

THE  
ALPINE JOURNAL:

A RECORD OF MOUNTAIN ADVENTURE

AND

SCIENTIFIC OBSERVATION.

BY MEMBERS OF THE ALPINE CLUB.

EDITED BY H. B. GEORGE, M.A.

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THE  
ALPINE JOURNAL.

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MARCH 1863.

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INTRODUCTORY ADDRESS.

THE amount of geographical and other information acquired during each summer by members of the Alpine Club, is felt to be worth making known more generally than by means of the papers read at their monthly meetings. It has, therefore, been resolved to establish a Journal, which shall not only give an account of their actual proceedings, but also contain other matter relating to mountain explorations, and thereby to extend to all members of the Alpine Club, and to the public in general, advantages which have hitherto been enjoyed only by those able to attend regularly the meetings of the Club.

It is intended to report all new and interesting mountain expeditions, whether in the Alps or elsewhere; to publish all such new items of scientific and geographical knowledge as can be procured from the various available sources; to give some account of all new books treating of Alpine matters, and, generally, to record all facts and incidents which it may be useful to the mountaineer to know. The Club being responsible for a Journal published under its direction, all the narratives inserted will

be written by members ; but a section devoted to 'Alpine Notes and Queries,' which, it is hoped, will prove a most useful portion of the Journal, will be open to all persons interested in the matters with which we concern ourselves.

It may, perhaps, be thought rather late to commence the publication of an Alpine Journal when so many of the great peaks of Switzerland have been already climbed, and the successful expeditions described. But we can assure the most sceptical reader that the Alps are not nearly exhausted, even by the many new ascents of last summer, of which we are now recording the first instalment. The number of persons who know the mere name of the highest mountain in the great Dauphiné group may be reckoned by tens ; and many peaks, that would be considered first-rate but for the proximity of such neighbours as Mont Blanc and the Weisshorn, are as yet untried ; while, even if all other objects of interest in Switzerland should be exhausted, the Matterhorn remains (who shall say for how long ?) unconquered and apparently invincible. Moreover, the Himalayas, which are daily becoming more accessible to enterprise, offer an unlimited field for adventure and scientific observation, not to mention the numerous ranges in all parts of the world which the Englishman's foot is some day destined to scale. With all these sources from whence to derive a constant supply of narrative and of valuable knowledge, we may defer the prospect of the starvation of the Alpine Journal, for want of matter whereon to feed, to some date beyond the scope of our calculations.



THE ASCENT OF MONTE DELLA DISGRAZIA, height 12,074 feet. Read February 3, 1863, before the Members of the Alpine Club. By EDWARD SHIRLEY KENNEDY, M.A., F.R.G.S., President of the Alpine Club.

AS the strokes of midnight were clanging from the Campanile at Sondrio, a carriage rolled heavily into the court-yard of the Hotel della Maddelena; and five belated travellers, who had left Lugano by the mid-day steamer, thus brought to a simultaneous conclusion their day's adventures on flood and fell, and their tedious drive along the nearly level lacustrine formation, that, watered by the stream of the Adda, extends from the present head of Lake Como as far as the town of Tirano. The party consisted of the Rev. Isaac Taylor, the Rev. Leslie Stephen, with his trusty Oberland guide Melchior Anderegg, myself, and Thomas Cox, an English servant. Our energies were partly devoted to the elucidation of matters of antiquarian and geological interest; but while ethnology and physical science claimed their due, another and a mightier attraction existed; we had an unascended peak in contemplation, and what mountaineer can resist the charms which such an object presents?

On the morning of Tuesday, August 19, 1862, we left the hotel, and strolling leisurely under an Italian sun up the Val Malenco, reached Chiesa about one o'clock. We chose this village as our starting point, because it appeared to be the nearest inhabited spot to the mountain, and because the account published by Mrs. Henry Freshfield, who had passed two or three days there, told us that decent accommodation nominally existed. Having rested a short time, and ordered dinner for six o'clock, we proceeded to make a preliminary survey. Three or four weeks' previous mountaineering had put us in good training, and after a few days' sojourn in the neighbourhood of the Italian lakes, the mountain air was more than usually bracing. As we rapidly climbed the hill-side, we gained new strength, and our chests expanded to welcome the freshening breeze. How free and exultant is the true mountaineer, when he exchanges the warmly-glowing atmosphere of the south for the cold and invigorating blasts of the mountain; when he leaves behind him the gentle beauty of the lakes, and glories in the savage grandeur of riven rock and contorted glacier. Taylor, whose time was limited, and who had other objects in view, did not share our elevated aspirations, and after accompanying us the greater part of the climb, he asseve-

*Ascent of Monte della Disgrazia.*

rated, with some truth, that the accumulating clouds would make observation impossible, and thinking it, therefore, useless to proceed farther, contented himself with a sheltered nook under a finely moutonné'd rock.

And now, seated upon the slopes of Monte Nero, at a height of some 8,000 feet, we begin, with telescope in hand, to take a survey of our mountain. Hitherto little had been visible, but a series of needle-like peaks now appeared, rising abruptly from Chiesa in the south-east, and running thence in a north-westerly direction.



Melchior's eye is fixed to the telescope, and we have time to cast our glance carefully around. We are looking in a south-westerly direction. Yonder is the Disgrazia, her culminating point, a maiden citadel, defying attack, proudly piercing upwards above every lesser fortress in the chain, and, as if resenting our intrusive gaze, shrouding herself from time to time in rolling clouds. In advance of her, and at an elevation nearly level with our eye, is a formidable outwork of massive bulwarks and beetling rocks, that springs from the brow of frowning precipices. Round the bases of these

craggy battlements there winds the Val Malenco, forming, in its circular sweep, with the Disgrazia as a centre, the vast moat that encloses this grand natural fortress. Two modes of assault suggest themselves. To ascend rapidly directly from Chiesa, and then force our way onwards up steep ice-slopes and ridges, in nearly a straight line, and thus take the citadel by storm; or to follow the moat of the Val Malenco, in a westerly direction, and thus, while gradually rising, to keep nearly at the same distance from the summit, in the hope of eventually reaching, by less steeply-inclined glaciers, the foot of the final peak; and thus achieve a triumph by the slower but surer mode of gradual approaches.

‘Now, Melchior, you have been looking through that telescope quite long enough; what have you to say?’

‘Herr, I think the way straight up from Chiesa is the best.’

‘But, Melchior, suppose we get up those steep rocks, and find ourselves at the edge of the snow-fields, how are we to climb those hanging glaciers and cross those wide crevasses?’

‘*Es ist etwas schwer*, Herr, but I think we can succeed.’

‘Besides, Melchior, we shall get entangled in that maze of peaks and ice-falls, and shall not be able to distinguish which is the highest point, so that after all, perhaps, our labour will be thrown away upon the wrong one.’

‘That is true, Herr, but *was denken Sie selbst?*’

‘Why, Melchior, even from here we cannot be sure which is the highest, and when we get among the peaks it will be still more difficult.’

Examination was now entirely put a stop to, for the clouds rapidly descended. Thus shut out from further view of external matters, we were compelled to attend to inward feelings, and unworthy thoughts of dinner would intrude themselves. We quickly ran down to Chiesa, still undecided as to plans for the morrow. We found the place alive with excitement. So novel to the Italian mind was the idea of an ascent, and so great the effect produced by the bare suggestion of such an impossible absurdity, that that mysterious individual, so well known to every mountaineer, that ubiquitous chamois-hunter, who infallibly makes his appearance whenever a new ascent is contemplated, and who, though he is not like a bird, and cannot be in two places at once, is yet popularly believed to present himself in Switzerland, in the Tyrol, and in the Engadine, at any spot, and at any moment when he is particularly not wanted: that wonderful chamois-hunter, on the present occasion, put on a duality, and two chamois-hunters, each of whom knew all about every thing, were announced.

A council was held. Present, the five travellers, the two chamois-hunters, and the landlord of the hotel, who, joking aside, was a host in himself. In fact we never discovered who the landlord was. The establishment appeared to be conducted upon the principles of a London joint-stock hotel—numerous proprietary, limited liability; for those who made every passage and every room resonant with a Babel of tongues swarmed around in countless numbers; while those who were ready to attend to the wants of the guests were limited in the extreme. As this wondrous host of hosts kept deploying itself before our bewildered gaze, analogies of evolution, of multiplication, of continued, not to say vulgar, fractions suggested themselves to the mathematical minds of our party. Whether the landlord were a knot of men, or a parcel of women, or a crowd of children, or an Italian bag-man who took especial interest in the welfare of the house, or a combination of all these motley groups, is a question that must for ever remain undetermined. Although the course of reasoning adopted by this two-fold Briareus—by this hundred-headed monster—was self-contradictory, the result was identical. Impossible was pronounced by a hundred tongues and in a hundred tones. Such was the opinion of the multitudinous landlord; but what say the mysterious chamois-hunters? They can take us safely to the foot of the glacier. ‘Good.’ They can do more. They will even undertake to conduct us across the glacier, or, at least, very nearly so; they are, in fact, almost equal to Mathews’ guide at Monte Viso; they will take us within sight of *le pied des rochers*. But to reach the foot of these rocks is too difficult; the glacier is much crevassed and very dangerous; the rocks themselves are perpendicular and absolutely impossible; while the peak itself, which springs from their summit, is frightful to contemplate. It rises straight upwards to a vast height, and in form exactly resembles a man’s finger. About this time the council, after the fashion of other and less important councils, broke up promiscuously.

At three o’clock in the morning of Wednesday, the day after our consultation, we started for the Disgrazia. Melchior Anderegg, with knapsack and lantern, led the way; I followed next; then came Thomas Cox, with the second knapsack; then Stephen. Although the stars were shining brightly, the morning was dark, and we had some little difficulty in finding our way along the rough and stony path that, following the course of the stream, gradually led us up the valley, which winds round the rocky promontory that forms the north-eastern

buttress of the Disgrazia. As we wound along the tedious valley, and made but very little ascent, Melchior knew that we were wasting the precious hours of the early morn, and he felt also that the unusually heavy responsibility of taking charge of three travellers, to say nothing of the weight of the knapsack that he carried, rested upon his single pair of shoulders. True it is, that long association had taught him that Stephen was a man more ready to assist than to impede in any difficulty, but with Thomas Cox and myself he had never made an excursion. Knowing the importance of time, we advanced rapidly, pausing but once, as dawn was stealing on, to admire those effects of light and shade, continued familiarity with which appears not to impair, but rather to enhance, the power of appreciating their beauty.

At six o'clock we passed the half dozen huts which constitute the village of Chiaraggio, and where rough sleeping accommodation for three persons can be obtained. We were rounding the western shoulder of the outlying buttress upon our left, and the valley up which we were advancing, and into which the great glacier from the Disgrazia range descends, was opening out before us, when behold the peak appeared. It is a glorious peak, rising right in front, from the top of a rocky escarpment, with broken ridges running sharply down from each side of the summit. Melchior was down on one knee, gazing through his favourite telescope. Stephen uttered sounds of disapprobation. 'Why waste time, Melchior, when we shall have better opportunities presently?' Onwards again. We could see the entire slope descending from the right of the peak, and as we advanced the near rocks on our left allowed us to see more and more of the left hand slope. A little further in advance, and the peak has become more isolated; another step forward, and the left hand slope, instead of continuously breaking away in a downward direction, made a re-entering angle, and began to rise again. 'Look, Stephen, that new slope to the left is rising very much, it is almost as high as the peak itself.' We still advance, the valley opening up at every step. 'Almost as high,' Stephen said; 'why, it is quite as high!' And soon, indeed, we find it towering up, far, far above what we had at first supposed to be the highest peak. As the valley opens, the slope still keeps rising to the left. We are now on the tip-toe of expectation. When will the summit appear? 'Look, there it is!' And truly, now, the peak cut sharp and clear against the sky; we were obliged sensibly to lower the line of vision when we looked at our first peak, and were delighted to find that the line of ridge culminated in the

new summit, and rapidly descended towards the left. We agreed that it was one of the finest peaks that we had ever seen, and that few had looked more difficult. Melchior's eye is again at the telescope. Stephen's murmurs grow more audible, and his language a shade stronger; but at length Melchior's examination is concluded. And now, hurrah for the ascent!

We are suddenly brought to a stand-still. No one speaks. We all point to the ridge. It is again rising towards the left. We go on. How high will it rise? Will it equal the last grand peak? No! There is a slight depression. It begins to sink again towards the left. Will it fall gradually away? No! It rises again! It equals the last peak! And now a broken line of jagged teeth, intermixed with masses of dazzling snow, pierces upwards in the deep blue vault of heaven. I think our first feeling was one less of admiration than of intense surprise. We had never anticipated a summit of so apparently great an elevation. The first peak exceeded our expectation, the second one necessarily far more so; and now, with an intense enjoyment, we contemplate a summit bathed in the morning light, and peerlessly towering aloft. We gaze in silence, admiration begins to blend itself with surprise, and a feeling that approaches reverential awe succeeds. No human being has placed his foot upon that peak, all gloriously radiant in virgin beauty; and as we recall the object of our excursion, an object that, in the first presence of such grandeur, the mind had wholly forgotten to grasp, a subdued hope gradually falls upon us that we shall succeed in the attempt.

We are now at the foot of the glacier; it is seven o'clock, and by the side of a clear streamlet we rest for breakfast. But still the conversation runs upon the course to be taken. Melchior has soon selected his line. *Forwärts! meine Herren!* Easy running in a south-westerly direction up the lower part of the glacier. Reach an ice-fall, rapidly climb an old lateral moraine to the north-west, and, without delay, take to the névé above. Here roped together for the first time; glacier exceedingly crevassed; Melchior dodges the intricacies with wonderful skill; axe in constant requisition; obliged to descend and ascend several crevasses, skirt warily along the edges of others, and at length reach the *bergschrund* at the foot of the rock and snow precipice. From below we had seen this wall *en face*, and consequently could not judge of its inclination. And we now found that it rose at a very steep angle, the ice and rock being coated with snow to a depth of about nine inches. We slowly ascend, sometimes

cutting steps, sometimes taking advantage of a foot-hold of rock.

At last we gain the ridge; there is just standing-room, and we gaze down into the valleys to the south and west. It is one o'clock, and we are all somewhat down-hearted; for we know, that if upon no other ground, yet upon that of want of time success is impossible. Stephen and Melchior propose to climb the ridge a short distance towards the left, and take an observation. I determined not to accompany them, because I knew that, without me, their progress would be more rapid. They were soon lost in the fog that had succeeded the beautiful morn, while Thomas Cox and I found ourselves by no means too warm, especially as the wind rose to a little gale, beating against us with flakes of snow and sharp bits of ice, while we, for want of space, were limited to the unsatisfactory exercise of stamping our feet upon the snow. In two hours Stephen and Melchior returned. They had reached the second peak, and reported that it was possible to descend thence on to a glacier, which, starting from the notch between the second and the highest peaks, flowed in a south-westerly direction into a valley upon the side of the chain, exactly opposite to that whence we had ascended; and that the grand peak appeared to be accessible from the head of the glacier. They reported also that it would be by no means difficult to ascend the glacier from the valley into which it flowed. I listened with chattering teeth and trembling limbs to their interesting recital, and wished myself safe back at Chiesa. We two were closely approaching the congealed and uncomfortable state of human icicles; and we resorted to the very unusual necessity of swallowing a mouthful or two of cognac.

And now for the descent. It looked very steep. The snow was softer, and the footing so much the more treacherous. At first we descended by the rocks, but soon took to the snow. We were all roped together, with a length of about 20 feet between each man. Stephen went first, Thomas Cox came next, I was the third, and Melchior Anderegg brought up the rear. Had there been broken rocks, or precipices, or ground of a dangerous character below us, we should have adopted those well-known measures, that reduce the risk of injury to an almost infinitesimal quantity: we should have descended in the most careful manner, with face to the snow-wall, holding on to the snow above either with axe or pole, and cautiously placing the toe at every step in the carefully-cut foot-hold beneath. But we selected a line of descent in which there were no dangerous crevasses, and which avoided all

projecting fragments of rock; and we knew that, at the bottom of the ice-wall, there was a bed of soft snow, although it is true that this bed was a long way beneath us. We therefore dispensed with those expedients, which, although they almost entirely prevent the chance of a fall, are yet the cause of great delay; and, turning our backs to the wall, away we went, digging our heels forcibly into the snow, occasionally sliding a short distance, and then bringing either ourselves or our neighbour up short whenever the slide threatened to become too rapid. Presently, Stephen called out, 'Hold tight, I must make a little slip; have I got rope enough?' Cox and I came close so as to allow sufficient rope, and while we leaned backwards and held on to the snow with our heels and our elbows, away went Stephen. He stopped some twenty feet below and managed to secure tolerable foot-hold. Cox followed his example, but in consequence of the rope being a little shorter between him and me, he jerked me downwards. Melchior, who was behind, pulled me upwards, an operation that, combined with the tension from below, placed me in the position of a captured turtle, with the unpleasant addition of a liability to severance into two equal parts. My legs and arms were in the air, my back being the only portion in contact with *terra firma*, or I should rather say with slippery ice. At this critical juncture, Melchior called out to me, '*Halten Sie fest,*' and he descended a couple of steps to enable me to recover my equilibrium. He was not aware of the strong pull upon me from below, so that immediately his hold was relaxed I dashed down the smooth and slippery course that the two others had formed. Stephen and Cox averted their gaze as a fellow creature rushed wildly past, but, unable to check him in his headlong plunge, they were almost instantly carried off their legs and hurled into the depths below. Entangled with the rope, and twisted, and tossed, and rolled over in every conceivable way, we were carried,

like a swarm of fire-flies,  
Tangled in a silver braid,

about 90 feet down the ice-slope, shooting in our course the *bergschrand*, across and over which we fell vertically some 20 feet through the air. A short distance below this *bergschrand* the human avalanche was arrested in the soft snow-bed that we had descried from above. Spectacles, and veils, and hats are scattered in every direction: cigars are destroyed, and pipes broken, and pockets, and shirts, and clothes, and ears, and noses, and mouths are filled with snow.



Regarded in a proper point of view, this little affair was a most fortunate occurrence, for it was the means of saving much valuable time, and was not destitute of enjoyment, inasmuch, as it afforded us a new sensation. Melchior came to our assistance, and then, picking up ourselves and our property, we went on our way rejoicing.

Rapidly over the glacier to the top of the moraine, where we unroped and enjoyed some food, then down the moraine, and with a short pause at our breakfasting place, onwards, past Chiaraggio. It soon became pitch dark, with heavy rain and thunder and lightning. We went blundering on, and frequently lost the path, but at such times Melchior's great skill displayed itself. He and Cox crawled over the rocks, until they discerned with their hands some symptoms of a track. True to his character, as Stephen's especial guide, Melchior continually stopped and shouted out to know if he were all right; and for a length of time, during which I could scarcely distinguish anything from nothing, Cox carefully led me over the broken ground. Finally, about midnight, and in miserable plight, we arrived at Chiesa; the seven o'clock dinner that we had ordered had been demolished by our hundred-throated host, who, convinced that we had all perished miserably, had retired to his beds in a contented frame of mind. Repeated knockings upon the door, with poles and axes, obtained admission. We swallowed some mulled wine, and dropped asleep.

In the morning the tops of the mountains were wrapped in clouds, heavy bodies of vapour clung sluggishly to the hill sides, and the streams, swollen with the rain which still fell continuously, sullenly chafed against their rocky banks. The out-door world was no inapt type of the frame of mind in which Stephen and I found ourselves. As to Melchior and Cox, they were still sleeping off the effects of yesterday's exertions. There we were, shut up in a wretched little inn, with no means of egress, save over some high pass, which the weather had rendered impassable, or else by the old route which we had followed two days previously, and which familiarity had rendered wearisome, while added to these causes for melancholy reflections, was the consciousness of yesterday's failure. However, after breakfast, we had to recount our adventures to a listening throng, and were obliged to comply with the request of the multiform landlord, that we would condescend to inaugurate a travellers' book. It appeared that the inn had hitherto been deficient in this useful appendage, and accordingly we duly entered our names, embellished the title page with an illustration, sketched from memory, of the Disgrazia range, and

accompanied this work of high art with suitable literary matter. Having ascertained that the second peak, the peak which Stephen and Melchior had ascended, was without a name, we ventured to christen it *Picco della Speranza*.

Our party was now diminished by one, for Taylor had taken the Muretta Pass into the Engadine, in order to secure a day for prosecuting his ethnological inquiries,—inquiries that have produced results which will, I hope, soon be brought before the public.

The weather soon brightened a little, we strolled slowly down to Sondrio, and again took up our quarters at our old Hotel della Maddelena; with the ultimate intention of ascending the valley of the Adda to Triano, and of thence taking the Bernina Pass to Pontresina. Much doubt existed as to future proceedings: whether up or down the valley of the Adda; whether give up the mountain, and, going on to Tirano at once, enjoy and explore fresh scenes; or whether, seeking out the valley we had descried lying to the south-west of the peak, make thence one more attempt.

About nine o'clock on the following morning, I was pacing the balcony of the hotel. The sky was cloudless, and a white mountain in the east, dimly blending itself with the distant haze, pointed encouragingly upwards. Again did the outer world harmonise with the spirit within; but yesterday's shade had passed away in the mantle of night, and the genius of the new day was hopeful and buoyant.

I held a consultation with the head waiter while Stephen was sleeping off previous fatigue, and when he appeared I was prepared with a proposition.

'It is a very hot day, Stephen; would you not like a ride?'

'Yes, I should. I dislike these straight, hot, dusty, in every way detestable Italian roads. I suppose we can have a carriage up the valley, at any rate as far as the foot of the Bernina Pass?'

'I suppose we can, Stephen; also, we can have a carriage down the valley to Morbegno.'

'No! I have been there once; I won't go along that odious road again.'

'But, Stephen, think of the beautiful vineyards, and Indian-corn fields that we shall see.'

'I hate beautiful vineyards, and I hate Indian-corn fields.'

'Also, Stephen, there is another beautiful valley that comes down to Morbegno at right angles to the high road, and near the head of this beautiful valley I find there is a "Grand Ancient Italian Bathing Establishment," at which 140 people of distinc-

tion dine daily at a magnificent *table d'hôte*; and, Stephen, if we start directly after breakfast, we shall be just in time.'

'I don't care, Kennedy. I hate "Grand Ancient Italian Bathing Establishments," and I hate 140 people of distinction, and I hate magnificent *tables d'hôte*, and I hate being just in time.

'Also, Stephen, near the head of this beautiful valley, is the foot of the glacier that runs up to a notch, not far from the summit of a certain mountain that you know; also, the carriage can wait at the "Grand Ancient Italian Bathing Establishment" until to-morrow evening, and can then bring us back to Sondrio.'

Two hours later we sallied out from the courtyard in a couple of cars, amid the tramping of steeds, the cracking of whips, and the shouts of the hangers-on of the hotel. In the first carriage were Stephen and I, driven by the head waiter, who appeared in person, as the *filz aîné de la maison*, and whose mother turned out to be one of the 140 persons of distinction who were imbibing nitrogenous salts at the bathing establishment. In the second carriage were Melchior and Cox, driven by a boy in blue, who had been specially impressed for the occasion. The head waiter was pleased with the prospect of seeing his parent, the boy in blue was delighted with his holiday, and we four were in high spirits at the prospect of another chance of attacking the Disgrazia. Altogether, we were a very cheerful, not to say an uproarious, party. Shortly before reaching Morbegno, we turned off to the right from the high road, and began the steep ascent of the Val Masino. The horses necessarily went at a foot's pace; nevertheless, the ride was not without its dangers. The boy in blue was the better driver, but even with him Melchior preferred trusting to his own legs for a portion of the way; our man, however, was evidently so much better acquainted with the functions of a waiter than with those of a charioteer, that we unfastened the apron in front, and were in readiness for a spring. The road was very narrow, the descent upon our left precipitous, and our only protection an occasional stone at the edge. Against these stones the near wheels of our carriage had a remarkable tendency to come in contact, and whenever one of these collisions occurred, the whip was brought into use with the double object of screening the driver's blunder and of restoring locomotion to our vehicle; and as the horse swerved from side to side, it appeared, upon each of these interesting occasions, about an equal chance whether the wheel would pass upon the outer or the inner side of the stone. If on the outer, the fragments of the carriage that might afterwards be collected would probably

be of a size suitable for stuffing those comfortable mattresses that are to be found in mountain châteaux.

All travellers who find themselves at Morbegno should give a few hours to the Val Masino. A clear trout-stream brawls along the rocky bottom of the valley; traces of glacial action are plainly perceptible upon the rounded surfaces of the rocks; an existent moraine, occasionally 20 feet in height, can be distinguished for several miles; and from the rugged peaks and ridges that bound the valley on each side there have fallen fragments of granite, that, exceeding 100 feet in height, are scattered about in wild confusion. We were unanimously of opinion that no valley with which we are acquainted surpasses the Val Masino in grandeur and in variety of natural beauty.

About four hours up the valley we came upon the cluster of houses that forms the village of S. Martino. At this point a valley opening up upon our right, in a north-easterly direction, disclosed at its head Monte della Disgrazia; but the car-road making a bend to the north-west, carried us in about twenty minutes to the bathing establishment. Our welcome was cold as the stream of the glacier; we were obviously not invalids, and all other classes of visitors were deemed unworthy of even nitrogenous salt. Of the existence of our mountain, everyone was placidly unconscious, and mountaineers themselves are a race so entirely unknown, that we were regarded as a species of *lusus naturæ*. The people of the bathing establishment could not undertake to call us in the morning, they could not let us have coffee earlier than six o'clock, and they could not find us a man to carry a lantern, and point out a path in the dark. At length a man was promised who would furnish a lantern, and who, though he did not know the path himself, knew some one who did. We then had a discussion with our head charioteer, who agreed to wait for us with the cars at S. Martino until six o'clock in the afternoon. We wished him to make the hour a little later, but he urged, and not without reason, that we could not be benighted on the mountain road without danger. After a more than usual amount of discussion, all our arrangements were complete, and we were glad of a quiet stroll to admire the scenery, and generally to explore the premises. We had not been misled as to the great extent of the establishment, and the varied nature of the occupations carried on in its vicinity. Mining, charcoal-burning, carpentry in all its branches, flourish here. We were attracted by the sounds issuing from a species of carpenter's shed, and discovered that this was the coffin department of the establishment. A coffin was then on the point of completion, and its

future occupant was at that moment lying dead in one of the apartments. Though we deemed the mortuary arrangements eminently satisfactory, and were satisfied that any unhappy eventualities of the morrow would be decently and promptly provided for, we declined to give any definite commission, but, cheered by our inspection, we returned with lively steps to our quarters, packed up our food for the morning, saw that our lantern was properly trimmed, and carried off everything to our bed-rooms.

At ten minutes before one on the morning of Saturday we were fairly under weigh. The stars were shining, but not so brightly as could have been wished, while the lofty rocks around us limited the scope of vision. Midway between the bathing establishment and the village of S. Martino, we met a company of travellers in two carriages, with men on foot carrying lights to guide the drivers. It was a funeral procession coming to carry away the corpse.

At the village of S. Martino our lantern-bearer woke up an old man, and, without a word of explanation, disappeared with him in the obscurity. We waited, but no one made his appearance. Our patience was becoming exhausted, so that even the taciturn Melchior gave vent to his pent-up feelings, and exclaimed, '*Ach! wie dumm sind diese Leute.*' The delay gave time to examine the state of the sky. Alas! every star had disappeared; there is a flash—it lightens—the distant thunder comes rumbling up the valley, while sparse but heavy drops begin to fall. We saw nothing more of our lantern-bearer, nor of the old man, his friend; and reached the establishment at half-past two, just as the rain was beginning to fall in heavy sheets. With difficulty we obtained admission, and, after wandering through the gloomy passages, encountered a dirty chambermaid without shoes and stockings, who informed us that we had given up our bed-rooms, and could not possibly have them again; that, in point of fact, they were occupied by the burial party and the corpse. Another half-hour's delay, and we found ourselves in other apartments, that had been hastily prepared.

The same day we breakfasted about ten o'clock, and after strolling about in dubious, not to say irascible, frame of mind, sent off Melchior and Cox to explore the mountain-path for a few miles, so that we might have no difficulty; and we determined, if the weather improved, to make one more trial; but if it continued unfavourable, to start off by the carriage in the afternoon, and to give up all further attempt. After the customary particularly light supper of the establishment, we once more turned in for the night.

The same day we were up soon after eleven, and at twenty minutes before midnight were once more *en route* for the Disgrazia. I am inclined to think that the feat we thus accomplished is almost, perhaps entirely, without precedent. We had got up, dressed ourselves, and fairly entered upon the day's work, three times in less than twenty-four hours, and between one midnight and the succeeding one. The work of the first day was completed in three hours; the work of the second day was completed in ten hours; while the work of the third day occupied, as it turned out, twenty-four hours for its completion. Under such circumstances the flight of time becomes very eccentric in its character, and one's notions are much confused.

We passed through the village of S. Martino without a pause, and steadily followed the track that had been explored by Melchior and Cox on the previous day—no, it was on the same day. It was quite dark, and we could not see. Thus it happened that we wandered too far to the left, and became entangled among rocks and streams. Clambering onward over rugged stones, stumbling over decayed pine trunks, and plashing through pools of stagnant water, we reached, just as day was breaking, a high alp; and there, sitting down upon some rocks, had our first breakfast. Mounting by rather a steep track the rocky rampart that appears to close the valley at its upper or north-eastern extremity, we entered upon that wild region of scanty vegetation that always intervenes between the spots used by man for the purposes of pasturage and the realms of snow and glacier; a region that, even to the experienced mountaineer, occupies an extent far less in appearance than it does in reality; a region wholly hidden from the traveller in the valley, and one regarded by Mr. Ruskin as the stage designedly prepared for the purpose of receiving the masses of snow and huge fragments of rock that fall from the peaks above, and of thus intercepting these missives of destruction in their passage towards the inhabited valleys beneath.

Having traversed this desolate space, and crossed some patches of old snow, we clambered up steep masses of rock hurled confusedly together, turning occasionally to throw a hasty glance upon the scenes we were leaving beneath. The eye followed the long course of the valley up which we had just walked, and fell upon the point at its extremity, whence the branch to the right led up to the baths, and that to the left, down to the high road of the Adda. We were almost level with the summits of the grand masses that enclosed these valleys, and being on the western or shaded side of the mountain, we were exactly in a position to receive with full effect, and in a direct line, the

reflected rays of the sun, and these revealed with perfect distinctness and in all its details a scene that was not more than fifteen miles distant. The wild confusion of jagged peaks interspersed with craggy precipices, with hanging glaciers, and with towering pinnacles was fully displayed in all its wild and savage grandeur. In ten minutes we turned again; we had overtopped the frame-work of this rugged picture, and now beheld towering up in the sky far above it, and directly behind it, at a distance of some eighty miles, the Monte Rosa range. The contrast was marvellous. With tints of wonderful loveliness, soft and subdued to a bluish white, with unbroken patches of shade, of a tone but slightly darker than the illumined portions, with each magnificent breadth, whether in sunshine or in shadow, of unvaried hue, there they were, the noble Weiss-Horn and the lofty Mischabel, reposing in calm majesty, and seeming to be borne aloft by the softened haze that encircled their base, and to be projected with their upper outline clearly defined against the deepest blue of the whole hemisphere. They appeared like some creatures of the sky that had no connection with things of earth: below them, below us, and now apparently at our feet, while the great space between the near and distant ranges was wholly lost, were the rugged and contorted masses that might well constitute the remnants of a battle field whereon had striven, with monstrous implements of war, the gigantic children of the Titan race. Familiar as most of us are with the magic effects of light and shade amid the Swiss mountains, we had never, I think, witnessed any colouring that surpassed the fascinating beauty of that scene.

The passage of a comparatively level piece of glacier brought us near the extremity of a ridge that terminates in the face of the upper glacier, and that, gradually becoming narrower, forms the line of separation of two glaciers that roll, one on each side, at some depth below. In effecting the transit from this ridge to the glacier, there occurs the only real *mauvais pas* in the whole excursion. I was much inclined to turn back and leave Stephen and Melchior to go on together, but they both remonstrated so strongly and so kindly, that I, very greatly to my future satisfaction, could not do otherwise than advance. Melchior's resources came out conspicuously. We are on a narrow ledge of rock interspersed with patches of fresh snow; there is just space for one foot before the other, with precipitous rocks rising on our right hand, and falling towards the glacier beneath, on our left hand. An insurmountable buttress bars our path. Melchior fastens both ends of the rope round his waist. We three stand, each of us, in the firmest position we can select,

and allow the doubled rope to pass through our hands as Melchior descends the side of the buttress, and gradually, with scarcely hold for finger or for toe, contrives to wind round its face. He is now about level with us, but out of sight, and he fastens one end of the rope to a jutting fragment of rock. We haul upon this part of the rope so as to tighten it all round the buttress, and then secure it to a projecting piece upon our side. Melchior returns, regains his footing by us, and unfastening the rope from his own waist attaches it to mine. The three then pay out the rope through their hands, while I have the double security, in case of a slip, of the rope which passes round the buttress, and which I grasp in my right hand, and the rope attached to my waist, that is held by the three above. Landed on the ledge on the opposite side, I disengage the rope, and the others pass in succession. Melchior is last, but even he cannot carry the poles and axes, he is therefore obliged to mount the buttress to a spot whence he can throw down these necessary implements one by one for us to catch. Returning, he detaches the rope from the jutting piece, we haul in the slack until the rope is tightened round his body, and he then cautiously crawls round. As we three stand there pulling in the rope as we feel him gradually nearing us, it may be believed how thorough is the determination that we all share, to hold on with unflinching grasp should the foot of our trusty guide fail. But the fact is, I believe, that in all these ticklish passages a slip never does occur. The nerves are braced to the utmost, the limbs move slowly and cautiously, and the consciousness that there is sufficient power in others to afford the necessary support, in case of necessity, imparts a feeling of confidence that materially tends to diminish the risk of accident.

A few yards further along the ledge, and we are upon the glacier; and here, for the first time, we are all roped together. Melchior first, then I, Stephen, and Cox. We gradually wind up rather steep bits, but such as present no real difficulties, and at ten o'clock reach the notch in the chain, with Picco della Speranza on our left, and the highest peak of the Disgrazia on our right. Hence we look down upon the deep valley of Chiaraggio beneath us; beyond is the Monte Nero; higher up, and in the back-ground rises the Tremoggia, the whole surmounted by the grand range of the Bernina. Immediately at our feet, and a little to the left, is the crevassed glacier that we had traversed three or four days previously, and commanding, as we now do, its whole surface, we pause in astonishment to admire the skill which had enabled Melchior to lead us through its wonderful intricacies. Having rested at this spot some twenty



minutes to enjoy the grand view, and to make another breakfast, we began the real work of the day. This embraced the usual characters of a mountain ridge, a snow cornice on our left, steep couloirs of ice varied with ribs of rock on our right; our actual line of advance over some rocky tooth, up a steep slope of snow, an occasional descent, and finally, a general scramble that placed us at half-past eleven, on the final peak. And then, indeed, a shout of exultation burst from all.

What was our first thought? Was it, 'How shall we get down again?' or, 'How magnificent is the panorama!' or, 'Where is the top that I may pocket it;' or, 'Can we find any stones wherewithal we may build up a memorial?' or, 'What have we got to eat and to drink?' or, 'Who has the tobacco-pouch?' or, 'Where is the barometer and the boiling-water apparatus?' or was it—if it may be called a thought—the simple passive consciousness of success? This is, to many, itself the great reward. The descent is trying, and gladly would I avoid it. The view is sublime, and I enjoy it. The top is an object in every way worthy of attainment, and as an heir-loom to posterity would I transmit it. The memorial to succeeding generations raises a feeling gratifying to the pride of man, and I am a partaker in it. The crust of bread recruits exhausted strength, and I devour it; the wine is nectar itself, and I relish it: the pipe is universal, but I nauseate it. The scientific observation is of the utmost importance, and with most unfeigned satisfaction do I behold others trying to keep their hands warm while they are conducting it. But, to my mind, each and every one of these sources of gratification sink into insignificance when compared with the exhilarating consciousness of difficulty overcome, and of success attained by perseverance.

I venture then to assert that this effect and the results to which it gives rise form an answer more than sufficient to confute those who say that these excursions are without aim or purpose; that those who undertake them do so solely for the purpose of saying that they have been to the top of a high mountain. I believe that these mountain excursions produce not only a highly beneficial effect upon the physical character, that they strengthen the constitution, that they develop the limbs and muscles, and that they impart a hardihood to the frame that renders it almost impregnable to the attacks of disease; but I believe also that they produce an equally beneficial effect upon the mental character, that they excite a thoughtful foresight in preparation, that they impart a self-reliance in the moment of danger, and that they give a fertility in resource when diffi-

culties are impending. No other manly exercise thus brings out these two distinct effects, these effects of bodily and mental culture. I am therefore justified in claiming for Alpine climbing the first rank among athletic sports, as the nourisher of those varied elements that go to form all that is commendable in the constitution of the Anglo-Saxon character.

After remaining at the top three-quarters of an hour, we rapidly descended. Our ascent had occupied twelve hours all but ten minutes. A second ascent would doubtlessly require less time; however, we made a fair pace on the descent, for five hours and forty minutes saw us once more at S. Martino, thus bringing us there at five minutes before six, or five minutes before the time appointed for meeting the cars. They were, however, in readiness, and we were not long in jumping in. The head waiter took charge of Stephen and me in the first carriage, the boy in blue brought up the rear with Melchior and Cox. I will not stop to describe how we rattled merrily along; how, at a turn in the road, the blue boy's steed fell to the ground, luckily throwing the occupants of the car into the road, and not over the precipice; nor how we reached the most ticklish part of the road just as it was growing dusk; nor how the horses shied at a waterfall and nearly caused another overturn; nor how, upon gaining the high road, we tried to get up an Olympic chariot-race. Oh! the dangers that await those unhappy beings who travel in cars, how far do they surpass the perils attendant upon a real mountain excursion! We reached Sondrio at half-past ten: supper, champagne, and success put us at peace with all the world, and we found ourselves, somewhere about midnight once more in bed. We had thus made a day of twenty-four hours, but whether it was the same day, or the next day, or the day after that day, or the same week, or the next week, that that day ended, is one of those things that no fellow could tell.

A NARRATIVE OF AN ACCIDENT ON THE ALETSCHE GLACIER IN AUGUST 1862; with Remarks on the Necessity of making use of a Rope on Glacier Expeditions. By WILLIAM LONGMAN, F.G.S., Vice-President of the Alpine Club.

**A**N accident which happened to my son on the Aletsch glacier, in August last, having attracted general attention, and the published accounts of it being incorrect, it seems desir-

able to relate the circumstances accurately, and to take the opportunity of impressing inexperienced glacier travellers with the necessity of great caution, when making excursions on the ice. All glacier travellers should be tied together when the glacier is covered with snow, and, whenever the rope is used, all guides included, should be fastened to it. It is too often the case that the guides neglect this precaution, and only hold the rope in their hands. The accident to my son arose from the culpable carelessness of a guide; but two fatal accidents, to which I wish to call attention, arose from the guides holding the rope in their hands instead of being tied to the travellers.

The first is that which happened to a Russian gentleman, named Edouard de Grotte, who left Mattmark-see on the morning of Saturday, August 13, 1859, accompanied by two guides, to cross the Weissthor, and descend to Zermatt by the Findelen glacier. The traveller and his guides were fastened together by a rope, but it was only the traveller who was actually tied; the two guides passed their left arms into large loops at the ends of the rope. In this way they had passed safely over the greater part of the glacier, when they came to a large patch of snow, which the guides, according to their own account, proposed to pass round, but which M. de Grotte insisted on crossing. The first guide passed over safely, and M. de Grotte followed, but when he reached the middle, the snow gave way, and he sank into a hidden crevasse, from which he was never extricated alive, as the guides were unprovided with a second rope, and, long before one could be procured from Zermatt, he was frozen to death. The cause of the disaster must for ever remain a dark mystery. The guides say the rope broke at each end, which is most improbable; and, moreover, when the rope was examined, it seemed to have been cut, and the fractures or cuts were near to, and about the same distance from, each end. M. de Grotte's brother went to Zermatt to enquire into the circumstances, and seems to have satisfied himself that there was no ground for suspecting foul play; it is probable, therefore, that when M. de Grotte fell, the rope was jerked off the arms of the guides, and that they subsequently took an opportunity of cutting it, with the view of supporting their story of its breaking, and thus concealing their own culpable carelessness. But, accepting the guides' own account as a true relation of what took place, it follows that the accident arose from the rottenness of the rope; while, on the other hand, if we believe that the rope was jerked off the guides' arms by the fall of their companion, it is clear that the accident arose

from the careless manner in which the guides were fastened. In either case the accident would have been prevented by the possession of a proper rope properly attached.

The next accident, to which I wish to call attention, is that of the melancholy death of three Englishmen and a guide, on the Col du Géant, on the 15th of August, 1860. They left Chamounix at five o'clock in the morning, accompanied by three guides, intending to reach Courmayeur that evening. They had some rough weather; the travellers were not accustomed to glacier-climbing, and they were consequently a good deal fatigued when they reached the col at about four o'clock. To experienced travellers, and with common prudence, all danger was then over; but the travellers wished to avoid the laborious descent of steep rocks, and took to a steep snow-slope in preference. To this the guides should not have consented; but when it was determined to descend by the snow-covered ice-slope, *all* should have been tied together by the rope. This was not done; the travellers were tied, but the guides only held on by their hands. What was the result? The travellers slipped, and the guides were prevented from giving proper help by their not being tied. Their hands, which should have been free to use the trusty alpenstock, were employed in the fruitless effort to hold up heavy-falling bodies without a fulcrum to rest on. The most experienced Alpine travellers have publicly expressed their opinion, that neither the angle of the slope nor the state of the snow were sufficient to have prevented three experienced guides, with good alpenstocks, and hands free to use them, from arresting the fatal descent of three men attached to them by ropes.

It would be easy to multiply instances of the fatal results of not using, or improperly using, a rope; but before relating the incidents of my son's escape last year, I will only mention two instances, which have come under my own observation, of narrow escapes from danger incurred by neglect of the rope.

In 1856, I crossed the Tschingel with a friend and two guides, and after passing the Tschingel-tritt, we proceeded over the glacier, which was covered with three or four feet of snow, concealing the crevasses. We had a rope with us, but we did not use it, when, suddenly, down went Linder, one of our guides. His fall was arrested by his knapsack; but he could not have extricated himself, and it was obviously the merest accident that he did not fall to a depth whence escape without a rope would have been impossible. Had we been tied together, there would have been no danger. After this, we were, of course, tied together, and, within a few minutes, my com-

panion was held up by the rope from a hole into which he had fallen.

Two years afterwards, in 1858, I myself had a narrow escape on the Aletsch glacier, owing to the fact that I and my companions were unprovided with a rope. I left the *Æggischhorn*, with a friend and a guide, intending to visit the lovely *Märjensee*, and then make an excursion on the Aletsch glacier. The glacier was covered with snow, and consequently the crevasses were concealed; but our guide was very careful in probing with his alpenstock, and many a crevasse was leaped over with ease and safety. At last we arrived at one which, probably, was somewhat wider than those we had up to that time passed over. Still, it was an easy jump. The guide leaped it with ease, and so did my friend; but when it came to my turn, I unfortunately placed my foot a few inches too far forward. The result was that when I sprang, my foot went through the snow, I consequently jumped short, and the other foot went through also. My friend reached his hand to me, and I was on the solid ice in an instant. Our curiosity prompted us to examine the holes I had made, and we looked down into an apparently bottomless crevasse. Had the snow not supported me until my friend's hand reached me, it was clear that I should have fallen into a chasm, from whence rescue would have been impossible, as we were unprovided with a rope. Had we been tied together, no chance of danger would have arisen.

The circumstances I have now related, and the oft-repeated opinions of experienced friends, impressed me with the necessity of always making use of a trustworthy rope on all glacier excursions, and I consequently provided myself with one in London, preparatory to my excursion of last summer. It was made of flax, in order to combine flexibility and moderate thickness with sufficient strength; and it was fixed to belts by spring hooks, in order to secure easy and safe attachment. I and my son reached Switzerland early in August, and arrived at *Wellig's* comfortable hotel on Monday, August 25th. On the following morning we set out for a visit to the *Märjensee*, and an excursion on the Aletsch glacier, with the intention of getting as far beyond the *Faulberg* as time would allow. The weather was perfect, and everything promised a most agreeable excursion. In addition to myself and my son, our party consisted of two friends, *Vivian Hampton*, and *F. P. Barlow, junr.*; *Fedier*, a guide whom we had taken for our whole journey; *Andreas Weissenflüh*, of *Mühlestalden*, a brave but modest and unassuming young fellow, to whom I am indebted for saving my son's life; and a porter from the *Æggischhorn*

hotel. We took the latter to act as a local guide, for none of the party but myself had ever been on the Aletsch glacier. Of course we took our rope, and, fortunately, I insisted on a second rope being also taken with us.

We started in high spirits, and all were delighted with the Märjelen-see, which was in great beauty. A hope that time would permit a near approach to the foot of the Jungfrau col was indulged in: the glacier was in perfect order; no fresh snow covered the ice; the crevasses were all unhidden; and no one thought it necessary to use the rope. I felt it to be a wise precaution, however, to place my son, a boy of fifteen years of age, under the charge of the Äggischhorn porter. It was his second visit to Switzerland, and he could, I am sure, have taken good care of himself; but I felt that it was my duty to place him under the care of a guide. I have no wish to throw undeserved blame on the guide; but his carelessness was unquestionably the immediate cause of the accident. He began wrong, and I ought to have interfered. He tied his handkerchief in a knot, and, holding it himself, gave it to my son to hold also in his hand. This was worse than useless, and in fact, was the cause of danger, for it partly deprived him of that free and active use of his limbs, which is essential to safety; it threw him off his guard, and seemed to supersede the necessity of his taking care of himself, without supplying a substitute of any value. Except at a crevasse, it was unnecessary for the boy to have anything to hold by; and, at a crevasse, the handkerchief would have been insufficient. The impression that there was no real danger, and that all that was required was caution in crossing the crevasses, prevented my interfering. So the guide went on, his hand holding the handkerchief behind him, and my son following, his hand also holding the handkerchief. Many a time I complained to the guide that he took my boy over wide parts of the crevasses, because he would not trouble himself to diverge from his path; and many a time did I compel him to turn aside to a narrower chasm. At last, I was walking a few yards to his left, and had stepped over a narrow crevasse, when I was startled by an exclamation. I turned round suddenly, and my son was out of sight! I will not harrow up my own feelings, or those of my readers, by attempting to describe the frightful anguish that struck me to the heart; but will only relate, plainly and calmly, all that took place. Where my son fell, the crevasse, which I had crossed so easily, became wider, and its two sides were joined by a narrow ridge of ice. It was obviously impossible to ascertain exactly what had taken place; but I am convinced

that the guide went on in his usual thoughtless way, with his hand behind him, drawing my son after him, and that, so soon as he placed his foot on the narrow ridge, he slipped and fell. I rushed to the edge of the crevasse, and called out to my poor boy. To my inexpressible delight, he at once answered me calmly and plainly. As I afterwards ascertained, he was fifty feet from me, and neither could he see us, nor we see him. But he was evidently unhurt; he was not frightened, and he was not beyond reach. In an instant Weissenflüh was ready to descend into the crevasse. He buckled on one of my belts, fixed it to the rope, and told us to lower him down. My two friends and I, and the other two guides, held on to the rope, and, slowly and gradually, according to Weissenflüh's directions, we paid it out. It was a slow business, but we kept on encouraging my son, telling him all that was going on, and receiving cheery answers from him in return. At last Weissenflüh told us, to our intense joy, that he had reached my son, that he had hold of him, and that we might haul up. Strongly and steadily we held on, drawing both the boy and the guide, as we believed, nearer and nearer, till at length, to our inexpressible horror, we drew up Weissenflüh alone. He had held my son by the collar of his coat. The cloth was wet, his hand was cold, and the coat slipped from his grasp. I was told that when my boy thus again fell, he uttered a cry, but either I heard it not or forgot it. The anguish of the moment prevented my noticing it, and, fortunately, we none of us lost our presence of mind, but steadily held on to the rope. Poor Weissenflüh reached the surface, exhausted, dispirited, overwhelmed with grief. He threw himself on the glacier in terrible agony. In an instant Fedier was ready to descend, and we began to lower him; but the crevasse was narrow, and Fedier could not squeeze himself through the ice. We had to pull him up again before he had descended many feet. By this time the brave young Weissenflüh had recovered, and was ready again to go down. But we thought it desirable to take the additional precaution of lowering the other rope, with one of the belts securely fixed to it. My son quickly got hold of it, and placed the belt round his body, but he told us his hands were too cold to buckle it. Weissenflüh now again descended, and soon he told us he had fixed the belt. With joyful heart some now hauled away at one rope and some at the other, till at length, after my son had been buried in the ice for nearly half an hour, both he and the guide were brought to the surface. . . . Let a veil rest over the happiness of meeting.

When my boy rejoined us, he was somewhat cold, but

otherwise unhurt. We all refreshed ourselves with wine, and slowly and solemnly, with overflowing hearts, we retraced our steps, reached the hotel in safety, and the next morning my son tripped lightly on his way, uninjured, but not unimpressed by the danger from which he had escaped.

His own account of what befell him is, that he first fell sideways on to a ledge in the crevasse, and then, vertically, but providentially with his feet downwards, till his progress was arrested by the narrowness of the crevasse. He says he is sure he was stopped by being wedged in, because his feet were hanging loose. His arms were free. He believes that the distance he fell, when Weissenflüh dropped him, was about three or four yards, and that he fell to nearly, but not quite, the same place as that to which he fell at first, and that, in his first position, he could not have put the belt on. His fall was evidently a slide for the greater part of the distance; had it been a sheer fall it would have been impossible to escape severe injury.

I have written this account, partly from a wish to impress on glacier explorers the absolute necessity of always making use of a good rope, and partly from a strong desire to place on record a true narrative of all the circumstances. But I cannot conclude without expressing my deep sense of the kindness and skill shown by my companions on this trying occasion, and, above all, I wish to recommend the brave young Andreas Weissenflüh and his father, of Mühlestalden, in the Gadmen Thal, to the notice of all Alpine travellers as excellent guides, and noble, trustworthy men.

#### A NIGHT ON THE SUMMIT OF MONTE VISO.

By F. F. TUCKETT, F.R.G.S.

ON the 2nd of July, 1862, in company with my guides, Michel Auguste Croz of Chamounix and Peter Perrin of Zermatt, I left Turin for Pinerolo, proceeding the same afternoon as far as La Torre. On the following day we ascended the Val Pellice, engaging at Bobbio a good-natured, tough little fellow, Bartolommeo Peyrotte by name, as porter, for 2 francs 45 centimes and his food per diem, and reaching at 4 P.M. the summit of the Col de Seylières, where a glorious view of the Viso at once burst upon us.

We lingered there for an hour, and at 5 commenced the descent into the head of the valley of the Guil, which bears the



name of the Vallon de Viso. Intersecting the route of the Col de Traversette, we skirted the slopes on the left, so as to avoid all unnecessary descent, and then, once more mounting, gained the summit of the Col de Vallante at 6.30. The weather was exquisite; and the sun, now getting low in the western sky, sent a blaze of golden glory on the rocky mass of the Viso, which towered up close at hand in the most majestic manner. The descent on the side of the Val Vallante is rapid, but presents no difficulty. At the highest châteaux we found inhabitants, but, either naturally churlish or suspecting our appearance, they positively declined either to take us in or sell us a draught of milk. At the next lower group, which we reached about 8 o'clock, we met with the utmost kindness and civility, the *berger* and his wife welcoming us heartily, apologising for the scantiness of their means of entertainment, and begging us to avail ourselves of them, such as they were, to the utmost. The invitation was gladly accepted, a pot of milk and chocolate (the latter of course provided by us) was soon boiling merrily over the fire; and, refreshed by a hearty supper, yet sufficiently tired to make any bed welcome, we stretched ourselves upon some hay and were soon in the land of dreams.

My sleeping-bag here came into requisition for the first time, and as I shall have occasion to refer to it again, I may perhaps be permitted a short description of its construction. My friend, Mr. Galton, having kindly lent me a bag he has had constructed on the plan of those used by the French *préposés* in the Pyrenees, and described by him in the first series of 'Vacation Tourists,' my first attempt was little more than a copy of the model in question. Composed externally of macintosh, it was lined with thick homespun Welsh cloth, and on the two or three occasions when I had an opportunity of testing its capabilities in 1861, though answering the purpose of keeping out the cold, its retention of the insensible perspiration proved its weak point. To obviate this, my second attempt, whilst covered with macintosh on its under side, and on the upper surface, for a distance of about fifteen inches from the foot, consisted simply of a bag of very stout and dense scarlet blanketing (of the description known to the trade as 'swan-skin'), opening like a shirt-front to admit the body, and provided with two arm-holes for greater convenience and facility of movement. At the point where the upper surface of macintosh terminated, a sort of bib or apron of the same woollen material commenced, and could either be thrown back over the feet if not required, or drawn up to the chin and

secured by a button to each shoulder if greater warmth was desirable. A hood or *capote*, also of woollen, but uncovered with macintosh, to facilitate the escape of perspiration and confined air, and constructed after the fashion of Arctic head-gear, completed the ordinary means of protection. 'Stuffiness,' however, though a serious drawback, might be put up with in the event of a night of rain or snow in preference to a state of more or less complete saturation; and, therefore, in order to provide against such a contingency, I added a loose sheet of macintosh, with button-holes down each side, by which it could be attached to a corresponding series of buttons on the bag, and thus render the latter impervious to water. As the material is exceedingly light, I had this sheet made considerably wider than was necessary, and when not required for the bag, it proved very useful as an addition to the wraps of my guides, keeping out the wind admirably, and lessening the one great objection to the use of sleeping bags, the force of which I cannot wholly get over, viz. that, unless similar provision be made for the whole party, it seems hardly fair to expose others to the hardships which occasionally attend the practice of bivouacking. To conclude, the weight of the whole concern is about  $8\frac{1}{2}$  lbs., and as it is quite capable of doing duty as a knapsack, it may for a time be made to take the place of that otherwise almost indispensable article, either for clothes or provisions. Indeed, I generally pack in it a small macintosh case, which holds a spare pair of flannel trowsers, shirt, and socks, as a change in the event of being overtaken by wet before reaching the intended *gîte*. For I need hardly say that, however well protected when once inside one's dormitory, it would be extremely unwise to risk a night, *sub Jove frigido*, in rain-soaked garments. The wet clothes, when taken off, may be stuffed into the case, which then makes a by no means contemptible pillow. Thus much premised, I will now proceed with my narrative, in the course of which I hope to be able to show that my bed fulfilled my most sanguine anticipations, and proved a most valuable ally. It was made for me by Messrs. Heyes and Co., waterproofers, of Bristol, at an expense of 1*l.* 12*s.* for the bag, 12*s.* for the sheet, and 2*s.* 6*d.* for the clothes-case; I supplying the 'swan-skin,' which cost 1*l.* 2*s.*

As I proposed, weather permitting, to spend the night on the summit of the Viso, and it was clear that we had not a long day's work before us, we were in no hurry to quit the friendly shelter of the *châlet*; but at 8.15 on the morning of the 4th, after a hearty breakfast of bread and milk, we bade adieu to our hosts, and proceeded to climb the wooded slope

immediately behind and to the E. of our quarters, which forms the southern prolongation of the Petit Viso, and the W. boundary of the Vallon delle Forciolline. After an ascent of about one hour's duration, we quitted the upper limits of the pine, and entered upon a region of grassy slopes, followed by débris, over which the remainder of our route almost uninterruptedly led. At 9.45 a short halt was called, and then, traversing a sort of shoulder or col, we found ourselves, at 10.30, on the bank of one of a chain of small lakes or tarns nestling in the bosom of the mountain, not far from the point at which the ascent to the Col delle Sagnette commences. These are formed by the melting of the snow-slopes above, and their surplus water is discharged through a rocky gorge into the Vallon delle Forciolline. The scenery is very striking, the huge and splintered crags around being reflected in the calm waters, ere they go dashing onwards to the valley below; and we lingered half an hour, under pretence of demolishing a second breakfast, in the shape of a hard-boiled egg apiece. Skirting the slopes of débris which descend from the jagged ridge on the E., traversed by the Col delle Sagnette, and avoiding the mistake of our predecessors, Messrs. Mathews and Jacomb, which led them to the summit of the Petit Viso, we reached, at 11.45, the base of the steeper portion of the mountain. As snow had now to be ascended for a considerable distance, gaiters were put on, though probably they would scarcely be needed later in the season. A steady, but leisurely progress for an hour and three-quarters, sometimes over rocks and up couloirs, varied by occasional step-cutting, brought us at 1.45 to the crest of the ridge descending from the summit in a SSE. direction towards the Col delle Sagnette.

So far all had gone smoothly, and time being less than ever an object, it was decided to halt here for dinner, rather than delay till the summit should be reached. From the position we had now attained, the eye roamed over the valleys of the Lenta and Po, and far away beyond them to the boundless expanse of the great plain of Piedmont, whilst above us the summit of the Viso towered up in rugged grandeur. The remainder of the ascent gave us little trouble, except where the rocks were covered with hard ice, rendering extra care and an occasional resort to the axe necessary. An hour and a half sufficed for the climb, and at 3.30 we stood on the summit, just  $7\frac{1}{2}$  hours ( $1\frac{1}{2}$  of which must be deducted for halts) after quitting the Châlets de Vallante. The ridge connecting the E. and W. peaks was, owing to the recent snow, in such a dangerous condition, and the advantage of attempting to reach the latter appeared

so questionable, that we decided to rest satisfied with having attained the point which—thanks perhaps to its snowy cap—was, at the time of our visit, decidedly the loftiest. After an unsuccessful search for the minimum thermometer attached to the cairn erected by Messrs. Mathews and Jacomb, which was in good order and remarkably solid, I proceeded to install my barometer, spread out my wet socks to dry, and examine the view, whilst the men busied themselves with small local explorations, pipes, and the conversion of very unpromising materials into a *gîte*. I shall not here dwell on the grandeur and beauty of a panorama, to which full justice has already been done by the first conqueror of this supposed inaccessible peak, but I may just remark that, after long and careful examination, I came to the conclusion that the Mediterranean was certainly not to be *distinguished* from the haze of the southern horizon. At the same time it results from a careful calculation of the effects of curvature and refraction that the Viso would be *visible* from the sea at a distance of 148 miles, or 83 miles from the shore in the direction of the Col di Tenda, while this latter being 6,158 feet in height would vanish beneath the horizon at a distance of 103 miles, or 76 from the shore. Hence it follows that there is no obstacle to the sea being seen from the Viso, or *vice versâ*, but the imperfection of the human vision or the haze of the atmosphere. It seemed to me just possible that some exceedingly distant high land seen almost over the Col di Tenda, and apparently separated from the range of the Maritime Alps by an expanse of *brouillard* such as would be produced by a large surface of water, might be the Monte Rotondo in the Island of Corsica. The height of this summit is 9,068 feet, but its distance is so great (200 miles) that the utmost I can claim for my supposition is that it is not physically impossible, the Viso being, as already stated, visible from the sea-level at 148 miles, whilst the Monte Rotondo is seen at 125.

Though the mountains of Dauphiné are very well seen from the Viso, the position of the sun rendered their details extremely confused, and as their forms were comparative strangers to me, I could do nothing in the way of identification or determination of bearings with the theodolite kindly lent me by my friend Mr. Mathews. Reserving this for the morning, when the first condition would be reversed in my favour, and whilst the barometer was being allowed to settle, I deposited in the cairn one of Casella's new mercurial minimums and a Phillips' maximum by the same maker, to which I beg to call the attention of future comers.

At five, six, and seven o'clock I read off the barometer, and the

mean resultant height deduced from comparisons with Turin, Aosta, Geneva, and the Great St. Bernard, comes out 3,860·1 metres (12,664 feet). A fourth observation at 5.30 the following morning, similarly compared, gives the lower result of 3,840·3 metres (12,600 feet). The former is within four feet of Mr. Mathews' determination (12,668 feet), and the latter within one foot of the trigonometrical measurement of the Sardinian engineers (12,599 feet), so that the mean of both (12,632 feet) is highly satisfactory. The boiling point at 6 P.M. was  $190^{\circ}$  Fahrenheit, or  $87\cdot78^{\circ}$  centigrade, which, by M. Regnault's table, corresponds with a pressure of 482·53 millimetres. Now the barometer at the same hour stood at 482·1 millimetres, and the difference, 0·43 millimetre, is precisely the same as that found a week previously on the summit of the Grivola. Comparing the mean of the readings of the barometer at five, six, and seven P.M. (482·2 millimetres) with that of the aneroid (one of Secrétan's) for the same hours (477·2 millimetres), we find a difference of 5 millimetres, an increase upon that found on the Grivola, which was only 3·2 millimetres. A similar comparison of the observation at 5.30 the following morning, reduces the discrepancy to 4·3 millimetres, and the mean would therefore be 4·6 millimetres; but as on the 2nd, at Turin, the error was already precisely the same in amount, if this were used as a correction, the two instruments would be absolutely accordant.

The sunset was magnificent, the huge pointed shadow of the mountain stretching away over the light veil of fleecy clouds which began to cover the surface of the Italian plain; but as at seven o'clock the temperature had already fallen to  $-2^{\circ}$  C. ( $28\cdot4^{\circ}$  Fahrenheit), and the wind was beginning to rise, my position on the summit became rather exposed, and the question of shelter and a bivouac assumed increased importance. The sound of falling stones had for some time indicated considerable activity on the part of my companions, who had left me to attend to my 'machines;' but on rejoining them, I found that their united efforts had made but little progress in the construction of a *gîte*. A small surface of ground at a point about forty feet below the summit had, indeed, been to some extent cleared of débris, and a sort of wall constructed of loose stones on the side of the precipice, but not a single jutting fragment offered even partial protection from radiation, and the creation of a tolerably level surface on a slope of  $10^{\circ}$  or  $15^{\circ}$  had proved an absolutely insoluble problem. The appearance of the weather, too, was by no means reassuring, and as fitful gusts of wind moaned amongst the crags, and the dull grey vapours came stealing up from the valleys, I confess I began to feel doubtful about the wisdom of

the whole proceeding. There was no help for it now, however, as darkness was coming on apace; so, whilst the final touches were being given to our nest, I occupied myself with heating a bottle of wine in my boiling apparatus by way of night-cap. Peyrotte then got into the sack which he always used to carry his load, Croz indued a comfortable knitted woollen head-piece, and Perrn a seal-skin cap, with ample flaps to come over the ears, which I had lent him. Finally, covering themselves with a *couverture* which we had borrowed at the châteaux, my companions drew my macintosh sheet over outside to make all snug. I meanwhile entered the bag, and, planting my feet firmly against a rock to prevent slipping, endeavoured to compose myself to rest, but the intensity of the cold, aggravated by the wind, combined with an uneasy position and the constant sense of being in motion downwards, proved too much for me; and, after long and persevering efforts, I calmly abandoned myself to a perpetual condition of semi-conscious wriggling. The time seemed to pass very slowly, as usual under such circumstances; but after what appeared to be hours of wakefulness I at length dropped off, and did not rouse again, at least more than partially, till about 2.30 A.M. I had buried my face so completely in the *capote*, and so closed every cranny with a handkerchief, that at first it was difficult to ascertain the state of affairs, but an icy cold drop of water falling on my nose through some unguarded chink roused me completely, and on peering out, I perceived to my surprise that everything around was white, nearly an inch of snow lay on my chest, and thick sleet mingled with fog was falling. The prospect was anything but cheering, and my feelings were so nearly akin to the painful, that I confess the thought of having to hold out for some hours more was peculiarly unwelcome. Still, though cold, I felt I could yet bid defiance to the weather, and any grumblings that tried to make themselves heard were silenced by the sense of satisfaction at the manner in which my bag bore the severe test to which it was exposed. A temperature of  $-2.5^{\circ}$  C. ( $27.5^{\circ}$  Fahr.), as shown by a thermometer protected from radiation, snow, wind, and damp, the worst possible combination in short, were all rendered endurable by its means, and this in itself was worth finding out at the expense of some little personal discomfort. Meanwhile, the guides were, I fear, in much more miserable plight; for though tolerably protected, and having the advantage of mutual warmth they naturally were unsupported by the same enthusiasm, and from poor Peyrotte's sack especially dolorous groans would from time to time issue. I ventured to

cheer him by suggesting that the honour of being the first subject of the king of Italy who had reached the summit of the Viso, and passed a night on it into the bargain, lasting for his life and rendering him famous to generations of Bobbioites yet unborn, would amply atone for a few short hours of exposure. Besides, it would recommend him to future travellers, who might take him as guide on the strength of this performance. I found, however, that all my eloquence was wasted, and that he would have sacrificed the brilliant future portrayed had it been in his power to escape. Thus time went on, and sometimes we dozed, and sometimes we peered out into the mist to see if there were any signs of its disappearing; but at length, about 5.15, there being no appearance of improvement, our little encampment was broken up, a hasty breakfast taken, and the barometer observed and put up in a very rusty condition from its long exposure to the damp. At six, despairing of any opportunity for using the theodolite, which had been dragged up with considerable trouble, we set out on our return.

As we descended the snow gradually diminished, then ceased altogether, and at last we emerged from the cloud which hung densely round the upper portion of the mountain and clung to it throughout the day. The fresh-fallen snow rendered caution necessary, and our progress was slow, but at 7.45, we reached the foot of the steepest portion of the descent, about half an hour above the tarns already described, and halting till 8.15 for breakfast, arrived at the chalets in about two hours more, or at 10.15. The time occupied in the ascent and descent was therefore  $7\frac{1}{4}$  and  $4\frac{1}{4}$  hours respectively, including halts, which amounted to an hour and a half in the first case, and half an hour in the second. At 2.30, we proceeded down the Vallon di Vallante to Ponte Castello, whence a pleasant walk of little more than an hour towards the head of the Val Vraitia brought us at 4.45, to La Chianale, thus terminating a most interesting expedition.

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ASCENT OF THE DENT BLANCHE. By THOS. S. KENNEDY.

ON Wednesday, July 9, 1862, I started from Zermatt, with Peter Taugwalder and his son, a lad of eighteen, as guides, to try the Dent Blanche. We crossed the Col d'Erin to Abriocolla, and were there detained two days by bad weather.

On Saturday the morning broke gloriously, and we started early, following a route we had traced out during our descent from the Col d'Erin. Soon, however, after entering upon the glacier, we agreed to try and climb straight up a precipice, towards the Dent Blanche, so as to reach the main ridge more directly. As I afterwards saw, this route, besides involving a loss of time and some extra labour, was fraught with some little danger. Stones and masses of ice tumble occasionally over the cliffs from a secondary glacier above, but happily we got up without mishap. After some difficult climbing among the steep and ice-covered rocks, we reached the top of the cliffs, and found ourselves on the edge of a large circular basin, of which the Dent Blanche formed the opposite side, and we had to begin by going directly away from our mountain, so as to get round the edge of this basin. Then we went directly up the great snow-ridge, whose lowest point is the Col d'Erin, and which is one of the long ridges whose union forms the Dent Blanche.

