper ice or snow slopes join the lower névé or glacier. A Bergschrund is almost always both broad and long, and its upper edge is often considerably higher than its lower edge.

BEWIRTHSCHAFTET (German). This term is used of a Club-hut which is inhabited during the summer by a caretaker, who supplies provisions, wood, and lodgings. A hut thus inhabited is on its way to become a small mountain inn. Common in the Eastern Alps.

BLATTE, in the plural BLATTEN (German). This is the patois pronunciation of Platte, which see.

BRÈCHE (French). A narrow gap in a ridge. Often used as Col.

CABANE (French). Club-huts are so called in the Mont Blanc range: in other parts of the French Alps this name is replaced by "Refuge."

CACHE (French). A hiding-place where lantern or provisions are left on the way up a peak, to be picked up on the way down.

CAIRE (French). A name given in the Maritime Alps to certain peaks.

CAIRN (English). A pyramid of stones, built in order to mark a summit, a doubtful point on a route, or a cache.

CALOTTE (French). A snow cap, or dome. Specially used of Mont Blanc.

CANALONE (Italian). A couloir, or gully.

CHEMINÉE (French). A steep narrow gully in the rocks.

CHIMNEY (English). Same meaning as Cheminée.

CIMA and CIMON (Italian) or CIME (French). A peak, specially if rounded.

CLAPIER (French). Same meaning as Geröll: the nearest English equivalent is Screes.

CLUB-HUT (English). Same meaning as Clubhütte.

CLUBHÜTTE (German). A hut built by one of the foreign Alpine Clubs for the use of travellers. It is sometimes "bewirthschaftet" (see that term). Members of the Club to which the hut belongs generally have a prior right to occupy it, but all travellers and guides are allowed to make use of it, generally without paying any fee. Sometimes the hut is kept locked, the keys being deposited at the nearest village, or given to the local guides; but they are generally lent to *bonâ fide* travellers.

COL (French). A pass. The term is often wrongly applied nowadays to any gap in a ridge, without regard to its accessibility on either side; but, strictly speaking, the essential point in a Col is that it can be made into a pass, even though a difficult one.

COMBE (French). A lateral glen.

CORNICE (English). This term has two meanings:

(*a*) A mass of snow or ice, which projects from a ridge, thus overhanging the slopes below it.

(*b*) A narrow rock ledge.

CORNICHE (French). Same meanings as Cornice.

COULOIR (French). A gully or furrow in a mountain side. It is sometimes filled with ice or snow, and is almost always more or less exposed to falling stones or ice.

COUPÉS (French). The phrase "Nous sommes coupés" is the equivalent, in the mouth of a French-speaking guide, for the "Wir sind abgeschnitten" of his German-speaking colleague. (See under A.)

CRAMPONS (French). Climbing-irons (the old English name is Cramp irons); specially those worn on the feet.

CRASTA (Romansch). A crest or ridge.

CREPACCIO (Italian). Same meaning as Crevasse.

CRÊTE (French). Properly means the crest of a ridge, though often used of ridges generally.

CREVASSE (French). A rent, crack, or hole in a glacier.

CRODA (Italian). A term used in the Dolomites for rock; *e.g.* "croda morta," means rotten rock.

DAMPFSCHIFF (German). A large collapsable drinking-cup is so called in Alpine slang.

DENT (French). A rocky tooth or peak.

DÔME (French). A rounded snow summit.

EISBEIL (German). Ice-axe.

EISRINNE or SCHNEERINNE (German). A gully or couloir, filled with ice or snow respectively.

ENGE (German). A narrow passage along rocks; specially used of two such passages near Grindelwald.

FACE (English). A mountain side.

FELSABFALL (German). A fall of rocks and the remains thereof.

FELSABSTURZ (German). Same meaning as Felsabfall.

FENÊTRE (French). A narrow gap or window in a ridge.

FERNER (German). The name given in the Eastern Alps to a glacier-clad mass of mountains.

FEST (German). An exclamation meaning that the speaker has good handhold or foothold, or both.

FIRN (German). Same meaning as Névé, which see.

FLÜH (German). A cliff or precipice. Specially used of smooth rock faces overhanging roads, villages, or huts.

FÖHN (German). A hot, south wind: it sometimes blows with great force for two or three days at a time.

FRUITIER (French). A cheesemaker on the mountain pastures.

GABEL (German). Applied to a deeply-cut notch in a ridge, by reason of its resemblance to a fork.