We halted to breakfast in a queer little nook, suspended far above the head of the Zmutt glacier, and there left our baggage. The snow was soft, so that at a very early hour we had been wading knee-deep, and the long slopes were not very safe to venture upon. However, the day was so fine that I felt sure of the ascent; but soon difficulties began to thicken. Great castles of shattered rock sprang directly out of the ridge, over which we had to climb, an operation often akin to a feat of rope-walking. At the base of one of these I sheltered myself in a little cranny from the wind, and tying the end of a long rope to old Peter's waist, bade him go up and see what he could make of it. After paying out fifty or sixty feet, I heard him clattering down, and was surprised to see the weather-beaten old fellow with a face as white as that of a frightened girl. He seized eagerly upon some spirits of wine we chanced to have, and then told me that when on the top of the rock his foot had slipped, and that for a moment he had thought himself done for. His nerve being entirely destroyed by the fright, I fixed the rope round my own waist, and led the way upwards. But presently his courage failed again—he declared that he could not follow, and the son sided with his father; so, it being useless to think of ascending alone, I was obliged to yield. It was then 1 P.M., and, as it afterwards proved, we were less than an hour from the top. We took up our traps in passing, and essayed to descend the precipice. But although we had taken the precaution of making a little pile of stones in every convenient place, we could hardly get down. However,



after many windings and doublings, we arrived at the bottom. It was then nearly 4 P.M., and we were at the foot of the glacier; but, wishing to be in Zermatt on Sunday, I proposed to cross the pass at once. We waded up through the deep snow to the Col d'Erin, which we reached at 5.30 P.M. A few steps were cut, and we tumbled rather than climbed down the little ice-slope on to the Zmutt glacier. Turning the few crevasses, we raced down the rocks of the Stockhi, and along the Zmutt glacier; and, after a few minutes' halt at the châteaux for a draught of milk, hastened onwards. At 8 P.M. we arrived in Zermatt, hungry, as may be imagined, and old Peter quite blown and distressed with the speed at which we had come.

The expedition had been rather an unsatisfactory one, and I was not sorry, finding in Zermatt on the Sunday two gentlemen, the Messrs. Wigram, eager for the ascent, to agree with them for a start the next morning, to try the mountain again. Jean Baptiste Croz was this time our guide, and a lad, one of the Kronigs, was engaged as porter. A numerous party on their way to Valpelline accompanied us to the head of the pass, whence we went down to Abricolla. The next three days, which were stormy, we spent at Evolena; but on Thursday night the sky began to lighten, so we returned to Abricolla, where we found that our two men had made a short reconnaissance in order to discover the easiest method of reaching the main ridge.

At 2 A.M. on Friday, July 18, the peasant entered our chamber to wake us. We consumed our breakfast, and then stood some time at the entrance to discuss the propriety of starting. The air was perfectly calm, and the stars shone out clearly and with that peculiar brightness only to be seen in the pure atmosphere of the Alps; but light streaky mists were gathering over the Col d'Erin, and hung on the Dent Blanche; and, even as we watched, they drew themselves into those long fine lines of white which indicate to the mountaineer's eye the presence of wind in the regions above. I did not much like these appearances—Croz said he would give no opinion either way; at last we determined to start, knowing, nevertheless, that there would be cold work to encounter on the peak. As we crossed the grassy mountain side to the glacier, I watched the Dent Blanche closely, and once saw the snow whirled aloft in a cloud from off the summit, and then blown away swiftly to the right. Appearances were against us, for a strong north wind was evidently setting in. Croz, too, was unwell; his answers to me were of the shortest, and his manner of going to work by no means indicated much

hope that we should succeed. C. Wigram and I were also poorly; we had been drinking at breakfast tea made from water charged with the finely-divided mud of the glaciers, and our stomachs now began to rebel against this foreign introduction. Slowly we progressed up the hard-frozen glacier and snow-slopes, skirting on the left the precipices which the week before I had climbed. The tracks of our men from yesterday's reconnaissance were still visible, and we followed them as our easiest guide among the numerous crevasses, till at 7.30 we stood upon the first shoulder of the mountain.

Some little rocks jutted their black heads above the snow, and we proceeded here to disburthen ourselves of all but necessary baggage, for everything had been brought in the hope of crossing the Col d'Erin the same evening back to Zermatt. C. Wigram had for some time been complaining; the work began to tell upon his unaccustomed limbs; and, fearing lest his lagging should hinder the others, he generously resolved to await our return upon these rocks. Bidding him not attempt the descent of the glacier without us, we bade him adieu and sprang upwards. Our route lay over rough loose stones, and then up an icy slope, Kronig in front hewing the steps; soon we emerged upon a little plateau at the commencement of the arête, which I had previously attained by a different route. An indefinable weight seemed to have hung itself upon me, impeding my motions. My limbs, though I felt no fatigue, refused to work with their accustomed vigour, and I had been considerably in the rear of the party, but now the gush of pure rarefied mountain air which blew over us, and the inspiring view of the peak of the Dent Blanche rising above, began to revive me. I closed up to the front, and led the way up the first cornice, occasionally making a few gashes in the hard snow with my axe, for better foothold. Presently a halt was called for breakfast, and while this went on I uncoiled and arranged our rope, originally intended for a signal halliard, and 100 feet in length. Each man was provided with a strong belt, strapped above his jacket, and to these the rope was made fast at equal intervals. Poor Kronig, who had been for a moment attacked by giddiness, now came to confide his troubles to me: he wished to be allowed to stay behind, not liking the look of the work before us, but we laughed him out of his fears, and later in the day, although by no means a first-rate hand, the lad did his very best.

A great rocky castle towered above us on the ridge, and an outlying bastion rose out of the slope some twenty yards to the left. Between these, in a little couloir filled with snow, we cut

our way upwards, moving very cautiously, for a serious slip might have endangered the lives of the whole party; for the mountain side sloped steeply downwards to a point near where we had that morning begun to climb, nothing but a few crags jutting through the snow that could stop a falling body. After passing the castle, we turned up to the right and regained the ridge, for there, although giddy work for unaccustomed heads, the climbing was easier. Croz's long arms and legs now stood him in good stead. Stretching out one of these long members he would hook himself to some projecting cranny, and then, as he never condescended to lend a hand to his shorter comrades, I was often compelled to make a little circuit in search of some more feasible way. Once Wigram let his staff escape from his hand, fortunately it caught on a stone in the slope not many yards below, and, planting myself firmly, I let him down till he had regained it.

Mists were now gathering below, over the glaciers of Zinal and Schönbuhl; from the north also a heavy bank of clouds was driving up. The wind roared and boomed over our ridge, making fearfully wild music among the desolate crags. A smooth rock lay above us, covered with snow; it was very steep ( $52^{\circ}$ ), but my footmarks from the week before were still visible in the snow. Croz went up on hands and knees, sticking in his axe head for anchorage. The rest followed in like fashion, and we then crawled along the stormy and blasted ridge till the base of a second huge and tottering ruin was reached. To climb this I knew was very difficult; it was the place from which we had retreated the week before; but to-day the snow was in first-rate order, and we prepared to turn the flank of the enemy. Croz went ahead, cutting small steps for his feet to rest in. I enlarged them after him, so as to serve for our descent, and thus we divided the labour. The rocky towers above us were broken into wildly fantastic groups and suggested many an odd resemblance. But the weird and terrible predominated to our anxious eyes: it seemed as though a single thunder-clap might have shaken the whole structure to ruin; and the furious wind threatened to bring some overhanging crag on to our defenceless heads. Gradually we became enveloped in clouds, the turrets began to loom through them ominously, and soon nothing at a distance greater than fifty yards could be seen at all.

I shouted to Croz, for the wind had rendered an ordinary voice inaudible, to reascend to the arête, and we climbed vigorously up a little gully in the rock towards it. Several stones came rattling down, dislodged by the leader, and striking his

followers severe blows, for in such a position it was almost impossible to dodge them. Another moment and we were on the ridge, and safe from these projectiles. We ascended slowly, kicking steps in the half consolidated snow. The north wind, charged with icy spiculæ, drove fiercely on our faces, and Wigram's hair, unprotected by his hat, became a mass of white icicles. A steep overhanging cornice was on our right, but this was more formidable in appearance than in reality. We calculated with the nicety of experienced men where we could safely tread. Sometimes, when the cornice was higher than our heads, we drove our alpenstocks through its weak part in order to try its condition, and could see white rolling clouds beneath through the hole. I began to calculate, with a thrill of exultation, that we ought to be nearing the top, but nothing was visible ahead. Presently Croz stopped and looked somewhat vacantly around, in a moment I was by his side, and a warm flush ran through me as I felt that we had conquered one of the giants of the Valais. The ridge ran forward on a level; we had reached the top. Still, as the clouds rolled and opened, a point six or seven feet higher appeared before us; it was merely an accumulation of snow upon one little point of the ridge, and the mass of snow between us and the little cone was so completely overhanging, that Croz gave his advice against venturing on it, and I agreed with him. The scene was awfully grand, and hardly a word was spoken as we clustered together on the sharp snowy ridge. Thick mists and driving clouds of snow swept over and past us; at one moment we could see the lower rocks and buttresses of the mountain far down in the depths around; another instant, and all was again hidden, and we seemed to be alone in the midst of chaos. Vainly we turned our eyes around, wearied by the formless glare, in search of some object on which to rest them. Downwards, to our left, were steep rocks covered with snow—not even the chamois might venture there; on our right was a seething abyss, at the bottom of which we knew lay the glaciers of Zinal and Schönbühl, but nothing was to be seen except an indescribable wreathing in the air, like the wind made visible. It was a sight which filled the mind with the majesty of nature, and can never be forgotten.

The cold was severe; a thermometer which was held in the air had fallen to 20° Fahrenheit, when Croz accidentally broke it with his axe, and the observation was cut short incontinently. In ten minutes I turned to descend, bearing in mind the chance of frost-bites; it was 1.15 P.M. Before quitting the summit, we each secured a piece of stone as a trophy. We descended

along the cornice, and entered again upon the rocks ; and now care had to be taken, for the best man was foremost, and his less-experienced comrades above might easily have dislodged stones, and endangered his head. Croz and I proceeded to test all suspicious-looking pieces, and soon, from our united efforts, a perfect storm of projectiles was sent leaping and crashing down to the glacier. Then we descended with the utmost caution, the steps made in ascending serving to guide us. Once I placed my heel incautiously upon the snow—ice was beneath, and my foot shot from under me ; Croz heard the noise, and turned like a true man to receive the shock, but before descending a yard I had arrested myself. It was our only mishap—two hours afterwards we were again ensconced in the little hole where we had breakfasted and left our provisions. A full bumper was drunk to the health of the Dent Blanche, and a roar of triumph sent down to C. Wigram on his rock below. Then we descended the snow rapidly, the mists coming down with us, and precluding all chance of getting to Zermatt that night. At 5.30 we found our friend, sitting under the lee of a great stone, and looking happier than we had a right to expect, for a more desolate position could hardly be imagined. During ten hours he had awaited us ; snow-storms and fogs had passed over him, and he had begun to think we should never find him again. He had tried to descend the glacier, but the snow was soft and treacherous, and soon a crevasse had forced him to return. After a short halt we gathered up our bundles, took him on our rope, and went swiftly downwards, threading the crevasses.

Once, while pausing below the precipices of the Dent Blanche, a shower of small stones came down ; most of them fell short, but one flew directly between Wigram and me, burying itself in the snow—but this was nothing to men who had succeeded. We escaped from these dangerous missiles, and ran cheerfully down the glacier, reaching the Abricolla chalet at 7 P.M. We had been sixteen hours on foot, and I think the sight of the little building was pleasant to us all. We turned into bed early, and rose the next morning at four as fresh, and perhaps stronger than if the previous day's work had been a bagatelle. I traversed the Col d'Erin in less than six hours, running ahead of my comrades, and at mid-day was kindly welcomed by friends in Zermatt.

THE WEISSHORN. By the Rev. LESLIE STEPHEN, M.A.

THE pyramid of the Weisshorn is one of the most exquisitely beautiful objects in the Alps. The only objection to the mountain is that his enormous size prevents your seeing him till you get a long way off. From whatever side, however, his graceful proportions display themselves, they excite an irresistible longing in the mountaineer to be perched on the top of his sharp snowy cone—a longing never yet gratified, except in the case of Professor Tyndall, who, in 1861, first reached the summit, and of myself, his only successor. The mountain-mass towers upwards between the valleys of Turtmann and Zermatt, about fifteen miles southwards from the Rhone.

Mountains of the lower rank generally look as if they had been formed by tilting up the edge of a thick layer of horizontal strata. One side is thus precipitous, the other a mere gentle slope. They may be compared in form to a writing desk. A well-known example of these writing desk mountains is the Righi, and I grieve to say that even the Oberland giants partake to some extent of this formation. The nobler rank of mountains is formed by the radiation of two or three grand spurs from a central knot, and of this class there is no finer example than the Weisshorn. Three great ridges descend steeply from the summit, like the claws of a gigantic tripod. Two of these are nearly in a straight line, one running approximately north and the other south. The third ridge is nearly at right angles to these two, running almost due east. In the compartment between the northern and eastern spurs lies the Bies Glacier. It is connected with the summit by long and extremely steep slopes of snow. In the compartment, again, between the eastern and southern spurs lies the Schallenberg glacier. Ranges of steep rocks rise round the whole basin of this glacier, except in one or two places where they are interrupted by couloirs of snow. Finally, on the western side the mountain presents one gigantic face of rocky precipice. The northern spur forks out at a considerable distance below the summit into two branches enclosing the Turtmann glacier.

My first attempt of this summer was made in company with Mr. Howells, with Melchior Anderegg and Franz Biener (of Zermatt). We started one morning from Zinal, with the intention of sleeping that night at the châteaux of Tracuit, and of next morning striking the northern ridge, by following the rim of the Turtmann glacier (which can easily be reached from this side) to the point of bifurcation just mentioned. A fearfully

cold and violent wind was blowing, and after a time Howells and I returned to the *châlets*, sending the guides on to explore. The said *châlets* consist of a roof (decidedly porous), a few posts for walls, and a floor of unutterable filth, open to the incursions of pigs and cows. The dry part of the roof covers the cheese-making apparatus. The more permeable part covers two small wooden trays filled with dirty remnants of hay, and one placed above the other like berths in a steamboat. I presume that the four travellers were to be jammed into one of these, and about six unwashed natives into the other. As, however, the natives talked a mysterious jargon, composed of the most unharmonious fragments of French, Italian, and German, they may have had other plans. I am willing to hope that they meant us to sleep with the cows. I was really not sorry when our guides on their return announced that we need not stay at this dismal abode. The *arête* was so precipitous, and cut into such jagged teeth, that Melchior said he thought it all but impracticable. A suggestion about 'lange Leiter,' which he threw out, was, I imagine, merely meant to avoid calling anything quite impracticable. I found out afterwards, what I might have known before, that this was the point reached by Mr. Wm. Mathews with J. B. Croz. As they also pronounced this *arête* impossible, I think it may fairly be assumed to be so for all ordinary purposes. The southern *arête* is still worse. It is cut off more abruptly than either of the others. I consequently resolved to attempt the eastern *arête*, that followed by Professor Tyndall, and am convinced that it will prove to be the only one practicable.

Accordingly, on the night of August 12th, I found myself, at the little *châlet* below the Schallenberg Alp. Mr. Howells had been compelled to leave me. I calculated that it would be unnecessary to follow Professor Tyndall's plan of sleeping on the rocks some two hours farther up, as a full moon enabled us to start at any time we desired. Even without a moon, a lantern and a native would enable one to avoid the penance of a night on freezing rocks, at a height of 10,000 feet. I curled myself up on some clean hay, congratulating myself on my wisdom, but feeling rather annoyed at my solitude. In 1859 I had slept at the same *châlet* with the same object in view. Not only had the cheerful mountain flea kept me company on that occasion with his playful bounds, but three friends, Messrs. Ormsby, Liveing, and Bruce, had been with me. We had on that occasion not started till four. It was late in the season. The party was too numerous for speed, because those in the rear were constantly checking the impetuosity of the leaders, who, in their

zeal, were kicking down occasional masses of heavy angular granite. We had consequently only advanced about half-way across the rocks when it became necessary to retreat. Warned by this misfortune, I sprang up early on the present occasion, and was out in the clear moonlight at 1 A.M., punctually. Never had I watched the sunset so anxiously as on the previous evening, and the light flakes of cloud which were drifting high above the highest mountain-tops before a gentle north-west wind. All the signs had been good, and now not a breath of wind was stirring, and every mountain was as clear as at noon-day. We followed exactly the same track as we had done before—with one exception. A Randa porter had offered to point out to me Professor Tyndall's route, and from over-anxiety I had accepted his services. He now misled us by inducing us to follow for a short way in Professor Tyndall's track, instead of our own. This would have been quite right, if we had slept in the same rocky lair as Professor Tyndall, but as we should have made a considerable détour to reach that lair, we, in fact, lost both time and temper in consequence. The porter was sent back to Randa as soon as we touched the ice, with something which had a superficial resemblance to a blessing. We were, however, on the rocks above the first small glacier by moonlight, and took our first breakfast at a height of, I guessed, 11,000 feet, before sunrise. We went steadily to work at the tiresome rocky labyrinth, keeping below the ridge, on its southern face, looking down upon the Schallenberg glacier. Once only we topped the ridge, and judged that as a rule it might be better to have crept along the top of the snowslopes on the north or 'Schattenseite.' The snow was now, however, too hard. I will not attempt to describe the dreary work of laboriously turning one rocky shoulder, covered with big loose stones, only in order to see another rocky shoulder, covered with big loose stones, just in front of you. Imagine a fraction of a vast stony horizontal wilderness, heaved into long parallel ridges, like a long ocean swell. Suppose that this wilderness had performed a miracle analogous to that by which the pavement of Glasgow astonished the Scotch divine after his whisky toddy, when it rose up and smote him in the face; you will then have a very fair notion of the monotonous piece of work which employed us for four or five hours. At eight o'clock we reached the point where the arête of rocks is merged in a more commonplace arête of snow. Here, after breakfast No. 2, we started along the arête, which has no very remarkable peculiarities, except that every successive knob along it looks exactly like the top, till you surmount it, and see



that the top has moved a little farther off than before. There is an occasional parapet of stones below you on the southern slope, but every now and then this ceases; the snow then ends abruptly at the edge of precipices of really frightful steepness. I have never seen more fearful cliffs. In passing these, it was of course necessary to cut steps with more than usual care, and from the state of the snow, we had a considerable deal of work to do, every bit of which was done by Melchior with unflagging spirit. At half-past ten, however, every difficulty was passed, and we found ourselves landed at the top.

Of all mountain tops that I know, that of the Weisshorn is, I think, the most beautiful, with perhaps, the one exception, of the Wetterhorn. It is none of the great round domes of snow where you might erect a tent to sleep in. It is formed by three of those firm and delicate edges which can only be modelled in the mountain snow, uniting to meet in a mathematical point. The three faces of the solid angle correspond to the three sides of the mountain. Curiously enough a crevasse crossed the névé within a few inches of the top. I flattened down the little cone with my foot, and felt in its highest degree the exquisite pleasure of standing in the thin, clear, and most exhilarating mountain air, with the Alpine world lying at my feet, from the Monte Viso to the Jura, and from the Bernina to Mont Blanc. It was warm, and absolutely calm, and only one deficiency occurred to my imagination. Need I mention a glass of British beer? We took off Biener's shirt for a flag, made a staff of his alpenstock, and at 10.45 turned to descend. The steps had partly melted, and made our progress slow. Melchior clung on, like a kind of universal anchor, to the occasional bits of rock till Biener and I had passed on to places of comparative safety, and were able to hold the rope firm whilst he followed. We returned for a knapsack which we had left at the foot of the snow arête, but instead of another meal, we started for a race over the rock slopes. We took them at a lower level than on our ascent, and found them easier. We did not halt once, though our mouths were parched, except at one place where the guides sucked a little trickling water, till we got back to the place where we had first reached the rocks. Here we had a final lunch and a cigar, and watched behind us one of those great showers of stones, so well described by Professor Tyndall, which we had successfully evaded by our forced march from the top. The return home needs no description. We passed a gap in the cliffs by the same guidance as that which Professor Tyndall describes, the track of a chamois which had ascended it. We had a quiet

lounge through the pleasant Alps into the deeply trenched gorge of the Zermatt valley, reached Randa at six, and, after an hour's halt and refreshment, got to the admirable Monte Rosa inn at Zermatt, with supper and civilisation, at 9 P.M.

I may remark that we had a clear view of the point reached by Mr. C. E. Mathews\* with Melchior in 1860. If they had not been prevented by the dangerous state of the snow from advancing, there was no obstacle between them and the summit of the ridge, and thence, to the top of the mountain, their progress would be easy.

## NOTES AND QUERIES.

TO THE EDITOR OF THE 'ALPINE JOURNAL.'—Sir,—A question has often presented itself to my mind, which the publication of the 'Alpine Journal' enables me to bring before those most likely to feel an interest in it. What is the life of the mountain guides when illness, or accident, or age renders them unable to follow their calling? There is a bond of union between the guide and his employer which seems to remove the former in some degree from his ordinary sphere. Dangers and difficulties shared, and the exchange of thoughts and opinions, which must result from days and sometimes weeks of companionship, wonderfully diminish, for the time, at least, the gulf that exists, socially, between them; while the courage, presence of mind, endurance, and unselfishness which is so often displayed in behalf of the traveller, makes him feel that his advantages of birth and education do not weigh so very heavily against native worth. Of course, all guides cannot thus be spoken of, but a large proportion can, if we may judge by the terms in which Alpine travellers speak of those they trust to. Should not our annually renewed intercourse with them excite some more lasting interest than that which originates in our need of them for the accomplishment of projected enjoyment? When we remember the steady eye, the firm foot, and the unflinching courage which many a time have ensured us a hairbreadth escape, we feel that the payment agreed upon, however liberal, but feebly expresses our obligations towards them. Might not some plan be suggested for establishing a fund to give aid in sickness, or a small pension when quite unable to work? The pastor, or some resident in each of the principal guides' localities, might, perhaps, be found willing to manage a portion of the fund; and if none were ever to benefit by it but those of sober, honest worth, it might prove an incentive to those who are still able to follow their calling. I believe that many a tourist would rejoice, on quitting the mountain districts, to leave behind him a

\* See note by that gentleman at p. 45.

thankoffering for restored health and energy—for intense enjoyment—or in evidence of friendly (I had almost said affectionate) interest in his trusty guide. I am, sir, your obedient servant, H.

THE WEISSHORN.—In 1860 I made an unsuccessful attack on the Weisshorn by the southern face. I came to Zermatt with Melchior Anderegg, and engaged Johann Kronig as second man. We slept at the chalets described by Mr. Stephen, and starting at half-past one on the morning of the 1st of July, carefully picked our way by the bright starlight along the ridges which extend from the chalet to the edge of the glacier. Crossing the moraine, we walked steadily on till we reached a steep and rugged portion of the glacier, which hid the mountain from our view; and rounding this obstruction with some difficulty, we reached the upper portion of the glacier about five o'clock, and contemplated the work before us. The prospect was not particularly cheering. We were directly opposite the magnificent peak of the Weisshorn, with the southern and eastern arêtes on either hand. On these arêtes no rocks of any kind were visible—every projection was thickly coated over with fresh snow, and, except a little patch of rock some 700 or 800 feet below the summit, the whole mass was of brilliant and dazzling whiteness. We at once abandoned all idea of the Randa arête. Melchior thought the southern side looked easier; it certainly seemed less steep, and apparently more practicable. It seemed to me, however, that as there was so much snow, we might work our way up the face of the mountain, and if we found the snow in good order, get on to the Randa arête, very near the summit. For six mortal hours we toiled up the steep face of the mountain; during the first four hours there was no danger, it was simply plodding up a slope inclined at an angle of forty-five degrees. A great many steps had to be cut, but for the most part we were able to tread out our foot-holds in the snow. About half-past nine the difficulties became much greater—ten or twelve inches of snow rested upon the ice. We could get no safe footing upon it, and my clinometer indicated an angle of 48 or 49 degrees. The necessity of clearing away the snow before the step could be cut in the ice beneath it, made Melchior's work very arduous, and the higher we got the greater the difficulties became. We had to take off veils and spectacles, and use all our eyes, the footholds were so insecure, and this, though the sun was extremely hot and there was not a cloud to be seen. Suddenly the heat of the sun loosened some snow just above us, and down came a little avalanche quite near enough to be exceedingly unpleasant. This was too much for Kronig, who begged me in the most abject manner to give up the expedition. We stopped and looked round to contemplate the splendid semicircle of mountains in front of us, extending from the Mischabel-Hörner, on the immediate left, to Mont Blanc, on the distant right; judging from the height, we were above the Col de Lys and the Breithorn, whence I estimated our elevation as nearly as possible at 14,000 feet. Melchior, with a grim smile, called my attention to Kronig; his knees were positively knocking together with fright. I have no wish to injure him in the estimation of my Alpine friends, but feel bound to say that in any situation of danger he is worse than useless as a guide. I now felt that the last chance of

success was gone. I appealed to Melchior, and he said he would endeavour to gain the little patch of black rocks some 200 feet above us, and then determine what to do. We slowly reached this point, cutting every step of the way; but the rocks afforded us room neither for sitting nor standing, and crumbled away at the touch. I was very unwilling to turn, as we were not more than half an hour from the arête, and, perhaps, not more than an hour or an hour and a half from the summit; but I felt it would be idle to go on with one guide, and the condition of Kronig was hopeless. Whilst we were considering our position, another of those disagreeable little snow avalanches fell and slid down the face of the mountain, close to us. It was no use holding out any longer. The batteries of the Weisshorn were too deadly to be faced, and we turned and fled. As we descended, large patches of snow detached themselves from the mountain, ourselves being in the centre, and two or three times we were borne off our feet, and covered up to our shoulders with fresh snow. At eight in the evening, we arrived at Zermatt, after nearly nineteen hours of the hardest walking I ever experienced. Five days afterwards, having recovered the use of my eyes, which were terribly burnt, I had the satisfaction of contemplating the beautiful proportions of my victorious enemy from the summit of the Jungfrau.

C. E. MATHEWS.

THE ORTELER SPITZE.—Can any mountaineer give an account of this mysterious peak? Has it ever been ascended, except by the mythical Archduke? And is there such a summit as Monte Cristallo? The table in 'Peaks, Passes, and Glaciers,' 2nd Series, gives its height as greater than that of the Orteler Spitze proper, but with a very natural mark of doubtfulness.

A. W. M.

INTERSECTION OF THE LINES OF BEDDING OF THE NÉVÉ BY BLUE VEINS OF PURE ICE.—This phenomenon was, as I believe, observed first by Professor Tyndall, in 1858, on the great glacier of Aletsch, and on the Furgge Glacier: its importance is pointed out by him in the 'Glaciers of the Alps,' p. 390 of the edition of 1860. It was observed also by Mr. Tuckett in a glacier on the north foot of the Dent de Midi de Bex, on the Col de Sageroux. It appears to be of very rare occurrence, and I have searched for it in vain in many quarters; but I believe that another instance occurs in the upper regions of the Middle Aletsch Glacier. As you mount the Aletschhorn from the sleeping place, towards the lowest col from which you first overlook the Lotsch Glacier there descends, from a higher plateau, and on your right hand, a large mass of sérac. It is separated from you by a precipice on the top of which it lies, and it descends so as to cut the main limb of the Middle Aletsch Glacier at a small angle; and so that, as it flows down, portions of its (true) right margin are pushed over the precipice, and fall on the glacier by which you mount, and almost at your feet. The edge thus exposed was a good deal weathered; but for one short portion the fracture was clean, and there I saw three or four blue lines drawn across the lines of bedding. I examined them carefully with the naked eye and with a small telescope on a remarkably clear day. I did not climb to the place, and so perhaps must not declare positively that the

lines were the ends of veins, and not superficial markings only. But of thus much I am certain, that the place is just one in which 'blue veins' ought to be found; that the lines which I saw dip forward exactly as blue veins in such a place must dip; that, if veins, they are at right angles to the line of pressure; and that they do intersect the lines of bedding of the névé at a high angle.—Observed July 10, 1862.

W. WIGRAM.

ALPINE BYWAYS: I.—*From the Forclaz to Orsières by the Valley of Champey.*—This route forms an agreeable alternative to the hackneyed one by Martigny and the carriage road through Sembranchier, and commands a series of very fine views. From the Forclaz to Orsières requires from eight to nine hours, so that, if ladies were of the party, it would be better to sleep the previous night at the Tête Noire Inn; for to start from Chamouni, as we did, makes too long a day. On leaving the little auberge on the Forclaz, the path turns to the right, gradually ascending over grassy slopes and through pines, till, between the châteaux of La Giete and those of Bovine (see Sheet 22 of the Federal Survey), a point is reached commanding a view of the same character as that from the Forclaz, but far surpassing it in extent and grandeur. It embraces the extreme eastern end of the Lake of Geneva, the valley of the Rhone, backed by the peaks of the Oberland, and, by ascending a short distance from the path, the Grand Combin also. An abundant supply of milk may be obtained at Bovine, as no less than one hundred and sixty cows are kept there. On leaving the châteaux, the path rounds the corner of the mountain and turns sharp to the right, descending by some steep zigzags to cross a torrent by a plank bridge. It then turns in the opposite direction, following the course of the torrent, which pours down a wooded and rocky ravine on the left, far below the path, to reach the valley and village of Champey. This part of the route is rough and bad, but improvements are projected. Beautiful meadows and woods succeed, till the watershed of the valley is reached—one of the loveliest spots I have ever seen in the Alps. On emerging from a pine wood, the traveller finds himself on an elevated grassy knoll, looking down a gentle descent to the secluded little Lake of Champey, set like a gem in its fringe of firs, while beyond, in the distance, towers the Combin, a splendid pile of crag and snow. This is the most picturesque point of view, speaking in a strictly technical sense, for this mountain that I know, and I wish that Mr. Walton, or some other artist with powers equal to the scene, would go and do it justice. The lake is one of those quiet wooded tarns so rare in the Alps, the local scenery of the smaller lakes being usually of a character far sterner and more desolate. The water is very clear and shallow, and the trout can be seen from the bank nearly as far out as the middle of the lake. Hence a rapid descent of less than an hour brings us to Orsières; to which the lake, therefore, is so near that anyone passing through on his way to the St. Bernard would do well to stop and visit a spot so beautiful and so accessible, especially as the road up to it is passable for *chars* for more than half the distance. The grassy watershed spoken of above, on the Champey side of the lake, should by all means be visited, as it is the very spot for an *al fresco* lunch (I hate the word 'picnic' in the Alps),

as a rapid clear stream flows over the turf. The whole excursion is practicable for mules ; but those who might think it too long, can take the Champey section of it by quitting the carriage road from Martigny at Bovernier, and thence traversing the Val Champey to Orsières.

F. ELLIOT BLACKSTONE.

MINIMUM THERMOMETERS.—I have heard from two independent sources that the Alpine Club thermometer, deposited at the top of Monte Rosa, was found in 1861, with the spirit all gone and the index lying in the bulb, while both that and the tube were apparently without fracture. Has a similar result been observed in the case of any other thermometers exposed on the higher summits, and can any explanation be suggested ?

G. C. HODGKINSON.

QUERY.—Why does the sky on a perfectly clear day appear to one, when in the high Alps, black directly over head? It surely cannot be only from contrast with the snow, as all other portions of the heavens, except the zenith, appear blue.

W. WIGRAM.

PERSONATION OF A GUIDE.—It is never easy to obtain without actual trial a trustworthy estimate of a guide's merits, partly because the same man does not equally please employers of different tastes and temperaments, and any circumstances which tend to cast a doubt on the identity of a given guide greatly aggravate the evil. A few years ago, a worthless impostor passed himself off on some confiding travellers as Melchior Anderegg ; and last summer a similar incident occurred, which it may be useful to make known, as a warning to others, especially to those inexperienced in mountaineering.

On the 11th of August 1862, I arrived at Lauterbrunnen with a friend, having appointed to meet the celebrated Christian Almer there on the 13th. We had no personal knowledge of the man, but had engaged him through my friend Mr. George, whom he was to quit in order to join us. Being anxious to press on, we asked at once whether Almer had arrived, and the waiter at the Capricorn Inn produced a man whose name, on inspection of his book, proved to be written Christian von Almen. This was remarked, but the waiter (who took the leading part throughout) assured us that the names were identical. Finding no entry of Mr. George's name in the book, we inquired the reason, and were told that he had left his book at home while travelling with that gentleman. Being new to such matters, we did not recognise the gross improbability of such an explanation, and not knowing where Mr. George had been, we could ask no further questions. Besides, we were under the false impression that Christian Almer was a Lauterbrunnen man ; and finally we were convinced that this was the true Almer, and took him over the Petersgrat and Lotsch-sattel. Finding him only a second-rate man, though handy and civil, at the Äggischhorn we dismissed him, and only then, when it was too late, were undeceived by some Alpine men in the hotel who knew Christian Almer. It is needless to point out how damaging the consequences of this imposture might easily have been to Christian Almer, if our eyes had not fortunately been opened to the truth.

F. L. LATHAM.

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THE SESIA JOCH. By H. B. GEORGE, M.A. Read before  
the Alpine Club on March 3rd, 1863.

ON Tuesday, July 8th, 1862, I left Zermatt by the Adler Pass, with my friend Mr. Moore, intending to go on to Alagna, and thence return to Zermatt by a new direct route between the Signal Kuppe and Parrot Spitze. Our guides were my tried friend Christian Almer of Grindelwald, and Matthew zum Taugwald of Zermatt. The latter is not exactly the man one would choose, when a new and very difficult expedition is in prospect, though I must do him the justice to say, that while he was with us he did his work well throughout. But Moore was half bound to him, and there was no first-rate man available; besides, we had Almer for our leader, and it mattered very little what the other guide was worth, provided he could carry some food, and bring up the rear steadily. We made a most successful passage of the Adler, and next morning reached the top of the Moro at 7.15, whence we looked anxiously for the first glimpse of our intended pass. All we could see, however, was a side view of the steep couloir descending towards the Sesia glacier, and flanked on either side by the summits of the Signal Kuppe and Parrot Spitze; and this appeared, as it afterwards turned out to be, awfully steep, and practically impossible to ascend. Being ignorant of the exact bearings of the peaks of Monte Rosa from the Moro, we had expected to have our fate half determined on reaching the top of the pass, if we were fortunate enough to obtain a clear view; but it was obvious that we must not be checked, before our undertaking was even commenced, by the sight of any obstacle however formidable; so we dismissed the

subject from our minds, persuading ourselves that we could see nothing trustworthy from so great a distance, and confined our attention to the magnificent view of Monte Rosa, and to the question (since answered,\* as we expected, in the affirmative), whether a passage could not be made from Macugnaga to Alagna above the Pizzo Bianco.



We raced down to Macugnaga, and later in the same day crossed the Turlo, that stoniest and most uninteresting of passes, to avoid which a slight *détour* round the Pizzo Bianco would be doubly welcome, fondly hoping to reconnoitre the huge barrier that closes the head of the Val Sesia during our

\* See Mr. Hudson's paper on the Col delle Loccie at p. 75.



descent. But the clouds had risen since our morning view from the Moro, and were now continually drifting about the mountains, and only for ten minutes could we obtain anything like a clear view of the work that lay before us, if we were to reach Zermatt. The guides, when once we had settled the identity of the several peaks, scrutinised them silently and intently, until the wind once more carried a veil of cloud over the scene. Both were very eager to make the pass; and I knew that nothing short of absolute impossibilities would ever turn Almer back. But I had not then fully learned that Napoleon was right in expunging the word 'impossible' from his vocabulary; and my own eyes gave me no hope of ascending the couloir, which, besides being frightfully steep, promised frequent avalanches. 'Do you think it can be done, Almer?' I asked, at length, hardly hoping for a favourable answer. 'Not up the couloir,' was the characteristic reply; 'but I don't see why we should not go straight up the Parrot Spitze itself.' It was too late for me to apply this new light to the scene; the clouds had settled down for the night, and supper was fully due, so we turned our faces down the Val Sesia. The landlord of the excellent *Albergo di Monte Rosa* was too polite to laugh in our faces when we told him that we were intending to cross to Zermatt over the Parrot Spitze; but he evidently pitied our folly in supposing such a thing possible. However, the next day he supplied the provisions we required at a moderate price, found a very dirty and rather humpbacked native to go with us as porter to our sleeping quarters, and said farewell, with the most fervent wishes for our success, and requests that we would write him some account of our adventures. Part of the merit of this sudden conversion to comparative rationality must be attributed to Taugwald, who was himself highly confident, and had somehow contrived to instil into the landlord some of his own unbounded faith in Almer.

We left Alagna at 2.15 P.M., and in little more than two hours and a half reached some châteaux, which our porter declared to be the highest in the valley, lying on the left or Turlo bank of the stream, somewhat beyond and above the Pile Alp on the other side. The clouds were not very thick, but they lay so low as entirely to conceal the Sesia glacier, and render all reconnoitring impossible. As we sat on the grass near the châteaux, waiting, since we had plenty of time before us, to see how the weather promised, the clouds suddenly lifted enough to show us the base of the Parrot Spitze, and the

expanse of the Sesia glacier lying between us and it, though from our position it was difficult to form any estimate of the distance. We all anxiously scanned the rocks on the other side of the glacier, but there was no sign of a cave, nor of any place where it would be possible to bivouac, and presently the mists again concealed the glacier from view. So we determined, especially as the south wind and obstinate clouds seemed to threaten bad weather, to pass the night where we were, secure of a roof over our heads and plenty of milk, and to start the earlier in the morning. We had seen enough to know that we could get on to the Parrot Spitze, and that the lower rocks of it presented no apparent difficulty; the only doubt was which route to take in order to reach them. The most obvious course, and one that I believe would have been found at least as short as that which we actually followed, was to ascend the slope of stones and moraine that separates the Sesia glacier from the Embours glacier, directly towards the Vincent Pyramide, and then follow the right bank of the Sesia glacier to the proper place for beginning to climb. But trusting to the local knowledge of our porter, we kept to our own side of the valley, and struck the left bank of the glacier high up, nearly opposite the place where the rocks were to be ascended. In doing this we had to wind round several small lateral valleys, and to walk continually along steep slopes, knee deep in rhododendrons, and strewn with big stones: a delightful process at 3 A.M. on a moonless night, for which we did not bless the rascally native.

We left our sleeping quarters at 2.30 A.M. on the 11th, after a most uncomfortable night, thoroughly glad to escape from the close ch<sup>^</sup>let into the frosty air. The sky was cloudy, and seemed to promise a continuation of the dull weather that had lasted for thirty-six hours; but we were so anxious for success that we paid very little heed to this. Besides feeling the fascination which untrodden ground has for every mountaineer, our zeal was quickened by the general incredulity of the natives, and particularly by the remarks of our porter. In about two hours we found some more ch<sup>^</sup>lets, at which, of course, we ought to have slept, but whose existence the porter had denied, in the vain hope that he would thereby be saved any further walk than to the lower ones. By this time we had got beyond the region of rhododendrons, and began to ascend pretty steeply over a stony surface, gradually nearing the left bank of the Sesia glacier, till at about 5.45 we halted for breakfast on the inner edge of the moraine. Half-way across the glacier we came upon fresh snow, lying rather

thickly over the crevasses, and accordingly thought it prudent to dismiss our porter, who then and there put a finishing touch to his already ample pile of offences, by coolly saying that he should go back to the moraine at the edge and wait for our return, as he was quite sure we could not succeed. I hope he fulfilled his intention. Moore suggested the propriety of not paying him until the same time; and the guides vowed to one another, that if we failed through the loss of time entailed on us by the porter's misdoings, they would seek him out in Alagna and thrash him soundly. Fortunately, our success spared them the necessity of acting on this determination, for they would probably have caught a Tartar, in the shape of an Italian magistrate, had they tried it.

At length a short slope of snow brought us to the bergschrund, which we crossed without much difficulty; and cutting a few steps in ice, we soon set foot on the base of the rocks, almost immediately under the summit of the Parrot Spitze, and prepared to mount the wall before us into the clouds that still hung over our heads. However, as we ascended they rose also, and eventually disappeared, leaving clear to our view the plain of North Italy, with its lakes shining in the distance, beyond the region of deep valleys and mountainous ridges that lay immediately below and around us. For two hours we ascended very rapidly up easy broken rocks, not unlike those of the Col du Géant on the ascent from Cormayeur; and we began to think that midday would see us at the top, and that 'impossible' would, as usual, turn out to mean nothing more than untried. But presently the rocks came to an end, and half an hour of steep snow-slope succeeded, which, however, was as yet firm and easy to ascend; and then we halted upon a patch of rocks that projected through the snow, to feed our mouths with a little bread and honey, and our eyes with the splendid view that lay before us, seen all the more clearly because light clouds still floated between us and the sun.

After a brief delay we resumed our march, and followed the snow-slope, here inclined at an angle of  $42^\circ$ , which soon became a mere knife-edge, with a precipice on one side and a steep slope on the other, and finally disappeared at the foot of a rocky buttress running straight upwards towards the summit of the Parrot Spitze. After a few minutes' further climbing, we began to fear that success was impossible. Above us was a smooth face of rock, not very high, but bulging over, and presenting no foothold for a cat; to the right it was, if anything, worse; and immediately on our left was a deep cleft in the rock,

running down perpendicularly, or nearly so, to an unpleasant depth. Almer, however, instantly set about crossing this gully, which could be spanned by a long stride, thinking that the rocks on the other side were not so utterly impracticable. After some experience, I have come to the conclusion that Almer is first cousin to a fly; and this spot gave him an unusual opportunity for exhibiting his adhesive powers, as the little knob, which alone afforded footing on the further side, was so small that, even with the aid of the rope, we found it hard to balance ourselves on it, while we brought the other foot over to an equally precarious lodgement; and the handhold was little better. But somehow he got across unaided, and began to climb upwards so as to leave room for us to follow. Before, however, he could make himself firm to help us, I was obliged to bestride the gully in order to give him rope enough, and remain contemplating space between my feet until he could give me a bit of help. Moore and Taugwald had to follow in the same style, and we were not sorry to find ourselves fairly past this decidedly *mauvais pas*.

But this was only a specimen of our difficulties, which were so severe and continuous, as we followed the course of the arête, that presently, finding a specially awkward bit above us, and an opening to the right, we diverged in that direction on to the side of a great ice-slope curving round to the almost perpendicular couloir that forms the dividing line between the masses of the Parrot Spitze and Signal Kuppe. When we were all fairly on the ice, Almer turned to me and said, 'We must take very great care here, or we are all lost,' which cheering remark he begged me to pass on to Moore. I never before or since heard Almer say anything so emphatic: his usual habit is to make light of all mere difficulties, and to regard nothing as true danger that steadiness and due precautions will prevent, though he is cautious enough in avoiding what is really dangerous. I suppose he had not yet acquired full confidence in our powers of taking care of ourselves; and his warning declaration was, I believe, strictly true, for we had the rope on, and there was nothing to hold by in order to sustain a jerk, had any of the party slipped; but with Almer's beautiful step-cutting there was no reason for slipping—I might almost say no possibility of it. However, such a route was not to be chosen if any other was possible, for the ice was very hard, the slope considerable, and the distance to be traversed so great, that if steps had to be cut the whole way there was a day's work between us and the col. Taugwald did not like it at all, and began to remonstrate almost as soon as we set foot on the slope, but we left

the decision entirely to Almer, who soon determined that for once discretion was the better part of valour; so, after about twenty steps had been made, we turned back and resumed, as the least of two evils, our previous task of ascending the rocky ridge which had proved so unsatisfactory.

It is not an arête of the agreeable order, a straight back-bone of rocks, that merely requires to be climbed with greater or less exertion and difficulty. The general inclination is very great, so that one was often climbing almost vertically upwards, over sound rocks which gave secure hold for hand and foot where there was any at all, but where frantic gymnastics had to be gone through in order to get across or up from one point to another; and where the rocks were not extremely steep, we generally found a gap—sometimes only a few feet wide, sometimes several yards—filled up with an edge of snow, across which we had to file with great care. Midday came and passed, the time at which we had hoped to reach the top, and we seemed to have made little or no progress since we quitted the snow at 10.15. As we stopped for a moment to rest on one of the few places where the rocks were sufficiently convenient, we could trace every footstep we had made in the snow-slope below. Onwards again, Almer still leading with unabated energy and unerring skill, scrambling unassisted up places where it taxed our powers to follow with the help of the rope, and only once or twice condescending to ask me for a shove up from behind. Very often only one could be moving at a time, the others being firmly planted to give help, or detained by the inexorable rope, all which of course rendered our progress slow; and yet the gaps filled with snow occurred so frequently that it was impossible to go unroped. Once or twice, indeed, one of these little snow arêtes gave way under my superior weight, and I had a moment's very awkward floundering before Almer could help me out, after which Moore and Taugwald had to be dragged across somehow; but generally the snow bore us pretty well, and gave a welcome relief from the perpetual strain on every muscle requisite to climb from one narrow foothold to another. Once we found a little water trickling over a stone, to which we in turn applied our parched mouths as long as we could preserve our balance, for the precious stream had chosen to show itself only at one spot, to reach which required an arrangement of limb more natural to a spider than to a man. This luxurious episode put us into high spirits for a short time, and we expended the extra store of energy thence derived in a little talking; but generally we remained more silent than I ever remember to have been on any other ascent, the word *fest*, in

conjunction with the various forms of the verb *seyn*, forming the staple of our conversation.

At last, at 1.50, we had the pleasure of finding the arête merged in a steep white slope, which evidently would bring us to the top. An hour was the time Almer calculated, and an hour would have done it had the snow been a little thicker over the ice. Unfortunately, though fairly coherent, it was thin enough often to allow of our coming on the ice below, and consequently slipping, which on a slope averaging nearly  $50^\circ$  was tedious and disagreeable, and added considerably to the fatigue, especially for me, who being the heaviest found it the most difficult to get the snow to sustain me, and for Almer, upon whom as the leader nearly every jerk came. We grew apathetic and almost stupified between the frequent falls and the numbing influence of the cold wind, and plodded mechanically upwards without a thought beyond the discomforts of the present moment. Suddenly the snow-slope almost close to our faces disappeared, and our eyes rested on the wedge-like form of the Lyskamm far away across the great plateau of Monte Rosa. It was just thirteen hours since we had left the chalet in the Val Sesia, nine or ten thousand feet below us: so steep had been the general course of our ascent, that as we looked back down our traces on the last slope, which, as I have said, averaged nearly  $50^\circ$ , the bottom of it seemed to rest on the middle of the Sesia glacier, not a trace being visible of the vast precipice, some 6,000 feet in height, which it had taken  $6\frac{1}{2}$  hours to climb. A calculation founded on this and such other rough observations of heights and distances as we were able to make, combined with some known altitudes, gives the average inclination of the wall, from the edge of the Sesia glacier to the final slope of snow, as about  $62^\circ$ ; certainly the upper division of it was steeper than this, and the interval of snow was both short and very steep (increasing from  $36^\circ$  to  $42^\circ$ ), so that neither memory nor reflection leads me to doubt the general correctness of this result.

On the Italian side the view was of course very much the same as it had been all day, but hazier than some hours before, the most remarkable object being Monte Viso, emerging out of a sea of cloud. On the other sides our view was much circumscribed, for the Signal Kuppe was close to us on the right, towering 500 feet above us; on the left a steep slope of snow rose about 100 feet to the summit of the Parrot Spitze, while in front the shoulder of the same peak, on to which we had climbed, rose in a rocky hump, just high enough to shut off much of the view down the Monte Rosa glacier. The Matter-

horn was full in sight, but looked awkward and almost ugly, and contrasted most unfavourably with the beautiful spear of the Dent Blanche, whose summit was almost exactly level with the spot where we stood. I have always regretted that we did not complete the ascent of the Parrot Spitze, which has never yet felt the foot of man on its summit, for the smooth slope of snow on our left presented no obstacle whatever to our progress. Perhaps the very obvious and easy nature of the ascent helped to deter us from accomplishing it—we felt that we had practically conquered the Parrot Spitze. But there were several better reasons for leaving the actual peak to the next comer: it was already nearly half-past three o'clock, we had been out thirteen hours, and had a long descent before us; the snow was thoroughly softened, and the further ascent was likely to be very laborious. Besides, the wind had risen in the last hour, and was blowing furiously—no pleasant companion, as the slope was considerable, and we should have been obliged to ascend on or close to the arête, with our left shoulders almost overhanging the Sesia glacier; so we came to the conclusion that we would let off the Parrot Spitze for this time only.

Meanwhile the keen wind was piercing us to the bones, and the dinner bell had been ringing for some time; so while Moore and the guides screamed, partly from exultation and partly to warm themselves, I tore a leaf from my pocket-book, and deposited it with the usual inscription in a bottle among the rocks, and then, finishing off the miscellaneous howling with three hearty cheers, we scudded down, first to the actual col between the two peaks, which lies only a few yards back from the top of the precipitous couloir that descends to the Sesia glacier, and thence down an easy slope of snow on to the head of the Monte Rosa glacier. A short time more brought us to a sheltered place under the Lyskamm, just where, in ascending that mountain, it is convenient to turn sharply up to the right off the usual route to the Lysjoch. Here we consumed the remainder of our provisions, and basked a little while in the sun, the two guides indulging in a nap—a pleasure which we, though drowsy enough, did not contrive to share. Almer's eyes were suffering, and no wonder, since he had not been able to protect them in any way during the whole ascent. Taugwald was thoroughly tired, and we, if not quite so much fatigued, were still fully conscious of having done a hard day's work. But we could allow very little time for indulgence, since we had more than four hours' tramp before us, and no moon to help us out if overtaken by night on the glacier; so on we pressed as fast as the soft slushy snow, often thigh-deep, would allow, until at 6.30 the friendly

rocks of Auf der Platte gave us once more dry ground to stand on, and allowed us to discard the rope, that had been on continuously for 12½ hours.

In a little more than two hours we reached the wished-for shelter of the Riffel Inn, to be received by M. Seiler, not with the expected welcome, but with a look of blank dismay at the sudden appearance of two more travellers when he had no more beds to give them. The house was full, parties being prepared to start the next morning for Monte Rosa, the Breithorn, the Cima di Jazi, and, I think, the Weissthor also. However it was absurd to dream of going on to Zermatt in the dark after more than eighteen hours' work, and supper was the first consideration; so we left the question of bed to settle itself, while we appeased our hunger, and satisfied the curiosity of several friends whom we found among the company that crowded the little *salle-à-manger*. Presently Seiler came in to say that there was one bed to be had in a double-bedded room, but that the other of us must be content to sleep in the *salle-à-manger*. But when the first occupant of the said room heard what was going on, he very kindly insisted on resigning altogether in our favour, saying that as he had not had a hard day's work, and was going to start very early the next morning, a bed was of no great consequence to him. The value of the great service thus rendered to us by a total stranger may be estimated from the fact of our having slept soundly through all the din attendant on the start from the Riffel of the successive parties bent on their different expeditions.

It is possible that another year, after a winter less exceptional than that of 1861-2, the steep slopes on the side of the Parrot Spitze, next to the Signal Kuppe, might be found covered with snow instead of being hard ice; but in that case the danger of avalanches would obviously be much greater. On the other hand, total absence of snow, such as might occur at the end of August, would render the ascent, which we found difficult enough on July 11th, very nearly impossible; for if the gaps in the arête were not filled by lines of snow, the labour of climbing it would be of course materially increased, even if it did not prove actually impossible to pass from one mass of rock to another. Moreover, the final slope, which as I have mentioned is extremely steep, faces to the south-east, and must lose its surface of snow very rapidly: it is easy to imagine, though one fortunately does not often realise in practice, the task of cutting steps in sheer ice up a slope which is an hour long when covered with snow, especially after the many hours of hard work required to reach the base of it. On



the whole, therefore, this expedition, like the ascent of the Wetterhorn and others, is easier and probably safer in July than in August; and an extra reason for trying it early in the season, if at all, is to be found in the great length of time necessary. By sleeping at the highest châteaux in the Val Sesia, two hours might be saved out of the eighteen which it cost us to make the passage; but a much shorter or better way is not likely to be found by any one arriving at the col between the Parrot Spitze and Signal Kuppe than that which we followed. I place the most implicit reliance on Almer's judgement, as a guide whose sagacity I have never known at fault on any ground, new or familiar; and he never hesitated for an instant about the proper direction, from the moment that we entered on the Sesia glacier until we reached the known regions on the other side, except in the one instance above related of the ice-slope on the right of the arête, which proved too much for us; and even there he was undoubtedly right to try it in the hope of finding snow. Nor is there, if our observations were worth anything, a single spot to the left of the Parrot Spitze, as seen from the Val Sesia, where the great ridge formed by the successive minor peaks of Monte Rosa can be scaled so readily as in this place. I believe that it is possible to pass from Alagna below the Vincent Pyramide on to the route of the Lysjoch, without crossing the Col d'Ollen, and this might be useful, if the weather or state of the snow rendered it undesirable to attempt a more direct passage to Zermatt; but between the Vincent Pyramide and the Parrot Spitze no point on the ridge looks at all accessible from the Val Sesia. We did not examine, with any special eye to an ascent, the Signal Kuppe itself, which is the most conspicuous object in the view, so I cannot say that no possibility exists of forcing a passage by ascending that peak instead of the Parrot Spitze; but as it is 400 feet higher, and the base is farther from Alagna, not much improvement is likely to result from trying that route. And even if the col between the Zumstein Spitze and Signal Kuppe be accessible, which is by no means proved, nothing that might be attempted in that quarter would facilitate communication between Alagna and Zermatt, and the only available route seems to be that which I have been describing.

There are two points which must be briefly discussed before a new pass can be entitled to rank among established routes, its name and its height. With respect to the latter, comparison with the known elevations of the Parrot Spitze and Signal Kuppe led us to the conclusion that the point at which we crossed the ridge is about 100 feet, or a little more, lower than

the Parrot Spitze (14,577 feet), and that the actual col, to which we descended, is about 60 or 70 feet lower. The height, therefore, may be safely reckoned either at 14,400 feet for the lowest point on the ridge, or at 14,465 feet if we regard the point where the passage was actually made. The name was, as far as we were concerned, more easily settled: after rejecting several unsatisfactory titles, we christened the pass 'Sesia Joch,' a barbarous-sounding and polyglot appellation, but strictly in accordance with the precedent established by the sponsors of other passes converging on Zermatt. The geographical propriety of the name cannot be disputed, but its euphony is more than questionable, and I shall be very glad to hear of a better title for a pass which will ever hold a high place in my regard, even when it has ceased to possess the highest rank among European passes.

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THE LAUTERAAR SATTEL. By Capt. J. R. CAMPBELL.

IN the summer of 1857, while staying at the comfortable *Adler* at Grindelwald, I fell in with two German tourists, Dr. Porges, a young lawyer from Vienna, and his friend Mr. Stern. The former gentleman, who possessed as great a passion for climbing those heaven-kissing pinnacles which tower above the world of life in Switzerland as, perhaps, anyone I have ever met with, proposed a journey to the Grimsel by way of the Upper Grindelwald glacier, descending on the other side by the glaciers of the Lauteraar and Unteraar—a route, the guides said, that had never been traversed; and I agreed to join the party.

We left Grindelwald about 3.20 P.M. on the 21st August, accompanied by Christian Almer and Ulrich Kaufmann, as guides. Our way led along the valley and up the green slopes which terminate it, to the foot of the Wetterhorn. From this point a stiff climb up a zigzag track brought us into the *Enge*, or *narrow*, as it is most properly called, a nearly horizontal path bending away across the stern precipices of the Wetterhorn, high above the right bank of the Upper Glacier which it almost overhangs in parts. For a well-defined track, it is the narrowest I ever saw; but of course there is little or no danger to anyone who can trust his head and feet. One part is queer, where you have to stoop in passing under a projecting rock, there being a clear fall of several hundred feet down to the glacier on your right. The *Enge* terminates on the green slopes of a sheep-walk, and beyond this you come to

the *Platten*, a range of smoothed rocks leading down to the ice, and giving one the idea of a gigantic house-roof. Little notches have been hewn in the surface, for the convenience of the fingers and toes of shepherds and others who may have to traverse it. Aided by these, and roped together as a precaution in the event of one slipping, we encountered no difficulty in crossing.

Nothing that I saw during the whole excursion struck me so much as the view from about here. Looking back, down the wild gorge we were ascending, between the Wetterhorn and the Mettenberg, whose towering walls formed a stupendous portal for the chaos of ice—an exit from the world of winter, through which, in its last slow struggle with the crags, the glacier fell, to melt and die in the valley below—a portion of Grindelwald backed by mountains appeared through the opening, like a picture in a frame. It was growing dusk (being about 6.30 P.M.), and mist was curling up the ravine, thereby heightening the gloomy grandeur of the scene.

Before we reached our sleeping place (half-way up the Wetterhorn) it was so dark that I could not see where to tread; and miserably did I regret, as we groped our way among the rocks, our having started so late. Almer, who seemed to possess the vision of an owl, and never hesitated as to the way, often guided my feet, thereby saving me much trouble, and perhaps a broken neck. At last, about 8.30 P.M., we arrived at a huge block of stone, resting on smaller fragments, and so enclosing a kind of cave or den. The interior, often the night's lodging of chamois hunters, and for ascents of the Wetterhorn, is fully lined with hay, and, considering the locality, by no means to be despised. Now began our preparations for the night. The guides lit a fire by the entrance, with some wood they had gathered on the Enge. Then we had supper, and I, my universal consolation, a good smoke. Kaufmann, after we had packed ourselves side by side at the extremity of the den, handed us in some weak coffee as a night-cap, and then he and Almer extended themselves between us and the opening, and all composed themselves for rest. Though rather close, it was not by any means an uncomfortable hole; and I think I might have slept well, had Dr. P. taken off his heavy boots; these, however, kept S. and myself painfully awake half the night. One might have fancied he was troubled with a dream of drowning, so complicated and violent were the motions of his legs. As I lay awake, I heard the voice of nature around me in the ceaseless roar of neighbouring waterfalls, and, now and then, in the long thunder-like peal of a distant avalanche.

Next morning at 7 A.M., the guides having lit a fire and given us some coffee, we were again *en route*. We had to descend a little at starting, in order to get over an obstacle in the shape of a waterfall—rather a rough bit of scrambling. This done, we commenced our climb towards the Upper Grindelwald glacier, and reached it about 9 A.M. After a time, the crevasses grew so numerous and intricate about us, that we were induced to send forward the guides on an exploring expedition, whilst we, stretching ourselves on a blanket spread upon the snow, waited, with some little anxiety, their report. They rejoined us in an hour and a half, and we proceeded, Almer leading, followed by myself, S., Kaufmann, and the Doctor, in the order I mention. Twice, after jumping a crevasse having rather a shelving edge on the opposite side, I slipped back after landing, and hung suspended by the rope. Almer had, however, a secure footing on the far side, and easily hauled me up. I felt there was no danger, simply owing to the *rope*; but the incident increased my conviction of the necessity of this safeguard in traversing a glacier such as that we were on.

At length we came to the base of a snowy wall, some 150 feet high or more, very steep, and running like a barrier across our route. Almer went up first to examine the other side, and on his assuring us the descent was practicable, we all scrambled up. The top was a narrowish ridge, which we followed to the right, till we came to a slight depression or col, called the Lauteraar Sattel. We judged it to be somewhat more than 10,000 feet above the sea. The view was hardly so grand of its kind as I had anticipated, or hoped it would be. Nevertheless, I must own, the stern ridgy peaks of the Schreckhörner (on our right), and other more distant mountains, with the oceans of snow and glacier from which they rose, formed a panorama that one, accustomed to such scenery, would remember for life.

Almer having fixed on a place where he thought we *might* be able to get down, we commenced our descent. For a few yards, this was over rocks, and then we proceeded slantingly across a steep slope of hard snow. Almer, who still took the lead, cut steps over this bit. The snow terminated in a short but difficult precipice of wet crags, which afforded scarcely any hold for hands or feet, and we were some time getting down it, but at last this was accomplished, and we landed at the bottom on a narrow neck of snow, leading in among a maze of crevasses at the upper part of the Lauteraar glacier. Thence we descended without much difficulty on to the plain

of the glacier, and, following its course, came upon that of the Unteraar. It was about 3 P.M. when we cleared the Sattel. Our difficulties (such as they were) were over, but we had still a long walk before us. I will not detain the reader with an account of the rest of our journey, as the Unteraar glacier is known to most tourists who visit the Oberland. Let me merely add, we did not reach the Grimsel till 9 P.M.—pleased at the success of our expedition, and, at least equally so, with the prospect of supper and bed.

[The above expedition having been made so long ago, a note by a gentleman who crossed the pass last year may not be unacceptable as a comment.—ED.]

I did not find any obstacle in the shape of the waterfall mentioned by Captain Campbell; and therefore, crossing the stream immediately above the sleeping-place, I ascended by the rocks on to the glacier or ledge of ice which extends at the base of the line of precipices which form a barrier to the east. The route to the Lauteraar Sattel is, for about half an hour after leaving the sleeping-place, the same as that to the Wetterhorn; it then diverges, turning sharp off to the right in a southerly direction. The ledge of ice which I have mentioned abuts upon, and at times actually touches, the Upper Grindelwald glacier. Last year, however, owing to the shrinking of the ice, I found a deep gap between them, over which we had to make our way on to the Upper Grindelwald glacier proper. We struck it just below the first ice-fall, and ascended on to the upper snow-field by a very steep, but not difficult, slope. My guides were Ulrich Kaufmann and Peter Inabnit. The former, who crossed the pass in 1857 with Captain Campbell, told me that he had never seen so great a change on any glacier as had taken place on the Upper Grindelwald and its tributaries in the interval between his two visits. I may remark, by the way, that an interesting pass might be made by crossing from the head of the Upper Grindelwald on to the Gauli glacier. It would take a long day to get down to Hof, otherwise there would not be much difficulty.—ARTHUR MILMAN.

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THE COL DU MONT BRÛLÉ. By the Rev. C. H. PILKINGTON, M.A.

AT page 285, vol. i. of 'Peaks, Passes and Glaciers,' 2nd series, Sir T. F. Buxton draws attention to a col, which appeared to him and his companions practicable, on the north side of the Pic de Zardezan. Having observed it both from the Col de Collon and the Col de Valpelline, he suggests it as a route which would join the two, and by which the Combe de l'Arolla might be reached in one day from Zermatt. In conclusion, he

leaves it to the lovers of topography and mountaineering as amongst the *agenda* of the coming season. Let me tell what I know of the col from actual experience, and relate how it came to be reckoned among the *acta* of last summer.

I had chosen what is called the high level route to be part of the occupation of my summer holiday, but, on getting to Zermatt, found myself obliged either to traverse it alone or give it up. At this juncture I was fortunate enough to fall in with Mr. E. E. Bowen and Sir Geo. Young, who were not only bound on the same excursion, but were provided with instructions from Mr. J. J. Cowell (who accompanied Sir T. Buxton) with reference to this pass from Zermatt to Arolla in one day. They had also Michel Payot, Cowell's old guide. Kindly they joined forces, and we started altogether at 2 A.M. on the 11th of August. I say but little of our preparations; such are tolerably well known now. Our difficulty was to carry with us enough provisions to last three days, as we could expect but little at Arolla and Chermontane, though sure of a better reception at St. Pierre.

At 11 A.M. we found ourselves on the Col de Valpelline—Bowen, Young, and myself, Payot and Favret of Chamounix, and Nägeli of Meyringen, who had been with me a week before. We had not time for the Tête Blanche, but kept on eastward. Before us lay, as in a basin, the névé which supplies the Glacier de Zardezan, descending gradually with a sweeping course round to the southward. The edge of the basin, consisting of steep rocks, formed a continuous curve from the Tête Blanche, on our right flank, to the Pic de Zardezan or Mont Brulè, which was in front of us, but to our left. These names indicate the same peak, if a comparison of different maps is to be relied on. The rocks seemed difficult of access in every direction, except just north of Mont Brulè; and this point, though close alongside of the icefall of the glacier, was to be reached by keeping round well under the rocks without descending more than was absolutely necessary. Our line was to follow the side of the basin, or rather half-basin, and then to make for a little bit of the rim near Mont Brulè, which was more flattened than the rest. Down we went under the Col des Bouquetins,\* the icefall of which seemed to us quite impracticable, but I understand the rocks at the side are comparatively easy. At 12.25, having got a good way round the sweep of the glacier, we halted as near the shadow of the edge of rocks as we could, and opened our provision sacks. Some philosophers

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\* See note on this pass by Mr. W. E. Hall, at page 92.

demonstrate to a mathematical nicety the exceedingly few ounces of food which suffice for a day's subsistence. I don't quite agree with them. Have a good dinner the day before starting, and a bite and a sup when you're hungry, especially just before the hardest bit of the day's work. On this occasion we were obliged to be chary of our rations, lest we should be starved on the Sonadon. Let me publicly tender the thanks of the party to that provident individual who, at the last moment before we left Zermatt, ordered more eggs; which same eggs, he says, kept us eventually from utter destitution and hunger. Gratitude is cheap—cheaper than eggs; let us be grateful.

At one o'clock we started upwards again, and found the ascent easier and shorter than we expected. In half an hour's time we were looking over the edge of the rocks on to the head of the Arolla glacier, and the curiously-formed Mont Collon in front of us. Pocketing a memorial, we all clambered down; the descent lay over a comparatively smooth face of rock, which however was not at all steep, and was covered thinly moreover with débris and snow, here and there; so our descent was rapid—a good jump took us over the bergschrund, and we went on our way rejoicing that there was nothing more to stop us, and the afternoon was yet young. We stayed once to sketch the pass, and again to recover an alpenstock from a crevasse, and then found ourselves on the Alp on the right bank of the glacier just before Mont Collon, and opposite the Vuibez glacier. There is a splendid cave there for anybody who, having crossed our pass, wishes to escape the fleas at Arolla, and to attack the icefall of the Vuibez glacier in the early morning. We got to the bridge across the stream at 5.30, and in a few minutes more reached the châteaux where we were to sleep.

To attempt this pass from the eastern side, it is not advisable to reach the ridge close under Mont Brûlé, unless the bergschrund should be impassable elsewhere, but rather as far west as possible, in order to avoid the icefall, and shorten the long sweep under the Col des Bouquetins as much as possible.

As to the height, I can give but little more than a tolerable guess. An aneroid barometer of Secretan's make, which I carried with me in my journeyings, has proved to have an error of so large a magnitude that its readings are not worth much. Perhaps we shall not be far out, after comparing with the Valpelline and Collon, in estimating the height of our pass at about 10,600 feet. Though merely a supplementary one, and pos-

sessing no very distinctive features of its own, it is valuable, as giving a variety to the Valpelline, and rendering Arolla easily accessible in one day from Zermatt.

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AN EXCURSION IN DAUPHINÉ, with a Partial Ascent of the  
Pointe des Ecrins. By the Rev. T. G. BONNEY, M.A.,  
F.G.S.

MY first introduction to Dauphiné was in the dismal summer of 1860, when, in company with my friends Messrs. W. Mathews and J. C. Hawkshaw, I explored some of the valleys in the neighbourhood of the Pelvoux, and made an attempt on the mountain itself, which was defeated by the traveller's worst enemy, a dense *brouillard*. Though our chief recollections of the country were of scant fare and abundant fleas, of bad guides and worse weather, yet still we had seen and learnt just enough to make us wish for more; and the parting glimpse that we had caught of the range of the Pelvoux on leaving Guilestre for Abries, had only suggested questions without supplying us with answers. Subsequent travellers, although in some respect more successful than we, made but scanty contributions to the geography of the district, until our friend Mr. Tuckett, armed with a tracing from some of the unpublished sheets of the French government survey, kindly supplied to him at the *Dépôt de la Guerre*, spent nearly a fortnight of last July among the Alps of Dauphiné, and so thoroughly explored many of the least known parts of the chain as to leave but little to be done by those who might follow his footsteps. Immediately on his return to England he communicated the results of his labours to Mr. Mathews, informing him that Les Ecrins was not (as had previously been supposed) a peak of the Grand Pelvoux, but a distinct mountain, and sending an outline sketch of it, on which was marked the most probable path to the summit. Consequently, the embattled wall of the mountains of Dauphiné had attracted our special attention more than once from various summits in the Graians; and when, on the Superga as a judgement-seat, we balanced the rival attractions of Dauphiné and the southern districts of the Graians, the former gained the day, and the next morning saw us *en route* for the Viso. A return of bad weather prevented our attempting the ascent of that mountain, and we went to bed in the primitive auberge at La Chianale, fearing that after all we had come on a fruitless errand. The morning, however, of August 23rd was much finer than we had ventured to expect,



and when, after crossing the Col de Maurin, we reached the summit of the Col de Cristillan, the whole chain of the Dauphiné Alps stood before us in unclouded beauty. Again a portion of the range appeared, a few hours later in the day, as we neared Guilestre, and about the topography of this I shall venture a few words of explanation. The ground plan of the Pointe des Ecrins and its immediate neighbours, most of which are situated on or very near the watershed between the Romanche and the Durance, is very like a capital E. In the right-hand corner of the upper bar of the letter we have a group of peaks from 11,000 to 12,000 feet in height, called by the French engineers the Crête du Glacier Blanc. The highest point is, according to them, 12,008 feet. They form the Mont des Agneaux of Bourcet. At the other corner is situated the 'Sommet de Roche Faurio,' 12,192 feet; across the middle goes the Col du Glacier Blanc, from Ville Val Louise to Villard d'Arène. The short middle bar represents the Crête de l'Éncula, and at its junction with the upright lies the Pointe des Ecrins;\* across the upper half of the upright goes the Col des Ecrins, and the lower half is formed by the Crête de la Bérarde, 12,323 feet (the Pointe des Verges of Bourcet, and others). Above this is the Col de la Tempe; below it there is a gap, through which it might be possible to pass to the glacier figured on the left of the Aléfroide in 'Peaks, Passes, and Glaciers' (2nd series, vol. ii. p. 209), and so to descend to La Bérarde. In the left-hand corner is L'Aléfroide; † the lower bar is formed by the Crête du Pelvoux, terminated by the truncated cone of the Grand Pelvoux itself. The upper cavity in the letter is filled by the Glacier Blanc, the lower by the Glacier Noir. The former sweeps round the Crête de l'Éncula, and brings its pure white cliffs into strange contrast with the moraine-covered slopes of its neighbour. The Pointe des Ecrins, being formed by the union of three ridges, may be considered as a triangular pyramid; with two sides of precipitous rock, and the third of steep snow.

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\* Called also the Pointe des Arcines, and identical with the Montagne d'Oursine, of Bourcet. M. E. de Beaumont ('Annales des Mines,' 3me sér., tom. 5) and Professor Forbes ('Norway and its Glaciers') speak of the Pointe des Ecrins as forming part of the Pelvoux, and are unaware that it is really only a synonym for the Montagne d'Oursine. There is a beautiful chromo-lithograph of the mountain (under the name of M. d'Oursine) in that most interesting paper on 'Dauphiné,' subjoined to 'Norway and its Glaciers.'

† This word is spelt Ailefroide by the 'Etat Major Français.'

Mr. W. Mathews and myself, accompanied by Jean Baptiste Croz and his brother Michel Auguste (one of Mr. Tuckett's guides), arrived at Claude Giraud's auberge in Ville Val Louise on the evening of August 24. Unhappily it was Sunday, and the *Salle* was filled with peasants, who made those demoniacal noises by which hilarity is ordinarily expressed in the French Alps. Not easily shall I forget one gaunt old fellow, who, for an hour or two, kept up an almost incessant clamour, something like the howl of a broken-down foxhound troubled with asthma, and drove us to the verge of desperation. I suppose it was a song, but nothing could be inferred from the changeless expression of his face, except, perhaps, that his wine did not agree with him. The landlord, however, was very attentive, and his cuisine, for Dauphiné, commendable. Hunger appeased, we fled from the noise to the open air, and, looking up to the bright stars, were surprised to see, a little above the Great Bear, the pale misty light of a large comet. An hour or so passed pleasantly in watching and speculating on this unexpected sight, and then, rather loath, we turned into a long narrow room at the back of the house, in which were two beds. They *looked* inviting, but I draw a veil over the horrors of that night. I did think I knew something about fleas, but I found there were experiences beyond any that I had hitherto reached. Let me not, however, seem to take away the landlord's character. I am sure that he does his best to entertain travellers, but at present he has so few of the better class that he cannot afford to reserve a room for them. He told us that, not many days before, he had been obliged to let an 'individu très-malpropre' occupy my bed, and that though after the man's departure, he and his wife had had a 'chasse,' and caught 'beaucoup des puces et des punaises,' till they thought they had cleared the covers, some must have been left. From the anxiety he displayed to satisfy our wants, I believe that in a few years, with proper encouragement, he will make his auberge all that need be desired.

Our attention was attracted early next morning by the sound of many voices singing, and on looking out of the window we saw a long procession wending its way up the valley. Both sexes took part in it, the men walking first, clad in a sort of white bed-gown, girt about the waist, and the women with large white veils thrown over their heads. Banners, maces, and crosses were carried at intervals, and here and there one or two curés walked near them. All chaunted a sort of litany as they went, which, at a distance, produced a good effect. The procession must have been more than a quarter

of a mile long. Presently another, a smaller one, appeared, but this time the dresses were black. Their object was a pilgrimage to the church at Claux, to pray for rain, very little having fallen during the summer.

Breakfast over, a stock of provisions added to the 'gigot de mouton' we had purchased at Guilestre, and a porter engaged to carry them, we started up the valley for the châteaux of Aléfroide. I know of few pleasanter walks than this. The path winds up and down among rocks overgrown with moss and fern, and shaded with trees; the torrent foams below, and the craggy buttresses of the Pelvoux tower in front. From Ville Val Louise to Claux, the valley is thickly populated and well cultivated, abounding in orchards of apple, cherry, and walnut trees. We passed by the first procession on its return home, our desires, as well as our direction, being exactly opposed to theirs. Our guides expressed sceptical opinions on the subject of processions, and hinted that the curé did not order one till he saw the barometer falling. We got a little out of our way on leaving Claux, by forgetting to turn to the left and cross the stream, and so had to retrace our steps.

Beyond Claux the path becomes more rugged, and the scenery wilder. Here and there the rocks are rounded by the pressure of glaciers long since melted away—memorials of the time when the ice-streams of the Pelvoux flowed down the Val Louise out into the valley of the Durance. We push on, till at last we come out by the side of a limpid stream, on to the well-remembered little plain on which stand the châteaux of Aléfroide. We halt a few minutes to examine the produce of the fields; rye, oats, potatoes, and cabbages grow, and to all appearance flourish there, though the spot is 4,937 feet above the sea, and at the very foot of the Pelvoux. We examine the old stone wall, close to the châlet, in which we had formerly found *Asplenium Germanicum*, and are again successful in discovering one small plant, with quantities of *Septentrionale*. Here the valley divides,\* we turn to the right, and are at once on new ground. No words can describe the grandeur of this side of the Pelvoux, as it rises precipitously some 7,000 feet above the ravine, crag above crag, and pinnacle above pinnacle,

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\* The left-hand branch, or Vallon de Sapinière, on the S. of the Pelvoux, leads to the Col de Selé, Mr. Tuckett's new pass to La Bérarde, and the right-hand branch, or Vallon de St. Pierre, on the N. of the Pelvoux, leads to the junction of the Glacier Blanc and Glacier Noir.

streaked here and there with snow, and wreathed with festoons of broken glacier. At the head of the valley is a small open plain, called the Pré de Madame Carle, covered with fragments of stone, among which the beautiful pink granite of the district is conspicuous, and intersected by the many branches of the streams that issue from the glaciers. These it was necessary to cross, in order to gain the right bank of the Glacier Blanc, as Mr. Tuckett had in vain attempted to reach the *gîte*, for which we were bound, by the other bank.

Our porter was not superior to the general law of incapability that distinguishes the natives of these valleys, and lagged far behind, sorely puzzled by the smaller streams. At last he came to the largest, which had given us some trouble. Here he halted for a time, and we began to fear that the bread, which was in his sac, would not make its appearance at lunch, unless we went for it. At last, after much deliberation, he converted himself into a Highlander, and waded across, to the intense amusement of our guides, who paid him many compliments on his strength and skill in crossing such dangerous torrents.

At the foot of the Glacier Blanc is a beautiful ice cavern. While admiring it, we received a practical hint upon the wisdom of keeping our distance, by seeing a few tons of ice fall from the roof without any previous warning. Our lunch finished, we began to mount the right bank of the Glacier Blanc. The sun was intensely hot, but the views of the Pelvoux, Crête de la Bérarde, and Pointe des Ecrins were magnificent. Our porter now began to groan 'Je ne puis plus marcher,' and implored us to 'rabattre quelque chose,' and dismiss him. This, of course, we could not do, but were at last obliged to take the greater part of his load from him and carry it ourselves. On arriving at the side of the glacier, he refused to venture on the ice. This difficulty, at Mathews' suggestion, was solved by our rushing on to it in a body, without paying any attention to him. As his wages were in our pockets, he soon followed us, and once on, was soon restored by the cool air and easy walking. We arrived at Mr. Tuckett's *gîte* at 3.40 P.M. It is a huge mass of rock that has fallen so as to make a sort of tunnel about eight feet by six. We at once set to work, built up the narrow end with stones, filled the crevices with moss and turf to exclude the wind, spread sods on the floor, and soon made quite a luxurious little cabin.

The view from the door is magnificent. In front, the range of the Pelvoux is seen across the two glaciers, and over the lower part of the Crête de l'Encula. The two highest peaks are the most prominent; next comes that singular peak, which

hitherto I had fancied must be the Aléfroide, but which I now saw was quite a separate mountain. Seen from Guilestre, or from anywhere near the Col du Glacier Blanc, it resembles a house with two wings and a gabled centre rising above them. Its height is, 12,845 feet. After the Matterhorn, it is the most remarkable mountain in the Alps. Next comes a crag like an upraised hand, 11,772 feet (?), and then the huge block of the Aléfroide, 12,878 feet. To the left of the Pelvoux we looked over the Val Louise, and the hills on the other side of the Durance, to the snow-streaked crête of the Pointe des Orches. We had each carried a bundle of dry juniper wood across the glacier, and our guides, by diligent search, found some more in the neighbourhood of our *gîte*, so, after watching one of the most glorious sunsets I have ever had the good fortune to behold, we lighted a fire, and spreading a macintosh below and a plaid over us, fell fast asleep.

We left our *gîte* at 4.35 A.M. on the 26th, and for some time kept to the rocks. After we had proceeded a little distance, the range of the Pelvoux corresponded exactly with the reverse of the outline I had taken at Guilestre, thus confirming in the most satisfactory manner the conclusions I had formed the evening before. The Pointe des Ecrins now came into sight, rising from the smooth wide fields of *névé* that form the upper part of the Glacier Blanc. This side is a mass of steep snow, broken here and there into tremendous ice-cliffs and *séracs*, and terminated by two peaks; one, the higher, on the left, a triangle of steep ice, with two rocky *arêtes*, divided here and there by projecting ridges of rock; the other a dome of snow. There are, in reality, three peaks to the mountain—(A) 13,462 feet, (B) 13,396 feet, (C) 13,058 feet. Of these I believe that A and B are seen just on the left of the Grand Pelvoux, from a point on the road to Queyras, about a mile above Guilestre. From the foot of the Glacier Noir, A only is distinctly visible. The two points seen from Les Etages, in the Val de St. Christophe, are B and C, A being probably concealed by the former. From the Glacier Blanc, A and C are seen.

It was evident that it would not be easy work to thread the labyrinth of crevasses which scarred the side of the mountain, and masses of broken ice strewn here and there over the slopes showed that avalanches were common, and warned us to keep our distance. At last, however, we determined on trying a slope on the right-hand side, and advanced up the glacier towards this point, leaving on our right the ascent

to the Col du Glacier Blanc. Here and there a long crevasse, too wide for a jump, obliged us to make a détour, the snow being in bad order and the bridges untrustworthy; but in general the surface of the glacier was but little broken, and walking was easy. On arriving at the foot of the mountain we halted for breakfast, and at 7.33 A.M. began the attack in real earnest.

For the next two hours our work was monotonous and fatiguing. We kept zigzagging up very steep slopes, now and then, for a change, cutting up an ice wall or walking along a narrow ridge with a steep incline on one side and a large crevasse on the other. The snow was in the worst possible order, an incoherent powder more than a foot deep, covered by a thin frozen crust, and resting in many places on hard ice. The first man had to stamp heavily to break a step, the second, however careful he might be, was almost sure to slip a little and break the holes into one, so that the third either floundered most uncomfortably in a sort of gully or had the labour of making a fresh set of steps. However, we pushed on, and our hopes each moment rose higher and higher; even the cautious Michel committed himself so far as to cry, 'Ah, malheureux Ecrins, vous serez bientôt morts,' as we addressed ourselves to the last slope leading up to the foot of the final cone. The old proverb about 'many a slip' was, however, to prove true on this occasion. Arrived at the top of this slope, we found that we were cut off from the peak by a formidable bergschrund, crossed by the rottenest of snow bridges. We looked to the right and to the left to see whether it would be possible to get on either arête at its extremity; but instead of rising directly from the snow as they appeared to do from below, they were terminated by a wall of rock some forty feet high. There was but one place where the bergschrund was narrow enough to admit of crossing, and there a cliff of ice had to be climbed, and then a path to be cut up a steep slope of snow, before the arête could be reached. At last, after searching in vain for some time, Michel bade us wait a little, and started off to explore the gap separating the highest peak from the snow dome on the right, and see if it were possible to ascend the rocky wall. Presently he appeared, evidently climbing with difficulty, and at last stood on the arête itself. Again we thought the victory was won, and started off to follow him. Suddenly he called to us to halt, and turned to descend. In a few minutes he stopped. After a long pause he shouted to his brother, saying that he was not able to return by the way he had ascended. Jean was evidently uneasy about him, and for

some time we watched him with much anxiety. At length, he began to hew out steps in the snow along the face of the peak towards us. Jean now left us, and making for the ice cliff mentioned above, chopped away until, after about a quarter of an hour's labour, he contrived somehow or other to worm himself up it, and began to cut steps to meet his brother. Almost every step appeared to be cut right through the snowy crust into the hard ice below, and an incipient stream of snow came hissing down the sides of the peak as they dug it away with their axes. Michel could not have been much more than 100 yards from us, and yet it was full three quarters of an hour before the brothers met. This done, they descended carefully; burying their axe-heads deep in the snow at every step. We were heartily rejoiced to see them once more in safety, and not sorry to be able to move, for though there was a fine view of La Meije and of Mont Blanc, it was very cold and uncomfortable.

Michel's account was that he had reached the arête with great difficulty, and saw that it was practicable for some distance, in fact, as far as he could see; but that the snow was in a most dangerous condition, being very incoherent and resting on hard ice; that when he began to descend in order to tell us this, he found the rocks so smooth and slippery that return was impossible, and that for some little time he feared that he should not be able to extricate himself, and was in considerable danger. Of course the arête could have been reached by the way our guides had descended, but it was so evident that their judgement was against proceeding, that we did not feel justified in urging them on. We had seen so much of them that we felt sure they would never hang back unless there was real danger, and so we gave the word for retreating. An observation made with my aneroid gives (after applying a probable correction) 12,936 feet as the height of the point at which we turned back, so that we were about 525 feet below the summit. We could have easily ascended the snow dome, which rose some 120 feet above us; but as the guides had just had such a hard piece of work, and time was an object, I did not propose it, consoling myself with the hope that I should get nearly the same view to the south from the Col des Ecrins below. This was not the case, and I now greatly regret that I did not mention it, as it must command a fine view of the range between the Val Godemar and the Val de Veneon. We expected to have some trouble with the snow in our descent, supposing that the heat of the sun would have made it softer and perhaps more dangerous.

Fortunately, we were mistaken, and we consequently descended with great rapidity, and reached the foot of the mountain in three-quarters of an hour, just half the time we had supposed it would take us. Here we halted for lunch. As soon as my hunger was appeased, I set off alone for the Col des Ecrins, which was some seven or eight minutes' walk from us across the glacier. To my disappointment very little was to be seen, but by climbing some distance up the sharp rocks on the right of the col, I got a view down the Vallon de Bonne Pierre into the Val de St. Christophe, and of a mountain which I believe to be the Tête de Lorraine, 10,961 feet. The couloir down which Mr. Tuckett descended looked very uninviting. After a hasty sketch, and an observation with my aneroid, I set off after my party, and soon overtook them. We arrived at the foot of the lateral glacier leading to the Col du Glacier Blanc in an hour. This is easily recognised from near Guilestre by a round patch of rock protruding through the middle of the ice. We reached the summit of the col in a little less than an hour, and thinking that our labours were nearly over, spent an hour and a quarter there in sketching and observing the barometers. The crags proved rather more difficult than we had been led to expect, and at last, instead of the easy snow-slope, which, when Mr. Tuckett descended in July, had united the cliffs to the glacier below, we found a precipice. We were therefore obliged to descend a very ugly cheminée that cost us much time and trouble. Night was coming on fast, and the glacier was at first steep and much broken by crevasses. At length, after some little difficulty, we extricated ourselves, and running over the smooth ice, took to the moraine, and succeeded in getting clear of it just when it became too dark to see objects distinctly. As the night was fine and the chalets uninviting, we decided to push on to Villard d'Arène or La Grave. Michel found the narrow track with wonderful skill, although it was at times very dark. Near the mouth of the valley the path suddenly disappeared, the Romanche having destroyed it. We had, therefore, to crawl along a steep bank just above the water, Michel now and then lighting a match to look for holes for our feet. The soil was so crumbly that we were frequently upheld by the points of our alpenstocks alone. We gained the 'grande route,' passed by Villard d'Arène, through several tunnels, and at last reached La Grave at 10.30 P.M. after an excursion of eighteen hours.



## THE COL DELLE LOCCIE.\* By J. A. HUDSON, B.A.

ON the 11th of August, 1862, I crossed the Monte Moro with my friend Mr. W. E. Hall, from Saas to Macugnaga, with the intention of effecting a passage between the Signal Kuppe and the Pizzo Bianco to Alagna. The weather, which had been unfavourable for some days previously, seemed at last to have become settled; and we reached Lochmatter's hotel full of hope for the morrow. Lochmatter eagerly accepted our proposition that he should try the new pass with us, and prevailed upon us also to engage his brother Alexandre. We started at 4 A.M. by the light of a lovely moon, and ascended slowly to the Belvédère, where we took to the glacier for a short time, and walked along a troublesome moraine. We soon, however, set foot on terra firma again, and proceeded over rocks and débris till we came to the chalet of Pedriolo, where a halt was unanimously called to imbibe milk.

At 6.30 A.M. we again got under weigh, and scrambled down a slippery moraine on to a gently-ascending slope of glacier, which presented no difficulties, and allowed us to proceed very rapidly. The view from this point was very grand and imposing. On our right was the summit of Monte Rosa, rising so abruptly as to seem almost directly overhead; on the extreme left was the Pizzo Bianco; and in front we saw a mass of very steep and broken glaciers, at the top of which was an ice-slope, leading up to the col we hoped to reach. On the right of the glacier huge precipices of dark rocks stood boldly forward, which did not look at all inviting, but up which Lochmatter told us our way would lie. We worked up the glacier to the left of the rocks, winding in and out among the crevasses, till they became so intricate that we were obliged to attack the rocks. To do this, however, it was necessary to pass a very awkward bergschrund, which required great care; but eventually we were all safely landed on the other side at 8.30 A.M. After a short halt, we commenced our climb up a series of steep rocky couloirs, plentifully sprinkled with loose slippery shale, and agreeably diversified by falling stones, which reminded me very forcibly of the Col de Sonadon. Half-way up we halted, to refresh the inner man, for twenty minutes, and then, with fresh vigour, we resumed our arduous climb. At 11.15 A.M. we bade adieu to the rocks with great pleasure, and threaded our way among some magnificent séracs, keeping

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\* The route is marked on the map inserted at page 50.

rather to the left till 12.45 P.M., when we came to a large bergschrund, above which a slope of hard ice led straight up to the col. The inclination of this slope could not have been less than fifty degrees, and great caution was necessary to avoid a slip, the consequences of which would have been very serious. Alexandre Lochmatter led the way, cutting large roomy steps, and his brother brought up the rear. One by one we crossed a frail bridge, and slowly mounted the slope, till, after seventy-four steps had been cut, we reached some projecting rocks; and in a few moments our object was attained, and we stood upon the summit of the pass.

On our left was a snow arête leading up to a peak, which Lochmatter said was called Cima del Pizzo, and which we could easily have reached had there been sufficient time; but as it was 1.25 P.M., we thought it better to rest content with what we had done. The various peaks of Monte Rosa were all our near neighbours, and behind us the Strahlhorn peered above the rocks of the Weissthorn; but on the south side some obstinate clouds provokingly interfered with our view. We attacked our provisions with Alpine appetites, and washed them down with some generous Malaga wine, for which we afterwards found, on settling with Lochmatter, that we had to pay very handsomely. We thought of calling our new pass the 'Col d'Alagna;' but having heard that a passage had been made a few weeks previously from Alagna to Zermatt by Mr. George, we thought that name might be already appropriated, and decided to call it the Col delle Loccie, from the peak immediately on the left, whose best known name is Montagne delle Loccie. Its local appellation, as I have said, is the rather unmeaning one of Cima del Pizzo; and in various maps I find it called Vonflue, Cima del Pisse, and Montagne delle Loccie, from which I have selected the last as the most familiar to Alpine travellers, and also the most convenient for giving a name to the pass.

We quitted the summit at 2.35 P.M., having left our names, inscribed '*more alpino*,' on a slip of paper inserted in an empty bottle. The descent presented few difficulties; there were one or two troublesome crevasses on the upper part of the Sesia glacier; but they did not detain us long, and we bore off to the left, leaving the glacier when it became precipitous, and descending rapidly down some grass slopes, which eventually landed us in the lovely Val Sesia. As we were traversing these slopes, a châlet suddenly came in view, which immediately conjured up in our minds visions of any quantity of delicious draughts of rich milk; but, alas! the fair pro-

priestess was absent, and the door was locked. Alexandre stood and scratched his head: suddenly a bright idea came into it. He inserted the point of his axe between two of the stones forming the side of the *châlet*, and thus made a perch, by standing on which he was able to put his arm through the window, and dip a succession of leathern cups into a large bowl of *niedl*, which fortunately was placed close to it. Having satisfied our thirst, we deposited some money to compensate for what we had abstracted, and were just departing, when the old lady who kept the establishment made her appearance. She seemed rather astonished at our proceedings; but, on seeing the cash, her face brightened up, and she thought it all a very good joke.

We proceeded without halting till we came to Alagna, which we reached at 7 P.M., having had a most satisfactory and enjoyable walk of exactly fifteen hours. We gave forty francs to Franz Lochmatter and thirty to his brother, with which they did not seem over well satisfied, and said they would not cross the pass again under fifty francs. We had, unfortunately, not agreed upon the price to be paid beforehand, as we ought to have done, and I am sure we gave them too much. This pass offers an agreeable alternative to the monotonous route over the Turlo; and I am certain that no one crossing it in fine weather will regret the exchange. I would advise travellers to take it from Macugnaga, as the ice-slope at the summit would not be easy to descend from the opposite side. Besides, all maps with which I am acquainted lay down the head of the Val Sesia so incorrectly, that it would not be hard to make mistakes in ascending from Alagna, and so find oneself at a wrong point on the ridge. The two Lochmatters are well up to their work, and I can recommend them for this pass, but they set rather an exorbitant value on their services. We had no means of accurately determining the height of the col, but we could plainly see that the Weissthorn was below us by several hundred feet, and therefore we must have attained an elevation of at least 12,000 feet.

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#### ZERMATT AND THE MATTERHORN IN WINTER.

By THOS. S. KENNEDY.

**D**URING the summers of 1858 and 1860 I had surveyed the Matterhorn from various points. From Breuil all access to the summit appeared to me to be out of the question, and

this was confirmed by the aspect of the mountain from the upper part of the Zmutt glacier. For there it appears that although the climber may, without serious difficulty, arrive at the base of the final pyramid, yet the southern side of that pyramid is for some hundred feet almost perpendicular, and evidently inaccessible. Another ridge, running downwards from the almost level summit towards the Dent Blanche, is cut short by that vast hollow in the rock so well seen from Zermatt; and from this secondary glaciers stream, to venture beneath which would be madness. Thus it appeared that the only route offering a chance of success was the northern or Hörnli ridge. The upper portion is tremendously steep; a body falling from it would not be arrested until it reached the moraines of the glacier of Zmutt, 6,000 feet below. But even in July and August snow lies there thickly, and black rocks jut their heads through, and where snow can lie a man may generally cut his steps and ascend. Careful examinations with the telescope convinced me, however, that the greatest obstacles would be found at a point considerably below the pyramid. There are long unweathered sheets of rock, very frequently covered with thin glassy ice from the drippings from above, and presenting of all things the most insuperable difficulties to the climber. Indeed, I did not see how, even with the aid of long ladders, they could be surmounted, till it struck me that in winter they might perhaps be found covered with snow; and this was partially the consideration that led me to Zermatt in January 1862.

One evening I arrived in Sion, having travelled two nights and days from Bohemia. Heavy rains had fallen for some days previously in the Valais, rapid mountain torrents had been formed, and portions of the Simplon road had been rendered impassable to the diligence. I waited a day, and next evening a light carriage was sent forward with the mails and some passengers. Beyond Tourtemagne the bottom of the valley had been converted into a lake, and the carriage splashed through several miles heavily. We arrived at Visp after midnight, having taken much beyond the usual time to perform the distance. I left my luggage with the innkeeper, and set forward early next morning to Zermatt. As far as Stalden all went well, but a little beyond the village the road is carried along the side of a steep hill, and here the devastation commenced. Masses of débris had fallen from above and choked the road, and frost had so disintegrated the stonework that in places many yards had fallen away. The little rills, so eagerly welcomed in summer by the thirsty traveller, now spread

themselves over the path in sheets of slippery ice, and the hills were laborious and difficult to traverse. Beyond Täsch all was hidden in snow. The roar of the Vispbach—for winter seemed to have no effect in diminishing its supplies—became gradually hushed; it was bridged over with snow, and only an occasional black hole through the crust betrayed the stream beneath. Pine trees and branches lay strewn about in confusion, landslips had frequently happened, and I crossed the remains of four avalanches. Just before entering the basin of Zermatt the valley narrows, and the Vispbach forces its way tumultuously through a rocky channel at the bottom. At this point a wonderful scene awaited me. Two tremendous avalanches, one from the Mettelhorn, the other from a spur of the Täschhorn, had rushed downwards and poured themselves into the valley. The mass lay 200 feet thick; I could have walked at that elevation across the valley on an almost level causeway. The snow had been rolled into round hard balls, and caused me no little trouble to scramble over. On reaching the inside I found marks of a recent inundation in the basin, caused by the damming back of the glacier torrents until they had been able to cut themselves a channel through the embankment. It was dark when I entered Zermatt, and the village presented a scene of almost utter desolation. Snow lay thickly on roofs and window sills, and long icicles depended from the spouts and rafters. Not a person was in the streets, hardly a light in the houses, and the two inns were barred up and forsaken. I went to the clergyman's cottage, and, after recovering from his first astonishment, the good man gave me a hearty welcome and a lodging.

During the evening I sent for Peter Perren to make arrangements, and started early on Monday morning up to the Hörnli. At the foot of the ascent are some *châlets*, inhabited in summer by herdsmen. These were filled with sheep and goats, closely crowded, for during winter the animals never leave their stables. Up to this point a narrow path through the snow had been kept open by people coming daily to feed their cattle; but thence we had to break fresh ground. The snow was dry and floury, covered with a thin icy crust, which broke under our weight. Though our poles were 3 ft. 6 in. in length, we plunged them in to the head before touching ground, and at every step we sank to the bottom. The work became severe; we took the lead alternately, changing every fifteen minutes. And now, as we wound slowly along the edge of the woods, the pines presented an aspect particularly beautiful. Laden with snow they waved heavily in answer to the occasional breaths of air, while

their slender tops, bent over by the unusual weight, nodded drowsily in a manner which harmonised admirably with the scene. We rested awhile, leaning against a convenient trunk, for the labour was enormous, and then breasted the steepest portion of the hill. Standing for a moment and panting for breath, we had turned to admire the gradually increasing view of the Mischabel, when a dull booming sound, like the distant firing of cannon, occurred behind us. Well we knew what it was, and turned instinctively, thrusting down our poles for anchorage. The snow gave way a few yards above, breaking from the additional weight, and then moved in a mass slowly downwards; but as we stood on the highest portion of the knoll, it parted beneath our feet, otherwise we might have been carried off by an avalanche. Several times that ominous booming sound was repeated, but the snow, having relieved itself, did not start more than a few inches.

At 2 P.M. we turned homewards, promising ourselves that, when the night frost had hardened our steps, the next day's work would be lighter; and, sliding and tumbling, we were soon at the bottom. Here old Peter Taugwalder met us, evidently wishing for work, and I engaged him, for two men would be necessary for the next day's expedition. In the evening we ransacked the village for provisions. No fresh meat was to be had, and hardly any bread, save the hard black stuff used by the peasants. Blankets and a saucepan were provided, and next morning we set off again, a large section of the village turning out to see the departure. We were heavily laden, and had some difficulty in ascending the snow steps. But from the brow of the hill the work was lighter: the wind sweeping over the plateau had bared the knolls from snow, and along these we wound our way slowly upwards. Late in the afternoon we arrived at the Schwarzsee, and set to work immediately to render the little chapel there habitable for the night. Deep snow-drifts lay all around the building, and snow had also been driven inside through the crevices of the door and window. We cleared a space in the middle for our fire, arranged the benches round, and built a fireplace with flat stones from the low wall outside. Perren found a log of wood lying in the snow; it was brought inside and hewn up with our ice-axes. Then a narrow path was trodden through the snow to the Schwarzsee, and a hole cut through the ice at which to draw water; fortunately the lake was not frozen to the bottom. We lit a fire, and proceeded to make soup, if a decoction of water, cheese, and some very ancient dried meat may so be named, to while away the time. Later on we donned our

extra clothing; I crept into my bag, and we all disposed ourselves for rest.

The smoke, finding but little outlet, was excruciating to my eyes, and prevented me long from sleeping; and my bag, although a perfect shield against all damp, was not impervious to the cold of the granite flag beneath. During the night the wind began to rise and to moan in fitful gusts around our shelter. At 4 A. M. we all rose and rekindled the fire, and had recourse again to the soup-making process. My minimum thermometer, hung outside the door, marked 9° Fahrenheit.

At six a faint illumination began to appear over the Cima di Jazi and Weiss Thor; we clad ourselves warmly, and set forth. We waded in the dark, knee-deep, through the snow up to and over the Furgge Glacier, and, at the usual point, ascended the rocks of the Hörnli ridge. A sharp north wind greeted us as we looked over towards the Dent Blanche, and portions of mist scudded past at intervals, making me fear for the success of my enterprise.

We turned to the left, and walked along the ridge directly towards the Matterhorn. A beautiful clear star shone out over his head as though it had been a beacon placed there to guide us. Slowly we toiled upwards, now round and now over the huge granite blocks so profusely strewn upon the lower part of this great ridge; still, as we ascended, the north wind blew fiercer and fiercer, and we were soon compelled to deviate to the left, and to climb about twenty feet below the ridge on the eastern precipitous face of the mountain. The work was laborious: steps had to be hewn, loose gravelly couloirs to be carefully crossed, and unsafe rocks to be avoided. Presently old Peter halted, announcing that he could not go farther; Perren looked upwards, and thought he could climb up again to the arête. He left his knapsack and alpenstock; we planted ourselves firmly, to give him every assistance in case of a fall, and upwards he went, climbing with great coolness and certainty. I took his knapsack and followed, aided now by the rope from above; then the axes were drawn up, and lastly old Peter's wild-looking head emerged above the rocks. Again the blast burst furiously upon us, almost sweeping us from our legs. We crouched for a time behind a rock and enjoyed the prospect. And now, while battling with the fierce wind, and with the stern grey rocks of the Matterhorn in front, I felt that sweet consciousness of power which runs through a man when meeting a worthy adversary. We looked more like a party of Arctic sledgers upon the ice than men about to use every muscle in gymnastic exercises. My guides

were both heavily clad. I wore a great coat and belt in addition to my usual dress, and a fur cap and a woollen scarf about my head; but such weather gives a man the strength of a giant, and no one seemed at the time to be conscious that he was doing more than ordinary work.

Again we attacked the ridge, knowing, nevertheless, that the battle could not last long. We were all blue in the face, our fingers were numbed, so that we could scarcely cling to the ledges and crevices, and the body could not be flung from point to point with such speed and unerring certainty as is practicable in a warmer atmosphere. The wind whirled up the snow and spiculæ of ice into our faces like needles, and flat pieces of ice a foot in diameter, carried up from the glacier below, went flying past. Still no one seemed to like to be the first to give in, till a gust fiercer than usual forced us to shelter for a time behind a rock. Immediately it was tacitly understood that our expedition must now end; but we determined to leave some memento of our visit, and after descending a considerable distance, we found a suitable place with loose stones of which to build a cairn. In half an hour a tower 6 feet high was erected; a bottle, with the date, was placed inside, and we retreated as rapidly as possible. We determined to go down the eastern slope, which at this point seemed to offer an easy descent to the basin of the glacier, and were thus almost perfectly sheltered from the wind. At the point of junction of the two glaciers we came upon a troublesome slope of ice, perhaps sixty feet long, which we could by no means circumvent; but in half an hour this was safely passed, and we trudged slowly along the basin of the glacier back to the chapel. There we essayed to set things a little to rights, took up our baggage, and went downwards to Zermatt, where we received a kind reception and a good supper from the curé. Next day I descended to Visp, and on Saturday was in England.

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THE MÖNCH. By COUTTS TROTTER, M.A.

SCARCELY anything in the history of the high Alps is more unaccountable than the fact that the Mönch, the fourth in height of the Bernese peaks, has been almost entirely neglected — never, indeed, ascended by an Englishman. A short account of the attentions that have been paid to this noble mountain may perhaps induce some travellers in the ensuing



season to continue them, and enable us to report next winter that the last of the Oberland giants has at length felt an English foot on his summit. There is a legend that a Countess, nationality uncertain, once ascended the Mönch, and she undoubtedly published an account of her adventures: but the only authenticated ascent was by Dr. Porges, of Vienna, in 1858. That gentleman, with Christian Almer and Peter Bohren of Grindelwald, and others, slept at the Stiereck châteaux, spent a whole day in ascending the Mönch-joch, and bivouacked under a rock somewhere between the Mönch and Trugberg. The next day they reached the summit, and returned to their rock, where they again spent the night, reaching Grindelwald again on the following afternoon. The weather was very bad, and the snow in a most unfavourable state, which must explain the extraordinary time requisite. From this time the Mönch remained untouched until the summer of 1862. Being lower than the Jungfrau and Finsteraarhorn, it was not so attractive to climbers starting from the Æggischhorn, while the experience of the only successful ascent was not such as to tempt explorers from the side of Grindelwald. Last summer however we determined, while crossing the Mönch-joch to the Æggischhorn, to try the Mönch *en route*, should circumstances favour us.

We left Grindelwald early in the afternoon of Thursday, July 24, and slept in the well-known cave on the side of the Eiger. As so often happens in mountain expeditions, we were later in getting off than we had intended, and it was four o'clock A.M. before we were clear of the cave. Our party consisted of the Rev. W. S. Thomason, my brother, and myself, with Peter Bohren and two younger Grindelwald guides. As there was a good deal to carry, and we intended to make use of the ladder left by the party who had descended by the Mönch-joch from the Jungfrau-joch a day or two before, we took also a couple of porters as far as the col. The threatening evening had been succeeded by a cloudless night and morning, and we reached the col which connects the Mönch with the Viescher-grat without serious difficulty, at about 8 A.M. The shoulder of the Mönch which descends to this col is very steep, so we proceeded nearly on a level to the second col, joining the Mönch and Trugberg, which we reached in little more than half an hour from the Mönch-joch proper. After a halt for breakfast we commenced the ascent of the peak. Crossing a small bergschrund we soon reached the rocks. These were rather steep, but not difficult, and we rose rapidly, the view to the south increasing in magnificence at every step. After a time, however, they came to an end, and we arrived at a steep slope of ice

covered with hard snow, which it was impossible to climb except by cutting deep steps. The ridge, after rising steeply, became evidently nearly level for some distance before it joined a second patch of rocks higher up the mountain. We accordingly, instead of following the arête, cut our way diagonally along the face of the slope, so as to reach the rocks by the most direct line. As, however, we were nearing them, after some two hours of tedious work with the axe, the sun began to soften the snow, and it was judged more prudent to turn directly upwards and reach the arête as soon as possible. The slope had been getting steeper and steeper, and closely resembled the last portion of the Wetterhorn. The ridge was at last gained, and the whole view to the north—the Eiger, the Faulhorn range, and the valley of Grindelwald—burst upon us; Grindelwald itself was hidden by the shoulder of the Eiger. We had now to follow the ridge to the rocks. The distance was small, perhaps ten yards, but it was the most trying part of our day's work. On our left was the formidable slope up which we had just come—on the right it was far steeper, I think quite as bad as the northern slope of the final peak of the Wetterhorn—the ridge itself fearfully narrow, and without the cornice which forms such a striking feature in the latter mountain. Slowly and carefully we all passed in safety, and, getting upon the rocks, sat down to rest and enjoy the view, which was one of the grandest I have ever beheld. It would take too long to describe it in detail, but any one familiar with the district can easily picture to himself its principal features. But we had to decide on what was to be done. Peter Bohren, who was one of the guides on the only previous ascent, had reached the summit in about two hours and a half from the col; we had already exceeded that time, and were by no means at the top—we had still a long steep ridge to mount before reaching what appeared to be the highest point, but which, as we suspected at the time, and afterwards saw clearly, was separated from it by a ridge of considerable length though slight inclination. It was nearly noon, the snow was rapidly getting loosened from the underlying ice, and though we might probably reach the top, the descent would be most likely dangerous, if not impossible; at least, the prospect of a night at the Faulberg with scanty wraps and failing provisions, was not a cheerful one, and we reluctantly determined to descend. When we got on to the steep snow we found that we had not turned too soon; the difference in its condition was already considerable; however, with care, we reached and passed the bergschrund without mishap, and set off down the glacier to the Æggisehorn, which we reached

about 8.30, after a fatiguing, but (in spite of our partial disappointment) a most enjoyable day. I have no doubt that under tolerably favourable circumstances, the ascent from this side would present no very great difficulties, but it would be advisable to start very early from the Faulberg, or even to bivouac on the rocks of the Trugberg. It should also be attempted tolerably early in the season, as the slopes are long and steep, and in September, when they are doubtless often hard ice, would require an amount of step-cutting, which would render them practically impassable.

NOTE.—It may be useful to append to the above a few notes of an attempt made on the same day to ascend the Mönch from the Wengern Alp. Mr Moore and I, accompanied by Christian Almer and two other men, one carrying a ladder, left the inn on the Wengern Alp at 2.30 A.M. We crossed the Eiger glacier by lantern light, and proceeded to ascend the shaly slopes that in this quarter form the face of the mountain. Up this progress was rapid, and at 6 A.M. we had nearly reached the top of the huge buttress that divides the Eiger and Guggi glaciers. After a halt for breakfast at the top of the rocks, we cut about fifty steps up the steep slope of ice that formed as it were the coping stone, and turning directly towards the summit, walked up the buttress for some distance. Presently it narrowed to a mere *kamm* of hard ice, along which 250 steps had to be cut, which brought us to the junction of the buttress with the central mass of the mountain. Round this we worked our way to the right, over patches of rock intermixed with ice and snow, going in the direction of the Jungfrau-joch, but always ascending, till at 9.15 we again turned to the left towards the summit. Progress would have been easier in the course we had before been following, but overhanging glaciers made it too dangerous to be thought of. For more than three hours we toiled up a slope of the hardest ice I have ever seen, inclined at from 42° to 48°, till, a little before 12.30, we reached the spot, the sight of which from below had induced us to bring a ladder. This was a low precipice of ice, quite impassable without a ladder, and very awkward with one. With some difficulty we made the ladder firm, Almer ascended it, and reported that the slope above was steeper, and the ice if possible harder than below. We were just on a level with the Silberhorn, some 1,300 feet below the summit, and, as far as we could calculate, we had four or five hours' work at least—700 or 800 more steps to be cut—between us and the top. We could certainly have got up, the only really formidable obstacle was the one we were just surmounting, but we should have had to spend the night clinging on to an ice-step. Under these circumstances it was clearly right to turn at once, and not inflict any unnecessary toil on our noble guide, who had cut over 750 steps in hard blue ice, but was still unwearied and totally undaunted, whereas the other men betrayed extreme satisfaction at turning back, not to say fear of the position we were in. Accordingly, we made our way leisurely back to the inn, contented to think that our failure arose from no fault of ourselves or of luck, but merely from our having

attempted an impossibility. Last summer was so exceptional in the great scarcity of snow, that the Mönch can hardly be said to have had a fair trial. With a reasonable amount of snow on the slopes which we found to be hard ice, I am fully convinced that the Mönch would be accessible in one day from the Wengern Alp, and I trust that the present summer may prove this opinion correct.

H. B. GEORGE.

AN ATTEMPT TO ASCEND THE LYSKAMM from the  
West. By A. W. MOORE.

**E**ARLY in July, 1861, I arrived at Zermatt with Zacharie Cachat, unfettered by any engagement, and eager, like every mountaineer, for an expedition over new ground. Having weighed the claims of the various peaks still waiting to be attacked, we determined on trying the Lyskamm. Accordingly, I engaged Johann zum Taugwald to accompany us, and at 2.15 A.M. on Monday, July 8th, we started from the Riffel Inn. The weather was perfect: there was no moon, but the sky was thick with stars, and the comet was blazing away over the valley of St. Nicholas, lighting up the snowy peaks around with unearthly splendour. However, the narrow path which leads down to the Görner glacier is not the best place for combining rapid motion with observation of the beauties of nature, especially in the dark; and several awkward stumbles kept this disagreeable fact fresh in my memory.

At 3.15 we reached the edge of the Görner glacier, the pools in which were frozen hard, and crossed it to the point where the glacier of Monte Rosa and that of Les Jumeaux fall into the main stream. By this time the sun had risen, and we called a halt to discuss the route by which the Lyskamm should be attacked; Cachat and I knew nothing of the ground, and we therefore left the matter to Taugwald. At his recommendation, we determined to make the assault by the Glacier des Jumeaux.

Having put on the rope, we accordingly made for the left bank of that glacier, close under the black crags of the Schwarzbürg, and soon found ourselves in the midst of a troublesome piece of ice navigation. The glacier was wonderfully broken up; indeed, I have nowhere seen finer séracs, except perhaps in ascending the Jungfrau-joch. Although at this early period of the season the bridges were comparatively firm, the passage was difficult and exciting; but Cachat led with wonderful skill and sagacity, threading a way through mazes sometimes so apparently hopeless that we were almost tempted to retrace our steps, and try the Monte Rosa glacier; until, working dia-

gonally from the Schwarzberg towards the Lyskamm, we gradually emerged from the chaos, and at 6.15 halted for breakfast on firm snow, with no apparent difficulty for some distance in front of us.

While engaged in this most agreeable of meals, we had plenty of time to look about us, and the result of our inspection was not encouraging. Although where we were sitting there was scarcely a breath of air, it was evident that up above a furious wind was raging, as, from the summits of the Twins, and from the arête along which we should have to pass, the snow could be seen blowing away in clouds. Slightly discouraged, but by no means in despair, we resumed our march up the glacier, and for a considerable distance our progress was singularly easy and pleasant; the slopes were not uncomfortably steep, the snow was in first-rate order, and the temperature of the air was just cool enough to render a sharp pace agreeable. But at length, having worked our way upwards in the direction of the Twins, we once more found the glacier considerably broken up, not into a system of tolerably regular crevasses as below, but into huge towers and pinnacles of ice. These appeared at first sight an insuperable bar to further progress in this direction, but after an infinity of trouble a passage was found, and the difficulties were gradually left behind. Steep slopes of hard snow succeeded, on which the axe occasionally came into play, but generally a good kick was sufficient to give footing; on cresting the last of these slopes, we found an abrupt drop of some 15 or 20 feet, with a crevasse at the bottom. The ridge was very narrow, so, straddling it, we worked along to a point where there was no crevasse, and dropping on to the soft snow which had drifted against the side of the ridge, stood, at 10.15 A.M., on the narrow plateau of snow stretching from the Twins to the Lyskamm, which has since been christened by Mr. Wm. Mathews, the 'Col des Jumeaux.'

Having halted for a few moments, we turned to the left, to begin the serious part of the day's work, and after a very few steps were encountered by the most violent north wind I have ever felt, which blew the snow in clouds about our heads, half blinding us; the slope in front became rapidly steeper, and the plateau gradually thinned off, until it became a mere knife-edge of snow; on the right, the slope fell with fearful steepness to the western arm of the Lys Glacier, and on the left to the *Glacier des Jumeaux*, which we had just quitted. Keeping just below the arête, on the south side, we gained with difficulty a point where the ridge widened out sufficiently to allow us to stand on, instead of below, the actual edge. In front of

us stretched towards the great mass of the mountain the most remarkable arête I have ever seen. It was not a knife-edge, like the one we had just passed, but a ridge probably about a foot and a half broad at the top, and considerably thinner lower down, so that to all appearance it would only require a more than ordinarily violent gust of wind to send the whole upper portion flying down to the Lys Glacier.

The effect of this peculiar conformation was, that, in crossing, it would be necessary to keep on the very summit, exposed to the full force of the wind, instead of a little below on either side in comparative shelter. But by this time the violence of the wind had increased to such a degree, that it was only by driving our alpenstocks firmly into the snow, that we could keep our footing where we were standing; and, on seeing the nature of the arête in front of us, both the guides simultaneously declared that in such a hurricane it would be madness to expose ourselves on it, and that we must therefore turn. Under any circumstances I could hardly have persevered against their expressed opinion; but, at the moment, the cold caused by the wind was so intense, and the feeling of physical discomfort so strong, that no thought of disputing their decision ever entered my mind, and my principal feeling was one of relief that the *onus* of giving up was removed from my shoulders. Accordingly, at 11.30, we turned our backs on the Lyskamm, which, ignorant of its approaching fall before Mr. Hardy's party, doubtless chuckled at our defeat, and made our way down to the plateau. The height of the Col des Jumeaux is, 13,517 feet; the point where we turned is probably about 500 feet above this, or more than 800 feet below the summit.

The heat during the descent of the Glacier des Jumeaux was very great, and we could scarcely believe in the severity of the cold we had experienced on the arête; but a glance upwards, where the snow was still blowing away in grand style, showed that the state of affairs there was not altered. The passage of the séracs was rather more difficult than in the morning, many of the bridges having fallen away, but they were passed at last, and we reached Zermatt at 5.30 P.M. I am very doubtful whether, under any circumstances, the ascent of the Lyskamm from the Col des Jumeaux is practicable, without descending some distance on the south side of the col, as has been suggested by Mr. Mathews. From the point where we turned I could see no clear way up the mountain, even had we been able to pass the arête. Cachat and Taugwald, however, declared that, on a calm day, we could

have got up when once over that obstacle; and I believe that Mr. Tuckett, who made the same attempt in 1860, and was turned back by the dangerous condition of the snow, is of the same opinion. Of course, the peculiar conformation of the snow arête described above, is not likely ever to be encountered again, as the weather causes almost daily variations in the state of snow, especially in such exposed places. The Lyskamm will probably, however, always be climbed by the Monte Rosa glacier, since two successful ascents have proved that route to be at least possible; though it is so long and difficult, that an ascent by the way which we tried unsuccessfully, if practicable at all, cannot well be a more formidable undertaking.

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THE GEOLOGICAL EVIDENCES OF THE ANTIQUITY OF MAN. By SIR CHARLES LYELL, F.R.S. Murray, 1863.

IT would be beyond the scope of the 'Alpine Journal' to discuss at any length the main subject of this valuable work; and we the more readily refrain from attempting to do so, as it would be impossible, within the limits to which we are necessarily restricted, to give an adequate idea of the amount of information which the author has brought to bear upon the geological records of pre-historic man. But in the course of his volume, Sir Charles Lyell has treated at some length on a matter which comes within our peculiar province; and a short account of what he has to tell us about the ancient glaciers of Europe, and especially of Switzerland, will not be out of place in these pages.

At the present day, glacier systems, or permanent accumulations of snow and ice, relieving themselves by an outflow into lower regions, exist only in few localities in Europe. But among mountains where now the winter fall is melted away by the first breath of spring, and over vast districts around, we find indications of former ice action on a gigantic scale. These indications are of various kinds. Rocks are ground, rounded, polished, and striated, as by the friction of substances rubbed over them with enormous force; heaps of unstratified mud and more or less rounded stones, often striated like the rocks, are found in positions analogous to those of existing moraines; huge boulders are scattered at a distance from their parent rocks, and sometimes perched in a singular manner in positions such as we often find them placed in on the edge of a glacier, but which it seems impossible to account for in any other way. In addition to these phenomena of mountain regions, we find extending over the greater part of Northern Europe, boulders and unstratified beds of clay and stones, such as must be deposited in the ocean on the melting of the huge icebergs, which loaded with stones and débris crowd the waters and imperil the navigation of northern seas.

There is evidence in the glacier traces found upon the highest mountains of Sweden that at one period the entire country was spread over with an uninterrupted coating of continental ice. The erratic

blocks scattered over the greater part of Northern Europe have been derived from Norway and Sweden, and a portion of the till and boulders of the eastern coast of England have had the same origin.

Scotland, like Scandinavia, appears to have been at one time 'moulded in ice,' and the Grampians to have been a centre from which erratic blocks were dispersed both northwards and southwards. The remarkable phenomena known as the parallel roads of Glen Roy, horizontal ledges surrounding the valleys at elevations varying from 850 to 1156 feet above the sea, and manifestly at one time lake margins, are accounted for by supposing the lower parts of the valleys to have been closed by enormous glaciers descending from Ben Nevis. Similarly, the Cambrian and Welsh mountains were once glacier districts, and the centres of dispersion of erratics over the greater part of England.

Most Alpine travellers are familiar with the indications which present themselves throughout Switzerland, of the enormous extension of the glacier system which must at one time have prevailed there. These are not merely confined to the valleys at the head of which existing glaciers are found; but remains of ancient moraines, *roches moutonnées*, and perched blocks may be traced over the whole of the plains, and abut to a considerable height against the chain of the Jura. In the year 1821, M. Venetz first called attention to these phenomena. M. Charpentier, in 1836, declared his opinion that the Alpine glaciers once reached continuously to the Jura. This theory, modified by the supposition of M. Agassiz that, instead of distinct and separate glaciers, the whole valley of Switzerland between the Alps and the Jura may at one time have been filled with ice, was adopted by Professor James Forbes in his 'Switzerland and its Glaciers,' published in 1843. Sir Charles Lyell however, in 1841, conjointly with Mr. Darwin, supposed that the morainic matter found on the slopes of the Jura had been transported by floating ice, at a time when the greater part of that chain, with the whole of the valley lying between it and the Alps, was submerged beneath the sea. This theory was afterwards adopted by Sir R. Murchison. Further observations, the importance of which has been strongly urged by M. Guyot, have convinced Sir Charles that, startling as it may appear, we must revert to the theory of Charpentier and Agassiz to account for the facts that are presented to us. M. Guyot has shown that 'the Alpine erratics, instead of being scattered at random over the Jura and the great plain of Switzerland, are arranged in a certain and determinate order, strictly analogous to that which ought to prevail if they had once constituted the lateral, medial, and terminal moraines of great glaciers.'

The principal source of the great ice sea which has thus covered nearly the whole of Switzerland appears to have been the valley of the Rhone. Fed by the drainage of the greater part of the surface both of the Oberland and Pennine Alps, this great glacier seems to have poured an enormous volume of ice through the gap which divides the Dent de Midi and the Dent de Morcles, and issuing from this narrow vomitory to have spread like a fan over the whole of the plain country, rising on the sides of the Jura at Chasseron, immediately opposite, to a height of 2015 feet above the lake of Neuchâtel, and descending in opposite



directions to the neighbourhood of Geneva on the south-west, and Soleure on the north-east. The erratics found about Chasseron are stated to be derived from the southern side of the Rhone valley near Sion. Those which have reached Geneva come from the south of Martigny. The blocks which descended from the northern side of the Rhone were deposited along the face of the northern outlyers of the Bernese Alps; while those which started from the highest parts of the valley travelled to the extreme north-eastern extremity of the glacier, and are found about Soleure, having performed a journey of no less than 150 miles.

This remarkable distribution of the débris would be alone almost conclusive in favour of the theory of glacier extension as against transportation by floating ice; but when taken in conjunction with the continual indications of glacier action over the whole country, and the absence of any contemporary beds of unequivocally submarine origin, carries complete conviction to the mind. It is another advantage of this theory that it does not require the height of the mountains to be diminished by some 4,000 feet, and thus render the increased cold more unaccountable. Sir Charles Lyell, indeed, appears now disposed to think with Charpentier that the Alps may have been higher, both absolutely and relatively to the Jura, than at present, but though this may have been the case, it does not seem to be necessarily required by any of the conditions of the problem.

When we turn to the southern side of the Pennine chain we meet with phenomena of a similar character. There are unmistakable indications that the whole of the Alpine valleys were at one time occupied by glaciers down to the points where they debouch upon the great plain of the Po, and that in the neighbourhood of Turin, and to a still greater extent around Ivrea, the ice flowed out upon the plain itself, and spread over a considerable extent of ground.

With regard to the history of the origin of these remarkable phenomena, the following is the account given by Sir Charles:—

‘1st. There was a period when the ice was in its greatest excess, when the glacier of the Rhone not only reached the Jura, but climbed to the height of 2015 feet above the lake of Neuchatel.’

‘2nd. To this succeeded a prolonged retreat of the great glaciers when they evacuated not only the Jura and the low country between that chain and the Alps, but retired some way back into the Alpine valleys. The geological formations of the second period consist of stratified masses of sand and gravel. Their origin is evidently due to the action of rivers swollen by the melting of ice, by which the materials of parts of the old moraines were rearranged and stratified, and left usually at considerable heights above the level of the present valley plains.’

‘3rd. The glaciers again advanced and became of gigantic dimensions, though they fell far short of those of the first period. That of the Rhone, for example, did not again reach the Jura, though it filled the lake of Geneva and formed enormous moraines on its borders, and in many parts of the valley between the Alps and the Jura.’

‘4th. A second retreat of the glaciers took place, when they gradually shrank nearly into their present limits, accompanied by

another accumulation of stratified gravels, which form in many places a series of terraces above the alluvial plains of the existing rivers.'

Connected with the subject of glacier extension is another question, namely, as to the origin of the considerable lakes which are so commonly found in subalpine districts. M. de Mortillet advanced the opinion in 1859, that the lakes had existed before the glacier period, but had been filled up with alluvial matter, and then re-excavated by the action of ice upon the incoherent alluvial strata. In support of this view, he pointed out that at the lower end of the great Italian lakes are found ancient beds of stratified alluvium containing pebbles which have come from the higher Alpine regions, and which could not have reached their present position unless the bed of the lakes, supposing them to have existed, had previously been filled up. Professor Ramsay about the same time suggested that the lake basins were not of pre-glacial date, but had been excavated in soft miocene strata by the action of ice.

These views are contested by Sir Charles Lyell, who bases his arguments on the position and direction of the lakes, and their entire absence in several areas where they ought to have existed if they had been produced by the cause assigned. He likewise asserts, contrary to Professor Ramsay, that alluvial deltas belonging to a pre-glacial period, are to be found on the borders of some of the lakes, especially that of Zürich. He further argues that, inasmuch as the upper strata of ice move more rapidly than those at the bottom, if the lake basin were filled with ice, the discharge would be entirely effected by the superior and faster moving strata, and that the lowest would be motionless or nearly so, and would exert very little, if any, friction at the bottom. His own theory as to the origin of the lake basins is, that they have been caused by unequal movements of upheaval and subsidence at or about the glacial period. At the same time he admits that the ice has contributed to the effect in some degree, both by its direct power in scooping out shallow basins where the rocks are of unequal hardness, and indirectly by preventing cavities from being filled up with sediment and by heaping up mounds of moraine matter.

Our limited space has compelled us to notice very briefly the author's views on these topics, and we must refer our readers to the work itself for a more complete exposition of them, as well as for his treatment of the question bearing directly on the main subject of this interesting volume, as to the existence of human life on the earth during, or antecedent to, the glacial epoch.

R. C. N.

## NOTES AND QUERIES.

THE COL DES BOUQUETINS.—Towards the end of August 1862, Mr. Digby and I reached the châlet of Abricolla with the intention of passing over to Prerayen by the Glacier de Mont Miné, and the saddle which the Federal Engineers have named in their map the Col des

Bouquetins. The distant view of the glacier—which is obtained from the Abricolla Alp—revealed, however, that a maze of séracs, broken to all seeming as much as those of the Col du Géant, stretch from Mont Miné to the Grandes Dents; the evening was too far advanced to allow of closer examination; it was a matter of some moment to cross the next day; we were ignorant of what might lie beyond the plateau which crowned the ice-fall; and we therefore unwillingly chose a more certain, but probably a less interesting route, by the western arm of the Glacier de Ferpèche. Its general direction is evident, the particular course may be infinitely varied, and it will probably be enough to say that the way lies up the middle of the glacier till progress is barred in front by ice cliffs, which are easily turned by a moraine descending from the upper level of the glacier. A belt of séracs follows, to thread which, when we passed, required a little tact; and finally an undulating tract of névé leads to the foot of a backbone of rocks, mingled with snow and ice slopes, which connects Mont Miné with the Tête Blanche. The point where we climbed the rocks is about one-third of the distance between the former and the latter mountain, and probably no better spot could be chosen; the slopes of Mont Miné itself are very inviting, but there would be a descent on the other side of several hundred feet, and again a fresh ascent to the level at which we gained the snow plateau of the Col des Bouquetins; while, were the ridge skirted till it almost loses itself in the névé near the Tête Blanche, a great circuit would be needlessly made. The rocks are of coarse red granite, steep, but affording firm hold. From their summit, which is the real col, a line should be taken to immediately under the Tête Blanche, where some *débris* fallen from its cliffs gives easy access to the snow field which lies above the rocks of the Col de Valpelline. The rest of the pass follows, of course, the well-known route down the Zardezan Glacier.

It is not often that there is occasion to find fault with the map of Dufour, but I cannot refrain from pointing out the absolute absurdity of the dotted line with which the col has been marked. It leads by an utterly impracticable ice cliff from a part of the glacier where no one ought to be, to another part equally out of the way; it can only mislead, and ought to be entirely disregarded. The Federal Engineers are also in error about the height of the col, no doubt because the highest point is not visible from the lower glacier. The rocks, when we passed them, were clearly above the level of the Col d'Erin, and the plateau underneath is not more than fifty feet lower; it may therefore be assumed, even if the plateau be taken as the col, that the pass is more than 11,400 feet above the level of the sea. W. E. HALL.

ALPINE BYWAYS: II.—*From St. Nicholas to Susten by the mountains.* So good an account appears in Murray of the first portion of this route, that it is only necessary to add a few remarks on some points. It is a great pity that so many travellers pass through St. Nicholas, without stopping time enough to make the excursion to the chapel of Jung or Jungen, a white building on the summit of the cliff immediately overhanging St. Nicholas. It can be reached in two hours by a very steep path, in some parts a mere staircase cut in the rock, but practicable

I was told for mules, though I think riding *down* would be hardly safe. The view from the chapel is superb, comprising the Oberland, the Monte Leone, the Saas Grat traversed by the eye from base to summit, like the Jungfrau from Murren, the Weisshorn towering overhead on the right, and the whole of the valley of the Visp, backed by the Monte Rosa range from the Lyskamm to the Theodule pass. I think the statement in Murray that Monte Rosa itself is visible is incorrect. A nice clean little inn has been built at Zmeiden in the Turtmann Thal, to which the path from St. Nicholas descends after crossing the col. It is charmingly situated, standing by itself in a green meadow on the bank of the stream, with some small rocky knolls cropping out of the turf. I hope its civil hostess will have more visitors next year than last; as at present the unfrequented solitude of the spot may be inferred from the fact that during the evening I spent there, I saw no less than six weasels running about within fifty yards of the door. Hence to St. Luc in the Einfisch Thal is well described in Murray. From thence, besides the ascent of the Bella Tola, the magnificent panorama from which is engraved in Berlepsch's new guide to Switzerland, a most interesting excursion may be made to the wonderful abyss called the Illgraben, or Les Eboulements. It may be reached in about two hours, and may be visited in descending either to Sierre or Susten, the latter being, I think, the preferable route, as it is more picturesque, and passes the lonely little tarn called the Illsee. The whole mountain has the appearance of having been first cleft open by some convulsion, and then, a great portion of it being a soft red sandy soil, the rains have widened and deepened the chasm, causing frequent landslips, till now it has become an irregular funnel-shaped hollow not less than 1500 feet deep, with an aperture towards Susten, the outlet of a small stream. The sides are very precipitous, and the upper edge on the side towards the Rhone valley is merely a thin crust, forming an arête too narrow to be traversed. The peasants have a story of a bear having taken up his quarters at the bottom a few years ago. The route from St. Luc to Susten starts from the back of the inn, and is at first a cart road through a pine wood, gradually mounting and passing some way above and to the right of the village of Chandolin. About an hour from St. Luc you cross a torrent on the right by a wooden bridge; and leaving the path strike up the moorland slopes, bearing to the right towards a depression between the Illhorn and the Schwarzhorn. I found my way entirely by Studer's map, as my guide, Moritz Andermatten, who had accompanied me from Zermatt, had never been this route before. On reaching this little col, about two hours from St. Luc, you see the Illsee close at your feet, on the bank of which is a chalet where milk can be procured. Hence the path zigzags down the ravine of the torrent from the Illsee, but before descending far it is advisable to leave the path, and striking left for a few minutes reach a point commanding a view right into the Illgraben. The finest point of view, however, is from the edge of the chasm towards Sierre, and a detour of about an hour might be made to this when above Chandolin, before mounting to the Illsee. The whole descent to Susten is very fine, passing through a dense forest of grand old pines, with lateral peeps on the left into the Illgraben, and thence

descending by pastures and châteaux and afterwards a second pine wood before reaching the flat of the Rhone valley. Six hours would be ample from St. Luc to Susten, and the whole route is practicable for mules.

F. ELLIOT BLACKSTONE.

**THE CLARIDEN GRAT.**—Can any mountaineer give an account from personal experience of the pass from the Linth Thal to the Maderaner Thal and Amsteg, across the Clariden Grat? It is just alluded to in Murray and other guide books, but I have never met with any particulars respecting its height, the difficulties (if any), or the time required for surmounting them.

F. E. P.

**GREEN SHADOWS ON SNOW.**—On the 16th of September, last year, I ascended the Gross Glockner in company with two friends. At 5.30 A.M. we were upon the long ridge which forms the snowshed of the Pasterze and Leiter Glaciers. The morning, upon the mountains, was perfectly clear and cloudless, though the valleys were filled with mist. The sun had not yet shown himself above the mountain ramparts which bounded our view towards the east, but a gorgeous fringe of fiery orange light, which rested upon the whole length of the mountain range, heralded his rising. I had been looking at this magnificent effect of the sunrise, when, happening to turn, I was surprised to see that our shadows upon the white snow at our feet were of a pale, though decided, green colour. Wishing to make certain of the fact, I asked one of my friends to look at the shadows and tell me what colour they were; and he immediately answered that they were green. This colour they retained for about ten minutes, until the sun had shown himself above the eastern range of mountains.

E. THURSTAN HOLLAND.

**FOREIGN ALPINE CLUBS.**—We have to record the formation abroad of two societies, according to the example set by the English Alpine Club, though not mere imitations of that peculiarly English fraternity. In Vienna was formed, last year, an Alpen Verein on a very extended scale, whereof any person interested in the Alps may become a member, whether he be a climber or not. The special object of this society is the exploration of the Austrian Alps, and the improvement of guides, roads, and accommodation in the little-known mountain regions of Germany. Within the last month a Swiss Alpine Club has also been founded, which proposes to make complete and systematic explorations, not merely of the great peaks, and of passes leading from one inhabited place to another (most of which have been already accomplished by the English club), but also of every part of the ranges from which the first class mountains rise. They also project the erection of night stations in the higher regions of the Alps, and the selection and education of able guides,—schemes which, if carried out, will be of great use to all travellers, and ought to obtain the pecuniary support, as well as the hearty sympathies, of English mountaineers.

**SWISS PENSIONS.**—So many persons being interested in knowing where healthy exercise and pure air, with a certain quantity of "creature comforts," may be obtained at a moderate expense, the following list of some of the most desirable pensions in the Alps may be found useful:—

*Stachelberg*, in the Canton of Glarus, accommodation excellent, at six or seven francs per day. Mineral baths. A very large and complete establishment.

*Poschiavo*, a nice little inn on the Italian side of the Bernina Pass; delicious trout from the lake.

*Sonnenberg*, immediately above the Grütli, five francs per day without wine; sixty or seventy people assemble here in August and September; new milk may be had every morning at six; one may bathe in the Lake of Seelisberg.

*Champery*, at the foot of the Dent-du-Midi, in the lovely Val d'Illicz, one of the cheapest mountain pensions in Europe, four and half francs per day; the living very fair.

*Comballaz*, said to be the highest pension in the world, 5,000 feet above the sea, in the Val des Ormonds, very comfortable, but does not command much view; five francs per day.

*Hôtel du Mont Joli* (St. Gervais, Savoy), six francs per day; the luxuries of a town in a quiet country village; near the Glacier of Bionnassay and the Col de Voza.

*Hotel de la Dent Blanche, Evolena*, in the Val d'Erin, good rooms, but a party should write beforehand, as the supply of provisions is liable to fall short. This is not a pension strictly, but, as at most other hotels in Switzerland, an arrangement may be made for a few days at pension prices.

*St. Luc*, in the Val d'Anniviers, a charming spot, with a view of the Matterhorn from the windows. The landlord, Pons, is a trustworthy guide, and has mules and side-saddles.

*Engstlen*, near the summit of the Joch Pass, rough, but clean, on a very secluded piece of table-land, with a small lake; four francs per day.

*The Frohn-alp*, on the east side of the Urner-see, nearly opposite Sonnenberg, an elevated and very airy spot. R. W. E. FORSTER.

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\* \* In the September number of the 'Alpine Journal' will be published a summary of all new ascents and remarkable expeditions made during the summer, to as late a date as may be found possible. For this purpose the Editor requests mountaineers to furnish him, at their earliest convenience, with memoranda of all new and interesting expeditions which they may happen to make. He would also be glad to receive contributions to the series of *Alpine Byways*; under which heading it is intended to give notes of excursions which, though near the great routes and generally practicable for ladies, are unnoticed or insufficiently described in the guide books.

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SEPTEMBER 1863.

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THE JUNGFRAU-JOCH AND VIESCHER-JOCH, two new Passes  
in the Oberland. By the Rev. LESLIE STEPHEN, M.A.  
Read before the Alpine Club on May 5th, 1863.

LET the problem be proposed to cross the main ridge of the Oberland in one day, or, in other words, to pass in one day from the waters of the Lütschine to those of the Rhone. We shall find that there are five possible routes corresponding to five depressions in the ridge which forms the watershed. This watershed lies NE. and SW. between the Mönch and Jungfrau, and there follows the edge of the huge cliffs which look down upon the Wengern Alp. But from each end of this line, it bends round towards the interior snow-wastes of the Oberland. Beyond the Jungfrau it runs due south to the Gletscherhorn. Beyond the Mönch it runs about SE. through the two Viescherhörner \* to the Finsteraarhorn. The great mass of the Eiger is a mere peninsula, connected with the Mönch by an isthmus, the glaciers from both sides of it sending their streams into the Lütschine.