GENDARME (French). Used in Alpine slang for a rock tower or tooth on a ridge, apparently barring the way.

GERÖLL (German). Stones (not being great boulders) which cover a slope. Much the same meaning as Clapier and Screes.

GÎTE (French). A bivouacking place.

GLACIER (French). The outflow of the Névé or Firn, which is pressed into ice and forms ice-streams in the valleys and hollows of high mountains. Strictly speaking the term *glacier* is only applicable below the snow-line; * but as "snow-covered glaciers" are constantly spoken of, the term "naked glacier" has been used in this book for that portion of a glacier which is not snow-covered.

GLACIER-TABLE (English). A large flat stone supported on a column of ice. The ice below the stone has been protected from the sun's rays, and has consequently not melted, while that around it has.

GLETCHER (German). Same meaning as glacier.

GLETSCHERABFALL (German). An avalanche produced by the fall of a great fragment of ice from a glacier; and the remains thereof.

GLETSCHERABSTURZ (German). An icefall.

GLISSADE (French). The mode of sliding down snow slopes adopted by mountaineers.

GRABEN (German). A ravine swept by falling snow or rocks. It is generally the bed of a wild mountain torrent.

GRAT (German). A ridge.

GRIFF (German). Handhold or foothold.

HANGING GLACIER (English). A glacier (generally small) which is stuck on to the face of a mountain. It is independent of any other glacier, though falls from it generally come to rest upon some larger glacier below.

HEISSE PLATTE (German). A patch of bare rock, in the midst of an icefall or of a steep ice or snow slope, over which avalanches constantly fall.

HOMME DE PIERRES (French). Cairn.

HORN (German). A peak.

HÜBEL or HÜGEL (German). A hillock, whether of earth or snow.

* Tyndall, "Forms of Water" (8th Ed.), p. 49.

ICEFALL (English). A much torn and crevassed portion of a glacier, due to a steep slope in the rocky bed on which it rests.

JOCH (German). A pass; its original meaning being yoke.

KAMM (German). A ridge or comb.

KAR (German). A Tyrolese name for a ravine or hollow.

KEES (German). A Tyrolese term for a glacier.

KLUFT (German). A crevasse.

KOFEL (German). A Tyrolese term for a rounded peak.

KUGEL (German). A rounded or flattened summit.

LAUINE or LAWINE (German). An avalanche.

LIMMI (German). A patois word used for a pass in the Gadmen valley.

LÜCKE (German). A gap in a ridge which is, or may become, a pass.

MASSIF (French). A group of mountains.

MORAINE (French). Stones and débris brought down by a glacier. These accumulations bear different names according to their position. "As the glacier moves downwards, it carries with it the load deposited upon it. Long ridges of débris thus flank the glacier, and these ridges are called *lateral moraines*. Where two tributary glaciers join to form a trunk-glacier, their adjacent lateral moraines are laid side by side at the place of confluence, thus constituting a ridge which runs along the middle of the trunk-glacier, and which is called a *medial moraine*. The rocks and débris carried down by the glacier are finally deposited at the lower extremity, forming there a *terminal moraine*." *

MORÄNE (German). Same meaning as Moraine.

MOULIN (French). This term is applied to the circular shoot or hole produced by the rush of a stream from the surface of a glacier to the rocky bed beneath. The water gradually enlarges the shoot, which, in its origin, was simply a small crack in the glacier.

MÜHLE (German). Same meaning as Moulin.

NÉVÉ (French). "The French term *névé* is applied to the glacial region above the snow-line." † It forms the reservoirs which feed the lower glaciers. Practically *névé* is hardened snow.

OMETTO (Italian). Cairn.

OUILLE (French). A patois form of Aiguille, found in parts of the Western division of the Graian Alps.

PALA (Italian). A term used in the Dolomites for summits which are supposed to have rounded tops.

* Tyndall, "The Glaciers of the Alps," p. 263.

† Tyndall, "Forms of Water," p. 49.

PICKEL (German). Ice-axe.

PIGNE (French). A ridge or comb.

PIOLET (French). Ice-axe.

PITCH (English). A short, steep cliff, or projecting mass of rock in a gully or chimney, which cuts it into two parts, upper and lower.

PITON (French). A ringed iron nail sometimes used by mountaineers (described on p. 181).

PIZ (Romansch). A peak.

PLAQUES (French). Smooth slabs of rock.