The first pass effected over this ridge was by the Mönchjoch, the depression between the Mönch and the Viescherhörner. This was crossed by Messrs. Hudson and Birkbeck in 1857 or 1858, and will always remain the easiest method

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\* These are the two peaks that, as seen from Grindelwald, seem to close the head of the lower glacier. They are also, and more conveniently, called the Walcherhörner, which name distinguishes them from the other Viescherhörner: the lower of the two, the further to the left as seen from Grindelwald, is also locally known as the Ochsenhorn.

of passing from Canton Berne to Canton Valais. The next pass made was the Eiger-joch, crossed by the Messrs. Mathews and myself in 1859. It is essentially the same as the Mönch-joch, as it lies over the head of that pass, though reaching it by first climbing the ridge between the Mönch and Eiger. The next passage was made by Messrs. Tyndall and Hawkins in 1860, over the Launen-thor, between the Jungfrau and Gletscherhorn. There remained two passes to be made at the beginning of 1862. The first and most obvious was the Jungfrau-joch between the Mönch and Jungfrau. The other was the pass between the Viescherhörner and Finsteraarhorn. This last differed from all the other passes in one respect, that whereas they all lead to the great Aletsch glacier, this would bring us down upon the head of the Viesch glacier.

The Jungfrau pass had long been an object of my ambition. It is obtrusively and almost offensively a pass. Unlike some passes, falsely so called, whose summit levels are either huge plains like the Théodule, or, still worse, tops of mountains like one or two that I have crossed, the Jungfrau pass presents a well-defined depression between the two highest mountains in the district. Moreover, the summit of the pass and the two ends of the journey lie in a straight line, from which no part of the route deviates considerably. In fact, if it were not for the mountains, the line of the Jungfrau pass would be the most natural and obvious route from the Wengern Alp to the Äggischhorn. The Jungfrau-joch is, therefore, the very type of a pass, and, as such, it shows itself to the whole middle land of Switzerland. No one could stand on the Jura or on the terrace of Berne, without instinctively recognising it as the right way to go. And yet with all this it has a certain affectation of inaccessibility. The huge barricades of overhanging névé on its northern side seem to bar all approach. Both Mr. Bunbury and his guide declare in the first series of 'Peaks, Passes, and Glaciers' that the scheme of climbing it on the north 'was wholly impracticable.' Even when looking at it with such men as Almer and Michel, we found it hard to trace any line of ascent. As, however, it is a mountaineer's article of faith that where Providence puts a pass it also makes a way over it, I had long hoped to try whether this big bully was as impassable as he appeared to be. Finding myself at Grindelwald with Messrs Hardy, Liveing, and Morgan, and having engaged the two Michels, we generally voted that it was desirable to try the effect of a closer acquaintance. Messrs. George and Moore were already at Grindelwald with Christian Almer meditating a similar assault; so we agreed to join forces.



A strong party accordingly marched out of the inn on the Wengern Alp at three on the morning of July 20th, 1862. The six above named Englishmen were accompanied by six guides, the two Michels, Christian Almer, Ulrich Kaufmann, P. Baumann, and C. Bohren. We soon reached the buttress of the Mönch, which divides the Eiger from the Guggi glaciers, climbed it for a short way, then descended upon the Guggi, and mounted by it to the great plateau which lies below the cliffs immediately under the col. We arrived here at about seven, and, after a short meal, carefully examined the route above us. Half way between us and the col lay a small and apparently level plateau of snow. Once upon it we felt confident that we could get to the top. But between us and it lay a broken and distorted mass of crevassed glacier, the passage of which seemed very doubtful. We might, however, turn part of this by creeping up a mass of icy débris, which lay at the foot of a cliff of protruding ice, the abrupt end of a glacier crawling down over the cliffs above us. It is always unpleasant to walk with the consciousness that a few tons of ice may at any moment be playing leapfrog about your ears. So unpromising, however, was the appearance of the distorted glacier upon our right, that three of the guides went forwards to examine this smoother but more treacherous route. We sat down and watched them, not without some anxiety. But after the pleasant process of cutting steps for half an hour under a mass of glacier in an uncertain condition of equilibrium, they returned to us with the news that further ascent by this route was impracticable as well as dangerous. No alternative was now left but to examine the maze of crevasses on our right. Christian Michel, Christian Almer, and Kaufmann accordingly went forwards to try to penetrate it. We watched them creeping forwards round the base of a huge pinnacle of ice, at the other side of which they disappeared. We sat quietly on the snow, finished our breakfast and smoked our pipes. Morgan sang us some of the songs of his native land (Wales); we occasionally struck in with an English chorus; Baumann irrelevantly contributed a few German verses. Gradually our songs died away, and we took to contemplating the scenery. Morgan, who had spoken very disparagingly of the Wengern Alp as compared with the scenery of Pen-y-Gwryd, admitted that our present view was not unlike that above Llyn Llydaw, on the side of Snowdon, though the quantity of snow rather spoilt it. Gradually our conversation slackened. The only sound was the barking of a dog at the Wengern Alp, which came sharp and distinct through the clear mountain air, though

we could not make out the beast himself with a telescope. Nothing could be heard or seen of the three guides who had gone forwards. A very long interval seemed to have passed away.

We all sat looking at each other in an uncomfortable frame of mind, feeling an amount of anxiety which we were unwilling to express. I could not avoid the recollection that the last time Christian Almer had left me on a glacier, I had only found him again with two of his ribs broken. When George said something about going to look for our lost guides we scouted his proposition with a determination proportioned to our wish not to believe in its necessity. Our nervousness was, however, gradually becoming intolerable, and we were about to decide that something must be done. Suddenly, after at least two hours' waiting, we heard a faint shout. Looking upwards, we could just distinguish three black figures at the edge of the small snow plateau. 'What do they say, Michel? Are we to come?' 'Nein, Herr.' 'And what is it that they are saying now?' 'Something about a *heillosser schrund*,' which I take to mean a schrund of such enormity as to be past praying for. They were evidently repulsed. We sat down on the snow in what I may call a ruffled frame of mind, and waited for their return. Morgan quoted a proverb in Welsh, the only literary remains of one of the greatest of Welsh sages, Anarawd, so he informed us—the translation of it being 'for the impatient patience is needful,' or words to that effect. Whilst we were discussing the least ignominious way of getting to the *Æggischhorn* under the circumstances, our guides reappeared. They had been stopped, they told us, by a huge crevasse, thirty feet broad in places, and running right across the glacier, dividing it into two distinct fragments; once beyond it, we should be all right, and by means of a ladder twenty-five feet long, they thought it might be possible to get over it at one point. All our despondency was over. Go back to the *Wengern Alp* and send down for a ladder was our unanimous vote, and accordingly, the same evening, the ladder appeared in charge of one Peter Rubi, a name much to be remembered, for a stronger, better-tempered fellow never stepped on a glacier or lugged a ladder over it.

The next morning, starting at 3.5, we had arrived at the same place as before, at 6.12. We plunged at once into the maze of crevasses, finding our passage much facilitated by the previous efforts of our guides. We had to wind round towers of ice intrenched by deep crevasses, carefully treading in our guides' well-cut footholds. A clinometer, which showed various

symptoms of eccentricity throughout the day, made some specially strong statements at this point. I only remark, however, that if you place one with judgment, the inclination of Holborn Hill may be brought to approximate to 90°. A more serious inconvenience was derived from the extremely shaky nature of the towering ice-pinnacles around us. We were constantly walking over ground strewn with crumbling blocks of ice, the recent fall of which was proved by their sharp white fractures, and with a thing like an infirm toad-stool twenty feet high towering above our heads. Once we passed under a natural arch of ice, built in evident disregard of all principles of architectural stability. Hurrying judiciously at such critical points, and creeping slowly round those where the footing was difficult, we managed to thread the labyrinth safely, whilst Rubi appeared to think it rather pleasant than otherwise in such places to have his head fixed in a kind of pillory between two rungs of a ladder, with twelve feet of it sticking out behind and twelve feet before him. We reached the gigantic crevasse at 7.35. We passed along it to a point where its two lips nearly joined, and the side farthest from us was considerably higher than that upon which we stood. Fixing the foot of the ladder upon this ledge, we swung the top over, and found that it rested satisfactorily against the opposite bank. Almer crept up it, and made the top firmer by driving his axe into the snow underneath the highest step. The rest of us followed, carefully roped and with the caution to rest our knees on the sides of of the ladder, as several of the steps were extremely weak—a remark which was equally applicable to one, at least, of the sides. We crept up the rickety old machine, however, looking down between our legs into the blue depths of the crevasse, and at 8.15 the whole party found itself satisfactorily perched on the edge of the nearly level snow plateau, looking up at the long slopes of broken névé that led to the col.

A little discussion now ensued as to the route to be taken. The most obvious way was through the steep seracs immediately under the snowy col. The guides, however, determined upon trying to turn these by cutting their way up the steady slopes more to the right. Chr. Almer and Chr. Michel accordingly went forward and set to work, whilst we indulged in a second breakfast and pipes. For a time they went on merrily. The snow was in good order, and required only a single blow from the axe. The fragments which rolled down upon us were soft and harmless. Soon, however, they began to be mixed with suspicious lumps of hard blue ice. Almer and Michel seemed to be crawling forwards more and more slowly. The labour was

evidently considerable for every foot of progress won. I began to remember, with increasing distinctness, a certain six hours' labour on an exactly corresponding place on the Eiger-joch. The slopes through which we had there cut our way were neither so long nor so steep as those now before us, and the snow here was equally hard. It was evidently getting to be a bad job. Our spirits, which had risen with the successful passage of the crevasse, began to fall again. The pleasures of a return through unsteady seracs in the heat of the day, to present ourselves a second time to the jeers of tourists on the Wengern Alp, were not attractive. Our cheerful reflections were put a stop to by the return of Michel and Almer. They agreed that the staircase on which they had now spent an hour's work must be abandoned; but we might still try the great wall of seracs on the left. It would be very hard to give to any but Alpine readers the least notion of what the task before us was like. I reject unhesitatingly Morgan's statement that it was exactly similar to the ascent of the Glydurs from Llyn Ogwen. We had to climb a wall built of seracs, their interstices plastered up with snow, and the whole inclined at an angle of between  $50^{\circ}$  and  $60^{\circ}$ . Every now and then, where the masonry had been inferior, a great knob of serac protruded, tilting up the snow to a steep angle, and giving us a block of solid ice to circumvent. Deep crevasses, arranged on no particular principle, intersected this charming wall in every direction where they were not wanted. It may be tolerably represented by imagining the seracs of the Col du Géant filled up, and jammed together by their weight at a steep angle. Michel and Almer led the way rapidly and eagerly. Sometimes we could get on for a few paces in snow; sometimes the axe was called into play. But we all pushed forwards as fast as we could, and in dangerous places those who had passed professed to help the others, by hauling in the rope as hard as they could. When the man behind was also engaged in hauling himself up by the rope attached to your waist, when the two portions of the rope formed an acute angle, when your footing was confined to the insecure grip of one toe on a slippery bit of ice, and when a great hummock of hard serac was pressing against the pit of your stomach and scrouging you out of your natural position of equilibrium, the result was a feeling of qualified acquiescence in Michel or Almer's lively suggestion of 'Vorwärts! vorwärts!'

Somehow or other we did ascend. The excitement made the time seem short; and after what seemed to me to be half an hour, which was in fact nearly two hours, we had crept, crawled, climbed, and wormed our way through various obstacles, till we

found ourselves brought up by a huge overhanging wall of blue ice. This wall was no doubt the upper side of a crevasse, the lower part of which had been filled by snow-drift. Its face was honey-combed by the usual hemispherical chippings; and it was actually hollowed out so that its upper edge overhung our heads at a height of some twenty or thirty feet; and the long fringe of icicles which adorned it had made a slippery pathway of ice at two or three feet distance from the foot of the wall by the freezing water which dripped from them; and along this we crept, in the hopes that none of the icicles would come down bodily. The wall seemed to thin out and become much lower towards our left, and we crept along towards its lowest point. The edge upon which we walked was itself very narrow, and ran down at a steep angle to the top of a wall below us, similar to that above. It was almost thinned out at the point where the upper wall was lowest. Upon this inclined ledge, however, we fixed the foot of our ladder. The difficulty of doing so conveniently was increased by a transverse crevasse which here intersected the other system. The foot, however, was fixed and rendered tolerably safe by driving in firmly several of our alpen-stocks and axes under the lowest step. Almer then, amidst great excitement, went forwards to mount it. Should we still find an impassable system of crevasses above us, or were we close to the top? A gentle breeze which had been playing along the last ledge gave me hope that we were really not far off. As Almer reached the top, about twelve o'clock, a loud jodel gave notice to all the party that our prospects were good. I soon followed, and saw, to my great delight, a stretch of smooth white snow, without a single crevasse, rising in a gentle curve from our feet to the top of the col.

The people who had been watching us from the Wengern Alp had been firing salutes all day, whenever the idea struck them, and whenever we surmounted a difficulty, such as the first great crevasse. We heard the faint sound of two or three guns as we reached the final plateau. In a letter which appeared in the *Bund*, which, from internal evidence, I attribute to the waiter at the Adler at Grindelwald, I find a justifiably severe remark upon the Englishmen who at this period did not stop to acknowledge the salute or admire the scenery, but went straight on with manifest thoughts of eating and drinking. The facts are melancholy. On reaching the foot of the gradual snow-slope I have mentioned, several suggestions were thrown out for guiding our conduct when we arrived at the top. I suggested giving three cheers; George, I think, hinted at singing *God Save the Queen*; Morgan proposed an adaptation of the *March of the Men of Harlech*;

whilst Hardy thought we might celebrate the occasion by a good glass of brandy all round. Whether it was, however, that the rise to the pass was so gentle and the saddle so broad as to be almost imperceptible, or that a cold wind which was blowing across it chilled our enthusiasm, I cannot say. The fact is that we crossed the final slopes as calmly as if we had been traversing the Théodule. On catching sight of a small patch of rocks where a ladder is kept for the benefit of those who ascend the Jungfrau from the Grindelwald side, we rushed violently down a steep place to a sheltered corner, and there partook of breakfast No. 3. After luncheon and a chat, we got under weigh again, our friends Messrs. George and Moore descending the Aletsch Glacier to the *Æggischhorn*, whose summit was already in sight, and deceptively near in appearance. The remainder of the party soon turned off to the left, and ascended the snow-slopes to the gap between the *Mönch* and *Trugberg*. As we passed these huge masses, rising in solitary grandeur from the centre of one of the noblest snowy wastes of the Alps, Morgan reluctantly confessed for the first time that he knew nothing exactly like it in Wales. We ploughed on in the mid-day sun, Rubi trailing the ladder behind us with singular ease and content. We were not sorry to reach the top of the *Mönch-joch*, and drop down through the complicated crevasses beyond to the Grindelwald side. Rubi deposited his ladder at the foot of the great icefall after thirteen hours' companionship; and at nine o'clock we returned to the *Adler* at Grindelwald, having made a new and interesting high level route from the *Wengern Alp*.

On sitting down to supper, I discovered a large hole in my ankle. On exhibiting this to Liveing next morning, he asked for my clasp-knife. Extracting from it a very blunt and rusty lancet, and observing that it would probably hurt me very much, he quietly took hold of my leg (in the *Speise-saal*), and, as it appeared to me, drove the aforesaid lancet right through my ankle with a pleasant grin. He then recommended me to lie down on the sofa, and keep my foot higher than my head. I obeyed his directions, and remained in this attitude (which is rather commodious than elegant) for eight consecutive days, during which my prayers for rain and mist were answered by an uninterrupted duration of cloudless weather. I had the pleasure (through a telescope) of seeing my friends one day on the *Wetterhorn* and another on the *Eiger*, and fervently blessing them from the valley. I read through the whole literature of the village, consisting of an odd number of the 'Illustrated,' half a 'Bell's Life,' and Tennyson's 'Princess,' about a dozen times, and occasionally induced Hardy and Morgan to trot me round

the house in a *chaise-à-porteurs*. On the 8th day, July 29th, my leg was better, and tying it up in a handkerchief, I resolved to get on to my feet once more, and make another pass across the Oberland. The same evening four of us (Hardy, Liveing, Morgan, and I), with the two Michels, Baumann, C. Bohren, and Inabnit, were the occupants of the Kastenstein, a kind of burrow under a big stone at the foot of the Strahleck Pass. A more glorious evening and a more lovely place for a bivouac I never saw. The long line of cliff from the Finsteraarhorn to the Eiger was in front of us. At their feet lay the vast reservoirs of snow, from which the huge Grindelwald glacier pours down right into the meadows and corn-fields below. Looking down the great ice-stream through the mighty gateway whose pillars are the Eiger and the Mettelhorn, we had our one glimpse of vegetation and habitable regions. The faint reflection of the flashes of summer lightning showed us at intervals the clear outline of the snow-fields opposite, and one glimmering spark marked the resting-place of some friends who were to cross the Mönch-joch next day. Some discordant shrieks from our party made the summer night hideous, but probably failed to reach the ears of our next neighbours at a distance of three or four miles. We certainly heard no response, and crept into our burrow, where I need only say that four of us were packed between a couple of nubby rocks, some two feet apart, and reduced into that kind of mass, which 'moveth altogether if it move at all,' which it didn't.

At 4.55 next morning, very much later than was either necessary or advisable, we were off. Crossing the crisp surface of level glacier beneath us, we arrived at the foot of a series of snow-slopes, which reaches from the highest reach of the Grindelwald glacier to the eastern face of the Viescherhorn. Seen from this side, the lesser Viescherhorn (or Ochsenhorn) rises in a double-headed form; the peak towards the Finsteraarhorn being bounded by a rounded outline, and divided by a saddle from the sharper peak towards the north. Immediately below this saddle lies a comparatively level plain. Two or three ridges starting from it partition off the secondary glaciers, which descend steeply through deep gorges to the Grindelwald glacier. The most obvious plan would perhaps be to ascend that glacier which starts from the actual col, south of the rounder point of the Viescherhorn and between it and the Finsteraarhorn. The lower part of this glacier is, however, torn by numerous crevasses, and its upper part divided from the col by long and very steep snow-slopes. We therefore preferred to ascend at once by the first glacier whose foot

we reached, and which appears to form nearly a straight line from the sharper summit of the Viescherhorn to the Grindelwald Glacier. This glacier was itself torn by huge transverse crevasses in more than one place. We toiled slowly up it in a long line, dragging behind us a ladder, which our experience on the Jungfrau-joch had induced us to lug along with us. The abominable machine acted rather like the log sometimes attached to a donkey's leg. It trailed heavily and deeply behind us. It of course abridged more or less our passage of some of the larger crevasses. But I doubt whether it was worth the extra trouble—and my doubts are not materially diminished by the care which old Michel took to assure me that we should never have got up without it. We certainly should not have taken an extra guide without it. Our glacier had a fine eastern aspect, and consequently, as the morning sun struck upon it, we sank deeper and deeper, and toiled more wearily up its apparently interminable slopes. The ladder made a deep trace along the snow, we floundered wearily on, and the Viescherhorn seemed to rise higher and higher with a monotonous but singularly steady motion. At last we struck into the path of an avalanche, which had come down not long before, and had effectually bridged some yawning crevasses. This helped us a bit, and at last, after about five hours of toil, we found ourselves on the little level I have mentioned. We struck across this, and circumventing a bergschrund by means of the ladder, the one time in the day when its absence would really have been inconvenient, we found ourselves at 10.30. on a kind of snowy rib descending directly from the rounded dome which forms the southern hump of the Viescherhorn.

Up to this point the work had been simply a stiff pull against the collar. No excitement, no variety, and very little pleasure. It was simply plodding up a very hot, long staircase, knee deep in snow. From this point the labour was so far changed that we frequently had ice under our feet instead of snow; the guides had the additional amusement of cutting a good many steps, and there was a small amount of pleasurable excitement from the fact that there was a bare possibility of our coming down with a run. The surface of the ice was covered by snow in that peculiar state in which it is sometimes found in these high regions. It consisted of a mass of granular lumps, like loose piles of hailstones. These poured into every footstep as it was cut, as so much sand might have done, and had to be cleared out by hand and foot before we could safely trust our weight to them. As it was, the rope once or twice tightened unpleasantly, and my next neighbour informed me that he was



standing on nothing particular, and advised me to stand steady. I presume, too, that it is to this point of our journey that I am to refer an incident which Morgan has since related in thrilling terms, but which has mysteriously escaped my memory. He says that we were exhausted with our labour, parched with the reflected heat of the sun, and toiling knee-deep in snow up the steepest part of the slope. Guides and travellers were alike faint—frequently pausing for breath, and at times half inclined to give up their toilsome enterprise. A halt took place—we were undecided whether to advance or retire—the critical moment was come. Suddenly Morgan raised his voice, and dashed into one of the inspiring songs of his native land. As the notes struck our ears, fresh vigour seemed to come into our muscles. With a unanimous cry of ‘Forwards!’ we rushed on, and in a fit of enthusiasm gained the top of the pass. I am content with stating as a fact that, somehow or other, we toiled up the dreary slopes, and at last found ourselves at the point where the snow-rib loses itself in the rounded knob of the Viescherhorn.

Just at this moment a cloud, which had been gathering along the ridge, turned vicious. A bright flash of lightning seemed to singe our beards, whilst a simultaneous roar of thunder crackled along the valley. A violent hailstorm rattled down, blinding and bewildering us. It was impossible to catch a glimpse of our route. We scooped some big holes in the snow with our axes, and covered down in them to get some shelter. My hands were in that miserable condition when the more vehemently I rubbed them, the wetter, and colder, and more numbed they seemed to grow. The hail got in at the back of my neck; the cold wind touched up my nose; the snow got into my boots and up my trowsers, and filled my pockets. ‘I say, Michel, how much more of this fun are we going to have?’ ‘Well, herr, if it does n’t leave off, we shall have to sleep here,’ said Michel. I was meditating a crushing retort, which the half-frozen state of my intellects prevented from coming freely, when the storm lulled for a bit, and we jumped up to look round us. We might curve towards our left, or in a southerly direction, round the great knob of the Viescherhorn, so as to get on to the col. This would, as we saw afterwards, have been the right way. It involved, however, some more step-cutting. We therefore went round in the other direction, and at 2 P.M. got upon the saddle between the two points of the Viescherhorn. From here it was obvious that we could descend upon the upper level of the Viescher Glacier. Accordingly, without further investigation,

we crept slowly down a steep but short slope of snow and rock to a point where we could easily surmount a threatening bergschrund, let ourselves down over it, and found ourselves on the upper level of the Viescher Glacier. A tedious but not difficult series of manœuvres placed us at the foot of the crevasses by which the upper part of the glacier is intersected, at about 3 o'clock. Our *détour* over the saddle of the Viescherhorn had cost us a considerable amount of unnecessary trouble. Our difficulties were, however, now all over. We had made a pass, which, of all the passes I know, is certainly one of the most wearisome. A very long monotonous pull up a very steep slope of snow, with only the variation of sometimes having to cut steps and sometimes not, is apt to be stupid. The views were of course grand, as in the centre of the Oberland they could not help being grand. But they were as dull as they could well be compatibly with their geographical position. I cannot, in fact, describe the scenery of the Vieschergrat pass as specially interesting. Perhaps I am biassed by our subsequent career.

We were now on known ground. Nothing but a level stretch of glacier intervened between us and the ordinary route to the Finsteraarhorn or Oberaar-joch. The *Æggischhorn* inn began to paint itself distinctly to our imaginations. But I could not help remembering that we were hardly likely to reach the *Æggischhorn* before dark; and there are few Alpine travellers in whose minds darkness on the *Æggischhorn* is not associated with weariness and vexation of spirit. I therefore strongly objected to any unnecessary halts, and after taking a standing meal and contemptuously abandoning our ladder to the tender mercies of the glacier, we started at a rapid pace for our much-desired haven. We left the *Grünhorn-lücke* on our right, struck into the *Oberaar-joch* route, passed the wilderness of boulders and mossy slopes, where a few wretched sheep pick up a mysterious existence above the Viescher glacier, descended the well-known waterfall, and after a rapid march found ourselves at 7.30 at the point where the stream from the *Märjelen-see* descends beneath the ice close to a few isolated huts. We were all rather tired. We were disposed to look upon our day's work as done, and we hardly relished another climb. Still we were afraid to take the lower path to the *Æggischhorn*, and preferred ascending the stream to the *Märjelen Alp*, hoping to find natives there if it should be too dark to succeed in seeing the path to the inn. We climbed wearily and slowly upwards, halting to take an occasional pull at the stream and to polish off certain

heeltaps of brandy. Gradually it became dark. We were guided chiefly by the sound of the rushing water on our left. Every form of mountain and rock had become indistinct in the twilight, and then been blotted out in a drizzling mist. The stream seemed to be falling from an indefinite height out of absolute darkness, and the path refused obstinately to bend over into the little plain by the lake. We might be climbing right up to the top of the grat, when, at length, we reached a small hummock of rock, on which was planted something like a wooden cross. We halted undecidedly and looked round. Nothing but a mixture of mist and night was to be seen. Some one raised a despairing jodel on the chance that we were near the châteaux. No answer. Another louder yell in which we all joined; silence again, and then, to our intense delight, something like a faint reply. A general yell now produced a singular phenomenon. A faint spark appeared at an indefinite distance indistinctly glistening through the drizzle. The spark grew larger, began to move, and presently came rushing in a straight line towards us. On approaching, a boy was discovered attached to one end of a flaming piece of pine wood. He had come on our cries from the Märjelen Alp, and guided us back to it at 9 o'clock, a distance of two or three hundred yards. This piece of luck raised our spirits. We soon became valiant over warm milk and bread, and having thus unexpectedly changed our prospect of lodging in damp heather for dry straw under a roof, began to think whether better things might not be done. Shall we try to reach the *Æggischhorn*? The guides unanimously pooh-pooed the idea. Liveing, who had been rather unwell a day or two before, signified his opinion by taking off his boots and lying composedly down on the regulation mixture of hay and fleas. I was for giving in to the majority, 'But,' said Hardy, 'I have made up my mind to a good bed and a bottle of champagne before it, and I mean to have it.' 'Well,' I replied, 'we must try a little diplomacy.' Certain hints at five francs produced an obvious willingness on the part of the small Will-of-the-wisp to go in any direction we might please to mention. The guides grumbled emphatically. A variety of judicious appeals to their skill and our extreme confidence in it, at last induced them to take a more favourable view of the case. The construction of a lantern out of an empty bottle and a candle removed one objection which had been strongly urged. As an additional and (as it proved) more effective source of light, the boy constructed a torch by splitting one end of a large piece of wood with an axe, and inserting splinters of wood into the splits. These when lighted

made a grand blaze, and we all started at ten P.M. in high spirits for the inn. Liveing, animated by our example, sprang up and accompanied us.

For a time all went right enough. The torch led the van, and the lantern brought up the rear. We climbed the crest of the hill leading towards the *Æggischhorn* rapidly and successfully. 'We shall have that bottle of champagne before eleven o'clock,' said Hardy. Presently the torch went out. It was soon relighted, and we were off again. Soon, however, our progress, which had been straight forward, seemed to me to be rather wandering. We have just missed the path, the boy explained, but we shall have it again directly. It soon became rather doubtful, however, whether we were not looking for it in the wrong direction. Shortly afterwards a discussion arose whether the narrow gully which we were descending was not the very one we had come up ten minutes before. During the discussion the torch went out. In attempting to relight it we put the candle out. Then all the matches were wet through, and it was not till we had hunted to the bottom of some one's knapsack that we found any that would work. At last we succeeded; and to save trouble, I may say, that this process of extinction of all our lights followed by their laborious rekindling went on at continually shorter intervals till we seemed to be sitting down longer than we were walking. Meanwhile the search for the missing path seemed every moment more hopeless. After scrambling up and down, and round and round for a long time, we found ourselves in a disconsolate and bewildered state of mind, standing on a damp ledge of grass at the foot of a big rock staring vacantly into blank darkness. Whether to go up or down, or right or left, we knew no more than if we had been suddenly dropped into the middle of the great Sahara. There was only one thing for it. We took our knapsacks and put on our remaining articles of dress, e.g. two pairs of socks, an extra pair of trowsers, a flannel shirt, a waistcoat, and a dozen paper shirt collars, and crouched down under the rock, hoping that the wind would keep in the right quarter, that the puddle in which we were sitting would be speedily absorbed, and that the sun would get up as early as possible. The guides made some very sarcastic remarks, in very broad *patois*, about gentlemen who wouldn't take advice, and I refrained from asking Hardy what he would take for his bottle of champagne. 'Where's that misleading brute of a boy got to all this time?' said somebody. At this instant, just as I had drawn my second pair of trowsers over my second flannel shirt, the boy suddenly emerged

from the dark, exclaiming, 'I've found a man!' It struck me as a bewildering and improbable circumstance that any other human being should be fool enough to be within reach of us; and I did not at first appreciate the fact that he was referring to a stone man or cairn, marking the route to the *Æggischhorn*. It was just twelve as he made the announcement, and in a few seconds the whole party was under weigh again, not even halting to take off their extra apparel. A dreary and a dismal walk we had. In front was the boy with the torch. At short intervals halts had to be called, to coax the said torch by various means into renewed activity. In the intervals between these halts I, being about fifth in the line, was only conscious of the torch as a kind of halo spreading out a very short way and very mistily on either side of certain black bodies, which oscillated strangely between me and it. From these black masses occasionally proceeded sounds invoking blessings upon hills and stones in general, and the *Æggischhorn* in particular. My radius of vision included about a yard of hill, inclining at a very steep angle to my left, scattered with mysterious objects, which generally turned out to be deep holes when I thought they were stones, and very unsteady and sharp-edged stones when I thought they were puddles. It is a well-known fact that the *Æggischhorn* consists of innumerable shoulders, so arranged that you suppose every successive one as you come to it to be the last, and find out when you have turned it that it is only an insignificant unit in the multitude. I have often been made practically aware of this fact, but never was it so painfully impressed upon me as from 12 to 2.30 on the morning of July 30th, 1862. Stumbling, groaning, slipping, and pulling up short over stones, puddles, slippery grass, and every variety of pitfall, including cows, we pushed wearily on, and about 2.30 became conscious that we were in a thing that called itself a path. A few minutes at a quicker pace and the *Æggischhorn* inn appeared. At 2.40 A.M. a wild yell from four weary, hungry, and thirsty travellers roused M. Wellig to a sense of his duties, and by three o'clock the said travellers were asleep, with two good bottles of champagne inside them.

It now only remains for me to compare the respective merits of the five great Oberland passes. Of the westernmost pass—the so-called *Launen-thor*, I cannot speak from experience. According to Professor Tyndall, it takes, I think, about nineteen hours from *Lauterbrunnen* to the *Æggischhorn*. The difficulties appear to be considerable, especially late in the season; and I doubt whether the scenery can be equal to that on either of the other passes. On these passes the time actually occupied is

about as follows: from the Wengern Alp to the *Æggischhorn* by the *Jungfrau-joch*, sixteen or seventeen hours, and by the *Eiger-joch* I took about twenty-two of actual walking. This last might occasionally be shorter. The time from *Grindelwald* to the *Æggischhorn* by the *Mönch-joch* is at least sixteen hours, if the snow is firm; and by the *Viescher-joch* would, I think, be under favourable circumstances, nearly twenty hours.

Of these four passes I consider the *Mönch-joch* to be undoubtedly the easiest. On the whole, too, it presents the finest scenery, especially if a short *détour* could be made to the top of the *Eiger-joch*—a point of view which I consider to be of almost unapproachable beauty. The *Eiger joch* itself is a cross-grained and irregular kind of pass, which I can hardly recommend to any but eccentric mountaineers. I hope, however, that some such may be found to give it another trial. The *Jungfrau-joch* is a very exciting and very noble pass. It would always want first rate guides, and generally (but I think not always) a long ladder. With these it may be undertaken with confidence in success.\* *Christian Almer*, or *Christian Michel* would be the best man to take. With regard to old *Michel*, I have one hint to give—make him get up early. This pass has one great recommendation. If made at all, it will be made in one day. It is, however, perhaps the most difficult of all. Finally, the *Viescher-joch* is very long, and rather monotonous. It has this merit (which it shares with the *Mönch-joch* alone), that it would be practicable from the *Æggischhorn*. Taking care to ascend to the col near to the *Finsteraarhorn*, it would present no great difficulties, and would be a very interesting variation on the *Mönch-joch*. I strongly recommend a trial of it from that side. *Chr. Michel* would be the best guide. The first night should be passed either at the *Faulberg* or at the *Rothorn*, where there is a remarkably good sleeping-place. A guide from the *Æggischhorn* would be able to point this out, as it is not generally known to the *Grindelwald* guides.

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ASCENT OF MONT POURRI. By WM. MATHEWS, Jun., M.A.

THE beautiful peak of the *Mont Pourri*, whose exquisite form delights the eyes of travellers descending into the *Tarentaise* from the *Col de Bonhomme* at the *Little St.*

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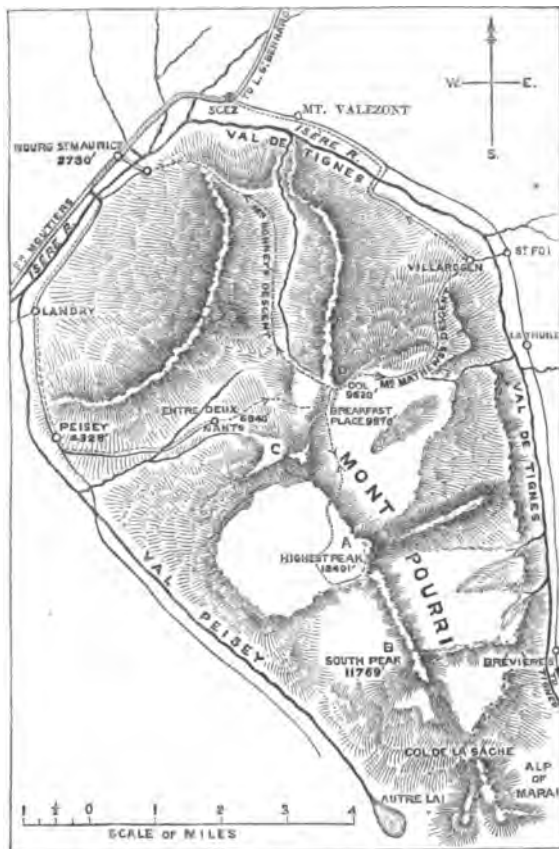
\* *Christian Almer* saw this pass on July 29 of this year from the *Mönch*, and pronounced it impassable, or, at any rate, far more difficult than last year.—Ed.

Bernard, is the culminating point of the great ridge which divides the Val de Tignes from the Val Peisey, and has long enjoyed, among the inhabitants of those valleys, the reputation of being the highest mountain in Southern Savoy. Like many other peaks in that district, it possesses a very extensive nomenclature; it figures on continental maps as the *Chaffe Quarre* and the *Mont Thouria*, while the English authors who have described it, even those of the highest reputation, have spoken of it either as the *Mont Iséran* or the *Aiguille de la Vanoise!* In the Tarentaise it is universally known as the *Mont Pourri*, and it is therefore highly desirable that this name alone should be applied to it in future.

In the course of a ramble among the Graian Alps in the autumn of 1860, I obtained satisfactory evidence that one mountain only was a competitor with the Pourri for the supremacy of the Tarentaise. This is the very important peak north of the Col de la Vanoise, known in that neighbourhood as *La Grande Casse*. The difference in height between the two appeared so slight that it was doubtful which was really entitled to precedence, and in the list of heights in the second series of 'Peaks, Passes, and Glaciers,' the post of honour is given to the Pourri. The top of the Grande Casse being a most inconvenient site for observations, the only way of settling the question was to carry a theodolite to the summit of the Pourri, and consequently the ascent of this mountain, in itself a new and highly fascinating expedition, thenceforth occupied a prominent place in my mountain longings. An abortive attempt made with Mr. Jacomb in 1861, which led us to the summit of a subordinate peak overhanging the Col de la Sache, served only to sharpen the appetite, and a view of the mountain obtained later in the season from the Col de Chavière convinced me that it might probably be climbed from the Val Peisey. I was, however, in no humour again to drag up heavy instruments on a fruitless errand, so I urged Michel Croz to make a preliminary exploration, and endeavour to ascertain the proper route. He did so, and reached the summit alone on the 4th of October, thus winning the undivided honour of the first ascent.

Early in August 1862 I was once more in the Tarentaise, in the company of the Rev. T. G. Bonney. We arrived at Bourg St. Maurice on the 3rd, and took up our quarters at the *Hôtel des Voyageurs*, an inn affording rough but tolerable accommodation, but which is luxury itself when compared with the horrible dens in the more secluded parts of the Tarentaise. We had decided upon the ascent of the Pourri as our

first expedition, but the structure of the mountain being rather intricate, I must preface my narrative with a few words of geographical description, which a glance at the annexed woodcut will render intelligible.



The range of the Mont Pourri may be described as an elongated mountain peninsula extending from SE. to NW., bounded by the Val Peisey and the Val de Tignes, and articulating on to the main range of the South Savoy Alps by a narrow isthmus of rock, across which the pass of the Col de la Sache leads from the head of the first-named valley to Brévières in the Val de Tignes. Immediately above the Col, a lofty peak, marked B in the woodcut, rises from the ridge which



separates the two valleys. This is the peak climbed by Mr. Jacomb and myself in 1861, and ascertained by us to be 11,769' above the sea. At a considerable distance to the NW. is the highest peak A, and still farther on a third peak C. At A and C subordinate ridges are thrown out at right angles to the main one, and enclose two vast glacier basins; one opening towards the Val de Tignes, the other towards the Val Peisey. The ridge extending from C towards the NE. at first sinks rapidly, and then rises again, into a steep rocky peak marked D. Beyond C the primary ridge is suddenly depressed, and the watershed consists of an upland grassy plain, giving rise to two torrents; one of these flows into the Val Peisey by the châteaux of 'Entre deux Nants,' situated, as their name implies, between two valleys, the other joins the Isère opposite Mont Valezont. The upland plain is bounded by a line of ruddy crags, crowning the enormous buttress which forms the NE. termination of the range. The lower slopes of this buttress, rising steeply from the Isère at Bourg St. Maurice, are richly clothed with groves of pine and verdant Alpine meadows, with scattered villages and church spires gleaming here and there among the trees; and when seen from some elevated spot on the opposite side of the valley, with the snowy peak of the Pourri just peering above its crags, it forms one of the most beautiful pictures in this delightful neighbourhood.

At 11.30 on the 4th of August, Bonney and I, with our two guides, started along the main road to Moutiers, and, crossing the Isère by a foot-bridge about half a mile from Bourg, followed a mule track on the left bank of the river as far as Landry, a considerable village at the entrance of the Val Peisey. Thence ascending the latter valley, we reached Peisey itself at 2.20, but we walked very slowly, with frequent halts, in consequence of the excessive heat. There is an inn in this village, with the sign '*A la Réunion des bons Amis,*' which affords bread, cheese, and wine, but not meat, which it is necessary to carry from Bourg. It belongs to a blind man, named Jean Baudin, who also owns a châlet on the alp, where he was then living, having left his wife in charge of the auberge. Having purchased from Madame Baudin all the articles necessary for the completion of our commissariat, we gladly availed ourselves of her offer to take them up to her châlet on a mule, and, leaving Peisey at 4.20, we followed the main valley for a short distance, and then turning into a lateral glen on the left, arrived in two and a half hours of easy walking at the châteaux of '*Entre deux Nants.*' From this pleasant Alpine settlement we looked down upon the workmen's huts at the silver mines of Peisey,

and across to the snowy range which divided us from the Val Champagny. As night drew on, the crags and glaciers of the latter were bathed in the softest moonlight, and projected against a cloudless starlit sky, and we entertained the most confident hope of perfect weather and a successful expedition on the morrow.

At 3.30 on the 5th we quitted the châteaux and continued the ascent of the valley, until we arrived at the upland plain, which is dotted with a number of small lakes, and commands so noble a view of the chain of Mont Blanc, that it is alone worth an independent excursion from Bourg. Here, turning southwards, we had before us a small glacier, flanked on our left by the rocky peak D (see woodcut), and on our right by steep slopes of débris. Mounting up the latter, we reached the crest of the ridge C D, covered with fragments of rock, and we looked down upon the wide glacier-filled valley which opens out into the Val de Tignes, opposite La Thuile. We gained the ridge at 6.10, some distance above the actual col, which is just under the peak D, and which forms the most direct communication from Peisey to St. Foi. Here we halted for breakfast, and enjoyed the view of the great world of mountains, now, for the first time this season, displayed before our eyes. Our position commanded all the Graian peaks, from the Ruitor to the Grivola. Beyond them were the Pennines, Monte Rosa and the Grand Combin being particularly conspicuous; while, considerably more to the left, Mont Blanc towered upwards in unclouded grandeur.

After staying an hour and ten minutes at this pleasant halting-place, we resumed our march. A descent of a few paces brought us on to the glacier, and we then mounted steadily up the névé in the southerly direction, towards the lowest point of the ridge B C. This was gained without further incident than the passage of a rather difficult crevasse and the ascent of a steep wall of snow. On setting foot upon the ridge, we looked down upon a vast amphitheatre of névé, which has an exit into the Val Peisey, and obtained our first near view of the highest peak of the mountain. It is supported on the south-west by a great spur or buttress, which, rising from the Val Peisey in nearly vertical precipices, is then flattened into a level shoulder, and finally leads by a moderately inclined snow-slope to the summit of the peak itself. In every other direction it appeared quite impracticable; but happily the shoulder was easily accessible. Descending from the ridge, we circled round the great snow-basin, reached the shoulder without difficulty, mounted the slopes beyond, and climbed the final pyramid of

snow upon its northern face. At eleven o'clock precisely we were standing on the summit.

Nearly every one of the peaks of the Graians is an admirable point of view; but the Pourri has a great advantage over its neighbours, in its more complete projection from the central chain. In addition to the panorama we had enjoyed from our breakfast-place, parts of which were now obscured by clouds, our range of vision included the numerous summits that enclose the Maurienne, with the Grandes Rousses and the long chain of the Pelvoux in the more distant horizon. Thanks to the labours of Mr. Tuckett, the form of the latter was now familiar to us, and we at once recognised the Pic des Écrins, towering above the remainder of the chain. Mont Blanc was of course the most marvellous feature in the panorama; its south-western extremity was completely commanded by our standing-point, and could be studied in its minutest details. In all the views of this range obtained from the Tarentaise, a great aiguille, which appears to rise above Mottet, is remarkably prominent. It may be the Aiguille de Trélatête or the Aiguille du Glacier; and as a height considerably greater than that of the Aiguille Verte is ascribed by Malten to the first-named peak, I wish to bring this circumstance to the notice of the members of the Club, who appear to have strangely neglected this portion of the chain. When dazzled by the glittering snows by which we were surrounded, we rested our eyes on the noble forests and verdant meadows in the valley of the Isère, which rolled its waters 7,000 feet below, and we could see the churches and almost count the houses in Tignes and in St. Foi.

A few feet below the summit, on the southern side, are the highest rocks, where Michel had built a stone man on his previous visit in 1861. While he and his brother were engaged in enlarging and strengthening this erection, we set up the theodolite and barometer, and I commenced taking the azimuths and zenith distances of the principal peaks in view. My first care was to turn the telescope towards the Grande Casse, and to intersect the summit by the cross wires. It proved to be elevated 10' above the horizon, thus conclusively establishing the fact that it is the highest mountain in the Tarentaise. The observations of the other peaks in the same district showed that the Pourri stands second on the list.

Exactly at noon we observed the barometer; the readings were as under:—

Barometer reduced and corrected	484·89 mill.	19·104 in.
Air temperature	3·4 cent.	Moist bulb 1·0 cent.

If I had been a wise man, I should have immediately put back

the instrument in the case, but being a foolish one I left it standing on the snow, and returned to the theodolite. A shriek from Bonney recalled my attention to it. It had been blown over by a gust of wind, and was sliding headforemost down the face of the peak with the mercury running out at the top. I seized it in an instant, but of course it was of no further use, and we had to console ourselves by thinking how much worse it would have been if we had broken the barometer before taking the observation. When our guides had completed the cairn, we nailed an Alpine spirit minimum (No. 382) to a piece of wood, placed it in a hollow on the top, and covered it with a flat stone. At the time of its deposit it registered 13.0 C.

Our proceedings on the summit occupied so much time that it was not until 1.25 that we commenced the descent. Retracing our steps to the breakfast-place, which we reached at 3.20, we followed the ridge to the col, for the purpose of taking its altitude with an aneroid belonging to Bonney. We had all along intended not to return by *Entre deux Nants* and *Peisey*, but we were now uncertain whether to descend to *St. Foi* on the eastern side of *D*, or to pass on the opposite side of that peak, and follow the valley which appeared to lead more directly to *Bourg*. After some discussion, we thought it a pity not to make our exploration as complete as possible, so we agreed to divide our forces, *Jean* and I taking the former route, *Bonney* and *Michel* the latter. After quitting the col I scrambled down a ravine by the side of the *glacier séracs*, descended by shingle-covered ice on to a sloping alp, and thence, bearing well to the left, reached the bottom of the *Val de Tignes* at the village of *Villaroger*. Following for some distance a path on the left bank of the *Isère*, I crossed the river into the road from *St. Foi* to *Scez*, about halfway between those places, and finally regained *Bourg* at 8.30 P.M. *Bonney* had arrived only a few minutes previously: the valley by which he descended ends at the brink of a lofty precipice, down which the stream falls in a fine cascade; but before reaching this point he followed a path on the left, which conducted him down the face of the great buttress immediately upon *Bourg*. The ascent of the mountain may therefore be made by either of these routes, but it would probably be necessary to camp out upon the col.

The whole excursion from the time of our leaving *Entre deux Nants* to our return to *Bourg* thus cost us seventeen hours, 12h. 40m. of walking and 4h. 20m. of rest. Our route to the summit was extremely circuitous, and obliged us to pass twice across the main ridge of the mountain, where, how-

ever, the descents on to the glaciers below were only very trifling. If the great snow-basin on the E. of that peak could be reached directly from the Val Peisey, the time required for the ascent would probably be much reduced ; but the solution of this problem I must leave to future explorers.

When we quitted England we had the pleasure of travelling in company with my accomplished friend Mr. E. Walton, whose drawings, uniting great technical skill with strict geographical accuracy, have a charm for all lovers of the High Alps, which the works of few other artists are able to afford. I am indebted to him for a series of sketches taken in the vicinity of Bourg St. Maurice, including several beautiful views of the Pourri, which illustrate very completely the structure of the mountain.

A few remarks upon the hypsometry of the Pourri and the Grande Casse may not be without interest.

Comparing the readings of our instruments on the Pourri with simultaneous observations at Geneva, St. Bernard, Aosta, and Turin, making the calculations independently in French and English measures, by the tables of Delcros and Guyot, and taking the means, we have the following results:—

	Metres
August 5, noon, Mont Pourri, Geneva	3,800
St. Bernard	3,790
Aosta	3,808
Turin	3,830
Mean	<u>3,807</u> = 12,491 English feet.

The summit of the Grande Casse was elevated 10' above that of the Pourri. The horizontal distance between the two peaks, measured on the six-sheet Sardinian map, is 14,500 metres. Of course, only very small reliance can be placed upon the accuracy of this base ; but assuming it to be correct, and making the necessary allowances for curvature and refraction, we have 56 metres as the difference in height, and adding this to the previously ascertained altitude of the Pourri, we get

Grande Casse, 3,863 metres.

Now this mountain was measured trigonometrically by Col. Corabœuf in 1803-4. It is described by him as the *Aiguille de la Vanoise*, but the latitude and longitude which he gives for it indicate a peak occupying the precise position of the Grande Casse. The altitude which he obtained is 3,863 metres, and the absolute identity of the two results is not a little curious.

The confusion in the nomenclature of the Tarentaise Alps is something astounding. Here we have two names denoting the same mountain. The words *Pointe des Grands Couloirs*, which appear on sheet 37 of the large Sardinian map, may possibly be

also intended to apply to it. M. Gottlieb Studer, who was one of the very first travellers to penetrate into the recesses of the Graian Alps, and to whose kindness I am indebted for a copy of a memoir upon this district, contributed by him to the 'Mittheilungen der Naturforschenden in Bern' (No. 480-484), supplies us with two more, *Mont Prémou* and *La Grande Maurienne*.

The following additional heights were determined by us in our two days' excursion:—

			English feet
August 4, 8	A.M.	Bourg St. Maurice, Church (mercurial) . . .	2,730
"	4 P.M.	Peisey, Auberge . . . (aneroid, corrected)	4,328
"	7.45 P.M.	Entre deux Nants . . . (mercurial) . . .	6,840
"	5, 6.10 A.M.	} Breakfast-place . . . (aneroid, corrected)	9,870
"	3.20 P.M.		9,620
"	4.15 P.M.	Col . . . . . (do. do.) . . . . .	9,620

WM. MATHEWS, Jun.

#### THE ASCENT OF GLÄRNISCH. By THOMAS HOWELLS.

'HE looks a preciously awkward customer from this side!' 'Oh! utterly impossible; but from the south he is more accessible.'

The speakers, on a glorious day in July 1862, were seated at the edge of a little lake, called the Klön-see, in the Klön Thal, in Canton Glarus, and were gazing up in thoughtful mood at a very promising mountain, which rises abruptly from the southern side of the aforesaid lake. Kennedy, myself, and Thomas Cox, Kennedy's servant, had come from England with the fixed purpose of what in English vernacular is termed 'having a shy' at Glärnisch. Hitherto we had progressed favourably, and, as we wound our way up the valley, we only wished for another fine day and an early start. About four o'clock in the afternoon we reached the little inn at Vor Auen, at the head of the Klön Thal, but not before the landlord, Herr Webber, had caught sight of Kennedy, and had come tearing along over stone walls and ditches to cross the fields to greet him. We had dinner; then came the business of the ascent. Herr Webber suggested guides as indispensable: he knew two or three first-rate men, chamois-hunters, in fact, who had been up no end of times; he would send for them in a minute. We declined the kind assistance. Hereupon our landlord talked much of the danger of the ascent—the old, old story, in short, told by all innkeepers, when mountains are the

theme of discussion—and finished up by telling us that we should not get to the top. However, we entertained a different opinion, and gave orders for the preparation of the food to be taken with us.

What a stupid thing it appears getting up long before the sun, to go tramping along a path where you are constantly knocking your toes against knobby roots and sharp stones, splashing up to your ankles through the thin ice into the puddles on a glacier, while you are not aware, save by ocular demonstration, that you are possessed of fingers. I must confess that this was somewhat after the fashion of my thoughts when Kennedy's candle flickered in my eyes, as he came to call me up the following morning. I felt very much inclined to say with the sluggard, who has been held up as a warning to the youth of all ages, 'A little more sleep, and a little more slumber.' But Kennedy was inexorable, I must get up; it was a beautiful morning, no excuse to go to bed again, so I dressed, and we had breakfast. It was decidedly chilly, but anticipating a hot day, I left my coat, which was a heavy one, behind me.

We made a clear start at 2 A.M.; the landlord shaking his head, as though saying, 'Ah! well, it can't be helped; if you will break your necks, you must, only don't say it's my fault.' We struck across the fields into the high road of the Prigel pass, which runs pretty nearly due west. This continued to be our route for about two and a half miles, till we came to a small valley running in a direction SSW. among the hills. This was the valley up which we were to find a path to get to the glacier descending towards the south from Glärnisch. It was now about three o'clock, and getting into the midst of pine woods, at the beginning of the valley, we were in almost pitchy darkness. Then came hunting for the path. Now there are very many employments much more congenial to one's feelings than groping about amongst loose stones and stumps of trees at three o'clock on a cold morning, when it is so preciously dark that you can hardly see your hand before you. Kennedy was the only one of our party that had been here before, and as he said, 'Places look so differently by daylight.' However, we scattered to feel for the path, and hunted and stumbled to our hearts' content. At last Kennedy, in a happy moment, hit upon the track; we rejoiced greatly, and started again for our attack on Glärnisch.

We had not gone far when Thomas Cox suddenly exclaimed, 'What a smell of wine!' What could it be? there were no wine brewings up in the mountains; when, like a

flash of lightning, the horrid thought seemed to strike upon our minds, and we simultaneously burst forth, 'It can't be ours!' But, alas! it was only too true. The cork of our bottle, our only, our unfortunate bottle, with the contents of which we intended to recruit our wearied spirits, had come out; and the precious and luscious juice of the grape was fast ebbing away in the quicksands of the provender and the lining of the knapsack, giving, as we afterwards found, a taste of wine sauce to the bread and cheese contained therein. The bottle was hastily righted and corked; we having first ascertained with frantic eagerness that there was rather more than half still left. I am not sure Kennedy did not prove this interesting fact by raising the bottle to his mouth to find out how long the wine was coming. But time was getting on, and soon we saw the sun gild the eastern hills. Presently they began to glow, but with a nasty, sickly tint, that put me more in mind of the flickerings of a tallow candle than the reflection of the glorious orb of day. However, as we watched, this pale tint faded away, and immediately the summits of the surrounding peaks were bathed in streams of rosy light, and we beheld one of the most magnificent 'morgen-glühe' that it has been my lot to witness. By seven o'clock we were in sight of the glacier. We could see only the ice-fall at its termination. Immense 'seracs' sparkled in the morning sun, while the clefts and crevasses looked blacker by contrast. At eight o'clock we reached the very foot of the moraine, and sought a passage to the ice above. On the west side there was a charming gully in the rocks which promised well. But Kennedy knew it of old; it was but a delusive snare. The ice-fall was impassable; we therefore crossed the terminal, and part of the lateral moraine, and then made our way over some steep snow slopes which lay on the east side, between the rocks and the glacier. Upon these slopes we were much amazed to perceive the marks of large hoofs, apparently recent. How any creature possessed of such continuations could possibly have surmounted the lateral ice moraine, was quite a puzzle. Besides, there were no marks as if the creature had first ascended, had thought better of it, and had then come back again. One of Byron's heroes lived 'throughout all space.' Query, could he, for purposes of his own, have descended these snow slopes in preference to coming down 'like lightning?' Altogether it presented a series of questions which no fellow could solve, so we went on our way marvelling. We now came to a very steep bit of the lateral moraine, of which the ice was awfully hard and covered with loose stones, sufficiently numerous to



prevent the cutting of steps, but insufficient to give a decent foot-hold, so that we progressed but slowly. By dint, however, of scraping and scrambling in a feline manner, we soon overcame the difficulty, and then got easily upon the glacier. All difficulty was now over, supposing the final ridge easy; so we, like Bunyan's pilgrim, 'went on our way rejoicing,' dodging and jumping the crevasses in splendid style. The crevasses are passed, and an easy snow slope leads up to a ridge on the glacier. Thence, no doubt, we shall get a view of our peak; for up to this time he has been concealed. Who is ready for a race to the top? Youthful aspirant for Alpine honours, be not too hasty; reserve thy strength for future difficulties; such is Kennedy's advice. It is followed, and we jog on through the snow contentedly, or at any rate patiently, till we reach the ridge. We give a great shout, and tumble down, kicking with delight in the snow; for there is Glärnisch rising in proud majesty from the head of the glacier, and not so much above us as we had anticipated. But a new difficulty awaits us; there are two peaks separated by a deep gap. Which is the higher? We mean to find out presently, and meantime attack the grub, and drink success. We soon started again, and steadily climbed steep snow slopes to the head of the glacier. Gradually as we went on, the more westerly of the two peaks seemed to rise higher, though the other was scarcely inferior; so we decided on our west-end friend. Then came the ridge, the arête, which appeared an exceedingly easy one, and did not belie its appearance. At a short distance below the summit we started for a race, and I fortunately succeeded in getting up first; then I 'jodeled;' then, glancing at the rival summit, which was certainly below my position, I pocketed the top, the very tip, and have it now. Now, it struck me, as there was a stone man at the very edge, and on the highest part of the cliff, the thing would be to climb up to it, so that I, by nature short, might overtop all. But climbing ambition nearly o'erclimbed itself; for the 'stein-mann' gave way beneath my weight, and I was within an ace of following some of its constituent parts down into the Klön-see, or wherever their vagrant propensities led them. But I did not; and had the pleasure instead of welcoming Kennedy and his attendant to the summit.

What a glorious panorama lay spread out before us! We were on the culminating point of a horse-shoe-shaped ridge, the hollow of the horse-shoe being filled up by the glacier which we had traversed. The little Klön-see, and even the inn at Vor Auen, were distinctly visible, so steep is Glärnisch

on the west side. Indeed we became so very minute as to what we could see that Kennedy, who is notoriously far-seeing, swore he could distinguish the landlord's daughter looking out of one of the windows. Now having, as it were, looked at home, Kennedy wanted to look abroad, and make out some of the peaks by which we were surrounded. But I decidedly objected, infinitely preferring to attend to the internal economy, before I paid attention to things without. I may be called a Goth, but 'it's natur,' as Sam Weller observes. Accordingly, we did eat divers boiled eggs, and many chunks of bread and butter, washed down with the remains of our much treasured wine: then, lying flat on our faces in the brilliant sunshine, with the map spread out before us, we made out as much of the geography as we could. Scarcely a cloud was visible over the whole range of the horizon. It was the first time that I had been on a fine day at the summit of a high mountain, and I greatly enjoyed it. But human nature has its frailties: in spite of the beautiful view we fell fast asleep, as sound as a church, in fact; by the bye, a better rendering would be as sound as *in church*. In this state we lay for about an hour. Now it came to pass that as I lay half awake and half asleep, I felt a peculiar burning sensation in my arms, and then it dawned upon my somnolent senses that I had no coat on. It was before mentioned that, expecting a hot day, I left my coat at Vor Auen; on coming to snow and ice, I tucked up my sleeves and never again thought of my unfortunate arms. Now, what with the sun and wind, and snow and ice, they were too painful to bear the rubbing of the flannel; so I had to go down in the same manner, and, in consequence, got a subcutaneous inflammation of my arms, which laid them up for a week.

It was time to think of starting downwards, so off we went, got over the ridge in no time, and went slithering down snow slopes to the glacier, tumbling over each other, and tying ourselves in complicated knots in the most approved fashion. The crevasses on the glacier cost more bother to manage than in the morning, and I had the felicity of testing the way over more than one treacherous snow bridge. But we easily passed all, and soon got off the glacier; then got our boots full of water in crossing the torrent at the termination of the moraine, which now really was a good big stream. But what cared we, we had conquered Glärnisch. So we jogged happily along our stony path, and once more came upon level ground in the Klön Thal about 5.30 p.m. We got back to Vor Auen at six o'clock; thus having been sixteen hours out, eight hours twenty minutes

occupied by the ascent, and six hours from the top to Vor Auen.

Of course, Herr Webber came to greet us as we traversed his meadow, and seemed perfectly prepared to sympathise with us at our failure of getting to the summit. Indeed, the idea that we could not possibly have got up seemed so fixed in his mind that for a long time he would not believe that we had reached the top. At last he did, or said he did, for I have my doubts as to the perfection of his faith, and then and not till then did we leave him and enter the house to feed.

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THE MISCHABEL-JOCH. By COUTTS TROTTER, M. A.

OF all the previously little known mountain masses which have been explored during the last few years by English and Swiss mountaineers, there are few, if any, more interesting than the remarkable spur of the Pennine Alps which, under the name of Saas-grat, stretches from Monte Rosa to the Balferinhorn, separates the valley of Saas from that of St. Nicholas, and finally dies away at Stalden. It was long reckoned almost, if not quite, impassable, at any rate between the Balferinhorn and Monte Rosa. Forbes was told of only one passage, apparently identical with that modification of the New Weissthor, by which it is possible to descend by the Schwarzberg Glacier to Distel Alp and Mattmarksee. The Allelin Pass and the Adlerjoch or Col Imseng were however soon afterwards discovered, the latter by the well-known Curé of Saas; they were crossed by Mr. Wills in 1852 and 1853 respectively, in company with Herr Imseng, and first described in his 'Wanderings among the High Alps,' in 1856. These passes, especially the latter, became rapidly popular: but though the Strahlhorn, Allelinhorn, Rympfischhorn, and Dom were all ascended, nothing further was done in the way of exploring passes till 1861, when Mr. Stephen crossed the ridge over the summit of the Allelinhorn, and afterwards ascending the Alphubel explored both sides of the Alphubel-joch lying between the latter mountain and the Allelinhorn. The real pass, however, was not actually crossed till the following year, though it now bids fair to become the most popular of them all. Another passage, still further to the northward, forms the subject of the present paper, while on the very day of the expedition here described Mr. Ll. Davies followed up his former victory over the Dom, by a most

successful ascent of the scarcely less imposing summit of the Täschhorn.

While passing the Alphubel-joch in the summer of 1861, it had struck me that it might be possible to cross from Saas to Zermatt by a new and still more direct passage to the north of the Alphubel, between the latter mountain and the Täschhorn. Finding ourselves last summer at the hotel on the *Æggischhorn*, and wishing to reach Zermatt from thence, we determined to go to Saas, and, at any rate, take a look at the eastern side of the supposed col. We accordingly left Stalden on the morning of Wednesday, July 29, the party consisting of my brother and myself, and our old guide Peter Bohren. On arriving at Saas, our first enquiry was for Franz Andermatten, who had accompanied me over the Adler in 1860, and the Alphubel-joch in 1861; we were, however, told that he was away from home, so we strolled up the slopes which rise on the east immediately above the village, and soon got high enough to look over the ridge which hides the valley of Fée and the central mass of the Saas-grat from one standing in the village itself. The glaciers up which our route lay looked formidably steep and crevassed, and it was with no small anxiety that we took out our telescopes and sat down to reconnoitre.

Right in front was the magnificent basin of the Fée glacier, divided in its lower portion into two parts by the Fée Gletscher Alp. Immediately above this rose the rounded summit of the Alphubel, from which stretched to the south the long and nearly level ridge which connects it with the Allelinhorn, and over the northern extremity of which lies the Alphubel-joch. To the north was a somewhat more lofty col, connecting the Alphubel with the steep rocky wall which forms the eastern side of the Mischabelhörner, the ridge ascending steeply and at a nearly uniform angle to the sharp peak of the southern summit or Täschhorn. Our route obviously lay up the Gletscher Alp, over the rocks called Langenfuh, which form its upper portion, and thence, instead of inclining to the left, and rising gradually to the Alphubel-joch, turned to the right, and ascended more steeply to the col north of the Alphubel. The seracs in this direction looked very unpromising, but a large patch of rocks protruding from the snow was pronounced by Peter, after a careful survey, to be probably practicable. This would bring us above the worst seracs, and from this point it was evidently possible to wind among the crevasses to the bottom of a rather formidable-looking bergschrund, above which was a steep slope leading to the col. On the whole, the Saas

side of the pass seemed decidedly practicable, though by no means easy. Of the Zermatt side we knew nothing, except from my very vague recollections of its general appearance from the lower part of the Täsch valley. We determined, however, to make the attempt, and returned to our dinner at Saas. The Rev. W. S. Thomason, who had been travelling with us, had been unwell for two or three days, and remained at Stalden, fearing to be obliged to go to Zermatt by the valley; however, in the afternoon we were delighted to see him arrive ready for work. With him came Mr. George, accompanied by Christian Almer, of Grindelwald. He had intended to cross the Alphubel-joch, but was easily induced by the prospect of a new pass to join our party. We had had some thoughts of leaving Saas in the evening, to sleep at the châteaux on the Gletscher Alp, but the beautiful day had ended in a stormy evening, and we went to bed in great fear as to what might be the intentions of the weather. However, the storm passed by, and we started after the usual delays, at 4 A.M. on a perfectly cloudless morning. We were eight in all, as we had engaged two men in Saas to come with us—one as guide, the other as porter. We were not favourably impressed by their looks, and suspected, as we afterwards found, that they were of no use except in the latter capacity, the professed guide being decidedly the worst of the two. However, with two such guides as Peter and Christian, we cared little who were our other men.

We took the usual path through the village of Fée to the Gletscher Alp, and after a short halt at the châteaux mounted the steep track which leads to the top of it, turning round every now and then to admire the wonderful view of the noble cliffs of the Mischabelhörner on our right, and the grand masses of the Fletschhörner and Weissmies behind us on the other side of the valley of Saas. We crossed the rocks of the Langenfluh at the usual point, and reached the snow about 7.30. After a short halt to put on our masks and spectacles, we walked for some distance along gentle slopes. We had hitherto kept to the track of the Alphubel-joch, but now bore away more to the right, the glacier becoming steeper and more crevassed, till we reached the patch of rocks which we had seen the day before from Saas. We had obviously to get on to these, but it was more easily said than done. The rocks sloped steeply and smoothly down to a projecting angle, below which they retreated, leaving a sort of cornice overhanging the glacier. The space below this had been filled up with snow, which had, however, partially melted, so as to leave a narrow and insecure-looking ridge immediately under

the projecting angle, separated from the rock by a wide and deep chasm. Peter trampled down the top of the ridge, and fixed himself as securely as he could, while Christian, standing on his shoulders, managed to scramble on to the upper slope of the rocks, and after a few struggles gained a comparatively secure footing above. It was of course much easier for the others to follow, aided by the rope; and last of all Peter was drawn up to the rest of the party. The rocks were steep, and in places unpleasantly smooth, but firm, and on the whole not particularly difficult, so that about 9.30 we reached the top of them, and, finding water trickling under the snow, sat down to attack the provisions in our knapsacks before beginning the final snow-climb. From this point the view was of exceeding grandeur; the cliffs of the Täschhorn and Dom, now close at hand, looked more imposing than ever. We examined them carefully, in order to see whether it appeared possible to climb the at that time unascended Täschhorn from the east side, and came to the conclusion that it was probably not impossible, though the climb would doubtless be very long and very steep.\* We were now above the most broken portion of the glacier, but found the use of our reconnaissance of the day before, which enabled us to choose the best direction among the still somewhat intricate maze of crevasses, and so to reach without difficulty the point we had before noticed just below the col. The bergschrund did not detain us long, and we were soon clinging to the steep ice-slope above it. I measured the slope a few feet above the bergschrund, and found it  $58^{\circ}$ ; we had about 180 steps to cut, mostly in very hard snow, scarcely to be distinguished from ice. This was rather slow work, but we reached the top about 12.30. We were evidently above the Alphubel-joch (12,575). I got a boiling point observation, which by comparison with Zermatt in the evening, gave a height of 12,850 feet; judging from the appearance of the Alphubel, which rose immediately on our left, I do not think it can have been much lower; so that it ranks probably next after the Sesia-joch, Lys-joch, and Zwillinge-joch in height. Just before reaching the top, we had a glorious view of the Bernese chain. The most conspicuous summits were the Finsteraarhorn, the Schreckhorn, and Aletschhorn. From the col we saw a magnificent sea of peaks and glaciers to the east, from the Fletschhörner and Weissmies on the opposite side of the valley to the distant mountains of the Tyrol. Further south, stretching

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\* The eastern side of the Mischabelhörner could never be climbed, unless when the rocks were denuded of snow, which very seldom happens.—Ed.

away to the far-off horizon, came the blue hills and plains of Italy, seen to-day to rare perfection, varied here and there by faint grey mists, and dotted over with numberless towns and villages. We could not identify any of these, but a large stretch of the Lago Maggiore was plainly seen. We looked for Milan, but could not make it out; it was most likely hidden by the shoulder of the Alphubel. We found ourselves, as we had expected, at the head of the small glacier (marked, though not named, by Studer, but called, I believe, Weingarten Glacier in the new sheet 23 of the Federal map) which fills the head of a small lateral valley lying between the Täschhorn and a shoulder of the Alphubel, and opening into the Täsch valley near its lower end. On one side rose the steep and jagged rocky arête leading to the Täschhorn, on the other the snow arête of the Alphubel. In front were the Matterhorn and Dent d'Erin, the Monte Rosa chain on the one hand, and the Weisshorn on the other appearing a little further on as we descended.

Our course evidently lay over the above-mentioned small glacier, which sloped gradually for a short distance, after which it became steeper, so that we could see but little of what lay between us and the Täsch valley far below. After a halt at the top we proceeded down the glacier. We found at first no difficulty, but before long came upon a great crevasse stretching almost completely across the glacier. To turn it would have obliged us to go back some distance and make a long détour; luckily, however, some twelve or fourteen feet below the edge was a rather wide projecting ledge, while on the other side was a similar one, not too far off for a jump or long step. To this Peter scrambled, held by the rope, cutting foot holes in the névé wall, and sticking in at intervals a number of our alpenstocks and axes into the snow. Holding on to these, and supported by Christian with the rope, we all descended, crossed to the other ledge, and followed Peter up the opposite wall by means of a similar ladder of steps and axe handles. Lastly, Christian followed, cautiously gathering up the sticks as he came. We crossed several more crevasses in various ways, but as they became more and more numerous we took for a time to the rocks on our right, down which we scrambled a short distance. Soon, however, these in their turn became awkward, and we determined to go back to the glacier, which was now a regular icefall. Christian detached himself from the rope and led the way, axe in hand, through the maze of séracs, cutting his way now down to the bottom of a crevasse, now round the sloping base of a threatening pinnacle. The labyrinth of crevasses seemed even more intricate than that of the Col du

Géant, though the whole was on a smaller scale. Christian, however, led us beautifully through its intricacies, leading us down without a single check, and seeming as much at home as on the most familiar glacier, though this one had probably never before been traversed by any human being. Once clear of the icefall, which occupied us for upwards of an hour, our difficulties were over, and we descended rapidly over moraines and stony slopes to the point where the valley we had been following opened out into the lower end of the Täsch valley. Hence we had only to follow the path round the shoulder, and to descend to the regular Zermatt road. George and Thomason pushed on, while I followed rather more leisurely with my brother, who was feeling the effects of an old sprain. We arrived at Zermatt shortly after seven, after one of the most magnificent days I have ever spent among the mountains. The pass is, I think, the grandest of all those which traverse the Saas-grat. The views are of course very similar to those from the Alphubel-joch, but the new route passes closer to the grand wall of the Mischabelhörner, and the icefall adds much to the interest of the descent. It is even more direct than the latter pass, but will probably always take longer time from its somewhat greater height, the steepness of the last part of the ascent from Saas, and the difficulties of the glacier on the other side. There is less extent of snow field to be traversed, which might make it less fatiguing when the snow is very deep. Under these circumstances, however, the final slope would probably be a serious obstacle, and the icefall perhaps dangerous. We thought it would have been possible to descend by the rocks on our right, had the seracs proved impracticable; they would, however, have been certainly very troublesome.

A few words in conclusion on the name to be given to the pass. The analogy of the Alphubel-joch and of many other new passes, both in the Monte Rosa and Oberland districts, would point to Täsch-joch, but the Allelin pass, which traverses the whole length of the Täsch glacier (which the new route does not even touch), is sometimes called Täsch Pass, and there is, I think, no objection to the adoption of the name of the mountain mass, instead of that of the nearest single peak, so as to call it the Mischabel-joch. The only other possible claimant for this name would be the exceedingly elevated notch between the Täschhorn and Dom; but though this may possibly be crossed by some active mountaineer in search of a novelty, it can hardly become a popular pass, and should it ever require a name may be called the Dom-joch.



## THE VIGNEMÂLE, PYRENEES. By CHARLES PACKE, B.A.

THE Vignemâle, the highest of the French Pyrenees, and the fifth highest of the whole chain, was ascended by the Prince de Moscowa in 1838, and an account of this ascent is given in the 'Revue des deux Mondes,' vol. xv. Since that time up to last year the ascent has always been a two-days' excursion; made by the valley of Serbigliana and the southern side of the range, following the track of the prince. In 1861, when at Gavarnie, I suggested to the guide Laurent Passy, the feasibility of assailing the mountain by the great glacier on the eastern side; and, on arriving at Gavarnie last September, I found that he had already more than once gained the summit by the new route. As by following this course the ascent of the Vignemâle and return to Gavarnie may be well made in a single day, and there is no mountain in the Pyrenees which presents such grand glacier scenery as this side of the Vignemâle, an account of this excursion may prove useful to Pyrenean travellers, and the more so as in my guide-book, published last summer, I have only indicated the old route.

The weather during my stay at Gavarnie last September was for the most part unpromising, and much fresh snow had fallen on the mountains. The few travellers who came up to Gavarnie from Luz and St. Sauveur were fortunate if the clouds lifted their veil sufficiently to allow them a view of the cirque. None remained for the night; and having lingered on for ten days, I began to fear that the Vignemâle was not to be again ascended that year. On Saturday, September 20, with Laurent Passy and his brother Hippolyte as guides, I made a fruitless effort. We made our way through mist and cloud as far as the grand glacier, but were then driven back by the excessive cold, and the *tourmentes* of wind, which dashed the fresh fallen snow in our faces, so as almost to blind us. On our return to Gavarnie, however, the sunset gave unmistakable evidence of a change in the weather. I was scarcely in sufficient force to repeat the attempt the next day; and had already got Laurent into trouble with the curé by inducing him to absent himself from mass, and accompany me to the Mont Perdu on the previous Sunday; but our opinion on the probability of a fine Monday was so unanimous, that I decided once more to defer my departure. On the Sunday, by way of making amends to the curé, I accompanied Laurent to mass, and in the afternoon assisted him in getting in his hay, the curé having permitted this necessary work to his parishioners, in consequence of the continued bad weather, which threatened to spoil the *regain*.

On Monday, September 22, Laurent Passy, his brother Hippolyte, and I started from Gavarnie at 4.40 A.M. The path lies westward up the Val d'Ossoue; starting from the back of Belou's hotel, in ten minutes you cross the stream to its left bank; and in fifteen minutes more recross to the right bank by a wooden bridge. Just below this is a beautiful clear pool—a most inviting bath, of which I availed myself more than once during my stay at Gavarnie. From this spot, about an hour of gentle ascent, the path winding among some stunted beech trees, brings you to an open plateau of grassy pasture, known as the 'Source de Bat.' This we reached at exactly 6 A.M., but rather late to witness the magnificent sunrise effects on the Vignemâle, which from this spot is full open to the view, bearing  $20^{\circ}$  N. of W. The rocks, which at starting are of clay schist, soon change into marble limestone, conspicuous in the Pic Blanc on the north side, and the Pic de Ségre on the south side of the valley. Beyond the Source de Bat the rocks again pass into schist, and leaving on the left the singular Cascade de Tapou which issues from an orifice in the eastern buttress of Mont Ferrand, at 7.10 we reached the Cascade d'Olette. Here, still keeping on the right bank of the stream, you must mount by a sort of staircase some steep reddish rocks, and descending above the fall you come upon the first snow. Thirty minutes from this brings you to the foot of the eastern buttress of the Vignemâle, which has to be scaled, and at the foot of this we halted twenty minutes for breakfast. Thus far the road is the same as that to Cauterets by the Col de Vignemâle; and it was in descending from these rocks that two travellers, some years ago, missed their way, fell, and lost their lives. To make for the Col de Vignemâle, you must descend again on the other side of this buttress; but to reach the Great Vignemâle you must continue to mount along the ridge which forms the south-western boundary of the great Vignemâle glacier, terminating in the Mont Ferrand. On the present occasion all these rocks were deeply covered with fresh snow, but, though toilsome, they offered no great difficulty, and we were guided by our tracks made two days before. Continuing along this arête in a direction  $10^{\circ}$  S. of W. with the séracs and ice-caves of the great glacier on our right, and an awful precipice falling away to the smaller glacier of Mont Ferrand on our left, at 10 A.M. we reached the spot that seemed most favourable for taking the glacier. The ice here was not much broken, and, thanks to the fresh snow, we had no occasion for the axe; so, skirting the open crevasses, some of which were very large, and roped together as a precaution against the

smaller ones, which might be blocked with snow, we made excellent progress, and in about fifty minutes, across the ice in a NW. direction, reached the foot of the rocky pyramid of the grand Vignemâle, which was now completely draped in snow. In surmounting these last rocks, we were again aided by the snow, which afforded a firm foot-hold; and in about twenty minutes we found ourselves on the top at 11.15 A.M. The weather was every thing that could be desired, and the view magnificent. I employed about thirty minutes in enjoying it and in taking bearings with the prismatic compass; but though the mid-day sun was shining brightly, the cold was so intense that our feet and hands could stand it no longer; and having noted the thermometer, which stood at  $-7^{\circ}$  centigrade, we began to descend a little before twelve. The Vignemâle consists of five several pyramids of rock rising to the NW. of the great glacier, and running from ENE. to WSW.; the highest summit, that of the great Vignemâle, being the fourth, or westernmost but one, and attaining 3,298 metres = 10,820 feet. These summits, separated by awfully-steep *cheminées*, descending towards the Lac de Gaube, are, on the north side, quite inaccessible, with the exception of the most eastern one, that of the Petit Vignemâle, which is much lower than the rest, and is easily reached from the col. M. de Moscowa says that the mass of the Mountain is the 'calcaire primitif' of the Marboré; and this rock is certainly prevalent in the moraine of its northern glacier. As far as I could observe, however, the flanks of the mountain are of granite, and the summit of a dark clay schist, containing iron pyrites. In descending, the snowy *arête* was so steep, that we did not trust ourselves to a 'glissade' till more than half-way down, when the word was given, *laissez aller*; and we speedily reached the plateau of the great glacier. From this to Gavarnie is about five hours' walking; but we made several halts; so that we did not reach the inn till 6.30 P.M.

In conclusion, let me say, that there is no station in the Pyrenees to compete with the little inn at Gavarnie, in combining good accommodation with proximity to the higher mountains. The fare is first-rate, the landlord civil, and the beds very tolerable. A shorter cut to the Mont Perdu has also been found by Laurent Passy; and it may be ascended in one day by the Brèche d'Astazou to the left of the cirque, or still farther to the east, by the Port de Canaou and the Lac de Mont Perdu. The rocks of this last pass, and indeed all those to the east of the Brèche d'Allanz, abound in shells and fossils of the lower greensand. I picked up several specimens of

*îma* and *cyclas*; but this locality merits a more special investigation by the geologist than can be spared from a day 'consacré,' as the French would say, to an ascent of the Mont Perdu. The Perdu was formerly ascended by the Brèche de Roland; but it is better to unite this expedition with an ascent of the Taillon. It is not, however, only by those capable of the more difficult and longer ascents that the charms of Gavarnie will be appreciated. On quitting the inn-door, you are at once in the midst of the most delightful scenery. Every rocky eminence is a point of view; and those who will take the trouble on a fine day to ascend the Pimené, due east of Gavarnie, will be rewarded by a panorama that will bear comparison with that from the Faulhorn.

SUMMARY OF NEW EXPEDITIONS DURING THE SUMMER  
OF 1863, UP TO AUGUST 12.

CLARIDEN-GRAT, JUNE 22.—Messrs. W. F. Short, Morshead, and Moore, and the guides Christian Almer, Peter Perrn, and Moritz Andermatten, left Amsteg at 3.45. A.M. and reached at 7.0 the Châlets of Waldibalm in the Maderaner Thal, where they were detained by bad weather till 9.40. A man named Träsch or Trosch was here found who knew the pass, and with him the party again set off, and followed a faint track high up along the left bank of the Hufi Glacier till above the ice-fall, the existence of which would not be suspected from below. At 1.10 P.M. they took to the ice, and were occupied till 4.40 P.M. when the Grat was reached, in traversing the immense field of névé, forming the head of the Hufi Glacier. The passage was effected close under the ridge of rocks stretching in a SSE. direction from the Clariden-stock, and the descent by the Clariden Firn to the Upper Sand Alp, passing completely round the Vord-Spitzälpli-stock, a most circuitous route. The châteaux of the Lower Sand Alp, three hours from Stachelberg, were reached at 9.10 P.M. A shorter and easier course would have been to have crossed the Grat close under the Catscharauls, and made the descent to the Sand Alp by the Sand Firn.

SILBERHORN, JUNE 29.—Mr. C. E. Mathews and M. de Fellenberg, with Melchior Anderegg, Ulrich Lauener, and another as guides, tried to ascend the Silberhorn from Lauterbrunnen. They slept at the Stufenstein Alp opposite Mürren, and climbed the enormously steep face of rock directly above it. After nine hours of most perilous climbing, they reached a little col looking down on the Wengern Alp, above which rose an absolutely impracticable rock. They therefore were obliged to turn back, and reached Lauterbrunnen after an expedition of nineteen hours.

SARDONA PASS, JUNE 29.—Messrs. W. F. and A. Short, Morshead,

and Awdry, with Peter Perrn and Moritz Andermatten as guides, left Elm at 3.40 A.M. by the Segnes path, and turning to the left along the Falzuber Alp, ascended a steep slope of shale and then a couloir of snow to the ridge left of the Piz Segnes, between it and the Saurenstock. They reached the top at 10.15, and ascertained that there were several practicable lines of descent on to the head of the Sardona Glacier. This is a more direct, but not shorter or easier way into the Calfeuser Thal than the ordinary route from the head of the Segnes Pass.

PIZ ROSEGG, JULY 2.—Messrs. George and Moore, with Christian Almer, left their bivouac at the side of the Tschierva Glacier (three and a half hours from Pontresina) at 1 A.M., and soon after 4 reached the head of the ridge separating the Rosegg and Tschierva Glaciers, close under the mass of the Piz Rosegg. From this point the only route is up a steep ice-wall to the foot of some rocks which looked too difficult to be tried in safety, at any rate with only one guide; so they turned back at once. From the top of these rocks it would probably be easy to reach the minor peak, whence a short arête leads to the actual summit.

BALFERINHORN, JULY 6.—Mr. and Mrs. R. Spence Watson and Herr Imseing the curé of Saas, with the guides Joseph Marie Claret of Chamounix and Franz Andermatten, left Saas at 2.20 A.M. and reached the summit at 10.15. The descent occupied rather less than six hours.

LAQUIN-JOCH, JULY 7.—Messrs. George and Moore, with Melchior Anderegg and Christian Almer, having passed the night in the Laquin Thal, at a good chalet high above the left bank of the stream, 1 hr. 20 min. from the Simplon road, started at 3.15 A.M. to try a pass to Saas over the ridge connecting the Weissmies and Fletschhorn. In a dense fog the party kept too much to the north, and in order to gain the foot of the ridge, had to turn with great difficulty successive buttresses of the Fletschhorn, until at 12.30 a point was gained, distant about two hours from the top of the ridge, according to the calculation of Almer, who went some way farther to see if progress was possible. Here, however, Mr. George became so seriously indisposed, and the difficulties ahead were so considerable, that the guides considered it unadvisable to persevere, and the party accordingly descended to the village of Sempeln, where they arrived at 6.15 P.M. Both guides agreed that it was possible to effect a passage over this portion of the chain, and the descent on the Saas side, as seen from the Alphubel-joch, does not appear to present any considerable difficulty, but the precipices on the Simplon side are most formidable, and will render the pass one of the hardest in the Alps.

MATTER-JOCH, JULY 10.—'F. Morshead, with P. Perrn and Moritz Andermatten, left Zermatt at 2 A.M. by Hörnli path—took the glacier at 4.15—crossed direct to the Furgge Grat, reaching the foot of the slope at 5.15. Ascended by the seracs immediately to the right of some rocks—reached the top at 6.20—stayed till 7.5. Descended at first over rocks partially covered with ice, then glissaded down a steep snow-slope on to the glacier. Followed the glacier, and got on to the grass slopes above Breuil in 1 hr. 20 min. from the top, having lost some time by keeping too much to the left, and being obliged to cut steps to get off the glacier.'—F. M.

On August 3, Mr. Whymper made a parallel pass, starting from Breuil, and reaching Zermatt in 6 hrs. 15 min., exclusive of stoppages. Guides—Jean Antoine Carrel and Luc Meynet, both of Val Tournanche. 'The route is, at first, the same as the Théodule; by and by the latter diverges to the right, but ours keeps straight on and strikes the moraine of the glacier at the foot of the Matterhorn, high up on the right-hand side. The route, still straight, traverses the centre of the glacier, towards a small peak of rock which juts prominently out of the ridge connecting the Matterhorn and Théodulehorn. The head of the glacier is connected with this peak by a rather steep slope of snow. We went straight up and struck the col at the lowest point, being a little to the right of the aforesaid peak. In descending we found a steep slope of snow first, down which we could walk by kicking footholes. The snow after a while became too thin, and we had to cut nearly 100 steps. We got off it on to the level portion of the Furgge Glacier without difficulty, and bore away, till in a straight line, for the top of the Hörnli, over which we went and descended to Zermatt by the usual path.'—E. W. Mr. Morshead's pass was made on the other side of the little peak of rock here mentioned.

**MONT BLANC FROM COURMAYEUR, JULY 18.**—The Courmayeur guides have built a hut under the Aiguille du Midi, between it and Mont Blanc de Tacul. To this hut MM. Maquetin and Briquet, with ten Courmayeur guides,—Dauphin Berthaud, J. M. Betfrond, J. M. Perraud, G. Bareux, J. A. Réveil, P. J. Mochet, J. Grange, M. J. Ottoz, G. Fleury, P. Petitgaz,—ascended on July 17 by the Col du Géant; and, starting next morning at 5.40 a.m., ascended Mont Blanc de Tacul in two hours, and in two more Mont Maudit. The descent on the head of the Corridor occupied about half an hour; and from thence they ascended Mont Blanc, and went down to Chamounix by the ordinary route.

A few days later, Mr. Kennedy, President of the Alpine Club, attempted the same expedition, and succeeded in crossing to the Corridor; but having been delayed many hours by bad weather, was obliged to descend at once to Chamounix. This is the route by which Messrs. Hudson, Kennedy, and others made their first attempt in 1856 to ascend Mont Blanc without guides, but were defeated by weather, and by which Mr. Ramsay, with some Courmayeur guides, afterwards succeeded in crossing to the Chamounix route, though too late in the day to allow of their reaching the summit.

**PIZ SELLA, JULY 22.**—Messrs. E. Buxton, W. F. Digby, and Johnston, with Alexander Fleuri, left the Rosegg châteaux (about 2½ hrs. from Pontresina), at 4 a.m., and ascending the eastern branch of the Rosegg Glacier, reached the top of the Piz Sella (the highest of the two Schwestern) in 5½ hrs. They descended in 3 hrs., coming down on the main branch of the glacier.

**COL DE LA TOUR NOIRE, JULY 22.**—Messrs. George and Macdonald, with Christian Almer and Melchior Anderegg, reached the ridge between the Aiguille d'Argentiére and the Tour Noire in 6¼ hours' actual walking from Argentiére. The descent of the steep wall of rocks and ice on to the

Saléna Glacier occupied  $6\frac{1}{2}$  hrs., and the party were at last benighted on the glacier. Next morning they got off the glacier on the left bank, about 6 hrs. in all from the foot of the wall, and  $2\frac{1}{2}$  hrs. from Orsières.

PIZ PALU, JULY 24.—Messrs. E. Buxton, Digby, Hall, Johnston, and Woodmass, with Peter Jenni and Alexander Fleuri, left a sleeping-place below Piz Morteratsch (4 hrs. from Pontresina) at 7 A.M., and ascending the Pers Glacier, turned along the arête to the Piz Palu, which they reached at 1 P.M. The descent occupied  $4\frac{1}{4}$  hrs.

SELLA PASS, JULY 28.—The same party, except Mr. Johnston, ascended from the Fellaria châteaux to the right of the glacier, till they were high enough to get on the upper névé of the Fellaria Glacier. Crossing a broad col to the Scersen Glacier, they soon reached the Sella Pass, and descended to the Rosegg Glacier. The distance was only four and a half hours' walking to the top of the pass, and three hours thence to the Rosegg châteaux.

Two days later, the same party tried to ascend the Bernina by the ice-fall at the head of the Morteratsch Glacier, a shorter route by four hours, in the ascent alone, than that described by Mr. Kennedy, but were driven back by wind and snow when not far from the top.

MÖNCH, JULY 29.—Mr. Macdonald, with Melchior Anderegg and Christian Almer, left the Faulberg at 1 A.M., and ascending to the Jungfrau joch, skirted the Mönch until they reached the foot of the arête, running nearly due south from the summit. Cutting steps up this, they reached the top at about 9 A.M., and arrived at the Æggischhorn at 6.45.

AUGUST 4.—Messrs. E. Buxton, Hall, Macdonald, and Grove, with Melchior Anderegg and Peter Perrin, crossed from the Grimsel to Viesch, between the Finsteraarhorn and Oberaarhorn, rather nearer to the latter. The ascent occupied about six hours' actual walking, and the descent seven hours.

LES GRANDES ROUSSES, AUGUST 6.—Messrs. W. and G. Mathews and Bonney, with Michel Croz and another Chamounix guide, ascended the northernmost peak of Les Grandes Rousses.

GRAND TOURNALIN, AUGUST 8.—Mr. Whymper, with Jean Antoine Carrel, ascended this almost unknown peak, which lies NE. of Val Tournanche, between the valley of the same name and that of Ayas. Ascending a lateral valley at right angles to the Val Tournanche, they reached a col south of the peak, and thence followed the arête to the summit. Time required, about four hours up.

COL D'AROLLA, AUGUST 10.—Messrs. E. Buxton and Digby, with Franz Biner and two other Zermatt porters, passed from Zermatt to Chermontane in one day. 'Passing the Cols de Valpelline and du Mont Brulé, we crossed the head of the Arolla Glacier towards the Col de Collon. Then, turning to the right, we ascended a small glacier that flows down between that col and the Mont Collon, and found ourselves at the head of the highest tributary of the Chermontane Glacier. We did not go down this, but crossing it, we descended on to the Reuse d'Arolla affluent, which is more direct. We reached Chermontane châlet in rather more than ten hours' actual walking from the Zmutt châteaux.—E. N. B.

AUGUST 10.—Messrs. J. R. King and Riddell, with Joseph Dorsaz and Jean Zeulihausen, both of Simpeln, ascended the Laquin Thal from Simpeln to the highest châteaux, then up the hill-side to the SSW., and by a long ridge along the north side of a glacier coming down from the Weissmies, till in five hours from Simpeln they reached a col whence an hour and a half of descent brought them on the route to the Zwischbergen Pass, about the same distance below the head of that pass on the west or Saas side.

DENT D'ERIN, AUGUST 12.—Messrs. Macdonald, Hall, Woodmass, and Grove, with Melchior Anderegg, Peter Perrn, and J. P. Cachat, left Prerayen at 2.30 A.M., and ascending the Glacier de la Dent d'Erin, crossed diagonally the rocks and ice forming the S. side of the Western Arête to a spot about one-third of its length from the summit. Thence they followed the Arête to the top, which was reached at 12.30; and returned to Prerayen after an expedition of about seventeen hours.

AUGUST 12.—Messrs. Blanford and Rowsell reached the head of the Arolla Glacier by Mr. Buxton's new pass, where bad weather came on, and induced them to seek the nearest shelter. They therefore ascended the ridge some distance S. of the Col du Mont Brulé, and easily reached another col, which may, perhaps, best be called the Col de Zardezan, whence a steep and difficult descent, mainly over rocks, brought them down to the lower level of the Zardezan Glacier, and so to the highest châteaux above Prerayen.

This summary will be continued in the next number of the 'Alpine Journal,' if notice of any further new expeditions reach the Editor.

## NOTES AND QUERIES.

MURDER OF A TRAVELLER IN SWITZERLAND.—On the 23rd July, a traveller from Hanover, named Hermann Quensel, councillor of the tribunal of Hildesheim, left Zinal, in the Val d'Anniviers, intending to cross the Cols de Sorebois and Torrent to Evolena. He was accompanied by a guide, named Baptist Petre, brother-in-law of the innkeeper at Zinal. About midday they reached the top of the Col Torrent; and here the guide drew the attention of the traveller to a small wall of stones, in the form of a breastwork, recently erected by the wayside. Some steps further on lay a powder flask and some bullets. The guide expressed fears that all was not right; but M. Quensel disregarded this, and began to descend a few steps in advance of the guide. When they had gone about ten paces from the top of the pass, a shot was fired, which passed through the guide's shoulder and broke the arm of the traveller. The latter exclaimed, '*Sauve qui peut!*' and began to run; while, at the same moment, a second shot brought the guide to the ground. M. Quensel must have run down the zig-zag path, while the assassin followed him directly down the hill side; for the murderer overtook his victim almost immediately, and fired again so close to him that the clothes bore marks of the powder. The bullet passed through the unfortunate man's heart, and death was of course instantaneous. The assassin then returned to the guide, and took from him the knap-



sack he was carrying; but, moved with pity by the guide's prayers for mercy, he not only spared his life, but bound up his wounds and helped him back over the col. Before leaving him, the murderer offered him money, saying that his companions, if they knew of it, would kill him for showing mercy. This last remark, which was probably misunderstood by the guide, caused him to believe and declare that there was an organised band of brigands concerned in the murder. The guide, faint and exhausted, remained lying on the ground until some shepherds heard his groans, and came to his assistance. They conveyed him to the nearest châlets, some distance from Gremenz, the nearest village in the Val d'Anniviers; and he was at length carried down to Sierre, where he lay for some time in a dangerous state, but eventually recovered.

It was not until the morning of the 24th that a party of villagers ascended the Col Torrent from the Val d'Anniviers, and found the body of M. Quensel lying in the path, despoiled of everything valuable, except a ring. The peasants dared not move the body without leave from the authorities of Evolena; but after the delay entailed by this necessity, the remains of the unfortunate gentleman were brought down, and buried in the churchyard at Evolena, where they now rest, the grave being carefully tended and dressed with mountain flowers by the inhabitants, who feel the utmost horror of the crime, and the deepest sympathy for its victim.

Subsequent enquiries have tended to prove that two brothers named Balet, or Balay, who live in a small village north of the Rhone, were the perpetrators of this atrocious murder, and leave no reason for believing that any others were concerned in it. The elder was last year convicted of forgery, but escaped from prison and fled to Algiers, whence he returned in the spring, and has since led a wild life in the mountains near his home, for fear of recapture. It is supposed that the younger brother gained intelligence concerning M. Quensel's movements in Sierre, where that unfortunate traveller stayed for a day or two before ascending the Val d'Anniviers. Both brothers had double-barrelled rifles, which have since been seized; and one of them, peculiarly marked, was recognised by the guide. The knapsack of the traveller has also been found concealed in an outbuilding belonging to the family of the brothers Balay. The younger brother was apprehended at his own home shortly after the murder. The elder fled into Canton Berne, and was eventually arrested at Gsteig, a village lying at the northern foot of the Sanetch Pass. He, however, managed to escape at Saanen from the gendarmes who had him in custody, and has not yet been recaptured, though he is reported to have been seen near Andermatt on the St. Gotthard.

Universal horror and indignation have been excited throughout Switzerland by the news of this murder, and there is no reason for travellers to feel any new fears in consequence of what is undoubtedly an isolated and exceptional event. Indeed the very fact that no such crime has ever before been known to be committed, in spite of the necessarily great facilities for such acts, is in itself strong testimony in favour of the Swiss character generally.

ALPINE BYWAYS: III.—*From Simpeln to Saas by the Gamser-joch.*

Although the existence of the pass here described is vaguely hinted at in some of the Guide-books to Switzerland, I have nowhere seen any account of it; and as it affords the shortest and easiest route from the head of the Simplon to the village of Saas, a few notes of a passage made during the past summer may be interesting to those Alpine travellers who have neither time nor inclination to attempt one of the more difficult passes in this direction.

An attempt made on the previous day to effect a pass between the Weissmies and Fletschhorn having failed, owing to the unfortunate indisposition of one of the party, when success was almost within our grasp, I left the village of Simpeln at 8.20 on the morning of the 8th July last, with Melchior Anderegg and a native, named Joseph Dorsaz, intending to reach Saas by the shortest possible route. Following the Diligence road as far as the Nieder Alp, a little distance below the old Hospice, we there diverged to the left, and passing a group of châteaux, took to a faint track over the pastures, bearing towards, but some distance to the right of, the Raut Glacier. The track soon came to an end, and an exceedingly steep ascent followed, ending in a precipitous and dusty gully, which brought us on to a desolate little plain covered with débris and the remains of the winter's snow. This we crossed, and by 11.45 had reached the crest of the ridge forming its western boundary, overlooking the Nanzer Thal, an extensive valley which joins the valley of the Rhone between Brieg and Visp. From the point where we were standing the head of the valley was shut out by a projecting shoulder of the mountain, so we kept along the ridge to the left for a quarter of an hour, until we had turned the obstacle, and opened out a fine view of the upper part of the valley, closed at its head by the Gamser Glacier. While halting for lunch, we had time to reconnoitre the ground and decide on our line of march; three cols were visible, one on the opposite side of the valley, north of the Simmelhorn, to reach which we should have passed close to the foot of the glacier, and then struck straight up the ridge; a second immediately south-east of the Simmelhorn, which might be gained by traversing a considerable portion of the glacier; and a third, at the head of the main branch of the glacier, above a very extensive ice-fall. After some discussion, we resolved to make for the second col, which appeared to be the most direct course. A rapid descent over shale and an occasional snow-slope soon landed us on the glacier, some little distance above its termination; here the rope was put on, and we commenced crossing it in a south-westerly direction towards the col. The slopes were steep, and a few crevasses had to be passed; but the snow was in good order, there was not the slightest difficulty, and by a judicious use of zig-zags the ridge was gained at 1.55 P.M. During the ascent, we had reason to congratulate ourselves on not having attempted to climb the ice-fall on the left, as pinnacles of ice were perpetually falling, which would have rendered the passage dangerous, and we should finally have arrived at an entirely wrong point of the ridge. The view from the col, whose height we had no means of determining, but estimated to be about 9,500 feet, was extremely fine

—the Aletsch, Viesch, and Rhone Glaciers in one direction, and the range of the Mischabel with the glorious expanse of the Fee Glacier in the other, being seen to singular advantage. A steep but easy descent over broken rocks led us into a wild glen, closed by the small Mattwald Glacier (which appears, from the map, to communicate with the head of the Gamser Glacier), the stream from which we followed in default of a path. This part of the route is toilsome, as both banks of the stream are covered with boulders, over and through which it is necessary to pick a way. In an hour from the col we reached the highest châteaux, whence a good path, carried high up along the side of the main valley, brought us to Saas, at 5.5 P.M., the passage having occupied seven hours and a half, exclusive of halts. We had dismissed the Sempeln man at the top of the pass; and indeed a mountaineer, with the Federal Map, might find the whole way without a guide, getting directions at the Nieder Alp Châteaux. It would, however, not be advisable for a solitary traveller to pass the Gamser Glacier; and anyone making the pass from the side of Saas would perhaps do wisely in taking a guide as far as the Col.

A. W. MOORE.

DR. HAMEL'S ACCIDENT.—The Glacier des Bossons is slowly restoring to light the remains of the unfortunate men who perished by this the only fatal accident that has ever happened on the ascent of Mont Blanc. In the middle of last June, Mr. H. J. Rouse was visiting the Glacier des Bossons with a Chamounix guide, and found a large piece of a man's back just protruding. The flesh retained some colour, and had a decided smell. They tried to dig it out, but having no proper tools, and the rain falling fast, were obliged to give it up. A party of guides had been searching the day before on the same spot, but the remains were not then visible. Since that date other portions, both of the bodies and of the clothes, &c., have been discovered. It is sincerely to be hoped that a degrading trade in these relics will not be allowed to spring up at Chamounix.

THE GUIDES AT PONTRESINA.—In July of this year we spent about ten days in exploring the mountains of the Bernina range under the guidance of Jenni and A. Fleuri, the only men in the Ober-Engadin who have any pretensions to be guides competent for new ascents. From the manner in which they conducted themselves during the ascent of the Bernina by Messrs. Kennedy and Hardy, we had formed the highest expectations of their ability as guides, and of their pleasantness as companions. We regret to say that our opinions were very disagreeably changed by actual contact with them. They are admirable icemen, but, so far as we had opportunities of judging, are nervous and of indifferent capacity upon rocks; and, what is of far more consequence, they seem quite unable to find the right route in new places of any difficulty. Many times they were proved to be wrong in things of minor importance, and on no less than three occasions in the course of six expeditions success was gained by overruling their opinion; in one, failure was distinctly caused by acquiescence. So strongly do we feel upon this point that we would most emphatically recommend no one to attempt ascents in the neighbourhood of Pontresina, without bringing with him from some other part of Switzerland sufficient assistance to

render him entirely independent of any which is to be had on the spot. This is the more necessary, because extreme jealousy is felt towards foreign guides; they are refused information, and there is a disinclination to act with them. Even more annoying, however, than their professional deficiencies were the faults of temper and the carelessness of Jenni and Fleuri. There was an entire absence of that good humour and handiness which make the better class of guides so pleasant in other parts of Switzerland; on the contrary, they seemed to consider themselves degraded by being of use, and tried to force us to adopt their plans, instead of busying themselves in carrying out ours. They chafed us continually by arrogance and ill-tempered impertinence, and revenged themselves by sulkiness, when their pride was injured by their being proved to be in the wrong. It is needless to say anything about their attempts at extortion: their tendencies in this direction were already known, and we were prepared for them, but it must be confessed that even our expectations were exceeded. It is very likely, however, that they will improve when they have had opportunities of comparing themselves with men who are really their superiors, and when their feelings of self-interest are aroused by finding that their monopoly is destroyed by competition from without.

W. E. HALL.

N. N. BUXTON.

M. WOODMASS.

In corroboration of the above, the Editor adds the following statement of his own experience at the same place: 'Mr. Moore and I went to Pontresina on June 28, to try the Piz Rosegg, taking with us Christian Almer, and willing to pay pretty liberally for the services of a local guide, the peak having never been ascended. The only terms, however, on which any of the Pontresina men would go, were that we should put ourselves entirely under their direction, exclude Almer from any share in the expedition, and pay 300 francs. On our declining these terms, they offered to let Almer go as an amateur, and to take 250 francs, and nothing would induce them to abate anything more from their preposterous demands. We in consequence went alone with Almer to see what could be done, and had the satisfaction of finding that Almer's skill amply compensated for want of the local information refused us in Pontresina. We hit without hesitation on the best route, reached the point whence the Pontresina guides, by all testimony but their own, retreated on their last attempt, after having failed on other sides of the mountain, and only turned back because the difficulties were such as no one guide ought to encounter unaided, especially with two travellers.

H. B. GEORGE.'

ELECTRICAL ADVENTURES.—On the 10th July, I visited the Col de la Jungfrau from the Äggischhorn, in company with my wife, and Messrs. John Sowerby and W. G. Adams of Marlborough College. We had with us as guides, J. M. Claret of Chamounix, and a young man from the hotel. The early morning was bright and gave promise of a fine day, but as we approached the col, clouds settled down upon it, and on reaching it we encountered so severe a storm of wind, snow, and hail, that we were unable to stay more than a few minutes. As we descended, the snow continued to fall so densely that we lost our way, and for some time we were wandering up towards the Lötach-sattel. We

had hardly discovered our mistake when a loud peal of thunder was heard, and shortly after I observed that a strange singing sound like that of a kettle was issuing from my alpenstock. We halted, and finding that all the axes and stocks emitted the same sound, stuck them into the snow. The guide from the hotel now pulled off his cap, shouting that his head burned, and his hair was seen to have a similar appearance to that which it would have presented had he been on an insulated stool under a powerful electrical machine. We all of us experienced the sensation of pricking or burning in some part of the body, more especially in the head and face, my hair also standing on end in an uncomfortable but very amusing manner. The snow gave out a hissing sound, as though a heavy shower of hail were falling; the veil in the wide-awake of one of the party stood upright in the air; and, on waving our hands, the singing sound issued loudly from the fingers. Whenever a peal of thunder was heard the phenomenon ceased, to be resumed before its echoes had died away. At these times we felt shocks, more or less violent, in those portions of the body which were most affected. By one of these shocks my right arm was paralysed so completely that I could neither use nor raise it for several minutes, nor indeed until it had been severely rubbed by Claret, and I suffered much pain in it at the shoulder joint for some hours. At half-past twelve the clouds began to pass away, and the phenomenon finally ceased, having lasted twenty-five minutes. We saw no lightning, and were puzzled at first as to whether we should be afraid or amused. The young guide was very much alarmed, but Claret, who has no kind of fear, and who had twice previously heard the singing (unaccompanied by the other symptoms), laughed so heartily at the whole affair that we kept up our spirits. No evil effects were felt afterwards, beyond the inconvenience arising from the burning of our faces, which, though there had been no sun, were almost of livid hue when we arrived at the *Äggishorn*. Principal Forbes mentions his having heard the singing noise from his *bâton* whilst crossing the *St. Théodule*, and, as I have said, Claret had also heard it before; but, with these exceptions, I can hear of no one who has met with these curious and interesting phenomena. It has been suggested that our bodies became as it were *Leyden jars* for the time, and that the thunder peal discharged us. Neither travellers nor guides were sorry when they got their final discharge.

ROBT. SPENCE WATSON.

PHOSPHORESCENT SNOW.—On the 11th September, 1862, in company with my friends Messrs. Martineau and Donaldson Hudson, I crossed the mountains between the *Fusch Thal* and *Möll Thal*, taking the ordinary route to *Heiligen-blut*. We left *Fusch* late in the afternoon, and before we reached the *Rauriser Tauern* night had overtaken us, and it became so dark that we had considerable difficulty in finding our way. After we had crossed the *Tauern* and commenced our descent towards *Heiligen-blut*, we came upon several large patches of recently fallen snow. By this time it must have been between eight and nine o'clock, but it was too dark for us to see our watches. As we were crossing one of the patches of snow, I observed that the snowy particles which fell from my shoes appeared like a number of bright phosphorescent

sparks. When I first saw these snowy sparks, I was walking in front of the party, but in order to observe the phenomenon better I dropped behind, and Hudson took my place. As I followed him, I saw clearly that at almost every step the snowy particles which he lifted with his feet fell in a little luminous shower. Except that the sparks were of a pale phosphorescent yellow colour, the effect was much the same as that of the sparks seen at night when a horse strikes his shoe against a stone. At one time also, I fancied that a large mass of snow was slightly luminous, but I cannot be certain whether it was so in reality, or whether I was deceived by the whiteness of the snow having suddenly caught my eyes through the darkness. Mr. Tuckett appears to have seen the same phenomenon of luminous snowy particles during his ascent of the Aletschhorn. (See 'Peaks, Passes, and Glaciers,' 2nd series, vol. ii. p. 58.) But he expresses some little uncertainty whether this effect was not to be attributed 'to the action of the moon's rays as they fell obliquely upon the small cloud of fine snowy particles raised by the movement of our feet.' I feel no doubt that the effect which I saw cannot be attributed to this cause, for the night was very dark, the sky being completely overclouded, and the moon and stars obscured by a thick cold mist which appeared to be creeping over the mountains. MM. Schlagintweit, whose remarks are quoted in the note 2 to Mr. Tuckett's paper, seem to believe that the appearance of this phenomenon depends in a great degree upon the state of the weather at the time. I may therefore add that on the 11th of September, as well as on the two preceding days, the weather had been remarkably warm, and throughout the two following days a cold mist prevailed.

E. THURSTAN HOLLAND.

AN ICE GROTTA.—In descending the Aletschhorn (July 10, 1862), we stopped to examine a most magnificent ice grotto. We discussed the formation of the grotto on the spot, and decided that it must have been produced in the following manner:—A very large crevasse in the névé had received, from drift snow, a roof and a floor: it may have been filled up from the bottom. The roof covered almost the entire length of the crevasse, but at the end furthest from us it drooped until it met the sloping floor, thus forming the bottom of the grotto; the crevasse having been converted into an enormous hole, penetrating downwards into the glacier. Masses of white sérac had fallen in all directions; they were frequently traversed by veins of blue ice; blue icicles hung from every convenient point; and the dry powdery snow, drifting into the hole, had formed itself into the most lovely snow flowers and crystals. We descended thirty-six steps down the sloping floor, the angle of which was 40° by the clinometer, and reached probably three-fourths of the way to the end. No words can do justice to the intense unearthly beauty of the scene. We were bathed in the clear blue light of the glacier, and we looked upwards through the vista of icicles, flowers and crystals, all cold and pure as possible, to the full blaze of the sunlight and to the intensely deep blue sky of that glorious forenoon.

W. WIGRAM.

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EXPLORATIONS IN THE ALPS OF DAUPHINÉ, during the month of July, 1862. By F. F. TUCKETT, F.R.G.S. Read at the meeting of the Alpine Club, June 9th, 1863.

PERHAPS no part of the mountain system of Europe has been less thoroughly explored than the lofty group bounded by the river *Durance* on the east, the *Romanche* on the north, and the *Drac* on the west and south, and occupying a portion of the modern French departments of the *Isère* and *Hautes Alpes*. The area of the entire *massif* is about 1,100 square miles, but the glacier-developing region covers little more than half this surface. The mean elevation is very considerable, as may be inferred from the narrowness of the valleys as well as from a comparison of the following classification of the principal peaks with those of the group of the *Finsteraarhorn*.

4	Peaks above 3,962 mètres (13,000 feet) and under 4,266 mètres (14,000 feet).
17	" 3,657 " (12,000 " ) " 3,962 " (13,000 " ).
29	" 3,353 " (11,000 " ) " 3,657 " (12,000 " ).

Its glaciers, including those of the second order, exceed one hundred, and are therefore little inferior in number to those of the Bernese system, though several of the latter have certainly the advantage in point of size from the greater extent of *névé* due to the less precipitous formation of the ground.

From time to time some accounts of its topography and physical features have appeared, and the writings of *Ladoucette* *M. Elie de Beaumont*, *Professor Lory*, and our own countryman, *Principal Forbes*, have called attention to many of its more

striking peculiarities. Within the last four or five years various members of the Alpine Club have penetrated still further into its recesses; and several papers in the second series of 'Peaks, Passes, and Glaciers' bear witness to their activity and enterprise. Hitherto, however, the absence of a trustworthy map, added to the really intricate relations of the principal summits and valleys, the poor fare and defective accommodation, and the fact that few of the explorers had an opportunity of intersecting the district in various directions, and studying it in detail, have rendered it difficult to arrive at a clear conception of the mutual bearings of its various parts. Under these circumstances, I ventured to think that a fresh examination by one who could avail himself of the labours of his predecessors would not be without advantage; and I therefore devoted ten or twelve days during the month of July in the past year to this special object.

It was important before getting on the ground to obtain all the preliminary information possible, and I was especially desirous of consulting such MS. maps or notes as might be available for my purpose in the *Dépôt de la Guerre* at Paris. Thanks to the kindness of my friend Principal Forbes, in furnishing me with a letter of introduction, and explaining my object to M. Elie de Beaumont, and the influence which that distinguished *savant* was good enough to exert in my favour, I met with the most courteous reception from General Blondel, director of the *Dépôt*, who gave me the freest access to maps and MSS. including the original memoranda of the officers of the *E'tat Major*, allowed me the utmost liberty in making notes, and, besides permitting me to have printed copies of several unfinished and of course unpublished sheets, furnished me with a manuscript one, beautifully executed by the draughtsmen of the *Bureau*, of the more important portion of the four MS. sheets of the *Feuille* Briançon on the same scale as the original. This last is partially engraved, being now, as it is termed, '*au trait*;' i.e. the rivers, roads, names of places, heights, and outlines (dotted) of mountains and glaciers are given, but no shading, nothing that represents relief. M. le Commandant Brossard, head of the engraving department, informed me that this sheet would certainly be ready for publication in six years, and very probably in five. The superintendent of the topographical department, M. le Colonel Bertrand, handed me over, after reading the general's order, to M. le Commandant Loupôt, a most pleasant, polite, and intelligent gentleman, whose kindness I shall not soon forget. He seemed as though he could not do enough to meet my wishes, and most energetically seconded all my applications to his *chef*. The four original MS. sheets, on a scale of



$\frac{1}{40000}$ , which form the basis of the future *Feuille* Briançon, are the result of the following labours:—

Première Triangulation—1828-9-30	M. le Commandant Durand.
Seconde Triangulation—1851-2	M. Davoût (Capitaine ?).
La Topographie (détails) ... ..	MM. les Capitaines Viroux, Valette, Taffin, Beaudouin, Bourgeois, Smet, Vuillemot, Courier, Cousinard, Versigny, and le lieutenant Meunier.

Of these gentlemen, MM. Bourgeois, Courier, Cousinard, and Meunier executed that portion which is included in the copy supplied to me, and of which a photographic reduction has been deposited at the rooms of the Alpine Club. From the large number of lofty summits ascended by them, I was led to anticipate a degree of accuracy which subsequent minute examination on the spot completely confirmed. With Commandant Durand the survey of this group of mountains was a labour of love to which he devoted all his energies. Indeed, to such an extent did he identify himself with the successful completion of his task, that it ultimately cost him his reason. Whilst working in one of the more southerly valleys of the district, he had unpacked and set up his surveying instrument, the constant companion of his labours, when a kick from a mule threw it down and broke it irretrievably. This loss so affected his spirits that from that day he never recovered the full use of his mental powers. His successors appear, however, to have worked with equal diligence and accuracy, and the result is a map which for faithful rendering of details will almost compare with those of the Swiss survey. My photographic reduction is on a scale of about  $\frac{1}{97000}$ , but for purposes of comparison with the maps of General Dufour, it may be roundly estimated as  $\frac{1}{100000}$ , or two and a half-times less than the original, which, as already stated, is on a scale of  $\frac{1}{40000}$ . The *Feuille* Briançon, now partially engraved, is on a scale of  $\frac{1}{80000}$ , like all the other sheets of the map of the E'tat Major Français. In the photographic copy deposited at the rooms of the Alpine Club, some errors have been corrected and omissions made good by me; but these are not for the most part of much importance, and I have reason to believe that the future Briançon sheet, No. 189, will be a credit to the French engineers.\*

Besides the above, I was furnished with a mountain barometer by Negretti and Zambra, an aneroid by Secrétan of Paris, two boiling-point thermometers by Casella, a theodolite by Troughton

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\* A reduction of this map has since been engraved for the 'Guide to the Western Alps,' where it will be found at page 62.

and Simms, kindly lent me by my friend Mr. Wm. Mathews, jun., a sleeping bag which has already been described in my paper on the Viso, a boiling apparatus by Stevenson of Edinburgh, and a supply of portable soup.

Thus much premised, I will now proceed to describe my various expeditions in Dauphiné. On the 5th of July, after descending from Monte Viso, I and my companions (Michel Auguste Croz of Chamouni, Peter Perrin of Zermatt, and Bartolomeo Peyrotte of Bobbio) took up our quarters for the night at La Chianale (5,847 feet, E.M.P. ; 5,906, W. Mathews, jun.), with the intention of crossing the Col de l'Agnello to Château Queyras and Guilestre on the following day. This pass is one of five or six which connect the head of the Val Vraita with the adjoining valleys of the Guil and Ubaye on the French side of the frontier, and, like most of them, is perfectly practicable for horses. As I can give no information from personal knowledge of the Cols Longet, La Niera (or Blanchet of the French map), St. Veran, La Ruine, and Ristolas or Soustra (the Lauze of the French map), I will not here allude to them further, especially since the recently published 'Alpine Guide' furnishes all needful particulars.

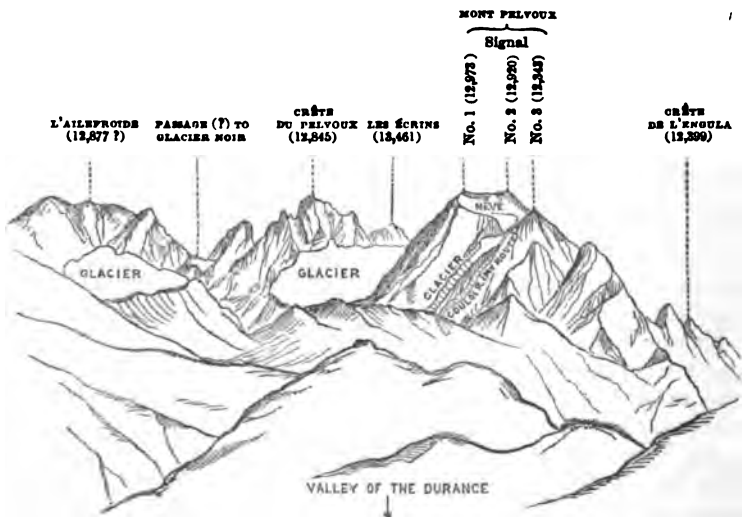
Of our quarters at La Chianale I cannot say much, but we managed to secure a good night's rest and a sufficiency of somewhat homely food, and about five on the morning of the 6th started for Guilestre. The sky was cloudless, the air fresh and pure, and all signs of the previous day's disturbance of the weather had vanished. About half an hour above the village the path turns off to the right up the Val de Soustra, at the head of which are the Cols de la Ruine and de Soustra (or Ristolas), both leading into the Vallon de Viso, as the upper portion of that branch of the valley of the Guil is called. Soon, however, turning to the left, we passed some sleeping *préposés*, zig-zagged up the hill-side through a scattered pinewood, and then following the course of a grassy upland valley, mounted the slopes at its head by a well-marked track to the actual col. Here we arrived at 7.15, but the distance might have been accomplished in less time if there had been any object in doing so. From two points before reaching the col the summit of the Viso comes into view, and from the actual crest it forms a striking object; whilst to the south the mass of the Rioburent (3,396 mètres) is seen towering up in ambitious rivalry. In the opposite direction a distant view of great magnificence burst upon us, embracing the entire group of the chief Dauphiné summits from the Ailefroide to the double-headed Aiguille d'Arves. The peculiar pointed mountain figured by Mr. Whymper at page

223 of the second volume of 'Peaks, Passes, and Glaciers' (2nd series), was very conspicuous, and I soon recognised the two principal peaks of the Pelvoux. To the right of these was a yet loftier summit which I was at the moment unable to identify, and of which, as I shall have occasion to refer to it again, I will only here say that it was in reality the E'crins, 4,103 mètres in height, and the culminating point of the *massif*. A barometer observation, by comparison with Geneva, Turin, Aosta, and the St. Bernard, gives a height of 2,730·7 mètres (8,959 feet), whilst in the unpublished *Feuille L'Arche* of the French E'tat Major I find the figures 2,699 (8,855 feet), apparently referring to the same spot.

After spending an hour very pleasantly over sketches, barometer readings, and a second breakfast, we again proceeded on our way. The descent on the French side was very gentle, and after passing a comfortable solidly-built refuge inhabited by a *préposé*, the path, which is an excellent one, follows the course of a grassy valley, the immediate scenery of which is rather monotonous, though the fine distant view of the Pelvoux and its companion peaks goes far to supply the deficiency. Two hours' walk brought us to Fongillarde, the French custom-house station, and an inspection of our baggage took place, though in the politest manner and with many apologies for giving us the trouble. Most of the *communes* in this and the neighbouring valley of St. Veran are Protestant, but many of the villages were furnished with places of worship of both creeds, and the utmost harmony appeared to prevail, the Roman Catholics speaking of their Protestant neighbours as '*de braves gens*.' Below Fongillarde there is a *char* road, and soon after quitting the village it descends rapidly to Molines, situated about three quarters of an hour farther down the valley, just below its junction with that of St. Veran. Between Molines and Villevieille (1 hour) the road is an excellent one, quite scientifically engineered, and in a gorge which is passed on the left just before the commencement of the steep descent to the valley of the Guil, there may be seen one of the finest natural pillars (similar to those of Useigne, Botzen, &c.) with which I am acquainted.

At Villevieille, whilst halting a few minutes for old Peyrotte, who had lagged behind, we entered a large inn rejoicing in the name of L'Éléphant to obtain some lunch, and judging from the appearance of the *salle*, the character of the provisions, and the hearty goodwill of the landlady, I am disposed to think that the traveller might meet with much worse quarters. Turning now sharp to the left down the main valley of the Guil, half an

hour's walk along a nearly level road (the *Grande Route* from Abriès to Montdauphin) brought us to Château Queyras, a most picturesque-looking place which the pencils of Brockedon and Lord Monson have already rendered familiar. There are two inns, neither of them brilliant specimens, and by no means seductive enough to induce me to stay for the night; but as the walk to Guilestre would be a tedious one, and, from the occurrence of a great quarterly fair at that place, every vehicle was in requisition, it appeared doubtful whether we should not have to face inevitable fleas, and possibly deeper horrors. At length, however, a *charrette* and mule were discovered, and after a pleasant chat with some of the sixty or eighty soldiers of the garrison, who find their residence in this little mountain fortress '*bien triste*,' and looked on a furtive visit to the E'léphant at Villevielle as the acme of bliss, we parted with Peyrotte, and effected a start at two. The ride was a very fine one, the road winding at first through magnificent gorge scenery, and finally reascending before it swept down by a series of well-constructed curves through the vineyards which clothe the slopes above Guilestre. From these the views of the range in front are most magnificent, as an outline taken a little above the town will to some extent show.



THE AILFROIDE, ÉCRINS, AND PELVOUX, FROM ABOVE GUILRESTRE.

Guilestre was in a fever of excitement in the prospect of the

morrow's fair, and M. Ferrari, the polite landlord of the Hôtel des Alpes (3,320 feet, W. Mathews, jun.), was quite in despair at the numerous claims on his attention. The arrival of a foreigner was, however, an unusual event, and he exerted himself to the utmost and with entire success to make me comfortable. The house was full, but an excellent room was found for me at a neighbour's, and in a little inner *salle* a capital dinner, to which I did ample justice, was soon served. The afternoon and evening were occupied in sketching, writing letters, and watching the groups of peasantry, the freaks of unmanageable mules, horses, and cows picketed about the streets, and the wonderful performances of a Cheap Jack, who kept the *grande place* spell-bound by the sounds of his voice and drum. During the night heavy rain fell, and I began to fear that my good fortune was departing just at the critical moment, and that Dauphiné was asserting its immemorial right to be wet. A babel of tongues having, however, roused me at 4 on the morning of the 7th, I found to my delight that all traces of the storm had passed away, save a delicious freshness in the air which was most exhilarating. As the *diligence* from Gap to Briançon was not due till about one o'clock, we amused ourselves for a few hours in strolling about the little *bourg* and its neighbourhood, which owes its fertility to a somewhat elaborate system of artificial irrigation, and is quite famous in the country for its vineyards. About twelve we started down the hill in a *voiture* for a desolate-looking post station on the *grande route*, called the Plan de Fazy, at which the *diligence* changed horses. We were an hour too early, and the *diligence* was three quarters of an hour late, so we had a dismally long wait with nothing to do. At length, a little before two, the lumbering vehicle made its appearance, there was luckily room for all of us, and at 3.30 we rolled up the hill into La Bessée.

My first proceeding, after ordering some dinner, was to make the acquaintance of M. Jean Reynaud, *agent voyer* of the district, and a great friend of Messrs. Whympier and Macdonald, whom he accompanied in their successful ascent of the Pelvoux the previous year. I was fortunate in finding this gentleman at home, and shall always retain a very pleasant recollection of the few hours spent in his society. Dinner over, and various matters arranged, we started at 5.45 for Ville Vallouise, M. Reynaud most politely insisting on accompanying me for an hour. The evening was lovely, the valley well cultivated and beautifully wooded, the road excellent, and with my bright, genial, intelligent companion, the time passed very pleasantly. At length he took leave, and I pushed on rapidly after the

guides who had left us to follow our own devices. It was amusing to see the impression produced by our ice-axes, everyone evidently connecting them with the idea of mining operations, and as the natives have exalted notions of the mineral wealth of their mountains, I had to stop and allow myself to be cross-questioned as to my object in visiting their valley. I got away at last, however; and at 7.30 entered the Ville, as the modest village is somewhat pretentiously called (height 1,150 mètres E. M. F. ; 3,842 feet, W. Mathews, jun.).

We had been instructed by M. Reynaud to seek quarters *chez* Giraud, whose house stands near the bank of the stream to the left of and just across the bridge, and thither we accordingly repaired. Our host, who was at the door, gave us a very hearty reception, and ushered us into an unpretending, but by no means uncomfortable, *salle*, where we were soon joined by some of the local authorities, including a very intelligent and gentlemanly man, a namesake of the landlord, a native of the place, and a doctor by profession, who had been settled for some years at Vienna as private physician to some noble personage, and, being in delicate health, had come home to rest and recruit. He was a most enthusiastic entomologist and botanist, and gave me much interesting information. Amongst other things he stated, as the result of the latest investigations, that the red snow, or rather the colouring matter, is developed on the pollen grains of *Pinus Pumilio* (the Legföhre), which serve as a nidus. In confirmation of this, I may mention that I have often remarked early in the season, and a few weeks before the red tint makes its appearance, that footprints in the snow have a strong yellow hue, the origin of which had always been a puzzle to me, as it was too persistent to be due to any dirt or colouring matter in the boots. I have now little doubt that it may be attributed to the presence in large quantities of the *Pumilio* or other pollen grains, which are often wafted by the wind over very wide areas.

Exquisite moonlight tempted me out after supper, and it was hard to resist the attractions of a stroll; but as we were to be early risers, as usual, I did a wiser thing, and went to bed at ten. The sleeping accommodation was not luxurious, and the fleas were not unmindful of their vested rights; but on the whole we had little cause to grumble, and might have fared much worse.

We were astir soon after four on the morning of the 8th, and again the same perfect weather greeted me on looking out. The sun had just risen without a cloud, and was beginning to

tinge some of the summits that form the west boundary of the valley. I proposed to commence operations by an attack on the Pelvoux, in order to get a general notion of the topography and relations of the surrounding valleys, to obtain bearings of the principal summits, and to determine as carefully as possible the height of the Pelvoux itself. To accomplish this it was at least desirable, and at the time supposed to be essential, to bivouac somewhere on the mountains; so we determined to establish ourselves that night at the Grotte de Soureillan, or Cabane des Bergers de Provence, and assault the Pelvoux on the morrow. A supply of provisions and wine was requisite, and some time was consumed in the necessary arrangements. A sort of double sack, something like a Spanish *alforgas*, was at length provided, with store of bread, cheese, ham, eggs, and wine; and at 7.15 we started for Ailefroide, intending, if possible, to secure *en route* the services of one of the Sémionds, as neither of my companions had ascended the mountain, though Michel had two years previously been as far as the glacier in company with Messrs. Bonney and Mathews. A walk of three quarters of an hour, along an excellent path on the left bank of the Gir, brought us to the village of Claux (*patois*, Claou), rich in orchards, and pleasantly situated amidst a luxuriant growth of trees at the entrance to the defile leading to the upper valley of Ailefroide. A path ascends the slopes on the north of the village to the upland Val de l'E'chauda, and across the col of the same name at its head to Monestier. Les Claux is said to have been formerly occupied, like many other places in Dauphiné, by a band of Saracens, who are supposed to have held it as a fortified port after they were driven from the more open and accessible districts. In the name, it is added, of Les Claux (connected with the Latin *clausus* and the French *clore*), there is an allusion to its position at the entrance of the gorge which communicates with the valleys at the south-east foot of the Pelvoux. We soon found one of the Sémionds, who at first informed me that he could not accompany us, and that his brother was absent at Ailefroide. I soon saw, however, that there was something else in the background, and at last out it came. Taking me aside, he proceeded to inform me that he and Croz, who had been companions on the occasion of the unsuccessful attempt of Messrs. Mathews and Bonney in 1860, had not got on very well together, and that he was determined not to show the way to foreign guides, who would make it known to others, and thus deprive the natives of their rights by dispensing with their services. Though not at all anxious, under these circum-

stances, to have anything more to do with him, I endeavoured to point out the short-sightedness of such policy; but finding him obstinate, I did not choose to waste time in bandying words with him, and so, at 8.15, we once more proceeded on our way. The path crosses to the right bank of the Gir, or Ailefroide, immediately after quitting Les Claux, and then ascends, at first steeply, through scenes of the most varied beauty, walnuts, chestnuts, and pines occupying the foreground, whilst beyond and behind the many-peaked Pelvoux towers up most majestically in an abrupt face of rock nearly 7,000 feet in height. At 9.15 we reached the châteaux of Ailefroide, situated at the junction of the Celce-Nière, descending from the Glacier du Selé through the Combe de Sapière of Bourçet, with the Torrent de St. Pierre which has its source in the glaciers Noir and Blanc. Their height is 1,505 mètres (4,938 feet) according to the map of the E'tat Major (4,940, W. Mathews, jun.). Not admiring the genus Sémiond, we did not trouble to enquire further for the brother, but secured the services of a strong boy, who, for three francs, agreed to carry our provision-sack and guide us by the most direct route to the 'Cabane des Bergers de Provence,' or 'Grotte de Soureillan,' as it is called by the inhabitants of the Vallouise and the French engineers.

In company with our young guide, we started at 10.45, and in about two hours reached our destination by a short cut up a steep *talus* of débris, followed by a chasm scarcely wide enough to allow of the passage of a man, leading to slopes of alternate rock and turf. A bivouac is to me, I confess, one of the most delightful incidents of mountaineering, especially when, as in the present instance, there is the shelter of a great rock, water within a reasonable distance, an abundance of wood, and faultless weather. After setting up the barometer, four readings of which give a height of 2,229 mètres, or 7,312 feet (my friend, Mr. William Mathews, jun., makes the height 7,381 feet from a barometric observation in 1860), and dismissing the boy, we dispersed to collect wood and water, and soon a goodly supply of both was stored away in readiness for the cooking of the afternoon and evening, and the watchfire of the night.

The hours fled most pleasantly by, maps were consulted, pipes smoked, soup concocted, and as darkness fell we withdrew beneath the shelter of the Grotte, and having served out a plentiful supply of chocolate and replenished the fire, betook ourselves to rest about nine. As the dry juniper branches crackled in the blaze, and the bright flames leaped from twig to



twig, casting Rembrandt-like patches of colour and shadow on the roof and sides of our den, the effect was most picturesque, and would have been more agreeably so if the smoke had not at times sought to improve the *chiaroscuro* by objecting to depart by the proper channel. Gradually we all dropped off to sleep, but whether the confined air, warmth, and smoke were rather overpowering, or whether I had not yet become seasoned to Dauphiné fare, certain it is that my rest was more disturbed than I could have wished; and when at three the next morning we turned out, I found that I was by no means up to the mark. It is wonderful what may be accomplished by resolution, but it is one thing to effect one's object by sheer determination not to be balked, and another to secure any beneficial result. My aim was not so much to make the ascent of the Pelvoux as to render the expedition subservient to other purposes, and as in a state of bodily prostration the mind is alike incapable of enjoyment or accurate observation, I felt convinced from the first that the loss of a day would prove unavoidable. Still there was nothing like trying, and so at 4.15 we started; but after dragging myself wearily upwards another 1,000 feet, I found that it was useless to struggle with my indisposition, and therefore, establishing myself on a turf knoll not many hundred yards below the termination of the Glacier du Clot de l'Homme, I despatched Croz and Perrn for the articles left at Soureillan, and determined to rest and bivouac at the spot we had reached. The worst sign of all was that, for the first time in my mountaineering experience, my appetite had departed; but after a good long doze the sight and taste of food became once more attractive. From that moment I began to mend, and before evening I felt that I was myself again.

A low slab of rock, a little plot of soft turf, and some loose stones artistically arranged, combined with my bag to form a very satisfactory dormitory, and after making a hearty supper, and watching a glorious sunset on Monte Viso, I turned in at eight. A barometric observation gave for our plateau a height of 2,575 mètres, or 8,449 feet. Some hours of sound and refreshing sleep were only once broken by the novel sensation of being suddenly jumped upon by some living creature, which roused me sufficiently to perceive that the intruder was a goat, whose curiosity had proved too strong for his discretion.

At 2.20 we were up, and having made a hasty meal, and *cached* our baggage, together with a supply of provisions sufficient for another day, waited till 3.10, when there was just light enough to enable us to pick our way with care. From

various reconnaissances we determined, instead of following the route taken by Messrs. Whympers, Macdonald, and Reynaud, to make for a long *couloir* (filled at the time with snow) a few hundred feet to the east of the Glacier du Clot de l'Homme, and uniting with the latter at a point not far below its origin in the snow *plateau* above, which we hoped to attain by cutting our way through the *séracs*, and forcing a passage between them and a lower summit of the Pelvoux (No. 3, 3,762 mètres in height). Ascending diagonally the slopes of *débris* beneath the glacier, we kept to the right, or in an easterly direction, for some distance, and then, bearing suddenly away to the left, found ourselves at four at the foot of the *couloir*, just as the rising sun tinged the surrounding summits and furnished an excuse for ten minutes' halt. The slope of the *couloir* was rapid, the space often very confined, and the snow sometimes rotten, and at others more or less converted into ice; but there was no difficulty worth mentioning, and, pushing steadily upwards, we reached the point of junction with the glacier at five. The snow becoming soft, gaiters were here put on, and we then addressed ourselves to the attack of the *séracs*, which hung in threatening masses above. At first all went smoothly, slopes of snow enabling us to avoid the more formidable obstacles; but at length we were brought to bay by some cliffs of *névé* of so forbidding a character that serious doubts arose for a moment of the possibility of forcing a passage. A sort of *cheminée* was, however, discovered between the ice and the rock on our right, and though almost perpendicular, its summit seemed so near that a skilful climber might, with assistance from below, worm himself up. Perrin volunteered to make the attempt, and after some most extraordinary evolutions, consisting of wriggings on his part, and shoves *a tergo* from Croz's axe, he pronounced himself '*fest.*' Then I, with the assistance of the rope, followed, secured myself, and gave a helping hand to Croz, whilst Perrin again worked forward, and in a few minutes shouted that the plateau was won. So much ice-glaze covered the rocks, and the *cheminée* had therefore detained us so long, that it was seven o'clock before we all topped the brow, and found, to our delight, that there was nothing between us and the summit but uniform and gently inclined slopes of snow. The view was exceedingly magnificent, and as the day was before us, it was decided to indulge in a second breakfast, our morning meal in the dark having been a slight and hasty one. We were now nearly on a level with the summit No. 3 (3,762 mètres), whilst to the north-west rose the 'Signal' (the Pic de la Pyramide of Mr. Whympers), about 176 mètres above us, and

farther to the left was the highest summit of all, partially concealed by the undulations of the plateau. At 7.45 we again set forth, and at 8.15, without meeting any sort of difficulty, stood upon the topmost peak, just five hours and five minutes (one hour of which must be deducted for halts, and about half as much for the detention at the *cheminée*) after quitting our *gîte*. Here we remained for rather more than  $3\frac{1}{2}$  hours, and though suffering at times severely from the cold, I was enabled to secure a series of theodolite and barometer readings which are not, I hope, without some value.

In the first place, I think I may claim to have determined, within very narrow limits of possible error, the height of this previously unmeasured peak, and before proceeding to speak of questions of topography, I will refer to the results of these measurements.

The barometer readings at 9, 11, and 11.45 A.M. give, by comparison with five inferior stations (Geneva, Turin, Grenoble, Aosta, and the Great St. Bernard) a mean height of 3,956.3 mètres (12,980 feet). Before returning to the valley, I carried an aneroid (by Secrétan) to the 'Pic de la Pyramide,' the 'Signal' of the French engineers. The corrected reading of this instrument at 12.15—476.7 millimètres—compared with that of the barometer on the highest peak at 11.45.—475.9 millimètres—the air temperature being respectively  $4^{\circ}$  and  $0^{\circ}$  C., gives a difference in altitude of 14.4 mètres, and adding this to the height of the Signal (3,937.6 mètres), already trigonometrically determined by Commandant Durand, we get for that of the principal summit 3,952 mètres. It will be seen that these figures are remarkably coincident with those of the direct barometrical determination, and for the present we will assume that the mean of the two methods—or 3,954.15 mètres—is very near the truth.