PLATTE, plural PLATTEN (German). Same meaning as Plaques.

PYRAMIDE (French). Cairn.

RANDKLUFT (German). Another name for Bergschrund.

RIB (English). A minor or secondary rock ridge.

RINNE (German). Couloir.

REFUGE (French). Club-hut, in all parts of the French Alps save the chain of Mont Blanc.

RIFUGIO (Italian). Club-hut, in all parts of the Italian Alps.

RIMAYE (French). A name sometimes given to a crevasse, but generally confined to a Bergschrund.

ROCHES MOUTONNÉES (French). Glacier-polished rocks, rounded, like sheep's backs.

ROGNON (French). A rounded rock.

ROTURE (French). An old-fashioned name for a Bergschrund.

RÜCKSACK, also written RUCKSACK (German). A loose bag, which many prefer to an ordinary stiff knapsack; adopted from the Tyrol.

RUTSCHEN (German). To glissade.

RUTSCHPARTIE (German). A glissade.

SAND-CONE (English). A small cone of ice, which is covered by small stones and débris: it results from the protection afforded by the said débris against the sun's rays, while the ice around has melted.

SATTEL (German). A saddle or pass.

SCHARTE (German). A pass, or notch in a ridge.

SCHLAFPLATZ (German). A bivouacking place.

SCHNEEWACHTE (German). A snow cornice.

SCHRITT (German). A step, in the sense of a pace, or of a step cut.

SCHRUND (German). A crevasse.

SCREES (English). A slope of small loose stones.

SENN or SENNER (German). A cheesemaker on one of the mountain pastures.

SENNHÜTTE (German). The hut inhabited by a Senn during the summer.

SÉRACS (French). Towers or pinnacles of ice in an icefall. The name comes from the appearance of cheese in one stage of its manufacture.

SNOUT (English). The lower end of a glacier.

SNOW-LINE (English). "There must exist a line where the quantity of snow which falls *is exactly equal* to the quantity annually melted. This is the *snow-line*."* The term is often used conventionally, and somewhat indefinitely.

SPALT or SPALTE (German). A crevasse.

SPITZ or SPITZE (German). A peak in general, but often limited to its highest point.

STAFFEL (German). A terrace or plateau on an alp. The Unter, Mittel, and Ober Staffel huts on a mountain pasture are those used seriatim in the upward progress of the cows during the summer, the names indicating the relative height of each.

STEIGEISEN (German). Crampons.

STEINMANN, in the Eastern Alps generally STEINMÄNDL (German). Cairn.

STUFE (German). A step on an ice or snow slope.

STUNDE (German). The distance which can be covered in an hour by an average walker; about three miles on the flat.

SUB-ALPINE (English). An adjective referring to the Alps below the snow-line.

TAUERN (German). A pass over the main ridge of a group of mountains.

THOR (German). A pass.

THÖRL (German). A pass over a lateral ridge of a group of mountains.

THURM (German). A Gendarme.

TOUR (French). A Gendarme.

TRAVERSE (English). This term has two meanings as a verb, and one as a noun.

(*a*) To cross a mountain slope horizontally.

(*b*) To ascend a peak by one route, and descend by another.

(*c*) A place where a mountain face is "traversed."

TRAVERSIEREN (German). Same meanings as Traverse (*a* and *b*).

TOBEL (German). A ravine like a Graben, but on a larger scale.

* Tyndall, "Forms of Water," p. 49.

TRITT (German). A step in the sense of a pace: also applied to a low rocky barrier or terrace, such as is often found between the snout of a glacier and the floor of a valley, *e.g.* the Tschingeltritt.

UEBERHANG (German). A cornice.

UJA (Italian). Aiguille.

VARIATION (English). A modification of a route previously taken by another party, but not sufficiently distinct to be reckoned itself as a new route.

VERGLAS (French). A thin film of ice which glazes rocks. It is due to the freezing of trickling water or recent rain, and is one of the most treacherous and dangerous enemies of the climber.

VIRE (French). A winding rock ledge.

WALL (English). A steep slope or cliff of ice, snow, or rock.

WAND (German). Same meaning as Wall.

WEILER or WYLER (German). A small hamlet of a larger village.

ZINNE (German). A pinnacle, or pointed rock peak.

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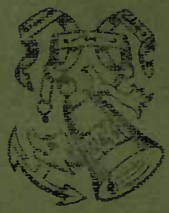
G. BELL  & SONS