The theodolite observations, however, enable me to check this result in a very complete and satisfactory manner, as I will now proceed to show. The height of the E'crins, the culminating point of the entire group, has been trigonometrically determined by the French engineers to be 4,103 mètres; its distance from my station, according to the map of the E'tat Major, is 3,950 mètres, or 12,960 feet, and its angular altitude, as determined by me, is  $2^{\circ} 8'$ . From these data, and after applying the necessary correction for curvature and refraction (amounting to 1.1 mètre), it results that the difference in altitude of the E'crins and Pelvoux is 148.07 mètres, and subtracting this from 4,103 mètres the height of the former, that of the latter comes out 3,954.93 mètres, or only 0.78 mètres

more than the mean previously deduced. Again, reversing the process, and taking the height at 3,954 mètres, that of the Signal as trigonometrically determined, at 3,937·6 mètres, and the depression of the latter shown by the theodolite, at 2° 15', we get for the distance between the two stations, 417·6 mètres, whilst the map makes it 400, as nearly as it is possible to determine. Similarly, taking the height of the third or eastern summit (3,762 mètres) with a depression of 10°, we get for its distance 1,100·8 mètres against 1,100 on the map. Thus in two ways barometrically, and by three geodetical tests, the figure 3,954 mètres seems established with a high degree of accuracy.

I will now proceed to give a list of my theodolite readings, and to offer a few remarks on their results, as well as on some points in the topography of the surrounding district.

	Azimuth		Altitude	
	°	'	°	'
1 Peak due north (magnetic) . . . . .	0		-1	30
2 Aiguilles d'Arve, W. peak . . . . .	4	18	-1	16
3 Ditto E. peak . . . . .	4	42	-1	14
4 Distant Range, NE. of Aiguilles d'Arve . . . . .	13	10	-1	20
5 Mont Blanc (summit cloudy) . . . . .	34	40 (?)	-	(?)
6 Mont Pourri . . . . .	42	30	-0	35
7 Grande Casse . . . . .	46	4	-0	19
8 Grivola . . . . .	55	56	-0	25
9 Grand Paradis . . . . .	59	45	-0	45
10 Pic de la Pyramide (Signal) . . . . .	82	35	-2	15
11 Peak No. 3 . . . . .	121	17	-10	0
12 Monte Viso . . . . .	129	58	-0	26
13 Highest Peak near Maurin (Aiguille de } Chambeyron?) . . . . .	151	57	-0	45
14 Peak S. of Col du Selé . . . . .	225	39	-2	11
15 Ditto N. ditto . . . . .	238	0	-2	11
16 Peak seen above last . . . . .	238	0	-2	0
17 Ailefroide . . . . .	261	26	+0	4
18 Les Écrins . . . . .	328	41	+2	8

In venturing to differ from my friend Mr. Whymper as to his identification of the Ailefroide, and the relative importance of the peak so designated by him, I need scarcely say that my criticisms are offered in the most friendly spirit, and with a grateful sense of my indebtedness to him as well as to others who preceded me; but as his paper in the second series of 'Peaks, Passes, and Glaciers' is one of the most important recent contributions to our knowledge of the topography of Dauphiné, and, from the absence of instrumental means of observation, I believe him to have fallen into some errors, I must be excused for stating frankly my own conclusions.

A comparison of the outline taken by me from the road a little behind Guilestre, with Mr. Whymper's vignette, at page 222 of 'Peaks, Passes, and Glaciers,' shows a very

satisfactory amount of agreement up to a certain point; but there is this important difference, that the mountain on the extreme left of the outline is not included in the engraving. Now it is precisely this left-hand mountain, and not the sharp peak in the middle of *my* sketch, and on the left of Mr. Whymper's, which is *the* Ailefroide, the summit known as such at La Bérarde, visible from the Col de Sais (see 'Peaks, Passes, and Glaciers,' page 209) rising above the east side of the Glacier de la Pilatte (the Condamine of Bourçet), and seen from the highest summit of the Pelvoux in a WSW. direction, though concealed by the latter from a spectator on the Signal. According to the theodolite observation, this peak appeared to be elevated  $0^{\circ} 4'$  above my station, and the distance between them being 3,800 mètres (12,467 feet) according to the map, this would represent a difference in altitude of 5 mètres, and give 3,959.1 mètres as the height of the Ailefroide. The satisfactory results of Observations 10, 11, 12, 13, and 18 (of which more presently), justify the belief that the case of the Ailefroide is not an exception; but on the other hand I am bound to state that the French engineers assign to it a lower figure, viz. 3,925 mètres, and as the wind and cold rendered accurate reading a matter of great difficulty, not to say suffering, I do not like to insist too strongly on my correctness in the face of the evidence of the map. Be this as it may, however, Mr. Whymper's Ailefroide—the sharp peak between the Pelvoux and the true Ailefroide—has an altitude of 3,915 mètres assigned to it by the French engineers, and forms the culminating point of the 'Crête du Grand Pelvoux' of the map. If further proof be required that this last is not the true Ailefroide, nor anything more than one of the summits in the eastern offshoot from the main ridge which goes collectively under the name of the Pelvoux, I may add that it lies altogether east of the watershed, is consequently entirely invisible from the side of La Bérarde, and is quite isolated on the west by the *névé* of the south-western feeder of the Glacier Noir, from which a passage might possibly be effected to the head of the Combe de Sapenière altogether to the east of the true Ailefroide. The sketch will, I think, render this abundantly clear, and I find that those of my friends, Messrs. Mathews and Bonney, who visited the district shortly after me, entirely confirm my view, in which, I believe, both those gentlemen concur.

Next comes the question of the position of the E'crins, the real monarch of the entire group. As will be seen by the map, it lies in a north-west direction from the Pelvoux, at a distance of rather less than 4,000 mètres, and separated by the whole

width of the Glacier Noir. Its height, as has been already stated, is 4,103 mètres (a second summit a little farther to the west is 4,083, and a third north of this latter 3,980 mètres), and the angular altitude above the Pelvoux was  $2^{\circ} 8'$ . Of its superior altitude there can therefore be no question, and I have little doubt that it was in reality the peak seen by Messrs. Whymper and Macdonald, and erroneously identified by them with the lancet-shaped mountain of the Guilestre sketch, whilst it is certain that it corresponds with that seen by M. Durand from the Signal, whence neither the true Ailefroide nor the summit so designated by Mr. Whymper is visible. It appears to be a three-sided pyramid with precipitous faces of rock in the direction of the Glacier Noir and La Bérarde, and a more rounded form covered with immense masses of *névé* and *séracs* in that of the Glacier Blanc. Further, it is the identical summit figured by Forbes ('Excursions in Dauphiné') under the name of Montagne d'Oursine, his drawing being taken from the same direction as my outline at page 168. There is no Montagne d'Oursine, or rather, the names Montagne d'Oursine, Pointe d'Arsines, and Pointe, Pic, or 'Barre' des E'crins or Escrins, all refer to one and the same mountain, which rises immediately behind and nearly due east of La Bérarde. Lastly, with respect to M. de Beaumont's outline (see 'Annales des Mines,' 3me série, t. v., and 'Peaks, Passes, and Glaciers,' page 227), there is such a striking similarity between it and my outline of the E'crins from the Col du Glacier Blanc at page 176, that it seems at first clear that his remarks refer to the E'crins, and that the serrated ridge to the left is either the 'Crête de l'Encula,' or a portion of the rocky barrier connecting the E'crins with the Ailefroide, called by the French engineers the 'Crête de la Bérarde,' and by Bourçet the 'Pointe des Verges.' But we are met at once with this difficulty, that as seen from the neighbourhood of Guilestre—where M. de Beaumont's sketch is stated to have been taken—the E'crins lies to the left or west of the Pelvoux by which it is partially concealed. If, on the other hand, as I cannot but believe, M. de Beaumont's drawing refers to the Pelvoux, and the serrated ridge to the left is intended to represent the summit figured by Mr. Whymper as the Ailefroide, I am bound to say that it conveys a very inaccurate idea of the originals. In either case, much of Mr. Whymper's criticism of both De Beaumont and Forbes is materially affected by his mistake as to the identity of the Ailefroide and his confusion of this summit with the E'crins. The passage in M. de Beaumont's paper quoted by Mr. Whymper (page 227, 'Peaks, Passes, and Glaciers') would seem, from the allusion to the 'Montagne

d'Oursine' (which I have already stated to be a synonym for the E'crins) as a different peak from that of his outline (*a*), to show that the latter is really meant for the Pelvoux, and indeed this *must* be the case if Guilestre was the point of view.

The conclusions just stated were not all come to as the result of my observations on the Pelvoux, the entire isolation of the pseudo-Ailefroide from the main chain having only been demonstrated when the ridge was seen in reverse a few days later from the Glacier Blanc, while the final identification of the true Ailefroide was reserved for my expedition from La Bérarde to Ville Vallouise by the Glaciers de la Pilatte and du Selé. For convenience sake, however, I have thought it best to dispose of the whole subject at once.

As regards the other theodolite bearings, I have already spoken of the excellent results given by 10, 11, and 18, in connection with the determination of the height of the Pelvoux. Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, I have not yet worked out, as in some, identification is difficult, and in others, it is not easy to determine the distances of the points observed. Taking into account the great difficulty of getting accurate readings for such distances, the following comparison of the results of the remaining observations (Nos. 12 and 13) with previous determinations is, on the whole, as favourable as I had ventured to expect:—

	Distance		Height	
	Mètres	Feet	Mètres	
12 Monte Viso . . . . .	62,100	196,854	3,875·4	3,850·2 Bar.
13 Aiguille de Chambeyron	54,500	178,809	3,391·5	3,400· Δ

A few words as to the view, and I will proceed with my narration. In the immediate neighbourhood, it embraced almost all the principal peaks of the Alps of Dauphiné, with perhaps the exception of the Aiguille du Midi de la Grave, La Grande Ruine, and La Roche-Faurio, which were, I believe, hidden by the eastern arête of the E'crins. The list of theodolite bearings will supply the principal details, and I will only add that our position commanded the Glaciers Blanc and du Selé, whilst at our feet lay an immense chasm separating us from the Crête de l'Encula, the E'crins, and the Crête de la Bérarde (the 'Pointe des Verges' of Bourçet), and filled by the great mass of the Glacier Noir, up which lies the route of the Col de la Tempe to La Bérarde described by Mr. Nichols in 'Peaks, Passes, and Glaciers.' The distant view was superb, though soon after our arrival clouds began to form over portions of it. Beginning in a northerly direction, and sweeping round to the east, I recognised the Rocher des Fys, the Buet, and the chain of Mont Blanc

from the Aiguille de Berenger to the Jorasses; then came successively the Pourri, Grande Casse, Weisshorn, Dent Blanche, Matterhorn, Dom, Täschhorn, Grivola, Grand Paradis, Breithorn, Zwillinge, and Lyskamm (Monte Rosa was hidden by an intervening summit), followed by the range of the Cottians, with Monte Viso towering over them all. No trace of the sea could be distinguished, and a dull haze resting on the plains to the south-west concealed all details.

At length my hands and feet had become so benumbed by exposure and continued inactivity, that further observations were impossible; so, packing up the instruments and casting once more a rapid glance around, we quitted the peak at 11.50, and proceeded to the Signal, which we reached in about a quarter of an hour. The cairn was in an excellent state of repair, and was provided with a long wooden staff considerably out of the perpendicular, to which I attached a broken wine gourd as a memorial of our visit. In the MS. notes of M. le Commandant Durand which I examined at the Dépôt de la Guerre, he says, 'Le Pelvoux est formé de trois sommets. Le Signal a été placé sur la pointe E., qui est moins élevée que la pointe W. Cette dernière est toujours couverte de neige.' It was the absence of stones on the latter, and their abundance on the former summit which influenced the selection of the less elevated station; but from the foregoing statement I infer that he must have visited both, and, indeed, apart from this it is scarcely credible that he should have spent two or three days on the Signal without proceeding to the higher or west point, easily reached in little more than a quarter of an hour. In a chink of the cairn I deposited one of Casella's mercurial minimum thermometers, and this done, we decided, as our present position was comparatively sheltered, to dispose of our remaining provisions. Half an hour thus passed rapidly away, and I should have liked to linger longer; but the weather began to assume a threatening appearance, the sun retired at intervals, and though the sky immediately above us remained clear, great masses of cloud of inky blackness, piled up and urged on by a furious westerly wind, were assaulting the southern spurs of the Cottians, and hurling themselves like the waves of an angry sea against their rocky buttresses. So at 12.45 we reluctantly set forth on our return.

Fearing that the descent of the *cheminée* would be almost impracticable, we decided to force a passage through the *séracs*, and by caution, great skill on the part of the guides, and keeping at first well to the right, we succeeded in reaching, without any mishap, the more uniform portion of the glacier. Our progress



thence to the foot of the *couloir*, which we reached at 2.30, was alike devoid of incident or difficulty, and after removing gaiters we proceeded down the slopes of *débris* by our track of the morning, reaching our *gîte* at 3.15. The descent, including the *détour* to the Signal, had thus occupied two hours and three quarters, and had the weather continued fine we might have spent six or seven hours instead of four hours and a quarter on the two summits. In looking back, I am vexed to think how many observations of interest might have been made which were neglected, partly from want of time, and still more from laziness, arising principally from the penetrating effects of the cold; but these regrets will now avail nothing, and I can only hope that some one will ere long make good my deficiencies.

I had planned to pass the night at Soureillan, and make an attempt the next day to effect a passage to La Bérarde by the Glacier du Selé; but I now changed my mind, and determined, as the descent to the valley would be difficult in the early morning light, and the nature of the work before us was so uncertain, to proceed at once to the Combe de Sapenière and establish myself in a third *gîte* as near to its head and the foot of the glacier as possible, so as to be on the ice at an early hour the following morning. On proceeding to collect the few articles left at our last camping-place, a small *sac* of Perrn's was not to be found, but after long and careful search it was discovered at the foot of a precipice below our plateau. At first we imagined that some wandering *berger* had been meddling with our *cache*, but the sight of the tails of my macintosh, which had been consigned to its keeping, protruding in a remarkably torn and mangled condition, showed that our friends the goats had been amusing themselves in our absence and at our expense.

From our ignorance of the ground, and its precipitous nature, much time was wasted in the descent, and two hours elapsed before we reached the level of the valley at 6.30. After searching for a stream or spring of pure water, which it is always desirable to have near at hand when bivouacking, we at length established ourselves beneath a rock, collected wood, and lighted a fire, over which some portable soup was soon simmering in my *casserole*. But alas! when we unpacked the provision sack, we discovered, to our intense disgust, that the goats, not content with tumbling it over the rocks, had abstracted and eaten the one remaining loaf set aside for the evening meal, the morning breakfast, and the midday lunch. This was exceedingly annoying, as it seriously affected our plans; but there was no help for it, and so we had to be content with the soup

and a morsel of cheese, and at 8.30 stretched our hungry selves on some dwarf juniper bushes, which formed an elastic though rather prickly couch.

On rising next morning (the 11th) at 3.30, we found that *brouillard* enveloped the glacier and surrounding peaks, and therefore decided to wait a little before setting out. Some more soup was made, and at five we broke up our camp; but after reaching the head of the Combe at 5.30, as the weather became worse, we determined to abandon the expedition for that day and return to Ville Vallouise for a fresh supply of provisions. We lingered a little at our bivouac, still hoping against hope, but at 6.35 started for Ailefroide, which we reached at 7.40. Here, as well as at Les Claux, we made tolerably long halts, and I learnt that at the latter place quarters may be obtained, *chez* Joseph Barneout, whose wife was most hospitable, insisting on my partaking freely of her cherries and currants. Owing to these delays, it was 10.30 before we arrived at the Ville. Here I remained quietly till the afternoon, and was agreeably surprised by the arrival of a very pleasant French gentleman and lady, who had come up from La Bessée to see the Vallouise on their way from Briançon to Gap.

At 5.15, furnished with a fresh supply of provisions, we once more started for the upper valley, reaching Les Claux at 6.10 and Ailefroide at 7.10. Some first-rate chocolate was at once brewed, and then, whilst Perrn and Croz climbed up to the rafters of a *châlet* under the amiable delusion that by so doing they would secure immunity from the fleas, and there roosted like two gigantic fowls, I betook myself with my bag to a neighbouring grassy hillock, and with the addition of a few loose stones scientifically combined with a couple of erratic blocks, soon constructed for myself one of the most delicious bivouacs that can be imagined. As I crept into my bag, the moon rose above the southern ridge and bathed the whole valley in its soft light. Never was any effect more enchanting, and amid so much beauty, in such solitude and silence, broken only by the subdued roar of the torrent or the tinkle of a cow-bell, sleep at first seemed impossible. When I did at last drop off, it was only to wake once and again to have one more look, though, under the circumstances, sound slumber was perhaps of more importance.

My intention was to gain the upper plateau of the Glacier Blanc, thence attack the *E'crins* on its north-eastern face, and return to Ville Vallouise to sleep; and not knowing how much time might be required, it had been decided to get off very

early. We therefore rose at two on the 12th, and were fairly *en route* at three.

The path, which is a mere track, traverses the torrent of St. Pierre to its left bank by a bridge close to the village, and then ascends the flat surface of the valley, consisting of mingled stones and turf, for three-quarters of an hour. A little before four, we reached a mass of *débris* called Le Banc, probably an ancient moraine, stretching across from side to side, through which on our left the stream had forced a passage and came foaming down in a series of rapids. Arrived at its summit, the Glaciers Noir and Blanc at once came into view at the further end of a large plain covered with *débris*, and apparently at some former period the bed of a lake formed by the waters of the retreating glaciers dammed up by the moraine. This desolate tract goes under the name of the *Pré de Madame Carle*, though what that unknown lady could have done to bring such utter destruction on her property I cannot conjecture. Doubtless there is some fearful legend in existence which would explain the doom, but I regret to say I cannot clear up the mystery.

Not knowing on which side of the Glacier Blanc the ascent to its *névé* would be most easy, we decided not to cross the torrent, but keep on its east or left bank till we reached the ice, and then make our selection. Our progress over the rolling and water-worn pebbles of Madame Carle's domain was necessarily slow, but at 4.45 the glacier was reached (height 1,851 mètres, or 6,073 feet), and as there appeared to be traces of a path up the slopes on the right, we at once commenced the ascent. The mass of the Glacier Blanc is exquisitely pure, presenting, as its name implies, a strong contrast to its neighbour, the Glacier Noir, disfigured by enormous masses of *débris*, and looking like the dirty snout of some unclean animal. At the same time the summits of the Pelvoux, Ailefroide, Crête de la Bérarde, or Pointe des Verges, E'crins, and Crête de l'Encula, in which it is framed, offer some of the finest and most striking combinations of wildness and grandeur that I ever saw. After about half an hour's climb, the grassy slopes gave place to rocks, and in these we soon became almost hopelessly involved. That there was some key to the labyrinth we were convinced, but being ignorant of it much time was lost in endeavouring to force a passage, and after all we were unsuccessful. It was at length decided to return, cross the torrent, and try the opposite bank, and at 5.45 we found ourselves once more at the foot of the glacier.

The passage of the torrent was not an easy matter, but was

accomplished without mishap, Perrin insisting on taking me upon his back, as he said the extra weight steadied him. Traversing the northern lateral moraine of the Glacier Noir for a short distance, we then struck off to our right, up the terminal slope of the Crête de l'Encula, and at 6.45, having attained a considerable altitude, halted for breakfast. Starting again at 7.25, and still ascending rapidly, we reached at eight the west bank of the first plateau of the glacier, immediately above the steep descent down which it pours its wildly-contorted masses into the valley below. The rocks farther up on our side looked ugly, whilst the ice above us was so fearfully rent by the sudden turn which the glacier makes round the eastern foot of the Encula that the practicability of further progress in that direction seemed doubtful, and our morning's experience having taught us caution, it was decided to traverse diagonally the gently inclined middle portion of the ice-stream to the opposite or eastern bank, and then gain the *névé* above by a wide *détour*. The decision proved to be a wise one, we met with no difficulty, and having effected the passage and climbed the slopes beyond for a short distance in a direction parallel to the glacier, we halted at 8.45 to look about us and rest. At nine we again started, reaching at 9.15 the foot of some snow-slopes leading to the second plateau or *névé*, which we reached at 9.45. Up to this point the course of the glacier is from NNW. to SSE., but here it makes an extraordinary curve, running from SW. to NE., and bounded on the south by the E'crins (4,103 mètres) and Encula (3,779 mètres), and on the north by the Roche-Faurio (3,716 mètres), and a range of nameless peaks from which a series of glaciers of the second order descend to swell the trunk stream. It is over this range, which I propose to call the Crête du Glacier Blanc, that I effected a passage a few days later, descending by the Glacier d'Arcines to Villar d'Arène and La Grave.

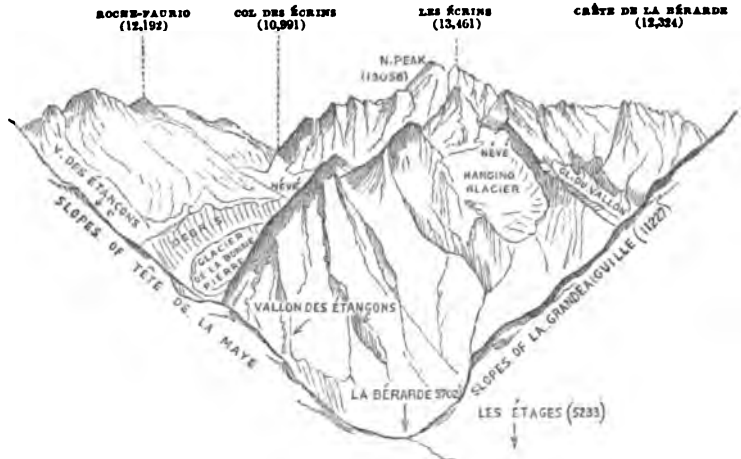
Arrived on the plateau, a most striking view of the E'crins burst upon us, and a hasty inspection encouraged us to hope that its ascent would be practicable. On the sides of La Bérarde and the Glacier Noir it presents, as has been already stated, the most precipitous and inaccessible faces that can well be conceived, but in the direction of the Glacier de l'Encula, as the upper plateau of the Glacier Blanc is named on the French map, the slopes are less rapid, and immense masses of *névé* and *séracs* cover it nearly to the summit.

The snow was in very bad order, and as we sank at each step above the knee, it soon became evident that our prospects of success were extremely doubtful. A nearer approach, too,

disclosed traces of fresh avalanches, and after much deliberation and a careful examination through the telescope, it was decided that the chances in our favour were too small to render it desirable to waste time in the attempt. I am perfectly satisfied that this decision was a right one, and the subsequent experience of Messrs. Mathews and Bonney, who were forced to beat a retreat after attaining a height of 12,936 feet, quite confirms the prudence of our course. At the same time it was a sore disappointment, and I mentally resolved to try again soon. Meanwhile, as we had come so far, I determined to push on at least to the head of the glacier, the surface of which is very gently inclined; and accordingly at 11.30 we found ourselves standing in a narrow rocky gap, the lowest point of the ridge connecting the E'crins and Roche-Faurio, and bounding the glacier on the west. The height, according to my barometer reading compared with five inferior stations, comes out 3,415.5 mètres (11,206 feet), but as the figures 3,350 mètres (10,991 feet) occur on the French map at a point which appears to correspond with our position, they may probably be more exact. Mr. Bonney's corrected aneroid observation on the 26th August comes out 3,358 mètres, or 11,017 feet.

While the barometer was settling we took some lunch, and I examined the map, from which I at once perceived that the glacier seen through the gap to the west at a great depth below must be that of La Bonne Pierre, and if a descent to its head was practicable, a passage might probably be effected to La Bérarde. On suggesting to Croz and Perrn that, though baffled by the state of the snow on the E'crins, we might still achieve something of interest and importance by discovering a new col, they both heartily assented, and in a few minutes Perrn was over the edge and cutting his way down the rather formidable *couloir*, which, though it looked doubtful from above, offered the only means of attaining our object. It was just one o'clock when, Perrn having cut steps down the most precipitous part of the slope and effected a lodgement on one of the rocks at the side, Croz and I followed cautiously in his track, and the snow being in excellent order, we all reached the *névé* of the Glacier de la Bonne Pierre at 1.45 without any serious difficulty. Later in the season, however, the absence of snow or its conversion into ice might render the pass less easy. We now halted for a few minutes on a rock (height 3,001 mètres, or 9,845 feet) to examine the topography of the glacier basin, and admire at leisure the grandeur of the huge and riven cliffs of the E'crins, which towered up to the S.E. nearly 4,000 feet above us, in the most rugged and fantastic

forms. Of the scenery some idea may be formed from my outline from Les E'tages, and the coloured illustration from the



THE COL AND POINTE DES ÉCRINS SEEN FROM THE SLOPES NW. OF LES ÉTAGES.

same point of view in Forbes' 'Journals of Excursions in Dauphiné,' appended to his admirable work on 'Norway and its Glaciers.' The position of the col may there be clearly recognised at the lowest point of the depression to the left of the E'crins, or 'Montagne d'Oursine.'

Leisurely descending the centre of the glacier till the increasing slope and the greater width and frequency of crevasses rendered further progress difficult, we took to the right lateral moraine and followed it to the valley below, where the Torrent des E'tançons, from the glacier of the same name which covers the south foot of the Aiguille du Midi de la Grave, joins that of the Bonne Pierre. It was now four o'clock, and we were close to La Bélarde; but here a considerable delay took place as we could discover no bridge, and neither stream was easy to pass. After reconnoitring the banks of the Torrent de Bonne Pierre for some distance, a point was at length selected for crossing, and Perrn again volunteered to ferry me over. Remembering the success of a similar proposal in the morning, I assented, and away we went. The slope, however, was much greater, and the current consequently much more powerful, whilst the large rolling stones in its bed rendered the footing very insecure. We got on very well till the middle of the stream was reached, when suddenly Perrn plunged into a hole and immediately subsided into the water, which reached

nearly to his neck. I was for getting off and wading to shore on my own account, but this he would not hear of, and with shouts of '*Halten Sie fest, Herr!*' grasped my dripping legs in his vigorous clutch. Still there we stuck completely waterlogged, and no efforts of my gallant steed enabled him to recover his legs and proceed with his burden. Our appearance must have been irresistibly ludicrous, and I could hear Croz shrieking with laughter on the bank, but at length I induced Perrn to leave me to my own devices, and free of one another we were soon on dry land, though in a most dripping condition. At five we set off again, after wringing our wet clothes, and in another quarter of an hour entered the house of the Rodiers at La Bérarde, where we proposed to remain for two nights, as the following day was Sunday. The time occupied from Ailefroide had been  $14\frac{1}{2}$  hours, from which about  $4\frac{3}{4}$  must be deducted for halts, &c., whilst  $1\frac{3}{4}$  should be added if Ville Vallouise be the starting-point.

Old Rodier and his son, the well-known chasseur-guides, and their respective wives, received us with every civility, allotted a *grange*, filled with *fresh* hay (the luxury of which every mountaineer will know how to appreciate, especially in such vermin-haunted districts as Dauphiné), for our sleeping quarters, allowed us the use of their fire for cooking, and their room for sitting in, and supplied us with bread, wine, milk, butter, &c., on very reasonable terms.

The 13th was spent quietly at La Bérarde, Perrn and young Rodier going down the valley to attend mass at St. Christophe, whilst I strolled no farther than to Les E'tages (height 1,595 mètres). I have since regretted that I did not walk up the Vallon des E'tançons and examine the glacier at its head, and the southern face of the Aiguille du Midi. The scenery must be very grand, and a reconnaissance of the Meije from this side could not fail to be interesting. I hope, therefore, that my omission will be repaired by any of our mountaineers who find themselves in this neighbourhood during the present or succeeding years. I would also direct their attention to the extensive glacier plateau, called the Glacier du Mont de Lans, stretching away nearly two leagues in length to the west of the Aiguille du Midi, and seen in places from the valley of the Romanche between La Grave and Bourg d'Oysans. Two aneroid observations (corrected) give for the height of La Bérarde 1,765.2 mètres (5,791 feet), whilst the French engineers state it as 1,738 mètres (5,702 feet), Forbes at 5,500 feet, and my friend Mr. Mathews at 5,669 feet. I had much pleasant chat with old Rodier, who mentioned, amongst other things, that there is a passage connecting La Bérarde with

Villar d'Arène by the Vallon des E'tançons, and thence over the ridge between the Grande Ruine and Aiguille du Midi de la Grave (La Meije), descending on the east by the Glacier du Clot des Cavales and joining the route of the Col d'Arcines (from Villar d'Arène to Monestier), near the châteaux de l'Alpe. This pass, which is alluded to by Forbes and Ladoucette, is called the Col des Cavales, and may be about 3,128 mètres (10,263 feet) in height, as these figures are found in the French map at the lowest point of the ridge in question. Rodier had, I believe, only once crossed it, and said that the time occupied was from 10 to 12 hours, but added that it was seldom or never used now.\*

As, encouraged by Mr. Bonney's favourable report of the chances of success, we proposed attempting to reach Ville Val-louise on the 14th, by the glaciers at the head of the valley of La Bérarde, and had decided to start very early, we soon retired to our hay, and secured some hours of refreshing sleep.

It was just two when we awoke, and at 2.30 we set off up the valley (the Val des Ençons of Bourçet) in most brilliant moon-light. At three o'clock we passed on our right the entrance to the valley (the Clochâtel of Bourçet), at whose head is the Glacier du Chardon of the French map, called by Rodier the Baverja. Over this glacier lies the old route to the Col de Sais; but Messrs. Forbes and Heath, as well as my friends Messrs. Bonney and Hawkshaw, reached the summit of the ridge dividing the valleys of La Bérarde and Godémar at a point further to the east, by ascending the main or east branch of the valley (the Conte Faviel of Bourçet). This latter, up which our route too lay, is closed by the fine Glacier de la Pilatte, the Condamine of Bourçet); and keeping on the right or east bank of the torrent, and crossing numerous streams from the secondary glaciers on our left, we reached the foot of the ice at 4.20, just as the sun struck the fine range of snowy peaks to the south-west. We then ascended the eastern moraine beneath the rocky buttresses of the Ailefroide (the Grand Pelvoux of Forbes, whose error was, I believe, first pointed out by my friend the Rev. T. G. Bonney), and at 4.30 took to the ice, which was here gently inclined, but slightly crevassed, and very free from dirt or débris. At five, we found ourselves at the foot of two ice-falls, and in the midst of the most magnificent scenery. A halt was called to examine the map and reconnoitre the ground

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\* In August 1863, those indefatigable explorers of Dauphiné, Messrs. Mathews and Bonney, repaired my neglect by traversing the great glacier plateau, crossing the Col des Cavales, and investigating the recesses of the Glacier de la Plate des Agneaux. See page 198.



carefully, before finally deciding on the direction to be followed. It appeared evident that the arm of the glacier on our right was that leading to the Col de Sais, and traversed by Forbes and others; so with it we had clearly nothing to do. This point settled, we resolved to make for the upper portion of the more easterly branch, and, turning the ice-fall by its left or west bank, we found ourselves at 5.20 on the plateau above. A sort of corridor opened out on our right, and it appeared to me probable that a passage might be effected over its head into the Val Godémar. On the eastern side it would present no difficulty, but I cannot say what might be the nature of the reverse slope. On our left the ice was still much crevassed, and we had to make a considerable détour to the right, but at 6.15 the foot of the final slope was reached, and before attacking it we decided to breakfast, and study carefully the proper direction, about which there was much uncertainty. This important question being at length settled, after much discussion, and the meal disposed of, we took to the east boundary of the glacier at 6.45, making straight up the snow and *névé* for a low ridge of rocks, which seemed to occupy the lowest point, and form the watershed in this direction. The inclination was considerable, but by no means extreme, and one hour over snow followed by a short scramble up the rocks, which in places were difficult, sufficed to place us on the crest. Here we at once found to our delight that we had hit the lowest point of the ridge to within ten yards, and that we were standing just where we wished to be, on the summit level of the Glacier du Selé. It was not yet eight o'clock, and the most doubtful part of the expedition was already accomplished.

The view to the south-west and west of the basin of the Pilatte Glacier was superb, but to the north and north-east a precipitous rock cut off the Ailefroide and Pelvoux, and it was necessary to descend a short distance on the eastern side of the pass before these came into sight. My barometer had unfortunately been broken during the descent of the moraine of the Glacier de la Bonne Pierre, and the boiling point was at the moment the only method available for determining the height of our position. The mean of the readings of two thermometers (corrected), compared with five inferior stations, gives an altitude of 3,302.1 mètres (10,834 feet), which cannot, I think, be far from the truth, though possibly slightly in excess of it. On the French map, indeed, the figures 2,983 mètres occur at a point which appears to correspond very nearly with the col, but I am satisfied that this is either a typographical blunder or the result of an error in calculation.

Before quitting this subject, I would call attention to the relative elevation of the *névés* of the glaciers on the east and west sides of the watershed, as illustrated by the Cols du Selé and des E'crins. In the case of the Glaciers Blanc and du Selé, gently inclined snow-fields extend up to the crest of the ridge, whilst on the side of La Bérarde this is separated by an almost precipitous slope 800 to 1,200 feet in height, from the upper portions of the Glaciers de la Bonne Pierre and Pilatte. So, too, as will be seen in the course of my narrative, there is a difference of level of at least 1,000 feet, between the *névé* of the Glacier Blanc on the side of the Vallouise, and that of the Glacier d'Arcines below the Col du Glacier Blanc in the direction of Villar d'Arène. This fact has not escaped the notice of M. Elie de Beaumont, as may be remembered by those who know his interesting paper on Dauphiné ('Annales des Mines,' 3me série, tom. v.), which has been so often referred to by later travellers.

At 9.10 we quitted the col, after christening it the Col du Selé in honour of the glacier which descends from it into the head of the Combe de Sapenière, and kept away to the right beneath the rocks of the Crête des Bœufs Rouges to avoid the crevasses which furrowed the middle of the stream. Having gained a point commanding a most glorious view of the Ailefroide and Pelvoux, I halted for nearly half an hour to sketch, and thus had a further opportunity of studying at leisure the relation of those summits to one another, and the question of the identification of Mr. Whymper's Ailefroide to which I have already referred. I will only add that my previous suppositions were here finally demonstrated to be correct. The pseudo-Ailefroide at once assumed its due rank as one of the many summits of the Pelvoux, whilst its more southerly neighbour, dominating at once the Glaciers du Selé and de la Pilatte, and occupying the actual watershed, completely justified its title to the disputed name. From its south-east flank two magnificent streams of ice, riven and dislocated to an extraordinary extent, descend to the main feeder on which we stood, the three together forming lower down the trunk stream of the Selé Glacier. This is not of great length, and we soon reached the lower and more level portion, down the centre of which we kept till the crevasses increased in numbers and width, and then took for a short time to the left-hand moraine just above the final ice-fall.

At 10.40 we quitted the ice, and made our way over a grassy shoulder and down some rocks on the left to the summit of one of the most extraordinary *clapiers* or slopes of débris that I

think I ever saw. The stones were all of moderate size, and in positions of the most unstable equilibrium, so that we lost our footing at every other step, and were not sorry to find ourselves at the bottom and on the level surface of the valley at 11.30. An hour was here devoted to lunch and rest, and then pushing forward at a rapid pace, we reached Ailefroide at 1.45, halted there for three-quarters of an hour, and at 3.20 arrived at Les Claux. Here for an hour we indulged largely in currants and cherries *chez* Barneout, and at 5.15 reached Ville Vallouise, where I found M. Reynaud and a party of his friends, who were anxious at our prolonged absence, having, of course, expected us back two days before. The time occupied between La Bérarde and the Ville had been  $14\frac{1}{2}$  hours, from which  $5\frac{1}{2}$  must be deducted for halts.

My holiday was drawing to a close, and I had now to select a homeward route, in which I purposed to include a visit to Grenoble, and an excursion thence to the Grande Chartreuse. My intention had been to proceed to Briançon, and thence cross the Lautaret to La Grave and Bourg d'Oysans; but as after reaching Ville Vallouise the weather appeared propitious, the idea of making one more attempt on the E'crins became perfectly irresistible, and a study of the map having led me to hope that it might afterwards be possible to reach Villar d'Arène by the ridge north of the Glacier Blanc, I resolved that the trial should be made. The change of plans necessitated various arrangements—the writing of letters, preparation of provisions, &c. &c.; so it was nearly noon on the 15th before we got away, with the intention of bivouacking that night on the bank of the Glacier Blanc above the final ice-fall, and assaulting the E'crins and effecting the new col on the morrow.

Two hours' easy walking brought us to the now familiar plain on which the Ailefroide châteaux are situated just in time to take shelter from a smart storm of rain, the first that had fallen, except at night, since the 27th June, during our descent of the Grivola. At 2.15 we again set out, and as our track for some hours was precisely the same as that followed on the 12th, with the exception of another point being selected for fording the torrent, I will not particularise further than to say that we reached the foot of the ice at 4.0, and the right or west bank of the first plateau or central portion of the Glacier Blanc just above the final ice-fall at 5.5. Here another storm overtook us, and not wishing to have to pass the night in wet clothes, we sought refuge under an erratic block, whilst I took advantage of the halt to secure a sketch of the outline of the various summits of the Pelvoux, whose rugged forms, as seen

from this direction, are among the grandest I ever beheld. At 6.10 the rain ceased, and we at once took to the glacier, reaching the eastern bank in a quarter of an hour at the same point at which we had on the previous occasion quitted the ice. Here the mountains recede a little, so as to form an elevated and rather stony *alp*, frequented by a few goats during the summer months; and as nothing but ice and bare rock were to be met with higher up, whilst for all practical purposes we had already attained a sufficient altitude, it was decided to encamp at once.

For the information of future travellers, I should state that I have no doubt that this spot may be reached by way of the slopes on the east bank of the glacier along tracks known to the goatherds; but as on the former occasion we had, from want of local knowledge, been turned back, we did not think it worth while to run the risk of failure again. Of course, if a route exists which would save the crossing of the stream and the re-crossing of the glacier, time would, no doubt, be saved.

Ascending the mountain side for a few minutes, we soon reached a little plateau of bright green elastic turf, and depositing our baggage, proceeded to make arrangements for supper and sleeping. The mean of three aneroid readings (corrected) gives for our station by comparison with four inferior ones a height of 2,579 mètres (8,461 feet), and an observation made some weeks later with a similar instrument (uncorrected) by my friend the Rev. T. G. Bonney produces an almost identical result, 2,578 mètres (8,458 feet), whilst a simultaneous reading of the mercurial barometer by his companion, Mr. W. Mathews, reduces it to 2,550 mètres or 8,366 feet.

The sky was still overcast, mists shrouded the mountain tops, and altogether the atmosphere wore an unsatisfactory appearance, which led me to fear an uncomfortable bivouac, and possibly a disappointment on the morrow. Now and then warning drops of rain came plashing down, warm currents of air swept in fitful gusts from all points of the compass in succession, the clouds, lit up by the setting sun, reflected a coppery glow, and everything indicated the approach of wild weather. Spite of the success of my bag on Monte Viso, I had no desire to expose myself unnecessarily, and still less did I wish that my more imperfectly protected companions should suffer; so, without more ado, we all set out in search of some sort of shelter. It was not long before this was found, for only 100 yards above us a most judicious rock had toppled down so as to protect with its overhanging roof a

space large enough to contain at a pinch three persons. Plenty of loose stones lay about, and with these a rough wall was soon constructed round the exposed side, and a very satisfactory *gîte* was the result.

The view of the range of the Pelvoux and Ailefroide to the south-west was grand in the extreme; whilst to the west, separated from us by the beautiful Glacier Blanc, a mass of pinnacles and crags, constituting the east buttress of the Crête de l'Encula, towered up into the sky.

Our simple meal disposed of, Perrn and Croz announced their preference of the soft, springy turf outside to the hard floor of our *gîte*, as, if rain came on in the night, they could at once retire to the rock for shelter. I, on the other hand, being by this time rather used to a granite mattress, and not caring to find myself suddenly compelled by soaking rain to bundle out of my bag and seek protection in utter darkness, determined to patronise the auberge. Thither we all first repaired for a glass of hot wine, and then, wishing my companions good night, I crept into my bag at 8.15. Pleasant slumbers, only occasionally broken by the uncompromising nature of sundry granitic splinters which formed the floor of my dormitory, were my lot till 2.45 on the morning of the 16th, when I roused to find a dense, wetting *brouillard* concealing everything. After prolonged shouting, Croz and Perrn made their appearance, and as the fog began to turn into a steady rain, whilst the thunder pealed forth at intervals, it was resolved to wait till after sunrise before either attempting to proceed or deciding to abandon the expedition.

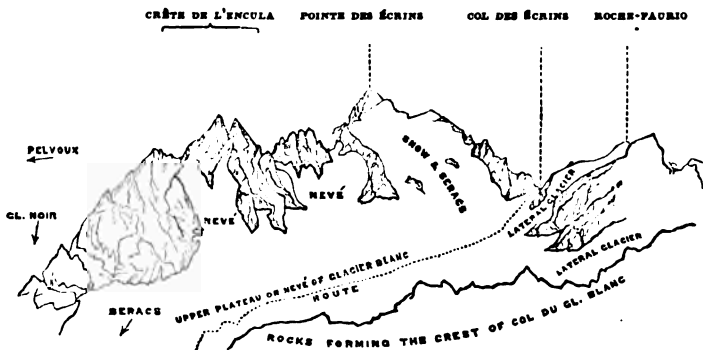
Time passed by, and still there was so little improvement that we at length were forced to admit the necessity of giving up, at any rate, the attempt on the E'crins, for which a favourable state of the snow, such as a warm, foggy night must be fatal to, was absolutely essential. This might not be the case on the pass, however, and want of time to make the détour by Briançon was another reason for persevering in the endeavour to reach La Grave by this route. So, at 5.45, we started off up the rocks and débris on the east bank of the glacier, taking to the snow at 6.20, and reaching the eastern or lower extremity of l'Encula—the upper plateau of the Glacier Blanc—at 6.45. Instead of proceeding up this last, we now turned off to the right in a northerly direction, ascending the rocks just where the first of a series of lateral glaciers comes down to join the main stream, and finally taking to the ice itself. This was for the most part covered with snow, and its state proved the wisdom of our course in turning our

backs upon the E'crins, which, at every upward step we took, rose in increasing majesty behind us, displaying its great rolls of *névé*, and at times disengaging its summit from the clouds which a furious wind was doing its best to break up and disperse.

At 7.30 the crest of the ridge was gained, and we found ourselves looking down upon a vast seething cauldron of vapour, through which it was impossible to distinguish anything more than that the descent was apparently extremely precipitous, and anything but inviting under the circumstances. To proceed without having first had a chance of reconnoitring the ground would have been foolish, so we ensconced ourselves behind some splintered crags, over which the wind sang and sighed discordantly, at times half blinded when a reflex blast would catch us in our sheltered nook, and spitefully discharge a *mitraille* of snowy particles right in our faces.

The mean of two aneroid observations (corrected) at 7.30 and 8.30 gives for the height of the pass, which I have called the Col du Glacier Blanc, 3,308 mètres (10,854 feet). Mr. Bonney's result, calculated from an uncorrected aneroid reading, is 3,314 mètres (10,873 feet), whilst a simultaneous observation with a mercurial barometer, by Mr. Mathews, reduces it to 3,281 mètres (10,766 feet). The position of the col is between the summits marked on the French map as 'Pic de Neige' (3,615 mètres) and 'Pic Signalé' (3,355 mètres), and somewhat nearer to the latter.

During the lulls and clearings which occasionally occurred,



THE POINTE DES ÉCRINS, COL AND NÉVÉ OF GLACIER BLANC FROM COL DU GLACIER BLANC.

I secured a careful outline of the E'crins, and when the mist in front lifted for a few moments at intervals, we all three peered

eagerly down, to see what hope there was of accomplishing the descent. Little by little we made out a glacier far below, which I concluded from the map (correctly, as it turned out) to be the Arcines, and it was therefore pretty certain that, if we could once reach it, our object would be gained. The Aiguille du Midi de la Grave must be a remarkably fine feature of the view from the col, but we only obtained occasional glimpses of its towering form, and of the other fine summits to the NW. and W.

At length, about nine, we decided to attempt the descent, and when fairly committed to the rocks, got on better than we had expected. The loose stones, indeed, required great care, and caused much delay, but no mishap occurred, and at 9.45 we reached the upper snow-slopes leading to the glacier, getting off the rocks without trouble, though later in the year Messrs. Mathews and Bonney, accompanied by my guide Michel Croz and his brother Jean, encountered considerable difficulty at this point. Steep slopes, in places considerably crevassed, now alone separated us from the level portion of the glacier beneath, but several détours were necessary, and twenty minutes more were consumed before the latter was reached.

The Glacier d'Arcines is short, but very broad, resembling rather one of the second order. Its upper part is remarkably clean and pure, but débris crop forth plentifully in its central portion, and its lower extremity is buried under immense moraines.

A little after ten we halted for lunch, and at the same time took the opportunity of examining the wall of crags we had just quitted. It then appeared that we had most fortunately hit the ridge at the one point from which alone a descent could have been attempted with a reasonable chance of success, and considering our total ignorance of the nature of the ground, and the obstacle opposed by the *brouillard*, we felt we had reason to congratulate ourselves on such a fortunate bit of intuition.

Keeping away to the left, we crossed three beautifully defined lateral moraines, quitting the last at 10.30, when another halt was called to remove gaiters, adjust knapsacks, and examine the map. Proceeding again at eleven, we descended a steep slope of rock and débris on the left or west of the terminal mass of the glacier, and in another ten minutes found ourselves on the turf at its foot, not far from the point where the path from Monestier to Villar d'Arène comes in from the east, after traversing the low grassy Col d'Arcines (2,368 mètres, or 7,769 feet).

The Glacier d'Arcines has one peculiarity which I have not elsewhere noticed, though I am aware that the same phenomenon

is occasionally to be seen. It occupies and flows along the watershed dividing the valleys of the Romanche and Durance, into each of which it discharges a portion of its drainage from separate ice-vaults. This, it will be seen, is quite a different case from that of the respective fields of ice and snow on either side of a ridge from which they are derived, as the movement of the ice is here parallel to and along the crest, instead of being at right angles to it.

We soon came upon numerous groups of cows, dotted over the grassy slopes which extend to a considerable height on either side of the valley, but no other signs of inhabitants appeared for about half an hour, when we reached the brow of a sort of descent or step in the valley, at the foot of which were seen the *châlets de l'Alpe*, a collection of miserable hovels tenanted by women and boys scarcely less wretched in appearance.

At this point a lateral valley opens on the left, down which come the united streams of the *Glaciers de la Plate des Agneaux* and *Clot des Cavales*, over the head of the latter of which lies the pass to *La Bérarde*, already referred to under the name of the *Col des Cavales*. In the background rose the most easterly summit of the *Grande Ruine*, and rarely have I seen a grander mass of rock or a more imposing outline. I much regretted that the time at my disposal did not admit of my exploring these glaciers and making the pass to *La Bérarde*, as it must lie through scenery of the highest order; but I would strongly urge our members to turn their attention to this and the numerous other fine expeditions which await their enterprise in Dauphiné.\*

We spent an hour and a half at the *châlets*, which are situated at a height of 2,118 mètres (6,949 feet), and after procuring some milk, though not without difficulty, proceeded at 12.45 down the valley to *Villar d'Arène*. We had been told at *L'Alpe* that 2 hours would be requisite to reach that place, and 1 more between it and *La Grave*, whilst by the *Col d'Arcines Monestier* was distant only 3. We were also informed that later in the summer this route was much frequented, and many travellers, especially botanists, traversed it in search of plants, in which the district is particularly rich.

Walking at a steady pace, we reached *Villar d'Arène* at 2.10, and *La Grave* at 2.25, less than 2 hours after leaving *L'Alpe*, but in ascending the valley  $2\frac{1}{2}$  hours should be allowed between *La Grave* and the *châlets*, and  $\frac{1}{2}$  hour more to the

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\* See notes at page 198.



foot of the glacier. The time from Ville Vallouise to our bivouac may be reckoned at 5 to 5½ hours, exclusive of stoppages, and thence to La Grave, 8¼ hours, from which 3 must be deducted for halts.

Twenty minutes after quitting L'Alpe, we came to the edge of a very precipitous descent, down which the path zigzags for some time. About midway the stream forms a pretty cascade, and on the left a lovely glacier comes creaming down from one of the lofty peaks to the east of the Aiguille du Midi de la Grave. A long, narrow, torrent-ravaged flat was next traversed for twenty minutes, and a track reached at its further end, which led almost directly into the old Lautaret road, and soon afterwards into the magnificent new 'Route Impériale' from Grenoble to Briançon, a quarter of an hour above Villar d'Arène.

As a full description of the topography and scenery may be met with in Ladoucette, Brockedon, Lord Monson, Murray, Mr. Ball's 'Guide to the Western Alps,' Joanne's 'Itinéraire du Dauphiné,' and other well-known works, I will only add that at La Grave we procured a *charrette*, and taking leave of Perrn, who was engaged to meet Mr. Whympet at La Bessée, Croz and I, at 4.30, rattled off merrily down the magnificent Combe de Malaval to Bourg d'Oysans, which we reached in 3 hours. A good dinner at the Hôtel de Milan was most acceptable, as, with the exception of my dinner at Guilestre and occasional supplies of remarkably greasy ham at Ville Vallouise, I had been a stranger to meat since quitting La Tour in the Val Pellice, more than a fortnight before. A little before midnight we left in the diligence for Grenoble, arriving at five the following morning, quite refreshed by sound slumber in such unusually luxurious quarters.

A delightful expedition to the Grande Chartreuse, in weather which still was everything that could be desired, and an ascent the next day of the Grand Som (6,670 feet), a lofty limestone summit in the neighbourhood, commanding a glorious view of the Pennine, Cottian, and Dauphiné Alps, the plains of France, &c., brought my campaign to an agreeable termination. Good quarters, good fare, and civilisation, were none the less attractive by contrast with the absence of all three, which I had almost uninterruptedly enjoyed since quitting Turin.

RESULTS AND DETAILS OF OBSERVATIONS WITH A MERCURIAL  
BAROMETER BY NEGRETTI & ZAMBRA.

Place	1862 Day	Hour	Baro- meter reduced	Air	Height, mètres	Height, feet	Remarks
1. Grand Pelvoux (highest peak) . Geneva Observa- tory, 408 mètres Turin Academy, } 285·24 mètres } Grenoble, 215 mètr., chez Demarchi . Aosta, M. Carrell's Observatory, 600 mètres . . . St. Bernard, 2,478·3 mètres . . . Mean . . .	July		Milli- mètres.	C.			
	10	9, 11, & 11.45 a.m.	476·3	0·3	. . .	. . .	30 observations. 3,952 mètres by comparison with the Signal, viz., 3,937·6 (Δ E. M. F.), + 14·4 (dif- ference). Mean of both 3,954.
	"	Ditto	726·91	24·8	3,954·3	12,974	
	"	{ 9 a.m. & 12 noon. Pelvoux at noon.	736·93 475·9	26·7 0·	3,959·7	12,991	
	"	12 noon	742·45	29·0	3,973·6	13,037	
	"	9 a.m. & 12 noon	709·88	25·5	3,951·9	12,966	
"	9, 11 & 11.45 a.m.	569·46	12·8	3,942·1	12,934		
			. . .	. . .	3,956·3	12,980	
2. Col des Écrins . . . Geneva . . . Turin . . . Grenoble . . . Aosta . . . St. Bernard . . . Mean . . .	12	12 noon	506·4	5·5	. . .	. . .	1 observation. 3,350 mètr. (Δ) État Major Fran- çais ; 3,358 m. (Aneroid cor- rected) Rev. T. G. Bonney.
	"	12 noon	724·17	20·2	3,411·8	11,194	
	"	12 noon	734·67	23·8	3,431·2	11,257	
	"	12 noon	739·4	25·0	3,422·7	11,230	
	"	12 noon	707·07	23·5	3,420·7	11,223	
	"	12 noon	565·69	10·9	3,391·3	11,127	
			. . .	. . .	3,415·5	11,206	

RESULTS AND DETAILS OF OBSERVATIONS WITH AN ANEROID  
BAROMETER BY SÉCRÉTAN (CORRECTED).

Place	Day	Hour	Aneroid	Air	Mètres	Feet	Remarks
1. Grand Pelvoux (Signal) . . . Do., highest peak (3,956·3) . . .	July						
	10	12 noon	476·7	4·0	. . .	. . .	1 observation. 3,937·6 Δ État Major Français.
"	12 noon	475·9	0·	3,941·9 (3956·3 -14·4)	12,933		
2. Col du Glacier Blanc . . . Geneva . . . Turin . . . Aosta . . . St. Bernard . . . Mean . . .	16	7.30 & 8.30 a.m.	509·8	0·7	. . .	. . .	2 observations. 10,873 (aneroid uncorrected) Rev. T. G. Bonney ; 10,766 (Bar.) W. Mathews, jun.
	"	Ditto	724·78	15·6	3,309·7	10,859	
	"	9 a.m.	731·45	25·0	3,316·8	10,882	
	"	9 a.m.	705·82	20·3	3,307·4	10,851	
	"	7.30 & 8.30 a.m.	564·31	5·2	3,298·7	10,823	
			. . .	. . .	3,308·1	10,854	

OBSERVATION WITH TWO BOILING-POINT THERMOMETERS BY CASELLA, CORRECTED BY NUMEROUS COMPARISONS.

Place	Day	Hour	Pressure equivalent to boiling point	Air	Mètres	Feet	Remarks	
	July	[Boiling point 193°·65 Fahr. = 89°·8 C.]						
1 Col du Salé	14	8.30 a.m.	517·75	7·5	· · ·	· · ·	1 observation, mean of two thermometers.	
Geneva	"	8.30 a.m.	729·52	18·7	3,290·1	10,793		
Turin	"	9 a.m.	738·99	25·0	3,311·5	10,865		
Grenoble	"	12 noon	743·06	28·0	3,305·4	10,845		
Aosta	"	9 a.m.	712·66	24·7	3,316·2	10,880		
St. Bernard	"	9 a.m.	570·9	10·9	3,287·3	10,786		
Mean	"	· ·	· ·	·	3,302·1	10,834		

The barometer employed was of Newman's construction, and since furnished with Negretti & Zambra's improved cistern. It was carefully compared at Geneva, the St. Bernard, Aosta, Cogne, and Turin.

The aneroid was by Secrétan of Paris, and graduated from 340 to 800 millimètres. It was compared at all the above stations, as well as at Grenoble, and a second time at Geneva; besides which its errors were further corrected by upwards of 80 simultaneous readings with my barometer up to a height of 13,000 feet.

The two boiling point thermometers by Casella, graduated respectively to 0°·1 and 0°·2 Fahrenheit, were compared at Geneva, Turin, and the St. Bernard, as well as about twenty times with my barometer up to a height of 13,000 feet.

The boiling-point observations are converted into terms of the atmospheric pressure by the tables of Regnault revised by Moritz, as given in Guyot's 'Meteorological Collections,' whilst the heights, as in the case of the mercurial and aneroid barometers, are calculated from the tables of Delcros given in the same volume.

HEIGHTS OF THE PRINCIPAL PEAKS AND PASSES IN THE DAUPHINÉ ALPS. (E. M. F. = État Major Français; T. G. B. = Rev. T. G. Bonney; W. M. = W. Mathews, jun.; F. F. T. = F. F. Tuckett.)

Name	Height in mètres	Height in feet	Position	Authority	Method
<b>PEAKS.</b>					
1 Pointe des Écrins, E. peak	4,103	13,462	E. of La Bérarde	E. M. F.	Δ
Centre peak	4,083	13,396	W. of highest peak	"	"
NW. peak	3,980	13,058	NW. of centre peak	"	"

## HEIGHTS OF THE PRINCIPAL PEAKS AND PASSES

Name	Height in mètres	Height in feet	Position	Authority	Method
2 La Meije (Aiguille du Midi de la Grave) .	3,987	13,081	S. of La Grave, N. of La Bérarde	E. M. F.	△
E. Peak . . . . .	3,911	12,832	ESE. of highest peak . . . . .	"	"
3* Grand Pelvoux . . . . .	3,954	12,973	NW. of Ville Vallouise . . . . .	F. F. T.	Bar.
*Signal (Pic de la Pyramide)	3,938	12,920	E. of highest peak . . . . .	E. M. F.	△
Crête du Pelvoux . . . . .	3,915	12,845	SW. ditto . . . . .	"	"
Ditto . . . . .	3,854	12,645	SW. ditto . . . . .	"	"
*Ditto, Signal . . . . .	3,588	11,772	SW. ditto, between the two preceding . . . . .	"	"
E. peak above Ailefroide	3,762	12,343	ESE. ditto . . . . .	"	"
4 L'Ailefroide . . . . .	3,925?	12,878?	WSW. ditto, between Glaciers Noir, Du Selé and La Pilatte	"	"
N. peak . . . . .	3,805	12,484	NNE. of principal Peak . . . . .	"	"
5 Peak ESE. of La Meije	3,880	12,730	SSE. of La Grave . . . . .	"	"
6 Peak W. of No. 5 and between it and La Meije	3,831	12,569	S. of La Grave . . . . .	"	"
7 Crête de l'Encula . . . . .	3,779	12,399	E. of Écrins, W. of Glacier Blanc . . . . .	"	"
8 Le Rateau . . . . .	3,770	12,369	SSW. of La Grave, W. of La Meije . . . . .	"	"
NW. peak . . . . .	3,754	12,316	NW. of highest peak . . . . .	"	"
9 Crête de la Bérarde . . . . .	3,756	12,323	S. of Écrins, between Glaciers Noir and Tempe . . . . .	"	"
10 La Grande Ruine . . . . .	3,754	12,316	S. of Glacier du Clot des Cavales	"	"
11 St. de Roche-Faurio	3,716	12,192	N. of Écrins, between Glaciers de la Bonne Pierre, Blanc, and Plate des Agneaux . . . . .	"	"
12* Crête du Glacier Blanc ( 'Signal' )	3,660	12,008	WSW. of Monestier, between Glacier Blanc and Glacier d'Arcines . . . . .	"	"
W. peak . . . . .	3,615	11,860	Ditto . . . . .	"	"
E. peak . . . . .	3,602	11,818	Ditto . . . . .	"	"
Centre peak . . . . .	3,499	11,480	Ditto . . . . .	"	"
* 'Pic Signalé' . . . . .	3,355	11,007	Ditto . . . . .	"	"
13 Mont Bans, or Baus	3,651	11,979	S. of Glacier de la Pilatte (La Condamine) . . . . .	"	"
14* Pic de la Grave ( 'Sig- nalé' ? )	3,649	11,972	SW. of La Grave, W. of Le Rateau . . . . .	"	"
15 St. des Rouies . . . . .	3,634	11,923	S. of Les Étages, W. of Col de Sais . . . . .	"	"
16 Aiguille du Plat . . . . .	3,602	11,818	NW. of Étages, E. of St. Chris- tophe . . . . .	"	"
17* Jocelme (Signal) . . . . .	3,585	11,762	N. of Col du Sellar, or Célar	"	"
18 Pic d'Olan . . . . .	3,578	11,739	N. of La Chapelle (Val Go- démar) . . . . .	"	"
19 Montagne de Clochâtel	3,575	11,729	S. of Le Bérarde . . . . .	"	"
SW. peak . . . . .	3,564	11,693	Ditto . . . . .	"	"
20 Tête de l'Être . . . . .	3,563	11,690	S. of Les Étages . . . . .	"	"
21 Rocher de l'Encula . . . . .	3,538	11,608	S. of La Bérarde . . . . .	"	"
22 Pic des Opillons . . . . .	3,506	11,503	N. of Col du Sellar or Célar	"	"
23* Pic Bonvoisin (Signal)	3,506	11,503	SE. ditto . . . . .	"	"
24 Pic N. of Col de Sais	3,472	11,391	. . . . .	"	"
25 Tête des Fétoules . . . . .	3,465	11,368	SSW. of Les Étages . . . . .	"	"
26 Roche de la Muzelle	3,459	11,349	WSW. of St. Christophe, E. of Col de la Muzelle . . . . .	"	"

IN THE DAUPHINÉ ALPS—continued.

Name	Height in mètres	Height in feet	Position	Authority	Method
27 Crête des Bœufs-Rouges W. peak . . . . .	3,454	11,332	WNW. of Entraignes, S. of Glaciers de la Pilatte and du Selé . . . . .	E. M. F.	Δ
E. peak . . . . .	3,431	11,257	Ditto . . . . .	"	"
Middle peak . . . . .	3,367	11,047	Ditto . . . . .	"	"
28 Tête de Charrières . . . . .	3,442	11,293	W. of Glacier de la Plate des Agneaux . . . . .	"	"
29 Pic Jocelme . . . . .	3,437	11,276	S. of Col du Sellar, or Célar . . . . .	"	"
30* Goléon (Signal) . . . . .	3,429	11,250	N. of La Grave . . . . .	"	"
31 La Grande Aiguille . . . . .	3,432	11,227	SW. of La Bérarde . . . . .	"	"
32 Cime du Vallon . . . . .	3,418	11,214	Between Pic d'Olan and Col de la Muande . . . . .	"	"
33 Aiguille des Arias . . . . .	3,401	11,158	S. of St. Christophe . . . . .	"	"
34 Tête de Loranoüre . . . . .	3,341	10,961	E. of Roche de la Muzelle . . . . .	"	"
35 Aiguille d'entre Pierroux . . . . .	3,293	10,804	SE. of Aiguille des Arias . . . . .	"	"
36 Aiguille du Canard . . . . .	3,270	10,729	NE. ditto and S. of St. Christophe . . . . .	"	"
<b>PASSES.</b>					
1 Col des Écrins . . . . .	3,415	11,204	N. of Écrins, S. of Roche-Fanrio. Ville Vallouise to La Bé- rarde by Glaciers Blanc and de la Bonne Pierre . . . . .	F. F. T.	Bar.
	3,358	11,017		T. G. B.	Aneroid
	3,350?	10,991?		E. M. F.	Δ
2 Col de la Tempe . . . . .	3,319?	10,889?	Vallouise to La Bérarde, be- tween Écrins and Ailefroide, and by Glaciers Noir and de la Tempe . . . . .	Berghaus ?	Bar. ?
3 Col du Glacier Blanc . . . . .	3,308	10,853	Vallouise to La Grave by Glaciers Blanc and d'Arcines . . . . .	F. F. T.	"
	3,314	10,873		T. G. B.	Aneroid
	3,281	10,766		W. M.	Bar.
4 Col du Selé . . . . .	3,302	10,834	Vallouise to La Bérarde by Glaciers Blanc and d'Arcines Selé, and de la Pilatte, S. of l'Ailefroide . . . . .	F. F. T.	Boiling point.
5 Col des Cavales . . . . .	3,128?	10,263?	N. of Grande Ruine. La Bé- rarde to Villar d'Arène by Val des Étançons and Glacier du Clot des Cavales . . . . .	E. M. F.	Δ
6 Col du Loup . . . . .	3,112?	10,210?	S. of Pic Bonvoisin Vallouise to Val Godémar . . . . .	"	"
7 Col de Sais (1 W. Col) (2 E. Col) . . . . .	3,092 3,116	10,145 10,224	La Bérarde to Val Godémar by Glacier du Chardon . . . . .	"	"
8 Col du Sellar (or Célar) . . . . .	3,076	10,092	Ditto by Glacier de la Pilatte Vallouise to Val Godémar . . . . .	Forbes. E. M. F.	Bar. Δ
9 Col de la Muande . . . . .	3,059?	10,036?	St. Christophe to Val Godémar . . . . .	"	"
10 Col des Infernets . . . . .	3,048?	10,000?	La Grave to St. Jean de Mau- rienne . . . . .	Forbes.	Esti- mate.
11 Col de Chabrières . . . . .	2,954	9,692	Val de Réalon to Chorges . . . . .	Guerin.	?
12 Col d'Arcines . . . . .	2,368	7,769	Monestier to La Grave . . . . .	E. M. F.	Δ
Col de la Selle . . . . .	?		La Grave to St. Christophe . . . . .		
Col de la Muzelle . . . . .	?		Venose to La Chapelle . . . . .		

THE AVALANCHES OF THE JUNGFRAU. By FRANCIS GALTON, F.R.S.

**D**URING a stay of some days at Mürren, in 1862, I was seized with a desire to obtain a nearer view of the great avalanches, that rushed and roared at frequent intervals down the north face of the Jungfrau into the depths of the Trümenthal. I observed that in the lower portion of their course they all converged to one narrow channel, and a close scrutiny with my telescope failed to detect any signs of fallen ice or stones on either side of their habitual path. The avalanches in that channel resembled an intermittent cataract of ice, which might, perchance, be witnessed as closely and as safely as any ordinary waterfall. Circumstances then prevented me from exploring it, but this year my first mountain walk was directed to the channel in question. I found that it was the same channel that directly faces the Jungfrau hotel, on the Wengern Alp, which scores of tourists daily frequent, in the expectation of witnessing avalanches from a nearer point of view than is to be attained by any other mule-path. But even the Jungfrau hotel is far too remote a point of view to enable spectators to appreciate them justly. I triangulated the interval between the hotel and the channel, by such rough means as I had at hand, and found it about 1,500 yards, or a little short of a mile. It is clear that no cascade, whether of water or of ice, can be properly heard or seen at that great distance. It is by their sides, and almost amid their spray and dust, that the power and the uproar of such glorious scenes can alone be truly enjoyed.

The channel of which I have been speaking is the sole outlet of all the avalanches that fall during the summer months from the north face of the Jungfrau, and it occupies a break in the continuity of the Giessen glacier. If the cliffs of the Jungfrau were less precipitous, the Giessen glacier would flow in a continuous stream from the snow-fields above, to its melting level in the Trümenthal below, but the rampart-like configuration of the mountain sides causes it to break asunder. The snow or ice in the upper fields slides onwards, until it assumes the shape of an overhanging cliff, or else reaches a slope too steep to support it. Then a vast piece gives way, and it crashes into fragments, that roll and tumble and grind one another into globes, on their way to the head of the ravine or channel that forms the path of the ice-cataract. They thence bound in a succession of leaps down the ravine, and dash forth at its foot, in an enormous

hail-storm, upon the head of a long uniform slope or *talus* of snow and ice, that represents the lowermost portion of the Giessen glacier, and stretches into the remoter depths of the Trümenthal. Its appearance testifies to its origin. It is wholly unlike the termination of ordinary ice-streams, for it is made up of rounded masses loosely jammed together.

My object was, as I have explained, to reach the foot of the ravine, and to watch the avalanches as they dashed past me, just as I should take my stand by a waterfall of similar dimensions. I succeeded beyond my expectations. There was no difficulty in the climb and no danger in the approach. The neighbourhood of the channel proved free from stray fragments of ice or stone, and the steep cliff through which the ravine is worn happens to rise in overlapping layers of solid rock, disposed naturally in the manner of slates or tiles. They yield a perfect shelter to within eighty yards of the ravine from a discharge of ice or snow over the face of the precipice, should such by any accident take place—an occurrence which I believe improbable during the summer months. A little scooping out of the rock, in conformity with its natural disposition, would make a perfectly safe covered way to within five yards of the ice-cataract.

I went from the Lesser Scheideck hotel and came back past the Jungfrau hotel. I did not note my watch, but am sure that an hour and a half would be an ample allowance to reach the channel from either inn. The goal is so near and conspicuous, and the way so easy to find, that it seems absurd to describe my course at length. Going straight to the bottom of the valley, a brook, derived from the melting of the Eiger glacier, is crossed by a bridge. Then comes the lower portion of the Kuhe glacier, which is fed by avalanches like the Giessen, and consists of similar rounded masses to those I have already described. It was not more than 120 yards across, and therefore, if a traveller were in the middle of it at the moment when an avalanche detached itself from the heights far above, he could readily retrace his steps, or continue them to the other side, long before danger could approach him. At an early period of the year, when the glacier is broader, the danger might be serious. I was told that the Kuhe glacier derived its name from the fact of 300 cows having been swept away by a single avalanche, that came down its path in the spring-time.

After crossing the glacier, the grassy base of the Jungfrau is reached and ascended. It is broken by two successive terraces of rock, which have to be surmounted. They are low, perhaps thirty feet high, but the rock is smooth, and does not afford good holding-ground: they would exceed the scrambling powers of

ordinary walkers. I should therefore advise everyone to make his guide take a rope by which he might be helped up. I should add, that a few nicks chiselled in the rock would obviate difficulty, and also, that an easier way might be found, though I doubt it, than that by which I went. If the expedition becomes, as I hope, a common one, some speculative landlord will doubtless make the way easy to all classes of tourists.

A narrow belt of sward and stone lies between the topmost terrace and the face of the mighty cliffs. I followed it till I reached the jaws of the ravine and the side of the *talus*, and I spent many hours at various points of view.

It was a dry August day, that had succeeded many others of the same character; consequently the avalanches came rarely, from lack of material to supply them. In some weather they are seen from the Wengern Alp to fall half-hourly; but I, throughout a long morning, only witnessed three grand ones, not to speak of occasional peltings. When they appeared, the sights and sounds were worthy of the scale on which they were enacted. The perpendicular fall of the detached masses of snow and ice, before they reach the head of the ravine, must be 2,000 feet. The depth of the ravine is nearly 1,000 feet more, and the descent of the talus extends through almost 2,000 feet beyond. Therefore the entire fall of the avalanche is nearly 5,000 feet of perpendicular descent. The finest effect was at the very foot of the ravine. I stood at one time so near to it that, had I been equipped as a fisherman, I could have thrown a fly over the avalanche. I waited for the third and finest avalanche under one of the overhanging slabs of rock I have already mentioned; but though I had persuaded myself of the absolute safety of my position, I freely acknowledge that the advent of the avalanche alarmed me. It gave notice of its coming by a prodigious roar, and the appearance of an exceedingly menacing cloud of snow-dust, that was shot out far above my head. I knew not what was coming, and I ran away as fast as I could, till I was reassured that all was right by the appearance of the ice-cataract in its wonted channel; when I hurried back again to its side, to rejoice in the storm and uproar. As to what became of the cloud of snow-dust, I can only speculate, for not a flake of ice nor a drop of water ever reached me. It must have melted into drizzle, and then evaporated in the hot dry air, before it reached my level. Probably it was the very fineness of the snow-dust that gave blackness to the cloud; its menacing appearance was therefore a gross imposition on my nerves. Had the particles that composed it been less minutely divided, they would have looked less appalling, but they would not have



melted as they fell. They were the less dangerous in proportion as they were the more visible.

The grandeur of the ice-cataract was greatly increased by close proximity. The hurtling of the ice-balls in the depths of the ravine, and the crash of the huge hail-storm that issued at its foot, were almost frightful. The storm was remarkable for the irregularities of its outbursts. Frequently these were accompanied by vast gushes of water, due, I suppose, to some sub-glacial reservoir, whose foremost wall had toppled away and partly supplied the avalanche. Wind, in moderate blasts of cold air, accompanied each outburst. I was surprised there was not more of it, after the tales one is accustomed to hear about such things.

When the ice-balls have reached the *talus* or slope, the character of their descent is wholly changed. They no longer tumble about or jostle one another, but they slide swiftly and steadily side by side. We can now examine them leisurely, and we see that the surface of the moving mass consists of globes of a pretty uniform diameter of one foot; a few are as much as two feet across, and here and there a globe may be seen of no less than a yard in diameter. The larger balls are topmost, as we may observe in any vessel full of variously sized fragments after they have been well shaken together. Beneath and between the greater globes there lies an abundance of smaller balls. Few of these rounded masses, large or small, are of pure transparent ice; they are mostly aggregations of fragments imperfectly regelated, and afterwards rounded by mutual attrition.

As they slide down the *talus*, they follow its undulations like a ribband: they reminded me forcibly of an orderly multitude filling the streets, and hastening, but not hurrying, to the same goal.

There were two good points of view along the side of the slope. One was near a gorge, which interrupted the regularity of its course; and the other was much lower down, at the place whence almost the entire cascade, as well as the *talus*, could be seen in one long straight line.

The noise made by the ice-balls on the slope was very peculiar. I often shut my eyes and tried to conceive what I should have guessed it to be, had I heard it without learning its cause. It had a rustling and a hissing sound, that reminded me most nearly of a tide rushing rapidly through many channels. There was no *sloppiness* in the sound, in the early part of the day, though afterwards, when more water accompanied the ice-fall, the ear could detect its presence. The noises were not sustained, but rose and fell like those of the sea—owing, I suppose,

to the irregularity of the avalanche supplies, to which I have already alluded. I was surprised at the dissimilarity of the various component sounds of the avalanche, when heard close at hand, to the thunder-like roar which is so familiar at a distance. But in truth, thunder itself affords a precise analogy. When the lightning is close upon us, we hear no roar, but a tearing sound, composed ultimately of a large number of distinct electric crepitations. These are so reverberated between clouds and rocks and earth, that the frequency of the sounds that reach the ear is increased to what is necessary to create the impression of a continuous musical roar. Finally, certain notes of the roar are selected and largely intensified by the cliffs, that play the part of huge sounding-boards. The sound of the distant avalanche is therefore the voice of the cliffs, and is due in but a small degree to the original clatter of the ice-fall, or to the rustle that is heard on the slope.

I confidently recommend all lovers of nature to make this easy and remarkable expedition. It is eminently suited for a day of repose to the active mountaineer. If the weather be sultry, he will find that he can choose his waiting-place either in the sun or in the shade. So considerable a time elapses between the uproar that heralds the avalanche and its appearance at the foot of the ravine, that he may read, eat, or sleep, without any anxiety as to losing his opportunity by being taken unawares. I should not be surprised if this expedition became one of the regular sights of the ordinary Alpine tourist. It is a marvel to me that no one seems to have thought of attempting it before.

THE BALFERINHORN. By ROBERT SPENCE WATSON.

'This that I see is not all, and this that I do is but little,  
Nevertheless it is good, though there is better than it.'

CLOUGH.

WE had crossed the Moro to Saas (finding six and a half hours' snow upon it), and were strolling up to the Fée valley in the cool of the evening, when we met the old curé, Herr Imseng, bearing a pail full of the freshest and frothiest milk in either hand, and making his way down to the 'Hôtel du Mont Rose,' where he is wont to reside. We hailed his reverence as an old friend, and, on our return to the inn, he was not long in making his appearance. After we had described our

labours past, and discussed our proposed plans for the future, he told us that he had something to suggest—something ‘un peu remarquable’—there was still in his native valley one peak un-ascended which he longed to climb, and he should be delighted and proud to lead my wife to its summit. It was the Balferinhorn, the peak which is so conspicuous from Visp, and which has so often usurped the title of the Mont Rose itself. He went on to picture in glowing terms the sensation which the feat would occasion amongst our friends at home; but we needed no persuasion, and left on the following morning for Zermatt, promising speedily to return, and join the worthy old gentleman in what he feared would be his last attack upon an unscaled mountain.

A week of bright pleasant weather at Zermatt, a delightful morning over the Cima and Weissthör to Mattmark, a quiet saunter down the well-known valley, and we were again beneath the friendly shelter of the little Saas inn. Saturday passed idly away in short walks suggested by the curé, who on Sunday forenoon guided us by a new route to the Valley of Fée, whence we could scan a portion of the road to be traversed on the morrow. At the head of the Hochbalm torrent rose a steep barrier of rocks, up which our intended route lay, and long and carefully did the curé survey them through my field-glass; at length handing it to me, exclaiming, with a happy shrug, ‘Nous pouvons monter.’ In the evening he dined with us, and described his preparations for the morrow. We had had too much experience to imagine that retiring early would insure sound rest, and therefore lay down at our usual time, with instructions to be called at 1 A.M., if the morning promised well.

It wanted yet some minutes to that untimely hour, on July 6, when heavy footsteps were heard overhead, disturbing the silence, and, punctual to the moment, our door opened, and the curé thrust in a large lighted lantern, accompanying it with the cruelly polite enquiry whether we had slept well. There was no need for the lantern. The moon poured in her cold rays through the windows (which extended right round two sides of the room) in such profusion, that when the noise had once induced you to open your eyes, it was vain to think of closing them again. Duty became necessity, and at 2 o'clock we were ready for the start.

Some quarter of an hour elapsed before the curé made his appearance, and when he at length came, he could scarcely be recognised, for his flowing canonicals had given place to a funny little jacket, out of which came a pair of breeches which obstinately refused to button at the knee, whilst a brim-

less felt saucer of remote antiquity was substituted for the broad-brimmed *chapeau* which usually graced his brows. But he looked full of good humour, and wielded a short but effective baton, which had a welcome promise of good work to come.

We crossed the wooden bridge opposite the church, and turned to the left up through the great pine forest; the moonbeams struggling through the branches in uncertain beauty, and causing us to stumble and boggle at the path; the cold fresh air thrilling us with the feeling of health, and strength, and joyful hope; the silence and obscure lighting of the forest adding the shade of solemnity so often felt at the beginning of some *grande course*. Up through the meadows surrounding the village of Fée, which lay quietly slumbering below us on our left; up a green pasture hill to the north, steering apparently towards a star which hung brilliantly upon the noblest peak of the Mischabel, whose cluster of summits, mysteriously silvered by the moonlight, stood grandly out against the deep purple sky.

But the moonlight began to pale and fade away, and the dawn commenced. Soon over the noble glaciers which pour so wildly down into the emerald Fée valley, over the billowy fields of snow which lead from them to the Allalein and Alphubel summits, stole the first faint rays of the approaching sun. Minute by minute the scene became grander and grander still. The faint pink hues changed to the most exquisite rose, which in turn gave place to a hot fiery red: the whole burnt in savage beauty for a moment, and then all the brilliant colour faded away, and the practical light of common day alone was left.

The pleasant turf, spangled with flowers of every hue, had now to be left behind for the realms of desolate wildness. We descended almost to the bed of the Hochbalm torrent, and commenced an ascent over huge loose pebbly stones through a gully, whence we had no view, so that the work soon became wearisome and 'Turlo'-ish in the extreme. Here, however, the curé came out brilliantly, and with many jokes (small, it is true, but good enough to laugh at), made aching shins, past, present, and to come, forgotten. One of these jokes still sticks in my memory, though its point has been somewhat worn down by time. A very steep and stony place making its appearance, he exclaimed, 'Ah! voilà un chemin de fer;' and then, by way of rejoinder, 'Non, je me suis trompé, c'est un chemin de pierres;' and so the stones passed, and slopes of snow began to mingle with them, until, on turning 'a corner jinking,' the Hochbalm glacier made its welcome appearance.

The rocks which we had surveyed on the preceding day

rose in front, separated from us only by the glacier, and apparently connecting the Ulrichshorn, the lowest peak of the Mischabel, with the Gemshorn, the lowest peak of the Balferin. Under the Ulrichshorn the glacier falls rapidly away, and is much crevassed; but nearer the Gemshorn, on the east, it is comparatively free, and at this side we observed a couloir which seemed to lead almost to the top of the rocks, and to it, having buckled on the rope, we made our way. Before we reached it, the slope of the glacier became so great that we had to commence step-cutting, especially as a grand web of crevasses was spread out but a few yards beneath us. Once in the couloir, our progress was very slow indeed; each step was hewn with difficulty, and Joseph Marie Claret and Franz Andermatten had frequently to relieve each other. The incline was considerable (we leaned against the snow with our breasts to maintain our balance), the couloir was very narrow, and our men active, and we had therefore to stand a constant fire of tolerably large chips for about an hour. But the step-cutting process, when the steps have really to be formed, is a slow and laborious one. The couloir, which from a distance had seemed a short and simple road, proved practically to be long and difficult, and at length, to the joy of all, the steps were cut up to the rocks, the rope was cast off, and fair climbing commenced. We clambered up, leaving a short space between each other, for the rocks were so much disintegrated that it was hard to avoid dislodging some of them. But it was a delightful change; rock-climbing is so full of adventure, and you are so independent, so self-reliant. With the fulfilled promise of a glorious day, joined to the excitement of meeting and overcoming adverse circumstances, our spirits rose rapidly. Small jokes fell in showers, and when we chanced to hear Joseph (availing himself of a particularly awkward spot) enquire politely of the curé whether it was not a good and fitting place and opportunity for 'une petite messe,' we laughed so immoderately as to make it difficult to retain our balance, although it would have been somewhat awkward to have lost it.

Well, laughter and exercise are both conducive to hunger and good appetite, and when we at length came to a place where we could conveniently anchor, we resolved to do so, and have breakfast. It was now eight o'clock, at which hour we had hoped to have reached the summit; but we had not yet even seen our peak. However, on looking up, we could now see, but a short way above us, a broad white belt, looking like the icing on a bride's-cake, the rocks representing the loaf portion, and nothing above it but the cloudless sky, a deep brilliant

purple such as I had never seen before. Breakfast, though welcome, was soon despatched, and then twenty minutes' steady climbing, and two dozen nicks in the iceing, and we were at the top, and then (at 8.15 A. M.) we got our first view of the peak, which we had been so long in circumventing. Before us the Gassenried glacier, a vast ice-plain, stretched away towards St. Niklaus, immediately above us on the left the Ulrichshorn rose, and on our right, removed from us by a ridge of rocks and a broad belt of glacier, rose the Balferin peaks. Up to this point the road was known to the curé and Franz, being nearly the same as that of the Ried pass, but beyond this it had never been traversed.

We walked across the belt of nearly level glacier to the foot of the nearest peak, whence we made our way across its base up to the snow-arête which connects it with the Balferin proper. This was a piece of bad travelling; the inclination was great; the rocks were much broken up, and had a great deal of hardly frozen snow and ice interspersed with them; step-cutting was necessary, for in many places the ice was smooth and extremely slippery; but it was difficult to make more than a scratch, because the ice or snow was so thin that the axe was continually brought into awkward contact with the underlying rocks. Once arrived at the arête, however, our difficulties were over. It was simple enough, though rather long, and at a quarter past ten we walked up the last easy slope to the summit of the Balferin.

That was a delightful moment, for which we would gladly have given more than the exertion required, when we found ourselves contemplating a scene of unutterable beauty from the noble peak which foot of man had never previously trod. True that the somewhat solemn feelings evoked were transitory, and gave way to thoughts of 'the substantial;' but even now, sitting over the winter fire and realising that happy time, how those old feelings return!—how 'the joy of the deed' leaps wildly up, and the infinite longing to be once again among the mighty Alps seizes upon you until it becomes almost painful! And, whilst you recall the beauty of the scene—as you marshal before you the wonders and glories of the view, until it becomes almost too glorious and wonderful for the imagination to conceive, you know well that when you do return, the wonder and glory of the reality will surpass by far your fondest recollection and even your wildest dream.

I shall not vainly attempt to describe in detail the things of beauty which were revealed to us on that clear, bright, happy day, but shall merely enumerate those which have left the strongest

impression upon my mind. The grand near view, of course, was that of the Mischabel cluster; the grand distant view, that of the range of the Bernese Oberland—the Aletschhorn, the Jungfrau, and the Finsteraarhorn standing out most prominently—with the great snakelike Aletsch glacier winding its way down into the Rhone valley, and visible apparently throughout its entire course, and the impetuous glacier of the Rhone pouring down between its parent hills. To the east, the Fletschhorn and Weissmies were most conspicuous, with peaks and ranges lying behind them without number, until far away on the horizon glittered golden mountains which Franz said were the snow-clad hills of the Tyrol. Italy was hidden behind a vast barrier of woolly clouds, which seemed to lie at a height of about 11,000 feet. Monte Rosa and the Rympfischhorn were clear to the south, whilst on the west the Weisshorn rose in such majesty that the interest of the view might be said to culminate in it. Add to these the four valleys of St. Niklaus, Visp, Saas, and the Rhone, with their varied characteristics, and any climber will readily conceive that we had food for long and eager contemplation.

On our arrival, we tied our handkerchiefs together to make a flag, which we fastened upon an alpenstock, and hoisted it from the highest point, where only one could venture at a time, for the immediate summit is entirely of snow, which falls over the precipices towards the north-east, forming a beautiful, but unsubstantial corniche. Before very long, our signal was seen at Visp, and a white flag was hoisted in reply from the bridge, where many people had gathered to discover what was up on the Balferin. They told us afterwards that they could make us out easily with the naked eye, whilst some of us had difficulty in seeing them even with the aid of a good field-glass. As soon as we were satisfied that our signal had been seen, we withdrew to the south side, where Joseph had prepared a shelter from the bitterly cold wind, and where we basked in the full rays of the sun for a delicious hour, enjoying the iciest of champagne, dreamily absorbing the view, and laughing over the adventures and little jokes of the morning.

At length prudence suggested that it was time to be going, and at 11.45 we took our last look round, and a short glissade carried us down to the snow-arête, which was now in a very melting mood. When we had reached the foot, 'Madame' suggested that we might endeavour to descend at once to the Saas valley, and so find a shorter and easier way home; and, as the day was young, everyone jumped at the proposal, and we descended to the Balferin glacier, and kept down it directly

towards the east. In a few minutes our steady deep plunge was brought up by the occurrence of so many crevasses that it was evident that something rapid lay below. We struck off to the north, obtaining a capital view of our peak with its treacherous but beautiful cornice fringed with huge and fantastic icicles, and falling in with, and occasionally into, several concealed crevasses. Again we were stopped by indications of a fall, and, turning once more towards the valley (east), we came to rocks whence we could see the Bider glacier lying far below us. There was some question as to whether we should endeavour to keep down the ridge towards the valley, or descend at once to the Bider glacier; but the curé advised the latter course, and we at once began a slow and toilsome descent, which lasted for more than three hours. The rocks were very steep, and so much disintegrated that we could not, even with great care, avoid at times discharging showers of stones. We therefore frequently descended singly, each finding shelter under the first large rock he came to until joined by his companions. At length we came to a stoppage: the rocks fell away below us, and the curé told us that things were very disagreeable, and that he thought we should have to return. That was not to be dreamed of, and Andermatten was despatched to find a road. It was really a pleasure to watch him, so smart, bold, and active, threading his way with a jaunty careless air through all sorts of queer places, until we at length lost sight of him altogether. The curé would not consent at all to our following him as far as we could, and we waited for a few minutes, but somewhat impatiently. Joseph volunteered to go off to the right and reconnoitre, and in a short time he returned to say that he had found a road which was 'passablement mauvais.' We followed him until we came to a spot where the rocks fell away for fifty or sixty feet, and all further progress seemed barred; for, across a gap of some four feet in width other rocks jutted out with smooth impracticable faces, and so we looked down a *cheminée* (having but three sides), and could not conceive where Joseph's road was. However, having thrown over, with aid of axes and batons, several large threatening rocks, Joseph let himself down into the narrow gully until he came to some strange kind of anchorage. We each then descended to him in turn, and he guided us to a place where we could turn the projecting rocks, and climb up to a small platform, whence we looked upon a very steep couloir some thirty feet below us. On following it upwards, we saw that a portion of the Balferin glacier hung over it at the top, and that it must have been this couloir which caused the numerous crevasses



which we had found up above. It led, of course, to the Bider glacier, which was still several hundred feet below us; but there were unmistakeable evidences that it was a road for other things than men. Indeed, whilst Joseph had been surveying, a small avalanche had dashed down it. The curé opposed our descending by it, but Joseph urged it strongly, and I knew that he was generally right, and always careful; so we lowered him down with the rope, and then my wife and I were in turn lowered to him; but the curé refused to follow, although by this time Franz Andermatten, coming up the rocks on the other side of the couloir, cut his way across, and was hoisted up to him. So they went off to descend by the rocks, whilst we (who had been sheltered by a friendly projection from any avalanches) struck out into the couloir, and sitting down, with a shout of farewell to our Saas friends, shot down the steep hard frozen snow, over the narrow crevasse at the bottom, and far into the Bider glacier, and in a twinkling we had hastened beyond the farthest traces of our dreaded foes the avalanches.

Our difficulties were over. We had plenty of time to examine the steep rocks, the narrow and rapid couloir with the jagged and broken Balferin glacier frowning over it, and the masses of fallen ice, before we were joined by the curé and Franz. We then had some capital glissades down the glacier, succeeded by a long and weary tramp over moraines and through fir woods, until at length Saas came in sight, and, by the foot-path on the west, we came down to the bridge which we had left in the morning by the foot-path on the east. We arrived at our hotel at 5.30 P.M., having been rather more than fifteen hours over our delightful pilgrimage.

‘Fools! madmen! amiable lunatics!’ ‘They went up a hill one way to come down it another.’ ‘They underwent certain expense, trouble, and fatigue, for an uncertain pleasure.’ Be it so; but where now are the fatigue and trouble? Faded, ‘like an unsubstantial pageant,’ which, indeed, they were; whilst the pleasure in difficulties fairly met and overcome, the solemnity of the summit, the joy of the deed, live fresh and sunny memories for ever.

I should like, in conclusion, to record our obligations to the curé for his kind and excellent companionship. Though not so old as he has been represented (being now but fifty-seven years of age), yet the hard life he has led has told its tale; and, whilst the Balferin fatigue was upon him, he spoke of it as the last ascent he should attempt. Of Franz Andermatten, nothing need be said, for his position as a local guide is

beyond dispute; but Joseph Marie Claret, of Chamouni, is less known than he should be. He is very steady and bold as a guide, and a cheerful gentlemanly companion. We examined together the last part of our descent on the following day, and came to the conclusion that the best plan to adopt in future ascents of the Balferin, or even for the Ried pass, would be to follow the west footpath down to the point where the ridge of rocks above the Bider glacier seems to come down to the valley of Saas. Below this ridge there is a watercourse (the third, I think, as you descend from Saas), and ascending this watercourse you come to a snow-slope, which would lead you to the ridge, and by it (or perhaps by snow-slopes beyond it) you might ascend to the Balferin glacier at the point where we left it. Neither Joseph nor I could see any difficulty in this route, by which we thought the summit of the Balferin might be gained in less than 5 hours.

SUMMARY OF NEW EXPEDITIONS DURING THE SUMMER  
OF 1863—*continued.*

COL DES TOURS SALLIÈRES, JULY 10.—Mr. Coutts Trotter, with Peter Bohren of Grindelwald, crossed from Champéry to La Barberine, by the Col des Tours Sallières, between the Tours Sallières and M. Rouan. The ascent is rather tedious, over débris snow-beds and glacier, with a steep *névé* slope near the top. The descent, at first over rock and then by the Glacier des Fonds, is mostly easy and pleasant. The hunter's track through the final gorge above La Barberine lies on the right bank of the stream; it is very difficult to find and to traverse for the first quarter of an hour. Distance 12 to 13 hours from Champéry to La Barberine.

JULY 31st.—Mr. Winkworth, accompanied by J. B. Croz and J. J. Bennen, effected a passage between the Twins. 'We left the Riffel Hotel at 3 A.M., descended on to the Görner glacier by the usual route to the Théodule, and crossed it directly to the centre of the Schwärze glacier. On surmounting the first slope and coming to the great ice-fall, we bore to the right, gradually getting almost close to the long line of precipice forming the eastern boundary of the Breithorn. Having climbed the ice-fall, we turned to the left, ascending a slightly inclined snow plateau, till we were fairly on the northern slope of Pollux. Here we breakfasted at 7.10, and then attacked some very steep snow for about half an hour, when we came to the eastern side of the mountain, which descends in an ice-wall and precipice to the very crevassed Zwillinge glacier. We were now considerably above the pass, and therefore cut our way horizontally along the ice-wall till we were almost directly above the col, which we reached at 9.15 by half-an-hour's scramble down the rocks which here form the eastern face of the Twin. I guessed the height at from 800 to 900 feet less than Castor, or about 13,000 feet. The view north is very circum-

scribed, but south, or rather south-west, it is wider, stretching from M. Blanc to M. Viso. The ice-fall of the Verra glacier, to which we soon came, gave us some trouble; but we finally got on to a ridge dividing the glacier into two, and soon afterwards crossed the western arm and scrambled for an hour down large masses of débris which had fallen from the magnificent gold-red precipices on our right. This brought us to the head of the Combe di Verra at 1.30 P.M., when we turned to the right, as I wanted to cross the Cimes Blanches, and sleep on the Théodule; but an hour and a half would have taken us to St. Jacques d'Ayas, making the whole pass about 12 hours from the Rifel.—S. W. The name Zwillinge Joch, which is clearly appropriate to this pass, having been already assigned to that between the Lyskamm and Twins, it may be convenient to affix to this new pass the name 'Col de Verra,' at least provisionally.

ROTHORN, AUGUST 3.—Mr. and Mrs. Winkworth, with J. J. Bennen and J. B. Croz, made an unsuccessful attempt on the Rothorn from Zermatt. 'We left the M. Rosa Hotel at 3.15 A.M., followed the usual route to the Mittelhorn for about an hour and a half, and then kept along the rocks and meadows above the left bank of the Triftbach till we came to the lower end of the Gabelhorn glacier. This we crossed, and scrambled up its northern moraine and up rocks to the Trift glacier, the ice-fall of which we climbed with considerable difficulty. We followed the glacier almost to the great *bergschrund*, just under the highest peak of the mountain, and then took to the rocks forming its southern arête. These, being granite, gave good foot-hold, but were broken up into such large masses as to be very difficult, and, after an hour's labour, we found it would be impossible to reach the top and return through the *séracs* of the Trift glacier before dark. We therefore reluctantly turned back, and reached Zermatt, after a rapid descent, at 8 P.M., enjoying on our way the glories of one of the most beautiful sunsets I have ever beheld.—S. W.

SILBERHORN, AUGUST 3.—Messrs. Baedeker and von Fellenberg, with the two Michels and others, succeeded in ascending this peak from the Wengern Alp. They ascended by the Guggi glacier, passed the night on the rocks under the Schneehorn, beyond and above the central plateau of the Guggi glacier, and gained the summit by a long and difficult circuit under the cliffs of the Jungfrau.

AUGUST 4TH.—Mr. Jacomb made a new pass from the Urbach Thal to the Ober-Grindelwald glacier. 'Having slept at the Urnen Alp, the highest châtelet on the left bank of the Gauli glacier, I started at 5.15 A.M., and ascended the Gauli glacier to a snow-col at its head, between the Berglistock and the Rosenhorn (Wetterhörner). From the col I climbed the Rosenhorn, and erected a small *steinmann* upon its summit. Returning to the col, I descended its farther side on to the head of the Ober-Grindelwald glacier, and, three and a half hours lower down, joined the usual route from the Wetterhorn, which I followed to Grindelwald, arriving there at nine the same evening. The col on the south of the Berglistock, and between it and the Schreckhorn, is called the Lauteraar Sattel, and the name Gauli has been already appropriated to the pass east of the Ewige-schneehorn. The present col may there-

fore be called the "Ober-Grindelwald Joch." This name is the more appropriate, inasmuch as the col is the true head of the Ober-Grindelwald glacier, the magnificence of the higher part of which can, in fact, only be seen by traversing this pass. From observations with a boiling-water apparatus, an aneroid, and a level, I believe the col to be 10,939 feet high. My guide was Christian Michel of Grindelwald; I had also Johann Zwalt of Guttanen, as porter, who did not go up the Rosenhorn with me.—F. W. J.

Messrs. Bonney, W. and G. Mathews, with Michel Croz and another Chamouni guide, made the following new expeditions in Dauphiné:—

'THE GRAND GLACIER DE LANS, AUGUST 8.—This is the glacier which crowns the cliffs on the south side of the great road between Le Dauphin and La Grave. We mounted from the latter place to Mr. Blackstone's Col de la Selle, called by the natives the Col de la Louze, and thence walked all along the glacier to the point marked Jodri on the map at page 62 of the "Alpine Guide," descending by a very steep ravine to the great road at the village of La Balme. The descent of the ravine was difficult and dangerous. The best way of making this expedition would be to take it as the route from Bourg d'Oisans to La Grave, and to approach the glacier by the Vallon de Lans. We were informed that the highest châteaux in this valley were 3 hours above le Frénet.

'THE COL DE LA CASSE DÉSERTE, AUGUST 10.—The western arm of the glacier marked on the map Gl. de la Platte des Agneaux, is called by the natives Gl. de la Casse Déserte; the torrent which issues from its terminal ice-cave is the source of the Romanche. We were led on to this glacier by a local guide named Alexandre Pic, the most unblushing liar in Dauphiné, who promised to take us over a col directly to the base of the Écrins. The only col by which this glacier basin can be quitted is at the top of a very steep couloir south of La Grande Ruine, and leads to La Bérarde by the Vallon des Étançons. This col we gained at 3 P.M., but the descent on the farther side was so doubtful that we returned to La Grave. We ascertained the following day that the descent would have been practicable.

'COL DES CAVALES, LA GRAVE TO LA BÉRARDE, AUGUST 11.—The ascent to this col, as to the preceding one, is by Villar d'Arène and "le pied de Lautaret," to the châteaux of Alpe. Here the route to the Cols of Arcine and Glacier Blanc is quitted, and a sharp turn is made to the right, up the course of the Romanche, to the point where this river is joined by the torrent from Glacier des Cavales. The col is at the head of the glacier, and is found without difficulty. We reached it in 5 hours and 20 minutes' walk from La Grave, exclusive of halts. The almost vertical precipices of the Aiguille du Midi de la Grave which close in the Vallon des Étançons on the north, are a magnificent feature in the scenery of this pass, but would be seen to greater effect if it were taken in the contrary direction. The quantity of shingle to be crossed made the descent very troublesome. This pass has been long known to the natives, but we have seen no account of any previous passage by travellers.—W. M.

NEW MOUNTAIN ROUTE FROM THE ÆGGISCHORN TO ZERMATT, made by

Messrs. Jacomb and Chater, with Christian Michel and Peter Baumann of Grindelwald:—‘Descending from the Eggischhorn hotel, we crossed the Rhone Valley, and ascended by the Binnen and Lang Thals, and over the Ritter Pass (Italian “Passo del Boccareccio,” Mayr’s map “Helsen Pass”) to Cormi, the highest châteaux at the head of the Val Cherasca. We left the Eggischhorn at 4.30 A.M., and reached Cormi at 7.30 P.M., taking it easily. The scenery of the Binnen Thal is well worth a visit, and, from higher up, a view of the Finsteraarhorn is obtained, which cannot readily be equalled. But the traveller would act wisely in taking provisions with him, as there is nothing either eatable or drinkable to be procured *en route* save black bread and milk at Heilig Kreuz, near the foot of the pass. We experienced some little difficulty in tracing a route up the rocks. From my observations, the height of the pass comes out at 8,887 feet. With a knowledge of the generally indifferent quality of the accommodation at alps on the Italian side, we were agreeably surprised to meet with unusual luxury at Cormi. Indeed, after a considerable acquaintance with the night-halts at châteaux in most parts of the Alps, I can call to mind none affording such excellent quarters. We appear to have been only the second party ever entertained there; but the alp deserves to be more widely known. Starting from it at 5.45 the following morning, we ascended the glacier at the head of the valley (leaving the Passo di Forchetta on our right) to a snow-col separating the glacier from the Kaltenwasser glacier, and between the Monte Leone and the Wasenhorn. The col was reached at 10 A.M. My observations give it a height of 9,248 feet. It may be appropriately called the “Kaltenwasser Joch,” as the glacier by which we had ascended appears to be nameless. Descending the Kaltenwasser glacier, we arrived at the Simpeln Hospice at 12.30, and the same evening at the Ober Stafel châteaux, in the Laquin Thal, lower down than the châteaux on the other side of the same valley, from whence (as described in the September number of the Journal) Messrs. George and Moore attempted, on the 7th of July last, to effect a new pass north of the Weissmies. Leaving the Ober Stafel châteaux at 4.20 the following morning, we ascended the lower part of the Laquin glacier to the rocks on its left bank, which we climbed to the col, where we arrived at 4 P.M. Its height I found was 12,103 feet. The difficulties, both of rock-work and ice-couloirs, swept by discharges of stones, were very considerable, and we fully concurred in Messrs. George and Moore’s opinion, “that the precipices on the Simpeln side are most formidable, and would render the pass one of the hardest in the Alps.” We considered we could not do better than give it the name suggested by those gentlemen, viz., the “Laquin Joch.” It is the more appropriate, inasmuch as the glacier on the further side of the col, and by which the descent to Saas is effected in 4 hours, is called the Trift glacier, and the adoption of its name would create confusion with the passes of that name near Zermatt and the Grimsel. Any one of the passes over the Saas-grat range completes the mountain route to Zermatt.’—F. W. J.

PARROTSPITZE, AUGUST 16TH.—Messrs. Macdonald, Grove, and Wood-

mass, with Melchior Anderegg and Peter Perrn, ascended this peak on their way over the Lys Joch. 'After crossing the col (from the south) we had the Parrotspitze straight in front of us, a long but not steep arête, separated from us by a small snow-valley. We climbed a few rocks on to the arête, and along it to the summit, in a direction nearly due east. The snow being loose, and step-cutting necessary in places, we returned by the same track.'—R. J. S. M.

COL DE MONEI, AUGUST 24.—Cogne to Locana, across the chain of the Paradis between the Rossa Viva and the Tour du Grand St. Pierre, made by Mr. W. Mathews and the same party as above. 'This magnificent pass is the highest yet effected in the Graian Alps, being about 300 feet higher than the Col de Grancron, crossed for the first time last year by Mr. Tuckett. According to the Sardinian map, we ought to have descended into the Val Noaschetta, but on gaining the pastures on the southern side, we found ourselves at the head of the Val Piantonetto, which joins the Val d'Orca just above Locana. The col is shown, with a query, on the map at page 139 of the new Guide, and is also indicated on the panorama at page 151. On leaving Cogne we ascended the Combe de Valnontey to the extremity of Glacier de Grancron, then taking to the moraine we gained the rocks on the eastern side of the last-named glacier, and climbed up them to the point where they emerge from the great basin of *névé*, at the foot of the Rossa Viva. This part of the route is well shown in the panorama. From the top of the rocks an easy ascent led us to the col. The views of the Pennine Alps and the Viso district were very fine, but the southern foreground was entirely obscured by clouds. On the further side we had to descend two or three hundred feet of very steep rocks; these were succeeded by easy snow-slopes, and these again by steep rocks. On quitting the latter, we arrived at once at the alp of La Muanda, at the head of the beautiful Val Piantonetto, which we descended to Locana. Time from Cogne to the col, 6h. 5m.; from the col to Locana, 4h. 50m., exclusive of halts. A shorter line of ascent may probably be discovered.'—W. M.

GRAND APPAREI, AUGUST 22.—Messrs. Nichols, Rowsell, and Blanford, with Joseph Favret of Chamouni, and Nicholas Jacob a chasseur of Val Rhêmes, left the Châlet Suche, at the head of the Val de Rhêmes, at 4 A.M., and climbing up the grass slopes and rocks to the west, gained the Glacier de Bassiac above. This they followed to the foot of a steep ice-slope that covers the north face of the Grand Apparei; the ice being very hard, it required 2½ hours to cut steps up to an arête on the right. Further progress at first appeared impracticable, but a friendly snow-couloir enabled them to reach a higher part of the arête, and the summit was gained at 11.40. The descent was made by the south face of the mountain, and was found to be easier.

AUGUST 26.—The same party, with a different chasseur, left the Châlet Plouta, south-east of Val Grisanche, at 6.15 A.M. After a tedious climb over intervening ridges of broken rocks, they reached the glacier de l'Épée, that flows from what had seemed a lower point of the Bec d'Invergnou. The glacier was not difficult, and its head was

reached at 11 A.M., but the peak at its summit was found to be a distinct mountain called Bec de Mont Forchu, and only connected with the Bec d'Invergnou by a ridge that appeared quite impracticable in some places. Over this there was a col to the Val de Rhêmes, the glaciers on either side of the ridge being quite practicable. There was not time to continue the ascent of the Bec d'Invergnou, but the travellers descended to examine the glaciers that stream down from its western face; these, though much crevassed, appeared to offer an available route to the summit of this fine but hitherto unnoticed mountain. The weather changed during the night, and rendered it impossible to attempt the ascent again. This mountain is called the Grands Rousses in the Val de Rhêmes, and is the highest point of the ridge separating the valleys of Rhêmes and Grisanche. Observations with an aneroid, by Frodsham, make the height of the Grand Apparei 11,429 feet, and that of the Bec de Mont Forchu 11,583. The Bec d'Invergnou would probably be considerably more than 12,000 feet.

MARMOLATA DI ROCCA, AUGUST 24.—Messrs. J. and A. Bryce, Lee Warner, Nettleship, and Oxenham, with two local guides, ascended this almost unknown peak from Caprili. They left the châteaux where they had slept at 5.30 A.M., reached the glacier about 7.30 A.M., and the top at 9.45 A.M., the whole route being through soft deep snow, except a small patch of rocks near the top.

DIABLONS, AUGUST 24TH.—Messrs. Sedley Taylor and Whatman, with Franz Andermatten and Joseph Viennin, ascended this peak, which forms the summit of the ridge separating the valleys of Turtman and Anniviers. 'Seen from Z'meiden it has a very grand look, but the ascent is easiest from Zinal, whence we took it. Leaving Zinal at 4.15 A.M., our path at first lay over gently inclined alps. At 6.5 A.M. we reached the highest châteaux. From 7.30 to 8.15 was spent in traversing a small glacier. The rest of the ascent was over patches of snow and rocks, which became extremely steep towards the summit, which we reached at 11 A.M.'—S. T.

Besides the above entirely new expeditions, we have to record several of unusual interest, though not possessing the charm of actual novelty. The Weisshorn was ascended no less than three times in August. The Col de Miage, never crossed since 1859, was twice passed, once by a very large party. The Old Weissthor was again crossed with apparently less difficulty than before. The Pizzo Bianco, not known to have been climbed since the days of De Saussure, has received the attention it deserves from two different parties; and the route from Courmayeur up Mont Blanc has been fully established, at least one Englishman, Mr. Head, having ascended by it since the expeditions recorded in our last number. The Jungfrau Joch was also crossed on August 8 by Messrs. Jacomb and Rennison, with the two Michels, Christian Bohren, and Peter Bennert, all of Grindelwald, by a route considerably different from that described by Mr. Stephen in the 'Alpine Journal' for September. From the central plateau of the Guggi glacier they took a course much nearer to the Jungfrau, and appear to have found the slope much steeper and less broken into séracs. The Michels led in this direction, in order to take advantage of the steps they,

had cut a few days before, for the ascent of the Silberhorn, and not as expecting to find it any easier than the old route which they had helped to discover with Mr. Stephen's party. Mr. Jacomb sends the following remarks on the height of the Jungfrau Joch:—

'My observations (taken with a boiling-water apparatus, an aneroid barometer, and a level) give the col a height of 11,095 feet, as compared with corresponding registrations at Aosta and Turin. I place reliance upon the accuracy of this and other calculations, both by reason of the accord of the different instruments, and also because the aneroid (besides a comparison after observations with the boiling-water apparatus, by Mr. Francis Galton before, and by Professor Tyndall after, the passage), exhibited much coincidence with standard barometers during its journey, and, at its termination, was found to have lost but a scarcely appreciable part of its original indication. It is right, however, I should mention, that, when ascending above 12,000 feet, I left the instrument behind, so that its elasticity was not subjected to a strain beyond that point. If the height of 3,560 m., marked on the Federal map, is intended for the col, and not (though more likely) for the rocks overhanging the col on the Jungfrau side, it is, I think, a mistake for 3,360 m., the figure 3 having been misread for 5. The lesser number gives 11,023 feet, whereas 3,560 m. is equal to 11,680 feet. Whilst the lesser is more in accordance with the height, as deduced from my observations, the greater would seem to be erroneous on the following further grounds:—1st. It is inconsistent with the known heights of the Jungfrau and Mönch on either hand. 2nd. The same Federal map gives the lesser height of 3,550 m. to the rocky spur from the Mönch, whilst it is obvious that both it and the corresponding ridge from the Jungfrau opposite, must be higher than the depression between the two, which the Joch forms in so well-defined a manner. 3rd. It is inconsistent with the known height of the Mönch Joch. 4th. The map places 2,993 m. and 2,789 m. at two points in descending the Aletsch glacier; the upper mark of 2,993, taking into consideration both distance and gradient, is more consistent with the col being 3,360 m. than 3,560 m. 5th. 3,560 m. is considerably higher than the range beyond the Binnen Thal, SE. from the col, over the Æggischhorn, whereas the level, both on it and other nearer points, gave no such indication.'—F. W. J.

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## NOTES AND QUERIES.

**ELECTRICITY IN THE PYRENEES.**—A notice of the following incident has appeared in the 'Philosophical Magazine' for August, but Mr. Watson and other members of the Alpine Club may be glad to read a corroboration of the electrical experiences recounted by him in the last number of the 'Alpine Journal.'

The night of the 23rd of last June I had passed on the summit of the Piméné, a conical mountain that rises due east of Gavarnie and north of Mont Perdu, which, though only 2,804 mètres (9,200 feet) in height, is an admirable station for a night bivouac and general observations.



It commands one of the finest panoramic views in the Pyrenees, and only requires 4 hours for the ascent from the inn at Gavarnie. In the morning, having dismissed my guide, Laurent Passet, who was busy constructing a grange in the valley below, I remained to continue observations, intending to descend in the afternoon. The morning was fine, and the sun very powerful: at 11 A.M. a black bulb thermometer, enclosed in a vacuum tube, and laid upon black wool, marking as high as  $65^{\circ}$  cent.; a similar thermometer, suspended four feet from the ground in full sun marked  $34^{\circ} 4'$ . Towards twelve o'clock two or three peals of thunder broke over Barèges in the NNE., though no lightning was visible, and I was induced to descend by the threatening aspect of the clouds. Laurent had taken down with him the sleeping bags and a portion of our traps, but with rifle, knapsack, barometer, &c., I was pretty heavily laden. In descending, after passing a little col of snow, I had occasion to remount an inferior peak, about 500 feet less in height than the Piméné, and in so doing, I heard a sort of creaking noise proceed from behind me, which seemed to increase as I gained the top. Feeling the pressure of my load, my first idea was that the noise proceeded from the straining of the straps on my shoulders; but on reaching the top and unslinging the rifle from my back, I was astonished to find a strange buzzing noise proceed from it, as though it had been an air-gun striving to discharge itself. As I held it away from me, pointed upwards, the noise became stronger, and as I in vain sought to account for it, I thought it possible that some large insect—a bee or beetle—might have got down the barrel, and be trying to escape. I held the barrel downwards, with a view to shake it out; but on lowering the gun the sound at once ceased, but was renewed as often as I raised it. It then first occurred to me that the sound was exactly that which proceeds from the partial discharge of an electrical machine, and on finding that the same noise proceeded from my alpenstock and barometer each time they were raised, though in a less degree, I came to the conclusion that the noise could only be referred to electrical induction, and not knowing how little might be wanting to effect a total discharge, I did not prolong the experiment, but made a hasty retreat. On having descended a few hundred feet, I was able to hold up the rifle without a recurrence of the noise, and I then regretted that I had not further investigated the phenomena, which I probably should have done, had I not been alone. The wind was very gentle from the SSW., there was no lightning, and but a very few drops of rain; though over Barèges, as I afterwards learnt, there had been a very violent thunderstorm, and the water had swept away part of the road. Unlike Mr. Watson and his companions, I felt no shocks, neither was I conscious of the slightest personal effect from the electricity either then or afterwards.

C. PACKE.

ALPINE BYWAYS: IV.—*The Turtman Thal to the Einfeld Thal by the Pas de Forcletta.*—This pass, though referred to in almost every published guide to the Alps, is nowhere described, and has been but rarely traversed. A few notes of the passage may induce mountaineers to turn their attention to a route which, though not rising to the dignity of a glacier pass, is inferior in interest to very few passes of the second rank.

I left Turtman on the afternoon of the 3rd July, 1861, and, in 4 hours' easy walking through the fine scenery of the Turtman Thal, reached the little inn at Gruben, which was in an unfinished state, and in my case opened its doors for the first time to receive a traveller. Starting at 6.15 the following morning with Zacharie Cachat and a youthful native who professed to be a guide, although his qualifications for that office turned out to be somewhat meagre, we followed a faint path along the right bank of the stream, steering towards the magnificent Turtman glacier in front. The ground, though rough, was not steep until the glacier was approached, when a cliff had to be surmounted by aid of some rough steps made by the herdsman, which robbed the ascent of all difficulty. After skirting the glacier for some little time, we got on to the ice at 8.10, and crossed to the left bank in twenty-five minutes, the surface being smooth and little crevassed. We now turned again in a northerly direction, in order to get round a long spur running down from the Diablons. The scramble up the steep slopes was stony and toilsome, but not long, and by 9.0 we were standing at the entrance of an extensive upland glen covered with snow, which stretched upwards to the ridge which runs north from the Diablons, and forms the watershed between the Turtman and Einfisch Thals. During half an hour's halt we perceived that by keeping to the right bank of the stream and crossing the glacier we had made a most unnecessary circuit, and that, had we crossed to the left bank immediately on leaving Gruben, we should have reached the same point with the same ease, and in much less time, without touching the glacier at all. Our course now lay over snow, which was soft and deep: Cachat and I both thought that this covered a small glacier, but none is marked on the map, and we may therefore have been mistaken. The slopes were steepish, but there was not the slightest difficulty, and pounding steadily along, we crested the low ridge of rocks forming the pass at 10.50 a.m. There are several gaps in the ridge, through any of which a passage might probably be found, but we selected the most southerly one, nearest to the Diablons. The height is 9,810 feet, if the figures on the Federal map refer to the pass and not to the highest point of the Crête d'Ombrenza to the south of it, as is not quite clear; in any case, the height is certainly over 9,500 feet. The view was unexpectedly grand. On our left were the glorious peaks of the Weisshorn and Dent Blanche, seen under an unusual aspect, while in front lay extended the vast expanse of glacier at the heads of the valleys of Hérens, Héréence, and Bagnes, dominated by many fine summits, of which the distant Combin was the most conspicuous. But the most attractive portion of the prospect was that to the north, where, towering into the cloudless sky, stretched the entire range of the Oberland from the Galenstock to the Diablerets. From no other point nearly so accessible, except perhaps the Bella Tola, can so perfect an idea be gained of the southern face of this superb chain, the intervening distance being exactly that which is most favourable for a panoramic view. The great trench formed by the valley of the Rhone could be traced from the source of the river in the Rhone glacier to the Lake of Geneva. The lake itself was concealed, but the hills of the Jura beyond were plainly visible. At 11.50 we

commenced the descent down a glen similar to that on the Turtman side, but comparatively devoid of snow, which was merely lying here and there in patches. There is no sign of a path, but it is not possible to miss the general direction, which is as much as possible in a straight line, keeping along the course of the torrent, which ought to be followed until the cattle alp is reached. On approaching, however, the brink of the steep descent into the Einfeld Thal, we unfortunately diverged from this, and, bearing to the left, got into the forest which clothes the side of the valley, and were involved in considerable difficulty before emerging from it, which we eventually did close to a bridge which carries the mule track from Vissoie, over the stream flowing from the Zinal glacier. From here a pleasant walk of three-quarters of an hour brought us to the small but comfortable inn at Zinal at 3 P.M. The passage had occupied about 7 hours, exclusive of halts, so that it might be possible, by the Jungloch and this pass, to get in one long day from St. Nicholas to Zinal, and it would not be easy to select another route so free from difficulty leading through such magnificent scenery. A. W. MOORE.

ASCENT OF OM SHAUMER FROM THE CONVENT OF THE TRANSFIGURATION, DESERT OF MOUNT SINAI.—Om Shaumer, Mother of Fennel, (that vegetable grows largely on the mountain), is always called the highest mountain in the Peninsula of Sinai. Another peak to the east appears as high, and Mount St. Catherine is not many hundred feet lower; but Om Shaumer has always had all the honours, and the Arabs seem to feel some of the same awe about it which often attaches to the chief mountain in a district among wildish people. Mr. Prout's data about its ascent are as follows (I was unable to accompany him, being attacked by dysentery at the convent):—

'One Saleh, well known there, is the only guide—a good, active, trustworthy old Arab. There is no difficulty with him, except the last cliff, the Hadjar-el-Bint, or Maiden-Stone, perhaps a Jungfrau, which is to be got at up a cleft or *cheminée* something like that of the Brévent, but more difficult. Time, 6 hours came from the convent to the sleeping-place in Wady Rahabeh, a kind of shed. It is better to take a tent with you and go on to Wady Zeytoun, close to the mountain, named after its one great olive-tree—a rare sight in the wilderness. From Wady Rahabeh to the top and back is 12½ hours, allowing short rests and some time at the top, for good goers. Time, from Wady Rahabeh to ridge opposite Om Shaumer, about 1,000 feet descent, 3 hours; thence to base of Om Shaumer, 35 minutes; to top, 2 hours. Take the gully which leads up to the central peak, and thence by the ridge to the western or highest point. The roughest walking known, but no danger and little difficulty, except at the last rock.'

We found in the convent at Sinai an account of a previous ascent, under Saleh's guidance, as far as the base of the Hadjar-el-Bint, but no one had ever been known to reach the actual summit.

R. ST. JOHN TYRWHITT.

THE GUIDES AT PONTRESINA.—*To the Editor of the Alpine Journal.*—Dear Sir,—It was with much regret that I read in the last number of the 'Alpine Journal' a sweeping condemnation of Peter Jenni and A.

Fleuri, of Pontresina, by Messrs. Hall, Buxton and Woodmass, and found their account to some extent corroborated by yourself. In justice to these guides, I wish to express the very different opinion of them I had previously formed. They guided my wife and myself, last July, in an attack on the Piz Rosegg (foiled by bad weather), and Jenni afterwards took us to the top of the Col Capütschin (Col Rosegg of P. P. and G.). Fleuri was throughout good-tempered, gay, and attentive; Jenni was to us always good-tempered, attentive, and helpful, but I can understand that it would sometimes require tact and good-humour to manage him. I believe the reported jealousy of foreign guides is mainly attributable to Colani; for Jenni and Fleuri evinced no disinclination whatever to our guide, J. B. Croz, accompanying us up the Rosegg, and discussed with him the route to be taken. Of the 'attempts at extortion,' too, I believe Colani to be chiefly guilty. Having read your note in the visitors' book, I offered to him, as *guide chef*, to take two guides for the Rosegg besides my own, giving them 50 fr. each as tariff price, and 15 fr. each extra as being the first ascent. This he refused, but the day following Jenni and Fleuri accepted my offer, for the honour, as they expressed it, of taking a lady up a difficult and virgin peak. The ultimate payment for the unsuccessful attempt they left entirely to me, and two days afterwards, on my offering Jenni 18 fr. for taking us to the top of the Col Capütschin, and letting us down the rocks above the Fex glacier, which form the chief difficulty of the pass, he refused to take more than 15 fr. The fact that Jenni and Fleuri are of a higher social rank than most Swiss guides, will, I think, explain their greater independence of character, as the comparative novelty of the district will account for any deficiency in those personal attentions which continual contact with English travellers has taught the best guides of other parts, but in which we certainly did not find them wanting.

Yours truly, STEPHEN WINKWORTH.

Dear Sir,—The remarks in the last number of the 'Alpine Journal' with reference to Peter Jenni, of Pontresina, are calculated to do him so much injury, and my own experience had led me to so different a conclusion as to his merits, that I venture to ask your permission to say a word, if not in exculpation, at least on the other side of the question.

I think I may assume that your own criticism of Jenni refers less to any misconduct or want of courtesy, than to his unyielding maintenance of the local guide regulations. Of these I offer no defence, and, in so far as Jenni has had a hand in forming them, he is fairly open to comment. As regards the more serious charges preferred by Messrs. Hall, Buxton, and Woodmass, I can only say that my own experience is of a very different nature. I am quite sure that these gentlemen have spoken from a sense of duty, and I do not for a moment doubt that they have good grounds for their statement, but that the faults indicated by them are not *habitual* to Jenni I must unhesitatingly assert from personal observation during a bivouac at the Boval *gîte*, and an excursion to the Cresta Aguiza Sattel, last August. From first to last I found him a right good fellow, useful, pleasant, and genial at all times, and skilful amongst the really formidable séracs of the great ice-fall of the Morteratsch glacier. He only asked 25 fr. before starting, and finally, of his own accord, offered to reduce the amount if I thought it

unreasonable, which I did not, considering that it included the use of the quarters constructed by Fleuri and himself, after considerable trouble and expenditure of time. Yours truly, F. F. TUCKETT.

AN ITALIAN ALPINE CLUB.—It may be interesting to some readers of the 'Alpine Journal' to know that, besides the Alpine Clubs which have been already established in Switzerland and Vienna, in imitation of the English one, another has been recently formed at Turin. M. Quintino Sella, Finance Minister at Turin, informs me, that his letter on the ascent of the Monte Viso, lately published, was especially written for the purpose of animating the Italian people to such excursions. He adds that he has been more successful even than he had anticipated, the idea of an Alpine Club having been received with favour, and 160 members already enrolled. F. W. JACOMB.

THE MURDER OF A TRAVELLER IN SWITZERLAND.—Our readers will remember that Balet, the man who murdered and robbed M. Quensell, on the Col Torrent, escaped from the gendarmes who had him in custody, and succeeded in putting himself beyond the reach of justice. It is satisfactory to record that the two gendarmes who allowed him to escape were tried by court-martial at Berne, and punished by imprisonment for their culpable negligence. This shows that the escape of Balet is not attributable to any habitual remissness on the part of the Swiss Government, and that there is no reasonable foundation for the fear which the murder of M. Quensell might otherwise have caused.

MONTE ROSA SEEN FROM THE SIMPLON.—Many of the travellers over this greatest of Alpine roads may be interested to learn that the top of Monte Rosa is visible at one place on the road—a fact unnoticed, I believe, in any guide-book. Mr. Moore and I, with Christian Almer, were driving up the Simplon very early in the morning on July 6, when, a mile or more above Vogogna, we caught sight of a snowy mass appearing in the distance above the opening of the Val Anzasca. We all, without hesitation, identified the forms of the Zumstein Spitze and Signal Kuppe, rising above the great wall overhanging Macugnaga, but were not quite sure whether the point seen farthest to the right was the Höchste Spitze or not. This is only to be seen for a very short distance along the Simplon road, and of course never except in the clearest weather. H. B. GEORGE.

THE DOLDENHORN AND WEISSE FRAU.—We have received a little book narrating the first ascents of these almost unknown peaks, by two accomplished Swiss gentlemen, Dr. Roth, editor of the 'Bund,' and M. von Fellenberg. We have not had an opportunity of comparing the English edition with the German one, published simultaneously, but, judging from internal evidence only, cannot help believing that there must be considerable differences between them. It seems almost impossible to imagine that such vigorous, idiomatic English is a mere translation; but, however this may be, it is wonderful indeed to find a foreigner writing English which the best writers among us need not be ashamed to own. But the most valuable features of this charming little book are the excellent map of a little-known region, and the beautiful chromo-lithographs from M. von Fellenberg's drawings, which will give the inexperienced a better idea of the mysteries of the upper ice-world than any illustrations ever before published.

CLOUD STREAMERS IN THE ALPS.—No one who has been much among the Alps can have failed to be struck with the appearance of the cloud streamers, which in an otherwise clear sky are often seen to float from the leeward side of the loftiest summits in a cold wind. Many an Alpine climber, on attaining the *Höchste Spitze* of Monte Rosa, or other peak, has found his expected view obscured by such a cloud, and, though the most philosophical account of its origin might at the time rather tend to aggravate than to soothe his disappointment, an attempt to trace its causes may serve to entertain his leisure at a calmer moment.

In a violent gale, the cause is manifest in the snow-dust which is mechanically removed by the force of the wind from the surface of the mountain, and which afterwards disappears as it is dispersed or evaporated. But in a gentle breeze the reason is not at once so apparent. Mr. King, who has noticed the phenomenon in his 'Italian Valleys,' gives this explanation:—'The moisture in the atmosphere carried by the northerly current over the icy masses is condensed behind the leeward summit, and, drifting for a certain distance, is dissolved again by the mingling currents of warm air, and disappears.'

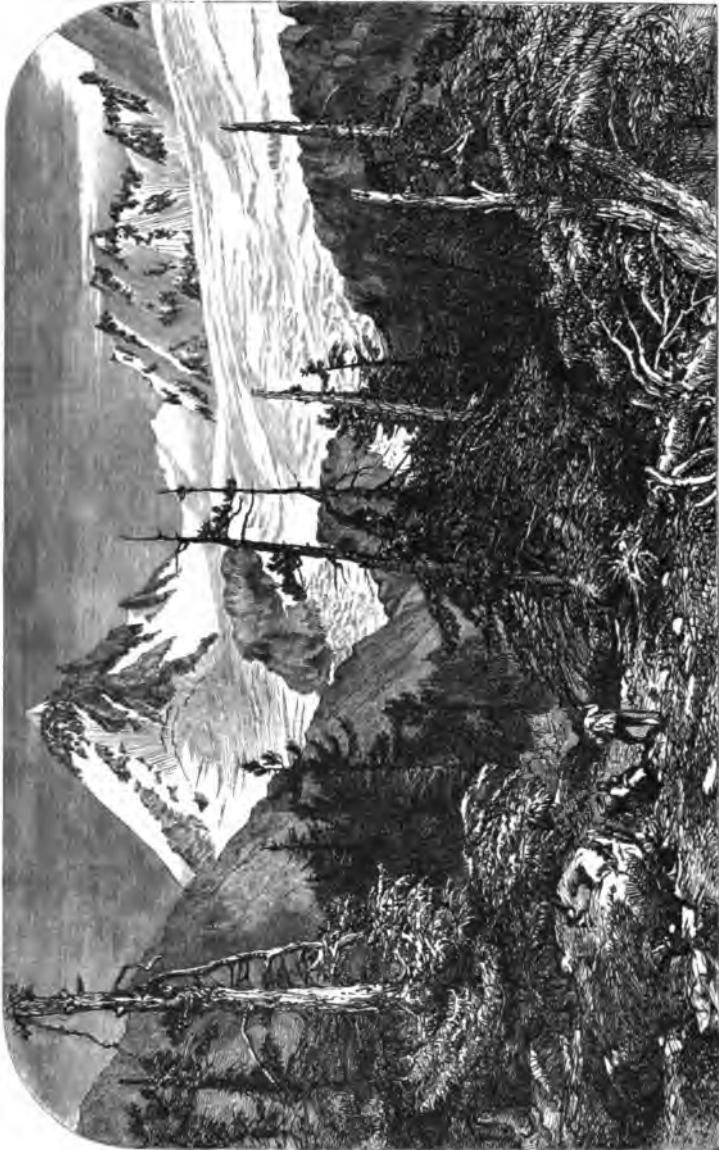
There is, however, in this explanation a weak point. There is no reason to suppose that the 'icy masses' are in reality colder, but rather warmer, than the air at the same elevation; and, if the moisture came from the air and were condensed by the mountain, it should condense on the windward and not on the leeward side. The true explanation must be rather the reverse of this. The surface of the mountain, heated by the rays of the sun, becomes warmer than the air, and a not inconsiderable amount of moisture is evaporated, both from the surface of the snow and from that of the heated rocks. On leaving the mountain the current of air is again cooled, and the moisture contained in it is precipitated, again disappearing as soon as it becomes diffused in a sufficient quantity of air to hold it in suspension at the reduced temperature.

In a perfectly still atmosphere the phenomenon frequently assumes a different form. A small cloud may be observed to hover a short distance above every lofty peak. Of course the explanation is the same; the temperature of the summit, higher than that of the surrounding atmosphere at the same level, will cause a slight upward current, and the moisture evaporated from its surface will condense, after it has risen a short distance, in consequence both of the reduction of temperature from its ceasing to be in contact with the mountain, and from the expansion of the air as it reaches a higher stratum. R. C. N.

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\* \* Readers of this Journal who may be willing to communicate information for the second part of the 'Alpine Guide,' including Switzerland, Lombardy, and the Tyrol, as far as the Adige, are requested to do so at their earliest convenience. Information as to new and unfrequented routes, and notes as to inns, new roads, or horse-paths, and the distances from one place to another, even on frequented routes, will be thankfully received by the Editor, whose address is:—Care of Messrs. Longman & Co., 39, Paternoster Row, E.C.





THE DEBT D'ARRIERS FROM THE VALPÉRIANNE.



THE  
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MARCH 1864.

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ASCENT OF THE DENT D'HERENS. By W. E. HALL, M.A.  
Read before the Alpine Club, February 2, 1864.

WITH the controversy that there has been about the Matterhorn, it has always seemed to me somewhat strange that it was not long ago thought worth while to reconnoitre its arête from a point so near at hand, and so commanding, as the peak of the Dent d'Hérens. Perhaps the repellent look of the long stony ribs which front the Val Tournanche, and the wild jaggedness of its eastern ridge, may have suggested the imagination of difficulties on every side of the latter mountain as great as those which surround the Matterhorn itself. Or, perhaps, as most men saw it from Breuil, and saw it therefore from a side on which it appears positively insignificant, they have failed to realise its actual merits, and so may have treated it with very undeserved contempt. That this contempt should have outlasted the frequent passage of the Col de la Valpelline is not a little puzzling. From the Stockje, the Dent d'Hérens challenges comparison in mass and grandeur with its great neighbour; and from the top of the Col, the purity of its simple pyramidal form makes an even profounder impression on the mind. True, last year attention seems at length to have been directed to it, and even before I left England various rumours had floated about which made Messrs. Grove, Macdonald, Woodmass, and myself somewhat nervous as we trudged into Zermatt late one night in August. A glance at the visitors' book assured us that none of the rivals whom we had reason to fear were on the spot, and the inquiries of Melchior Anderegg and of

Perren failed to discover evil reports as to anything already done. So we slept the sleep of contentment that night, and inasmuch as circumstances prevented us from leaving straight-way certain other nights as well, blissfully ignorant that at the very time Mr. Whympy was at Prerayen upon the very same errand as ourselves. At last, on the 10th of August we started with the happy addition to our staff of guides of Jean Pierre Cachat, a quiet plucky civil fellow, and skilful guide withal, of whose good qualities some of us had already had pleasant experience, but who, I fancy, is not by any means so widely known as he ought to be. So far as Prerayen we were to be accompanied besides by one of the brethren of the Club, and by a postulant for Alpine fame, who turned out to be one of the most amusing companions that any of us had ever the good fortune to meet upon a glacier. He was the very ideal of the competitive examinee. His young face was eloquent of long hours spent in painful grind, his meek expression told of that grind having been undisturbed by the rude manners of boys, and his whole physique seemed to register a protest against the cruelty of exercise. It was after terrible mental struggles that he brought himself to face the dangers of the Valpelline, and he left Zermatt in the morning with a steadfast assurance of disaster and of death, which lent an air of pathetic humour to his conversation when he rose or fell to the level of speech. So long as we were in the pine woods through which the path winds up the valley of Zmutt, satisfaction at his unexpected safety filled him with a calm which needed no expression by words; the open expanse of the glacier, hardly cut by a single crevasse, roused him to a melancholy jocoseness; then the jocoseness disappeared, and a nervous fluency of inquiry took its place, over the rocks of the Stockje; but when the fatal rope—so dreadful in its associations—was placed around him, his tongue began to refuse its office; and at last, by the time that we were running down the slopes on the other side, he was clutching convulsively at the arms of Perren and of his porter, who held him up on either hand, while his helpless legs, dangling loosely between, jogged erratic scores in the soft snow. Most men would have been satisfied with having accomplished so much, and would have returned to the habits of common mortals when they reached the lower glacier; but the excellent education of our friend had taught him the disadvantages of an anticlimax, and with creditable ingenuity he contrived to reserve his great effort for the last possible moment. Half way down the Zardezan glacier rain began to pour with a vigour which made us run for the

nearest chalet by the shortest way, and the shortest way led over a tolerably steep-sided edge at the point where we left the ice. Cachat, mindful of our frail companion, soon turned the edge into a broad and gently inclined staircase, while Perren chipped himself a notch or two by the side to be ready to hold up the failing limbs when they should finally give way, and to prevent them from rubbing themselves through the dozen feet down which they must have glided. The precaution was not in vain. One trembling uncertain step, and a smothered cry, and the rest of the ice journey was performed under Perren's left arm; the head drooping like that of a half-broken doll in front, and the feet vaguely stuck out behind as though at the end of sawdust-stuffed legs. A minute or two afterwards our faces were all separated from the world by the bottoms of niedl bowls, when the hysteric voice of some one was heard to sob, through the cadence of Perren's heavy feet, 'Oh, Perren has saved my life! saved my life! tell him how grateful I am—what can I give him?' 'Saved your life—bosh! But he has shown you how to get along to-day,—give him a couple of francs.' 'Oh! but he has saved my life. I have given him a napoleon already, but I must give him something more, a great deal more, for he has saved my life.' I am afraid that even niedl was forgotten, and five faces, white tipped on the nose, white barred on the lips, and with a round white mark upon the cheeks and chin emerged from the bowls and poured a concentrated fire of unfeeling chaff upon him who had just escaped from the jaws of death, which lasted till our attention was diverted by a much more serious affair. We had originally intended to sleep at the chalets of Gorgie, both because the cows were there, and to be nearer to our work in the morning. But Cachat had used the minutes which we had spent in gluttony and in laughing to the better purpose of examining the place where we should have to lie. He had found it a mass of dogs, men, sheepskins, and hay, all equally alive, and came out to say that very objectionable animals would be our bedfellows. Our assurances that we had all been devoured again and again by fleas, and that we yet lived, only produced a graver look, and the information that something worse than fleas was there. Well, their slower allies were unpleasant, no doubt, but they could be borne. 'Mais, messieurs, c'est quelque chose de pire encore. Il y a force poux là!' None of us, I think, are extraordinarily nice, but this was beyond our capacity to stomach; and we fled incontinently, leaving Perren to follow with the key of the lower chalet. Soon after we arrived he joined us with all his usual merry twinkle gone from his eyes,

and told us that the key could not be found, that if it were found it would not be entrusted to us, and that no one could be spared from the milking to come with it until some fifty more cows had been milked. Round and round the windowless chalet we wandered, looking for a loose stone in the roof above, for a loose board in the floor below, and trying to force the door from time to time by way of keeping ourselves warm in the chilly damp evening; and then we went through the same round all over again, not out of any hope that we could force our way into so well fortified a place, but out of sheer inability from want of temper to stand still with our hands in our pockets, and look at the impassive intractable block of stones. At last, just as the evening was closing in, the owner of the chalets, and of all the cows and the goats in the upper valley, came down to look for the key. He was a kind of Sheik of the Alps, black bearded, patriarchal in appearance, dignified in his manners, haughty in the possession of his many flocks and herds, and without doubt as great a scoundrel as the noblest thief among his Eastern brethren. Although he treated us with an air of fine superiority he could stoop to cheat and to lie marvellously well, and all the dignity of his manner could not prevent us from believing to the bottom of our hearts that he was capable of robbery or of murder, or of any crime which might happen to take his fancy. Perhaps, however, we may have been prejudiced by his failure to discover the key; certainly our tempers were ruffled at the time, and the impatience which had taken the place of dull despair when he appeared found vent in curses characteristic of the utterers. Melchior never speaks, but he looked anathemas; Perren is only master of that dissyllable which in its various intonations, serves the Swiss for every shade of endearment and of abuse, but he enriched the language that night with several fresh intonations; Cachat, as befits the more lively Savoyard, had more words, and used them freely; and we four drew upon our knowledge of English, French, German, and Italian for every expletive that our memory could command. And while we talked our superb Sheik merely looked imperturbable, and then answered that he was there for our convenience, not for his, and that any paltry sum that we could give him was a matter of pure indifference to a man of his fortune, so if we were not civil he would simply walk home again. Then when Perren had discovered a larger log wherewith to batter the door than those which had been used before, he quietly remarked that the log was splintery, and so might hurt our hands, but that the staple which covered the lock went six inches into the wall above and below, and

therefore that it was quite useless to hammer away at the door, which was strong enough to resist an attack of four and twenty hours long. It had been made strong lately on purpose to prevent travellers by the Col de Collon or the Valpelline from getting in without coming to him. By this time it was pitch dark, but we still hung about the place feeling the kind of attraction that an impossibility always exercises, when Perren, letting his hands wander aimlessly in a chink of the wall, touched a bit of metal. With a cry of joy he dragged out the lost key, and in five minutes we were asleep in a mass of sweet-smelling hay, without, odd as it may seem, a single free rover in all its broad expanse.

In the morning we rose at the due time, and had stumbled along in the dark as far as the upper chalets, when an event occurred which put an end for that day to all thought of getting up the Dent d'Hérens. Everybody knows that at the commencement of an expedition, it is impossible to keep an Alpine party together. Drowsy men cling lovingly to the freedom of laziness; and nowhere are the temptations to laziness more irresistible than on upland pastures in the uncertain gloaming when every path seems easier than that which is trodden at the moment. Stragglers, as it were, a malady which every expedition must calculate on suffering from, just as every child suffers from the measles; but it is very seldom that either disease is fatal. Ours was one of the more serious cases. The hill side near the chalets of Gorgie is hummocky with ice-ground rock, and in the dim light of early morning nothing is more easy than to lose oneself for a time; but there is a little green marshy bottom which it is impossible to avoid crossing, and when we found that Grove who was behind had chosen a line of his own, we felt sure of his re-joining us there. We clustered in the open flat to wait for him, and at that instant the Sheik crept stealthily towards us from behind a rock in the direction where Grove had been last seen, then sharply altered his course, and went off at a brisk pace up the mountain side. For the moment we thought nothing of this; when however time went by, when twenty minutes were gone, and there were no signs of our missing friend, these mysterious movements began to assume significance in our eyes, and we remembered that poor Grove had not been the least energetic among us on the evening before. Half an hour passed, and the necessity for action was evident. We spread out in every direction; even Melchior for the first—I believe it will be the only—time in his life parted from his 'Herr,' and allowed Macdonald to wander one way in search,

while he went himself in another. We shouted, but no answer came, save the hard echoes from the rocks around. We went to where he was last seen; his traces were plain for a while, then they abruptly stopped. We went along the side of the glacier to see where the body had been thrown over the cliffs. Some optimist even went on the glacier, to see if he had gone on under the impression that we were in front; but we of course felt no surprise on hearing that he was not to be found there. No! there was but one sad conclusion open to us; he had been murdered, and we had seen the murderer escape. No wonder the Sheik sneaked round the rock, no wonder he hurried away when he saw us. We called him murderer then, and we call him by no other name to the present day. The only question was, where could the body be? We had clustered together again—it was now six o'clock—to discuss this question, when the form of Grove walked down the same hill side up which the murderer had gone. By degrees we convinced ourselves that the form had substance, and an abusive tongue withal, for it actually had the impudence to ask us what we had been doing, wasting the early morning; and when explanations were made on either side, it seemed that he had contrived in some unintelligible way to pass us without seeing or being seen; that bearing in mind the undoubted fact that the higher he rose, the nearer he would be to the level of the top of the Dent d'Hérens, he had overlooked, in a manner marvellous for a man of so perspicacious an intellect, the equally undoubted fact that it mattered somewhat which way he went; and so had walked in a precisely opposite direction to that which he should have followed, till finding that no one was coming after him he looked round, saw far beneath the optimist on the glacier, and comprehending at length that we were nearly where he left us, retraced his steps to Gorgie. Thus was the Sheik proved not to be guilty of the murder of Grove, but we had decided that he was a murderer, and we still hold him to be so, none the less for his accidental innocence of a particular crime.

When the effervescence of our joy at the recovery of Grove had subsided a little, we turned discouraged faces towards Prerayen, pleased to see mists rushing past the mountain tops, and delighted with a shower which drove us ill-temperedly before it down the valley. The weather was decidedly not what one would choose to have for a first-class expedition; and perhaps for another reason it was lucky that we had not been able to persevere. Macdonald had hurt himself rather severely the day before, and he walked with an amount of pain which made us

glad of a rest for his sake, and which I am afraid must have a little dulled the pleasure of the actual ascent. How we spent the next eighteen hours no one I believe well knows. We grovelled in the hay, and I presume we slept, for no one of the party ventures to affirm that he has remembrance of anything until we were all shaken into life by Melchior about a quarter to two next morning. For once, the guides were as anxious as ourselves to be off; and accordingly, after unusually few delays, we filed out into the darkness exactly at half-past two. Until some time after the way to the Col de la Valpelline is abandoned the route is of the most uninteresting kind. Rocks arranged in straight monotonous slopes confine the Glacier de Zardezan, none of the higher summits are visible, and the splendours of the early tints are lost before any ray of sunlight can strike the minor peaks which protrude themselves in virtue of their insignificance. When the main stream is left, the case is even worse for a time. We took to the coarse moist moraine which bounds the last eastern tributary but one of the Zardezan, and while labouring for an hour over the stones, loose in spite of the night's frost which had given them an icy coat, our eyes could only choose to look upon a little glacier flowing down by our left, which disgorges the dirt upon which we walked, or upon some mean cliffs which, though not above two or three hundred feet high, shut out every further object from view. By and by however, we mounted diagonally across the glacier to where some noble sérac-forms began to appear over the rounded crest, and soon found ourselves engaged in their intricacies. From this moment almost every step was varied, and each stage of the ascent was more interesting than that which had gone before. At 7.35 we emerged upon the névé, and saw an immense plateau before us, rising in undulations to the base of the actual peak of the Dent d'Hérens, bounded in front by the jagged ridge which looks so remarkable alike from Prerayen and from Breuil, and stretching far away to the south at the same level to the foot of the Château des Dames. It was then that we first began to understand the form of our mountain and to settle our method of attack. The ground-plan of the Dent d'Hérens is a peculiar one. From the depression between it and the Matterhorn an arête of rock broken into fantastic shapes runs due west to the summit, near which it throws off an arête of like character to the south; and then, after continuing for a while, turns into a kind of plateau tilted on end, which I cannot better describe than by saying that it is as if the space between two steep-sided arêtes, diverging from a common centre, and again meeting below, were to be filled up with ice. It is this slope which,

when looked at from the top of the Col de la Valpelline, seems to be inclined at a very moderate angle, and in curling over to the south to prove the mountain to be a cone, shaven off abruptly on the northern face, but elsewhere rising gradually to a somewhat square coronal of rock, which would be thought in turn to support a dome of snow. In truth, the apparent cone is cut on the south also by precipices, the angle of ascent is much sharper than it appears to be, and a blue glitter on its surface, ugly to our eyes, told us that nearly bare ice composed the whole of the slope. It was a question, therefore, whether we should take advantage of a dip close to our left, where the southern wall drops temptingly so as almost to lose itself in the névé in which we stood, or whether we would make for a point some two-thirds of the distance between us and the coronal of rocks by struggling up the steep crags which, mingled with ice, form the wall in its higher parts. An animated debate resulted in Melchior's authoritative decision being happily given for the latter route; and probably no other track will ever be chosen with success, for there can be no doubt that the slope is too long to allow of steps being cut the whole way up, and there is little likelihood that any great depth of snow can ever rest upon so steep an incline, with a western aspect, terminated at either edge by abrupt walls, and so placed that the northern and southern winds must alternately sweep with draughty strength full across its surface. I am the more willing to speak positively, that our opinion is sanctioned by its agreement with that of Mr. Whympfer, who had attempted the ascent a few days before by the more obvious but less practicable way. He had been deprived of the advantage of that view along the inclined plateau by which we had been guided; because, having struck the upper snow fields immediately above the chalets of Gorgie, he was pushed by huge crevasses more and more towards the flank of Mont Albert, and had at last to descend somewhat to reach the dip which even to us was so tempting, and which from his position must have seemed the only natural route. He had not long committed himself however to the ice-slope when he discovered its impossibility, and, in the hope of finding a better state of things, cut his way over to the opposite edge which overhangs the Tiefenmatten glacier. There he found the same characteristics, the same impossibility; and I think therefore that except under circumstances which would be so exceptional that they can hardly be looked for, the way which we chose must be assumed to be the only one.

Whatever variation may be discovered by the genius of future travellers, we plodded in perfect contentment over our snow



fields, zig-zagging quickly at the last into a kind of cirque made by the junction of the southern and western arêtes. Here we found the Bergschrund, which I feel obliged to mention, not because there was anything unusual about it, but because, as I have already committed one grievous sin of omission by leaving out the description of breakfast, I cannot dare immediately afterwards to violate another sacred conventionalism in Alpine story. Then followed an ice slope, up which Melchior, who had led hitherto, and who, it may save trouble at once to say, led the whole of the day, hewed steps of the shape and size of Glastonbury chairs, so that by force of my eighteen hours' habit, I began to have some thoughts of settling myself into one for a snooze. Before however I had well made up my mind, our muscles were called into much more varied play by the rocks which followed, and our intellects were being strained to find something with which the abomination of their rottenness could be compared. For my own part I came to the conclusion that large slices of wedding cake, piled together without very strict regard to order, and with the gaps between bridged with almond paste, might represent pretty fairly the state both of rocks and ice. In spite of the giving way of the cake, of the necessity of cutting steps in the paste, and of many flounders into treacherous crusts and joinings, we reached a corner where between warping and pushing, and hauling, we all got upon the ice slope at 10.35. A few yards over this satisfied Melchior that it was by no means to be taken to unless the rocks at the side became absolutely impracticable, so we returned to them, and worked along at their junction with the ice, the hardness of which tempered the softness of the cake to our great comfort. Presently the hardness of the ice extended itself to the rocks, and we were beginning to congratulate each other noisily about the progress which we were making when the fact obtruded itself upon our notice that ice and rocks may have other qualities in common than mere hardness. A series of slabs reared themselves before us, which Macdonald, who should be an authority upon the question, declared must have been brought over from the Matterhorn, and which were as hatefully smooth as any that I can remember to have seen. These passed, we wound easily enough round the coronal that I have already mentioned to a chimney, from the head of which we supposed that a run over snow would bring us in a few minutes to the summit. But as Melchior hoisted himself out of its mouth we augured ill from his silence, and when a moment later we all stood together by his side, we looked at each other's faces for hope,

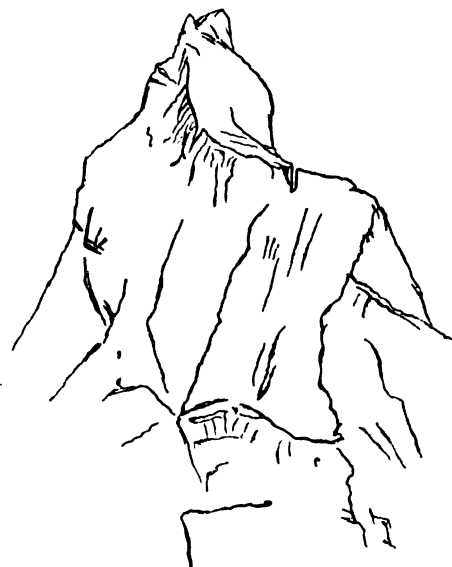
and found nothing but despair. Straight east from us mounted an arête composed of loose stones, piled together in such exact equilibrium that they were able to support each other, although the ridge was broader at the top than it was a few feet below. It was already past mid-day, and the lowest guess put an hour between ourselves and the commencement of an excessively narrow arête, which might be snow, or might be ice, and which trailed itself in gentle curves beyond, but for how far it was impossible to see. The surprise was especially bitter to me, for I had been tired all day, and during the last hour or so had been so exhausted that I felt much more exertion to be absolutely impossible. For me, unless I wished to compromise the chances of the whole party, there was nothing but to stop where I was, so I got down the chimney, piled up a few stones to prevent myself from sliding over the precipice if I should fall asleep, and put my head into a hole, where it could rest in shade upon a cool pillow of ice, and where my mouth could suck icicles *in situ* as I rolled from side to side. I had not sucked away more than two, and having mastered all the details of the Combin was debating whether it would not be well to reserve Cogne and the range of Mont Blanc for my amusement some hours later, when a stone bounded past me, and the rattle of nearing voices stirred my wonder and drew me from my hole. It was absurd to imagine that the rest of the party could be descending with success so soon, and it was equally absurd to suppose that they could be celebrating failure with joyous shouting and with laughter. My bewilderment did not last long. In another instant Macdonald, somewhat monkey and more avalanche, had leapt to my side, and contrived rather inarticulately to explain that the arête was a huge humbug, that the first curl of the snow was the highest point, that they had touched the summit at 12.30, that Woodmass had immediately danced the Highland fling, expressing his joy by the means most appropriate to the place, and that everybody was very drunk with delight, which last assertion was by far the most obviously correct part of his discourse. He went on to declare that I positively must go up in turn, and Grove and Woodmass, like a couple of good fellows as they are, professed themselves perfectly contented to wait till I came down again; so in a few minutes more I was crawling along the ridge. Humbug it undoubtedly was in some respects, for we had been egregiously duped, Melchior and all, as to its length, its difficulty, and the time necessary for its passage; but in another respect I confess that it was a most unequivocal monster—a very *lusus nature*. It was a cockscomb of rocks, efflorescent to a breadth of eighteen inches or two feet at the top,

but curving in, so that six or seven feet below it was socketed in a mere line on the real arête, and it seemed as if it ought to sway with every gust of air. In looking down the eye dropped fifteen feet or so before it caught the outward spring of the mountain; and though as a matter of fact I believe the ridge was firm enough, except at one or two points, I never was on a place which gave less notion of stability, or which appeared more alarming while actually so easy to walk upon. A few minutes brought me to the scene of the Highland fling, and while I blessed the activity which had trampled so convenient a stage from which to contemplate the view, I marvelled at the acrobatic tendencies which could display themselves in so eccentric a spot. I have never since been able to repress a longing to see Woodmass repeat his dance on the end of a balanced pole.

There are very few mouths in which a description of scenery, and especially of Alpine scenery, does not degenerate into a catalogue or a rhapsody, and as I have little wish to perpetrate either one or the other, I feel that it will be wise merely to say generally that our common opinion placed the view from the crest of the Dent d'Hérens above that from any other mountain-top known to us. It had the quality of picturesqueness, so rare in the great panoramic wastes which circle most summits. To the south and east the secondary ranges, which make it so hard to see the Dent d'Hérens, except from great heights, interposed themselves between us and the distance in such a way as almost to give the effect of a foreground; though the long flat line of the horizon, broken only by Mont Blanc and the Combin out of all the uncounted peaks, prevented the view from becoming a picture. To the north, however, this essential vice of summit prospects was barred by a framework composed on the one side of the vast crags of the Matterhorn, which reached up into the sky from close by us on the east, and on the other by the massive pyramid of the Dent Blanche, which helped to sink the Oberland, itself too elevated to allow the rising of the far-off country beyond. One thing surprised us much. It was the exquisite beauty of the Dent Blanche, which was even nobler in its general form, and was bounded by lines of even more subtle grace than is the Weisshorn when seen from the *Æggischhorn*. From where we were it looked without exception the grandest mountain in the Alps. But our chief attention was of course directed to the Matterhorn. The whole length of its arête lay exposed before us, and better still, we were face to face with those last rocks, about which there has been so much doubt and so much

dispute. We all of us had a deep respect for the mountain before, and I am sure that our respect was not weakened by what we saw then. From the last notch in the arête, where the final peak begins to rise, the ridge widens out into an inclined plane of slabby rock, which merges after a while in steep cliffs, apparently of almost polished surface, destitute of any trace of arête formation, and rounding laterally over the whole western front up to a point a short way below the summit, where they become more broken, and terminate in two crests, which would seem to run side by side from west to east, that to the south being slightly the higher of the two. Their probable junction at the eastern end of the summit ridge would account for the impossibility which there is of perceiving their independent existence from any other place than the one from which we observed it. From the notch to the top we estimated to be about eight hundred feet, of which the last six hundred were, in the opinion of the guides no less than of ourselves, absolutely impracticable, so far as it was possible to judge at a distance of two miles and a half. I believe it to be agreed that rocks, when viewed from far off, always appear to be more difficult than they are in fact, especially when they are seen in full face; but to whatever extent our conclusions

are open to doubt for this reason, it is scarcely possible that they can be materially wrong in so far as they depend upon—and they depend almost exclusively upon—our observation of the two great general facts of smoothness of the rock texture, and of roundness unbroken by couloirs in the form of the precipice. It is very easy to understand what amount of difficulty would be presented in the finest weather, by cliffs of such length, possessing such characteristics, at such an elevation.



THE FINAL PEAK OF THE MATTERHORN, SKETCHED FROM THE SUMMIT OF THE DENT D'HÉRENS.

I am loth to abandon the summit without saying a few words about our mountain itself. Quite apart from the natural predilection which one may be allowed to entertain for one's own pet wild beast, for the animal which has licked no other hand than one's own, I must confess to a fondness for the Dent d'Hérens, which I think is fully justified by its character. Height must always count for something in the thoughts of a mountaineer, and it is worth while to remember that though the Dent d'Hérens may be overtopped by many of its close neighbours, yet that it is higher than the peaks of Dauphiné or the Bernina, that the eye wanders from its crest over the heads of the Graians, and that the Finsteraarhorn and Aletschhorn alone surpass it of all the mountains of the Oberland. Something of attractiveness is added by nobility of form, and to any one who has seen it from the Col de la Valpelline, or from the Stockje, I need hardly speak of its beauty, or its massiveness, or its individuality. To the Valpelline itself it is what the Matterhorn is to the Val Tournanche, or Monte Rosa to the Val Anzasca, the great lonely peak which bars the end of the valley, the one object which the traveller cannot choose but look at, and which fixes itself in the mind as the distinctive thing which separates the Valpelline from the score of other valleys through which he passes. Then I must have greatly failed in my description if I have not let it be understood that the ascent is no mere trudge, but that it is full of variety and of interest, in fact that it is a very pretty scramble. In a year or two some enterprising Swiss will no doubt have seized upon the head of the Valpelline, and an hotel will afford better accommodation than can be got at present to the many travellers who pass by Prerayen. Then I think we may expect to see the Dent d'Hérens take its place among the half-dozen high mountains which, for various reasons, are ascended by tourists who want to make a few typical excursions, without committing themselves to successive seasons in the Alps.

My separate ascent occupied about half an hour. As soon as I rejoined the rest, we began to retrace our steps, and at 7.15, walked into the chalet of Prerayen. The ascent was over: and here, I suppose, in strictness, its history ought also to end. But there are miseries on which the mind cannot but dwell, though the bitterness of recollection may outweigh the pleasure which we derive from the remembrance of pain, and among such miseries are those from which we suffered on the evening of the 12th of August. I should hesitate to meet the ridicule of men whose dinner hour never passes without a meal, but the Alpine Club knows what it is to be hungry, and

in indulging my selfishness of memory, I am sure I shall not find myself quite without the sympathy of others.

In laying in our stock of provisions at Zermatt we had calculated upon making the ascent the day after crossing the Col de la Valpelline, and we had trusted somewhat to the deceptive assurances of one who, I grieve to say, calls himself my friend, that bread and wine, and who knows what luxuries besides, were to be bought from the great Sheik of Prerayen. When we were disappointed in our first expectation, we tried to realise our second, but a few grudging quarts of milk were all that could be wrung from the reluctant murderer, and while we slept in order to economise our food, Melchior and Perren journeyed down the valley to search for meat and for wine, that we might live and not die. But they found it a dry and inhospitable land; from Bionnaz came nothing, and Oyace yielded but one small rancid sausage, two bottles of wine, and a loaf of black bread. The last may be excluded from the list. We tried to chop it with an ice axe, and it hopped about the chalet like a marble; we boiled it for four long hours, while we glared greedily at the pot, and at the end a quarter of an inch of the outside was turned into gluey slime, and within it was as hard as ever. No fragment of that loaf was ever mastered by guides or by travellers. All the way up the Dent d'Hérens, a strict parsimony was observed in the meting out of shares, and the lowest rocks in coming down have a painful association as the spot where at three o'clock our last morsels were eaten. From thenceforth—nothing. As we neared the highest chalets, the absence of cows from the pasture, and the thick smoke curling from the roof told us that the milking was over and that the villanous cheese-pots were full. So we walked to our own chalet of Prerayen, and sat down, and put out before us the slimy black loaf, and five nutmegs, and one ounce of tea; and we were wondering what we could do with them, when a cry was heard that fresh travellers were coming from Chermontane, and a great load lifted itself from off our hearts. Soon they entered; a voluble Frenchman with long boots, a linen coat, and a picturesque hat; a nasal Yankee, with the usual inquisitiveness of his race about others, and with very unusual reserve about himself. With what eagerness we sprang forward to greet them; how affectionately Melchior and Perren helped the guides to disencumber themselves of the knapsacks. The travellers in turn were charmed to see us. No pleasure in fact, could be greater; they had expected to find a nice little hotel; it was disappointing to be obliged to put up with a dirty chalet; and besides, to be frank, they had only one sausage left among

them. No doubt we would recognise the solidarity which exists between mountaineers; we would show that generosity for which the English are so renowned—we would permit them to share our provisions. We pointed to our loaf and to our nutmegs, and told them with grim politeness how delighted we should be if they would do us the honour of sharing our supper. Instantly their expansiveness was turned into dryness. The Frenchman could not deprive us of any part of a meal already so slender, and hastily went away under pretence of washing his hands in the trough outside, evidently afraid lest we should so press his acceptance of our hospitality as to compel him to exchange the solid advantages of his sausage for the more refined luxury of our spice. All the evening they sat moodily apart, silent alike to each other and to us; and at night they rolled themselves up in the remotest corner of the hay, as though our inability to gratify their appetite had been to them a ground of personal offence. They went to Zermatt next day, and though they were far from being an agreeable pair the heart bleeds to think of their privations as they emptily, wearily, laboured over the long slopes of the Col de la Valpelline.

Our miseries had a quicker end. In the morning we sent on the guides to the fatherly old curé of Bionnaz, to beg for the largest breakfast that his housekeeper could cook, and about nine o'clock we were ushered into his dark little parlour, light to us with the brightness of delicious expectation. Let us drop the curtain here. There are scenes too tender to bear the roughness of translation into words.

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ASCENT OF EL VIEJO, an Extinct Volcano in Central America. BY CHARLES EDEN.

THE old Spanish city of Leon, in Nicaragua, lies crumbling into ruins on a fertile plain between the volcanic chain of the Maribios and the Pacific, some five-and-twenty leagues from Managua, the present seat of the Nicaraguan Government. The town is not in ruins, in the full meaning of the term; that is to say, some 40,000 inhabitants live there, in dwellings old and new, and the place is still the head-quarters of the Bishop of Nicaragua; but the soul of the city is buried under the mouldering masonry of its ancient palaces, now haunted by the scorpion and the snake, while the tumbled fragments of what once has been 'speak, plain as whisper in the ear,' of grandeur long gone by for ever.

It was from this town that, in the early part of the year 1860,

I set out to visit the volcano of El Viejo, ascended many years ago by Sir Edward Belcher, and subsequently by Mr. Squiers. Leaving the town in the direction of Chichigalpa, a village where I had decided to pass the night, the road, after winding through the scattered suburbs, plunges down a steep descent into a hollow, through which flows a sluggish stream. Here are always numbers of women, black-haired and yellow-skinned, in coloured petticoat and white cotton *camisa*, washing clothes or filling their earthen water-jars, and laughing and chattering incessantly. A few steps further, and we come to the quiet ford, cool and pleasant under the heavy overarching foliage of the high banks. The silent stream glides by and is soon lost in the gloom of the rank vegetation, which crowds its edge and invades its shallows. Large arums and water-plants rise out of the rich dark mould, and curve their broad leaves over to kiss the surface of the stream. Like the camel in the desert, one's natural instinct in the tropics is to profit by clear water when one can. After drinking, I dashed through the ford and up the opposite bank. Presently I came out on an open plain, redeemed from the woods in the time of the Spaniards, though now but scantily cultivated. The pulverised road wound through broad fields, where quail and partridges might be descried feeding or dozing among the long coarse grass. Here and there, near the borders of the forest, sheltered among overhanging trees, lay some small farm; near the house were groves of plantains and plots of plummy maize, perhaps a small quantity of tobacco or a sugar-mill; while in the woods around roamed the chief riches of the proprietor, numberless head of lean cattle and cows, giving daily one bottle or two of milk. Grass must be almost unknown to these poor beasts, and their instinctive botany most acute, to save them from falling victims to the many poisonous plants among the forest jungle, from which they crop their daily food.

On my right, as I rode along, beyond the broad plain throbbing in the heat, could be seen the blue outline of the Maribios, with the notched summit of El Viejo standing out against the sky. Journeying in the morning on this route, in the season of the northerly winds, I have repeatedly observed a remarkable cloud, constantly forming and vanishing on the lee side of the peak of El Viejo. It bore so close a resemblance to a column of smoke, that, were the crater not known to be quiescent, I should certainly have attributed it to the action of the volcano. The winds sweep over the low country beyond the mountain range, charged with a considerable amount of moisture. Coming in contact with the volcanic chain, they



rush up its northern flanks, and so come into a higher and colder region. Thus, as the wind passes the peak, it is no longer able to hold in suspension the same quantity of moisture, which is consequently precipitated in the form of a gauze-like cloud on the southern slope of the crater. I do not recollect having observed any similar cloud near any of the lower peaks of the range.

Leaving now the open plain with its distant city, marked by tall church and cathedral towers, I struck in under the refreshing shade of the dark woods. 'Dark woods' is a term not always so applicable in the tropics as it is to parts of those which lie along this road. This is partly owing to the nature of the trees which grow there, whose smooth polished leaves make gloom as deep as ilices; while the road, much narrower here than usual, winds through the densest portions of the forest. One of the most frequent trees has very rugged bark and long weird branches shutting out the heaven overhead. Another is well-known to the muleteers from the frequent deposits of water found in the rock-like hollows among its branches. The sylvan architecture of this part of the forest is, so to speak, peculiarly Gothic; and under the gloom of the clustered arches many a bird of darkness dreams through the daylight, unmindful of the hot white glare without. Occasionally we startled them from their roosting-place: in general, however, this part of the forest was much less thickly peopled than others.

Through this dark and shady portion of the way I had been following a bypath; I now emerged upon the broad main road. The great highways in these plains are like huge rivers, now flowing full, between gigantic trees, which stretch their festooned arms across; now spreading shallow, like a marsh, amid the surrounding tangle; here grasping islands in their forks, and sometimes, though but rarely, gathering together to force a passage through some rocky rampart, or splitting into a hundred devious courses down some cliff.

The place where we emerged was a broad still reach. The ceibas crossed their boughs above in rounded massive arches, broken by the slender twisted shafts of parasites, whose gaudy flowers shone bright against the sky. The gorgeous vista, arches, columns, and living capitals, fretted by a thousand varied traceries and arabesques, faded into the intricate mystery of the distance, as it were the nave of some huge temple or corridor of a Cyclopean Alhambra. The road, so often impressively silent, was now enlivened by gay groups of men, women, and children trooping from some *fiesta*, perhaps fifteen or twenty miles from their own village. We plunged from the banks into,

not the water, but a foot or more of finest powdered dust, which sent a cloud over our heads as though we had exploded by spontaneous combustion.

After about an hour's ride along the main road, the barking of dogs and the occasional crowing of a forlorn cock announced the village of Posoltega. Like most of these *pueblos* the distribution of the houses was into one street and many straggling lanes, not forgetting the *plaza* with its white church. The cross in front of the temple had taken root and sprouted shortly before my visit. It is to be hoped that it will bear more fruit than elsewhere where it has been planted in the neighbourhood.

After passing Posoltega, and as the day drew on, the heat increased to 100°, to 105°, and at times to 108°, while the temperature of my saddle was as high as 119°. One was as a new Phaethon, riding postboy on the horses of the Sun. The trees in this neighbourhood are of prodigious girth and growth. Many of them equal, if they do not surpass, the well-known ceiba. Of some of these giants the wood is valuable, but in many cases their stems would serve the builder little better than Brobdignagian cabbage-stalks. The trunks of many of the largest are so ill-knit, pulpy, and stringy, that, far as their long branches stretch, the wood of one oak sapling would often be more useful than a dozen of them. I fancy the majority of the finest timber trees are modest flowerers. These, on the other hand, often bear the flaunniest blossoms on their boughs, so that looking from a height upon the forest when the leaves were thin, it has seemed all—

Damask-work and deep inlay  
Of braided blooms unmown.

Past the village the road is instantaneously in the thick forest, which covers the plain on every side down to the very coast, and in places even invades the sea with the dismal shade of uncanny mangrove thickets, harbouring oozeborn crocodiles. On we rode through the dust, like comets, with our nebulous tails behind us. Nothing broke the monotony of the sleepy forest and the powdery road, unless, perhaps, a rare bullock-cart, of the primitive type almost confined to Spanish America and the old-world Peninsula; or now a waddling iguana, three feet long, would rush across or shoot up into the bank, waking one from a dream to fancy oneself in some Preadamite forest, haunted by the reptile monsters of the Oolite. At one place lay a dead armadillo, which a colony of ants were busy demolishing. A very Nemesis! To see them troop in thousands

from his scaly shell, it was as if his many meals were resuscitated to judgment. Thus in due time we reached a little hollow, at the bottom of which a streamlet trickled, and splashing through, galloped up into Chichigalpa, our night's quarters.

I soon found the house I sought for, and, in accordance with the ultra-hospitable custom of the country, asked permission to make it my hotel for the night. This was immediately granted by its inmates, two middle-aged ladies, and the best their small abode contained was placed at my service. I appropriated a hammock, and they soon prepared me a meal. My servant took care of my horse, and, according to an equally praiseworthy tradition, looked as best he might after himself.

What a magic land it seems, as one sits here on the doorstep, according to the custom of the country, while the moon floods her liquid silver through the cool night air. The white houses of the village gleam with a softened brilliancy, while here and there the red light of a candle, streaming from some open door, maintains a faint struggle with the moonbeams. Everything is in harmony, from the partial sacrifice of details, doubly compensated by long alleys of mystery opening out to lure the imagination on.

Was von Menschen nicht gewusst,  
Oder nicht bedacht,  
Durch das Labyrinth der Brust  
Wandelt in der Nacht.

Beyond the village wave the plumes of the forest, above shining like trees from the gold and silver gardens of the Incas, below, fantastic shadows and impenetrable gloom. One long vista terminates in the ghostlike outline of *El Viejo*, capped with cloud. Truly it *is* a wondrous land, and the old Conquistadores must have found it difficult to lie and beat the truth. Ridge upon ridge of varied fertility, from the cotton and indiarubber of the plain, through districts aptest for cacao and sugar, then for indigo, coffee, and cochineal; past temperate savannahs fringed with the guava and oak, up to silent solitudes of gigantic pine, or where, on higher slopes, the weird cheirostemon\* stretches its monkey hand, and the myriad tinted quezal floats, with its pennon tail, among the branches.† In

\* The cheirostemon (*Platanoides*) or hand plant of Mexico—from the similarity of the column and five curved anthers to an outstretched hand—grows on the slopes of the 'Agua' and 'Fuego' volcanoes of Guatemala. It belongs to the natural order of Sterculiads (*Lindley, Veg. K.*).

† The 'Quezal,' Trogon paradisicus, or Royal bird of Quiche, as it is called, lives only in the '*tierras frias*,' or extreme highlands. They

the rocks lies wealth inexhaustible—gold, silver, copper, and precious stones, while iron in some places strews the surface of the ground. Pearl-shells and coral gleam through the waters of the coasts. Full rivers flow from the mountains, and navigable lakes sleep in the bosom of the plains.

Lured by the moonbeams and the distant mountain, I wandered through the village, intending to sketch the outline of the volcano by the ample light of the night. From time to time there shoots above the horizon of the world, some magnetic star, whose influence, whether for good or evil, is remembered long after it has sunk below the horizon. If the great luminary still shine in space, it may return again: even if it be quenched for ever, still so; thus whispers superstitious fear or hope. Such was Quetsalcoatl of Mexico, such King Arthur, and in later times Don Sebastian of Portugal, called *Encoberto*;\* such too was William Walker, the filibuster, to the Central Americans; *extinctus execrabitur idem*. At the time of which I write, he was by no means extinct, and the subsequent expedition, taken to Honduras with fatal consequences to himself, showed how little groundless were the terrors of the Isthmus. The mere mention of his name excited more hatred and horror than the arch-fiend himself; '*Es un demonio*,' they said; and so, if his fame be true, he was. Cruelty, wasteful destruction, contempt for the feelings and rights of the inhabitants, marked his career from town to town, and finally ended in depriving him of a kingdom which for a moment he almost held beneath his sway. Thus it was that to the cautious little garrison of Chichigalpa every fowl was a hawk, every white-skin might be an '*Americano del Norte*,' and every *Americano* the redoubted William himself, or no better. Thus, too, my innocent sketch assumed an interest not its due, and the military commandant saw growing at each stroke of my pencil, the plan of some future campaign of extermination. So it happened that, as I raised my eyes, after bending longer than usual over my paper, I found myself surrounded by armed

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fly high among the tallest trees, but, notwithstanding this, have of late been destroyed in such numbers on account of their beautiful plumage, that it is highly probable they may shortly become extinct. They have long beautiful tails, of which they are exceedingly proud, building nests to suit the exuberance of their feathers, with a distinct way in and way out. The whole of its back, scapulars, long tail feathers, bastard wing and tail coverts are of a nameless metallic blue-green. Some of the shorter tail feathers are black, some white; the primary and secondary quills are also black; the breast and vent feathers, shades of crimson, carmine, and scarlet; the beak yellow and the claws black.

\* The Hidden One.

men, their murderous steel gleaming in the moonlight. 'If I would allow them to look at the paper in my hand?' How civil, under the circumstances! How could I refuse? As might have been expected, inspection by all hands by no means made the matter clear. 'Would I tell them what it was?' Even this I did, adding information more acceptable still, as to *who I was*. Their anxiety being somewhat allayed, my guards removed and I finished my sketch.

After this small incident, I paid a visit to a gentleman to whom I had a recommendation, and through whom I hoped to hear of a guide. I alluded, somewhat laughingly, to the idle fears of the military, and found out afterwards, that my friend was himself the commandant. Having secured my guide, I retired for the night.

My excellent hosts had discreetly resolved that I should occupy an empty house upon the Plaza. My servant was to go I don't know where. Taking, then, a hammock with me, in order to *furnish* my new apartments, I said good-night to my fair friends. The house 'from base to cope' was as empty as empty could be; at least, so I thought; but it turned out otherwise in the sequel. The building was one story high, and contained two rooms divided by a thin partition. Having suspended the hammock, barricaded the doors with a post, and deftly stuck my tallow dip to the partition within reach—for I weakly preferred being in bed before putting the light out—I sprang into my swinging couch. In the cords at my head I placed my revolver, duly loaded and primed, a *sine quâ non* in these lawless lands, where men's constant fear is

Ne furtum pateant homini, neu præda colubris.

With a blast from my nostrils, worthy of the retainer of the Baron Munchausen, I extinguished the candle, and the solitary darkness fell over me like a pall. It must have been a very short moment before the place began to be alive with sounds. It was a noise as of a host of demons, the airy switching of a myriad tails, the clutching of ten myriad claws. The partition, so horribly close to my face, seemed a perfect Jacob's ladder of them. It was there that the main question, whatever it was, that convulsed the spirit world, was being decided. Perhaps the mangled remains of some child, who, in this Catholic country, had died unbaptized. Goethe's Thürmer's position, when the skeleton's claws hooked on above the parapet, was pleasant compared to mine, barricaded in a dark room, with an army of imps close to my very face. Had I been a Catholic, I should have crossed myself, called on the saints, cried *avaunt*

to the devils, and perhaps been all right; as it was, I kept close and silent till the unhallowed hurley-burley gradually subsided, and finally ceased, well-nigh as suddenly as it had begun. I had been some time in the land where 'footless fancies dwell,' when a sharp knocking at the door brought me suddenly back to the country where bare-footed mulattoes have their habitation. 'The darkest hour is that before the dawn;' and so I found, and bethought me of my candle, for it was my guide that woke me, ready for a start. Not a vestige of my dip was to be found, either on the wall or on the floor. Some hard materialists may smile and explain away the awful orgies of the night by the partiality of rats for tallow. Poor fools! that the candle, perhaps a taper vowed to sacred use, and pressed into the unhallowed task of lighting me to bed, caused the infernal imps some scandal, I will not deny; but rats!—ugh! I wish you had heard them.

Our horses were soon ready, and I gladly exchanged my uncanny sleeping place for the cool air. We passed through the dreaming village and were soon in the road leading to the forests which clothe the feet of El Viejo. The moon was still bright in the western sky, though sinking to rest, when the sun burst through the red bars which had announced its coming. Instead of the solitary ground-dove that profited by the first dim light to flit down to breakfast, the whole earth started into life—birds called, insects buzzed, and reptiles shot along the banks; the very trees in their silent way seemed to feel the golden light. Is it in the heart of man or the soul of nature, that strange and solemn suspense, when the first grey twilight wrestles with 'darkness visible,' and the jubilant protest against death and shadows, which follows with the sun?

As we now threaded our way upwards through the forest, the ground, which betrayed its igneous origin, became more broken and occasionally fissured. The wind now got up, and the 'grand old harper' played the wildest strains upon his 'thunder-harp of pines' on the mountain overhead. When the forest ceased, except in patches or in sheltered hollows, we found in truth that the distant moaning and the hollow roar were not without a reason—occasionally we were blown, both horse and rider, several paces backwards. My guide assumed a nasty look about the eyes, which plainly said 'Go back.' I disregarded it, and we struggled forward. We soon reached the elevation of pine-trees; and the regularity of their ranks, starting into life in their appointed place upon this conical mountain side—rising, as it does, with the chain, like one long island in a tropic sea—far from their brother conifers, made a great impres-

sion upon me. Their advanced guard was as regularly formed as in an army. Here and there one whose sap stirred hotter in his veins had stepped some fifty paces in advance. In some places the enemy's fire had made a sudden breach within the ranks. There on a knoll was a picket: but beyond this all was military order, rigid and impassable. How came they there, this gloomy garrison? When the earth reposed once more after the mighty effort which raised the Maribios, and the numerous craters ceased for the time to belch forth molten rock, perhaps some weary bird, with feathers ruffled by the storm, fluttered for shelter in some crevice of the lava, little thinking, as it pruned its drenched and draggled pinions, to be the planter of a grim and stubborn forest, through which the wind would sing for ages. Either this, or, contrary to the local centre theory, at the fitted time, He who said 'Let there be light,' bade the pine spring from the volcanic bed and crown the mountain with an undying wreath. Water could not have borne the cones so high, nor the winds the seeds so far, for the nearest pines must grow away in the pale distance, on the misty hill-tops of Segovia or Chontales.

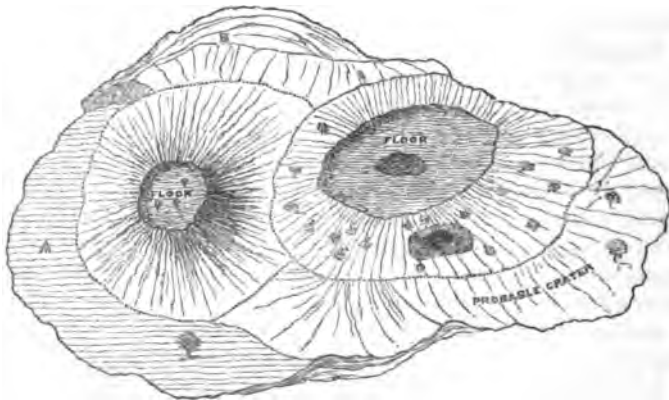
On this part of the mountain the grass is long and dry. Below lies the forest and the plain. Here and there a hollow between two spurs, or in the irregularities of the igneous rock, discloses a perfect scale of vegetation within a glance, from the temperate evergreen clinging on the brink, to the exotic tropic foliage in the sheltered bottom. The only living thing which attracted my notice was a large locust, called by the natives the *Chapulín*: it was about four or five inches long, and belonged to a race which has been at times a terrible scourge to the country. In Costa Rica, on one occasion, they devoured well-nigh every green leaf, and the population rose *en masse* to drive the nomad invaders from their soil. In the pine woods themselves reigns a most impressive solitude; scarce a living creature to be seen, save a few insects; and not even the little humming-bird, which frequents the like woods in Honduras, and enlivens the gloom as it flits among the cones. Our footfalls were muffled by the mouldering needle bones of past generations, and sombre boughs obscured the light of heaven.

Having arrived close to the saddle between *El Viejo* and the rest of the chain, we tied up our horses near the brink of a deep rent, which barred all farther advance in that direction, and proceeded to climb through the pine-trees on foot. We had scrambled up a good distance over the rough volcanic rock, availing ourselves of the assistance afforded by the trees, when my guide stopped short, and pointing to a chasm in the

mountain side, which had somewhat the appearance of a lateral crater, endeavoured to persuade me that we had reached our goal. The wile was ingenious; the old man's feeble frame made it pardonable. I had no banner, like Longfellow's hero, to wave, but on the other hand, no siren bid me 'stay and rest my weary head upon her breast;' my cry of 'Excelsior,' therefore, cost me little, and it was sternly given. My aged friend objected, and cut short the conversation by the dolorous announcement, that his legs hurt him; so, loath to move his venerable bones, I continued the ascent alone.

The wind still blew at times with great violence, and I felt myself at intervals clinging to the rugosities in the rock, like a midshipman 'spread eagled' in the topmost shrouds. As the loose blocks of scoriæ and stones sprung from under my feet and rolled headlong, it afforded me a vicious pleasure to see their momentum increase at each wild parabola which brought them nearer my ignoble guide. As the latter was wide-awake as a weasel, and partly protected by trees, he incurred no further annoyance than being compelled to dance like a grasshopper. Thus was I revenged upon his legs.

Another vigorous scramble, and I was over the lip of the crater; and looking down the awful chimney-pot, a vast basin, or rather series of basins, lay before me, one formed within another, or with intersecting rims, and of different depths. The accompanying rude plan sketched on the spot will give a



PLAN OF THE CRATERS.

better idea, imperfect as it is, of this intricate system of volcanic outlets than it is possible to convey by words. The part marked A was a ledge immediately below the lip by which I



had ventured into the jaws of the earth; that marked B a huge shoulder, formed principally of ashes and lava, thrown out by the volcano, and which I conceive gives the peculiar notched appearance to the mountain seen from the plain.

A long period of time must have elapsed since the giant El Viejo was to any great extent actively bilious, for large trees now grow on the sides and floor of the craters. The smaller orifices, formed within the larger, are of course comparatively recent, but they would never have committed much destruction. At the same time the mountain sleeps, but is not dead, and the existence of some hot springs and rills of smoke bear witness to the latent forces.\* There are, in fact, many more volcanoes active than we dream of, both in nature and society.

The flooring immediately below, on descending from the ragged edge, was strewn with grey mineral sand and ashes, and its appearance did not inspire confidence in the thickness of the crust.† I had no ambition '*deus immortalis haberi*,' and to plunge, a modern Empedocles, into a cauldron of molten rock. How long I might have lingered in doubt, had I discovered nothing to inspire confidence, it is impossible to say; as it was, peering ahead to reconnoitre, I presently discovered traces of previous visits from a creature heavier than myself. In what form the visit was recorded and of what nature the being, I leave to the reader to divine; suffice it to say, that the creature was horned, hoofed, and tailed, and, spite the fitness of the place, was *not the Devil!* Rejecting all notion of a decoy practised by the local demon, I now advanced over the suspicious shingle. The fearful traces of spent forces in rent, chasm, and charred rock, were well calculated to inspire awe in the breast of a feeble mortal alone in this grim solitude. But I was not quite alone, for the spirit of evil was well represented by an obstinate combat going on occasionally within a few inches of my head, between two crows and a small hawk. The eternal feud of nature was maintained over this awful gulf, as in the quiet wood which Tennyson found 'a world of plunder and prey,' and the combatants whirled and darted at each other as viciously as human

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\* During my short stay at the summit I did not discover either springs or vapour, but they are mentioned by Sir Edward Belcher and Squiers. The former calculates the diameter of the 'outer' crater at 1,500 feet. Squiers states that the volcano was noticed by Dampier the pirate, as being in his time in a state of activity.

† Julius Froebel, who descended into the crater of the volcano of Telica in the same range, mentions his feet actually breaking through the hard crust, and entering hot mud from which vapours rose. He fell back on the ground and succeeded in extricating himself.

beings. From what I could surmise I imagine the carrion birds had built on some ledge of the opposite precipice, forming one side of the crater, and returning from a raid of murder or scavengering, found the hawk just clearing his beak from the last empty eggshell, or perchance with a young hopeful in his claws. So much for the inhabitants of the crater.

In general, the summit of a volcano, besides a firmer resting-place, offers infinitely more resources to the student of nature than an Alpine peak, not to mention the descent into the funnel, which, when time permits and the means are at hand, is at least half the battle. The relatively cold temperature and the descent before me prevented my staying long at the top. I crossed along the edge of the crater, and glanced at the view towards the north and north-east, as seen above the harsh dark outline of the jagged brink. It was a troubled ocean of purple mountain and misty plain, fading away towards the highlands of Matagalpa and Segovia. I fancied one might almost have descried the Atlantic, had not the vapoury atmosphere cast a veil before the extreme power of sight.

In descending again from the crater to our resting-place, I had ample opportunity for enjoying the view on the Pacific side of the chain. It was a delightful half-divine lesson in geography, as a young angel might return and study the theatre of its past struggles and woes. On my left, in serried rank, rose peak after peak, broken cone and jagged crag of the fire-born Maribios, ending in the exquisitely tender lines of the great Momomtombo, on the shore of Lake Managua.\* A scarce perceptible thread of land separated this broad water from Lake Nicaragua, with its island volcanoes and mountainous northern shore fused together and mingling with the clouds. Nearer lay the great plain of Leon, with the city marked by some faint white lights—all the lines softened and drawn together into wisps of curving loveliness. In one part advanced the little chain of hills, sinking gradually down and merging finally into the plain, whose position has so much troubled the many would-be borers of the Isthmus: by some looked on as low and passable with ease; by others as almost impenetrable barriers; by some said to end here, by others there, and in the eyes of others next to non-existing. They certainly cease in ample time to be no impediment to a canal carried down the plain to the harbour of Realejo. Away to the right lay this same port, with its many creeks invaded by the mangrove and silted

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\* Lake Managua is the last object seen with any degree of distinctness. Managua, the town, is about ninety miles away.

by the washings of the southern slopes of the watershed. Up one of these creeks came Morgan in the golden age of piracy, and the ring is still said to exist in the rock where he made fast his light vessel, before his famous raid through Nicaragua. Realejo, the village, can now only be reached in boats from the harbour proper. Lastly, and encircling all, came the broad immensity of waters whose pulses beat from Asia to America.

I cut out an original line for myself in descending, and intended to come just on the spot where our horses were, and to which my guide had long since betaken himself. The pine forest, however, rendered reconnoitring to any distance very difficult, and consequently, when, after endless struggles from the depths of bramble-bound fissures, I arrived well-nigh bootless within a few yards of the trysting-place, I felt the full force of the old adage about a miss and a mile. The Peri outside the gate of Paradise could not have appreciated with greater bitterness what it is to be on the wrong side of the hedge. Heated, footsore, torn, scratched, and with my tongue like a piece of gluey shark-skin in my mouth, I had arrived within a stone's-throw of the place where lay our provisions, and at the side of the chasm, on the brink of which our horses were quietly browsing, but at the *wrong* side! I had turned the head of the fissure, without knowing it, in the wood.

Matters, however, looked worse than they really were. At a short distance I found it practicable to descend into the gulf, finally scrambled out on the other side, threw myself into the long grass, seized the huge gourd which my guide had prepared, and incontinently drained its contents. I then began to enjoy our position and the prospect of our frugal meal. The beverage I had just drunk was excellent for the occasion. It is composed of chocolate, maize, and water, and is a well-known Central American drink called *tiste*. We bivouacked in the tall grass, which protected us from the wind that whistled through its dry stalks, and in this sheltered nook the thermometer exposed to the sun rose to 105°. My guide was a very queer old man, but possessed a sufficient fund of conversation to relieve the intervals of mastication. He astounded me by inquiring who '*la reina Victoria* was,' displaying by the question quite an unusual amount of knowledge and inquisitiveness for a Central American. My descriptive answer appears to have made an impression worthy of the august personage in whom he had condescended to take interest, for the '*Valga mi Dios!*' with which it was received, was expressive of the profoundest astonishment and admiration, and mouthed forth in a manner quite worthy the occasion and the theme.

Ignorance of foreign countries is here often carried to its farthest bound. I have been told of Central Americans, of by no means the lowest classes, who expressed considerable curiosity and interest as to one 'Londres,' doubtless a most opulent merchant, whose name had so often attracted their attention upon bales of goods from Europe.

Our meal, like the metaphorical banquet of life, soon came to an end. We mounted our horses, and bidding farewell to the Old Man (El Viejo), wound downwards over the lava tracks to the steaming forests of the plain. The old volcano, which has been worshipped by Indian tribes long since swept away, will probably gape with its rugged jaws to the stars when many generations more have been gathered from the land; but with all its stern persistence, it is an emblem rather of change than stability, and it, too, will some time sink again into the earth from which it rose.

#### ASCENT OF THE VIESCHERHORN. By A. W. MOORE.

IT is certainly rather remarkable that, in spite of the vigour with which Alpine exploration has been carried on of late years, and the ardour shown in hunting for new peaks and passes, as the best known summits have been successively scaled, and so to a certain extent robbed of their attractiveness, the group known under the collective name of the Grindelwald Viescherhörner should have remained, up to the summer of 1862, untouched and absolutely unnoticed by mountaineers in search of novelty. This undeserved neglect is the more unaccountable, as the range in question is not buried in the recesses of the ice-world, invisible to all but the hardest class of travellers, but, rising in a magnificent wall, behind the opening through which the lower glacier pours into the valley, forms not the least interesting feature in the view from Grindelwald, one of the most frequented centres of Alpine travel.

The nomenclature adopted in Sheet XVIII. of the Federal Survey, in which this portion of the Oberland is depicted, is unfortunate, there being two distinct but contiguous ranges of Viescherhörner, and two Viescher glaciers. Of the glaciers, one, the most extensive and best known, flows south from the watershed, past the base of the Finsteraarhorn, while the other, clinging to the northern face of the Grindelwald Viescherhörner, is the principal tributary of the lower Grindelwald

glacier. On the map, the higher chain is styled simply 'Viescherhörner,'\* while to the lower and less important group is applied the prefix of 'Walliser;' and to avoid confusion, I shall, in the present paper, adopt a similar course in regard to the two glaciers, and call the largest, situated in the Valais, Walliser Viescher glacier. The group of the Viescherhörner consists of six summits, attaining respectively the heights of 13,282, 13,279, 13,190, 12,885, 12,708, and 12,695 feet, the most elevated being thus 237 feet higher than the Eigher, and 112 feet lower than the Schreckhorn. Of these only two are visible from Grindelwald, the highest and lowest but one, the latter locally known as the Ochsenhorn, and the only one belonging entirely to Canton Berne: it is, in fact, perfectly distinct from the main chain, being merely the highest point of the great outlying buttress which, terminating in the Zäsenberg, separates the northern Viescher glacier from the upper ice-fall of the lower Grindelwald glacier, flowing from the great field of *névé* which forms the common reservoir of both it and the Finsteraar. The four principal summits may be considered as the most elevated points of a long ridge, running in a south-easterly direction, forming the right bank of the Walliser Viescher glacier, and the left of an extensive arm of the great Aletsch, which though unnamed on the map, is generally known to travellers as the Trugberg glacier. The boundary line between Cantons Berne and Valais, starting from the foot of the eastern arête of the Mönch, runs east for a considerable distance, then turns sharp to the south-east along the top of peak No. 1, as far as peak No. 3, where it again turns to the north-east, and passes rather to the south of the actual summit of the Ochsenhorn. Canton Valais can claim exclusive possession of peaks Nos. 2, 4 and 6, the last spurs of the latter forming the north side of the col of the Grünhorn Lücke, on the south side of which rise the Walliser Viescherhörner.

On the evening of July 20, 1862, my friend Mr. George and myself, with Christian Almer and Ulrich Kaufmann, arrived at Wellig's excellent hotel on the Äggishorn *viâ* the Jungfrau-joch, and determined to take advantage of the fine weather which appeared to have set in, to recross to Grindelwald by the pass of the Mönch-joch, and make an attempt, *en route*, on the

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\* The name Walcherhörner is sometimes given to the two peaks seen from Grindelwald, but that title not being admitted on the government map, nor generally recognised, cannot well be adopted here, however confusing and inconvenient the present state of things may be.

highest summit of the Viescherhörner. The idea was not our own, but was suggested by Almer in reply to an enquiry as to what was the most desirable 'thing' remaining to be accomplished in the Oberland. Having vegetated all his life almost under the shadow of the peak, and become tolerably familiar with its aspect, as seen from the domestic hearth, he was fired with a laudable ambition to reverse the operation, and take a look at the home of his childhood from the top of the peak. We thoroughly sympathised with his feelings, and, on our own account, would not be sorry to survey the world from a point which, in addition to its attraction as being previously unascended, must evidently, from its position, command a prospect of no ordinary grandeur. The whole of July 21 was passed luxuriously, in studying the panorama from the top of the *Æggischhorn*, a day's rest being not only grateful to ourselves, but necessary to enable Almer to recover the use of his eyes, which had been much damaged by the necessity of leaving them unprotected during the ascent to the *Jungfrau-joch*. The morning of the 22nd was occupied in making the necessary preparations, amidst a scene of confusion which can nowhere be witnessed in such perfection as at the *Æggischhorn* before the starting of an expedition. Wellig, in accordance with his usual practice on such occasions, went perfectly mad, rushing all over the house in a state of excitement wonderful to witness, his tongue the whole time wagging in three languages at once, with a pertinacity which made one tremble for the stability of its position in his mouth. As we contemplated passing the night on the lower rocks of the *Trugberg*, and did not expect to find the accommodation first-rate, either as regarded food or warmth, a porter was engaged to carry thither a certain number of blankets, some wood, a saucepan, and a supply of comforts for the inner man, and return the following day. Having fortified ourselves for hardships to come by an early dinner, we started, at 1.35 P.M., amidst the cheers of the assembled hangers-on of the hotel, and frantic demonstrations on the part of Wellig, a rather imposing procession, in which a young fir tree, carried by Kaufmann, that was to be planted on the vanquished summit, formed certainly not the least conspicuous feature, but one which the bearer did not seem to appreciate, as he shortly transferred his burden, for a time, to George. A glorious morning had, as is often the case, been succeeded by a cloudy afternoon, but animated by the remembrance of a long series of successes, we paid little attention to the rather ominous aspect of the sky, and went singing and shouting along the tiresome path, past the lovely little *Märjelen*

See, struck straight up the centre of the glacier, and pushing rapidly on, by 5.25 were abreast of the Faulberg.

By this time the appearance of the weather had become still more threatening, heavy masses of cloud were creeping up the glacier from the south, and the general look of things was about as unfavourable as it well could be. Under these untoward circumstances a discussion arose as to the propriety of halting for the night at the Faulberg, where we should have a certain amount of shelter in case of rain, instead of going on to the Trugberg, where we should be completely exposed to the malice of the elements. On the Bernese side of the chain, however, a streak of clear sky beckoned us encouragingly onwards, and the importance of making an early start in the morning, and of sleeping as high up as possible, was so great, that we made up our minds to run all risks and adhere to our original plan, Kaufmann and the porter being sent, by way of precaution, to get some additional coverings which were known to be in the cave. On their return we resumed our march, and were soon at the point where the Trugberg glacier joins the main stream of the Aletsch. At the point of junction the crevasses are numerous and complicated, and we shortly found ourselves in the midst of a very troublesome piece of work, as in order to gain the rocks, where we intended to bivouac, which are on the right bank of the glacier, and form, in fact, the base of the Trugberg, it was necessary to skirt the lower portion of the ice-fall. Almer led with his usual skill, wielding his axe vigorously to force a passage, but our progress was unavoidably slow, and the apparent vicinity of our goal very deceptive. Things began to look ugly; night was rapidly coming on; the rocks steadily kept their distance; and it seemed very probable that we might have to pass the time till daylight should appear reposing in the frigid bosom of a crevasse. But perseverance, in this world, will accomplish a good deal, and thanks to a considerable exercise of that virtue, and in a minor degree to the opportune tracks of a chamois, which pointed a way through the most intricate part of the labyrinth, we got at 8 P.M. on the rocks, just when it was becoming so dark, that in five minutes more we could not have moved a step in any direction over the broken glacier.

The rocks rose steeply, and did not promise well for night quarters, but, after scrambling up for a short distance, we came to an extensive shelf strewn with small fragments, in the centre of which was a slight saucer-like depression, where, although exposed overhead, we should be fairly sheltered from any wind that might happen to blow. We were not likely to find a better spot—indeed it was now too dark to think of going on

any further—so the traps were deposited, and we set about making ourselves as comfortable as circumstances would permit. Fortune had so far smiled upon us: the threatening clouds that had caused so much anxiety had vanished, leaving the sky beautifully clear; the cold was by no means excessive, considering that we were at an elevation of certainly not less than 10,000 feet, surrounded on all sides by ice, and there seemed every chance of our being able to pull through the night pretty comfortably. A fire having been lit, Almer assumed the office of cook, and brewed a decoction of weak and washy coffee, which we consumed, pretending to consider it delicious, and then, as no particular amusement was to be derived from sitting on a heap of sharp stones, shivering in the dark, George and I prepared to turn in. Many efforts had been made to construct a smooth couch, but the stones were not sufficiently large, and we were obliged to abandon the attempt, and manage as well as we could with the accommodation provided by nature; gloves were put on, coats buttoned up, hats tied down over the ears, and then, with one blanket underneath and two above, we lay down side by side and courted the drowsy god. I lay for a long time sleepless, listening to the whispered conversation of the guides and the crackling of the fire; but at last both sounds ceased, and silence reigned, only broken by some water running over the neighbouring rocks. The heavens were blazing with stars, which kept winking at us in a most audacious manner, while the Aletschhorn, on the opposite side of the Aletsch glacier, stood frowning in solemn disapprobation of such highly reprehensible proceedings on the part of the celestial bodies. One absurd idea after another chased through my brain, but finally I fell into a pleasant state of torpor, from which George roused me at intervals by desperate efforts to roll off with my share of the blankets in addition to his own, which it required all my energies to defeat. I think it right to admit however, that, by a curious coincidence, he in the morning preferred a similar charge against me.

The night was certainly not a luxurious one, but with all its disagreeables, passed rapidly, so that when at last faint signs of movement among the guides became audible, I was surprised, on sounding my watch, to find that it was 3 A.M. During the lighting of the fire we lay snug, loth to stir, the cold having, as usual just before dawn, become intense; but the fatal moment could not long be delayed, and Almer, with two bowls of hot coffee, shortly roused us from our lair. Theoretically the romance of our position ought to have made us regardless of small miseries, but the shiver that ran through our veins when



the blankets were first thrown off, left little room for anything of the sort, the predominant feeling being one of extreme discomfort. The conversation was of a limited character, but any deficiency on that score was amply compensated for by the vigorous chattering kept up by our teeth, which rattled away merrily, while we sat hugging our knees, and thinking what particularly great fools we were, not to be sound asleep in comfortable beds at the *Æggischhorn* or elsewhere. We would have given anything to have been able to make a move at once, but it was absolutely necessary to wait for a certain amount of daylight, which was long in coming. However, at 4 A.M. we started, after paying and dismissing the porter, who having, I imagine, passed the night with a very limited quantity of covering, was blue with cold. It was the first time he had ever bivouacked on the *Trugberg*, and were he a free agent, it would, I think, be the last.

A stiff climb up shattered masses of rock, which the leader, by way of varying the amusement, occasionally dislodged upon the heads of those below, soon restored the circulation, and by the time we reached their top, and found ourselves standing, under the full light of day, at the edge of the upper snowfields of the *Trugberg* glacier, all despondency had vanished, leaving a keen sense of enjoyment in its place. Straight opposite, on the left bank of the glacier, rose a fine range of peaks, to which Almer pointed exultantly, and exclaimed, '*Viescherhörner!*' They were, indeed, the objects of our ambition; but a question now arose as to which was the highest point, the '*allerhöchste Spitze,*' and this question we did not find it easy to answer positively. Before us were five summits, of which two, respectively the northern and southern extremities of the ridge, were palpably higher than the others; but on the rival claims of these two, we were long in coming to a decision: the map was got out, but did not give much help, as we had not studied the geography carefully beforehand, and it was not very clear to what exact points the figures referred. Almer, though well acquainted with the appearance of the group from *Grindelwald*, was now in a state of great uncertainty, but, taking all things into consideration, we determined to attack the northern peak, concluding that it must be the one so conspicuous from *Grindelwald*, and consoling ourselves with the idea, that if it should eventually turn out that we had made a wrong selection, there would be sufficient time to return and polish off the southern summit, although its appearance was suggestive of considerable difficulties. After skirting the lower slopes of the *Trugberg* for some distance, we descended on to the smooth

surface of the glacier, and striking straight across it, reached at 5.15 a point at the base of the peak, where everything was left, except the fir tree, a small quantity of provisions, and a pint bottle of champagne, which was to be drunk in triumph in the event of our efforts being crowned with success. The rope having been put on, we started up a series of steep glacier slopes, intersected by crevasses of most formidable size, but for the most part well bridged over, and as at so early an hour the snow was very firm, little difficulty was encountered in passing them. These brought us at 6.15 A.M. to the lower edge of a most uncomfortable *bergschrund*, above which a short slope of ice led to the base of the rocks, over which would lie the way to the crest of the ridge. The sight of this obstacle suggested breakfast, as it was evident that we should not again find a convenient halting-place until the summit was won, supposing that desirable consummation was ever attained. Twenty minutes were accordingly occupied in lightening the provision knapsack, to the especial satisfaction of Kaufmann who had been carrying it, and, as he munched, doubtless reflected that it would be both easier and more agreeable to carry his own breakfast in his interior than bear on his shoulders the supplies of the whole party. At the end of that time, Almer set about crossing the *bergschrund*, the bridge over which was in a most rotten condition; but he scrambled over somehow, and then pulled us across in succession, until we were all safely landed, and clinging to an icestep on the upper edge. The ice was exceedingly hard, and the slope very steep. The steps would have to serve for the descent also, so that it was necessary to cut them almost as large as coal-scuttles. This Almer did in first-rate style, but it was rather slow work, and creeping along a staircase of this description is an amusement not only apt soon to become monotonous, but uncomfortably cold to the feet, which it is only possible to keep unfrozen by knocking first one, then the other, against the ice—an operation which, from the slipperiness of the position, cannot be conducted very vigorously. None of us, and least of all Almer, on whom the principal share of the labour fell, were sorry when, after sixty steps, the slope came to an end at the foot of a precipitous wall of rocks, where active exertion of a more agreeable character was called for. The ascent that followed was one of the steepest bits of rock-climbing I have ever done, and had the peculiarity that it was neither up an arête nor a couloir, but straight up the wall-like side of the mountain. There was little choice of route; but taking advantage of every cranny or projecting knob, we toiled slowly upwards, only stopping occasionally to take breath and

wipe away the perspiration, which nearly blinded us. The rope was, as usual, invaluable, and but for its friendly aid we should have found it almost impossible to surmount some of the '*mauvais pas*' which lay in our way; but on these occasions, with the help of a pull from Almer above, and a push from below, each man in turn managed to get past the present difficulty. All this time it required an awkward twist of the neck to get a sight of the top of the crags, which rose as perpendicularly as they well could to be scaleable at all. In spite of all our exertions, the goal never seemed to be a bit nearer, and we finally gave up thinking about it, and worked away somewhat apathetically, only realising by glances below the height to which we had risen above the glacier. At length, however, the crest of the ridge was won, we walked along it to the left for a few minutes, and at 8.5 A.M. stepped with a yell of triumph on to the summit of the vanquished Viescherhorn.

Our first proceeding was to get out the map, when we immediately recognised our position, and saw, with no small satisfaction, that we had selected the highest peak, though the southern point is only one mètre lower, and consequently well worthy the attention of future travellers. That knotty point settled, we composed ourselves to enjoy the gorgeous panorama that lay extended before us in even greater perfection than we had ventured to hope. Looking north, at our feet, at the base of a precipice so sheer that, to all appearance, a stone dropped from where we were sitting would have fallen clear for thousands of feet, was the Lower Grindelwald glacier, beyond which rose what Professor Tyndall has well called 'the grimmest fiend of the Oberland,' the great Schreckhorn, furrowed by secondary glaciers of fearful steepness. As we gazed at this mighty mountain fortress, we could scarcely believe it possible for a human being to scale its rugged battlements, and had we not known of the successful assault made by the Rev. Leslie Stephen in 1861, should certainly have pronounced it impregnable. The village of Grindelwald was of course conspicuous, and as, before crossing the Jungfrau-joch, we had made known our intention of attacking the Viescherhorn this day, we wondered whether we were visible on our lofty perch to any of the inhabitants, but thought it scarcely probable that anyone would be on the look-out at so early an hour. Between the Schreckhorn and the scarcely less imposing crags of the Eiger, the course of the lower glacier could be traced to the valley, whose smiling pastures were the more pleasing to the eye by contrast with the savage portal, through which they were alone visible. At no very great depth below us, on our right, was a

spotless field of *névé* of considerable extent and perfectly level. It is the northern edge of this which forms the cornice, seen on the top of the great wall so conspicuous from Grindelwald, and on it a traveller would land, were it possible to scale that wall. The Cantonal boundary passes along the southern edge of this plateau, from which the Walliser Viescher glacier falls away. At its north-eastern angle rose the Ochsenhorn, but to so slight an additional elevation as scarcely to be remarked, and presenting a wonderful contrast to its appearance as seen from the north. From that peak a ridge, over which lies Mr. Stephen's Viescher-joch, circles round to the most imposing object in the immediate neighbourhood, the monarch of the Oberland, the mighty Finsteraarhorn, the arête of which rose with such sharpness that the very idea of anyone traversing it was enough to send a shudder through our veins. From no other point of view, not even from the lower extremity of the Finsteraar glacier, have I seen this peak to such advantage. Of all the great Oberland summits it is the most modest and retiring; and George, who had traversed most of the high glacier passes of the district, including the Strahleck in a fog, without ever getting a glimpse of it, had almost come to the conclusion that there was no such mountain. Now, however, it displayed itself to our admiring eyes in all its glory. Looking south, we saw straight down the Aletsch glacier, with, as a background in the distance, all the well-known peaks of the Zermatt district, with one rather important exception, the Weisshorn, the view of which was completely hidden by the Aletschhorn, itself a glorious object. On our left, close at hand, the familiar forms of the Trugberg, Jungfrau, and Mönch stood forth resplendent. The latter peak we contemplated with especial interest, as at that time no Englishman had ever reached its summit. Most distant of all, far away in the south-west, was Mont Blanc, but of its overpowering magnificence no words of mine can give the faintest conception. Whether owing to a peculiar condition of the atmosphere, or other cause, I know not, but it appeared to tower into the air to an amazing height, palpably overtopping every other summit in sight, and displaying itself emphatically as the monarch of mountains.

There was not a breath of air, and, for the first time in the course of my Alpine experience, I was on the top of a high mountain in a really agreeable temperature. We sat basking in the sun, with our legs dangling over the fearful precipice overhanging the Grindelwald glacier, while Almer and Kaufmann amused themselves in the construction of a cairn in which to plant the fir tree, as evidence of our success to the sceptical

inhabitants of the valley. That operation finished to his satisfaction, Almer reminded us that, before commencing the descent, there was one most important and agreeable ceremony to be performed, in which the champagne would be a leading feature. The bottle was accordingly produced, the wire that secured the cork cautiously cut, and we stood expecting that, in accordance with the usual rule at such elevations, the cork would fly out with a pop, followed by three-fourths of the liquor, before we could get a cup ready. But no such thing. The cork showed an utter indifference to atmospheric laws, and positively refused to budge. Playful taps were applied to the bottom of the bottle, in order to stir up the spirit within, but without success, and it became evident that coaxing was of no avail, and that force must be used. A corkscrew having been produced, Almer pulled, George pulled, and finally we all pulled together, but without the slightest effect on the intractable *bouchon*. Finding that all our efforts were futile, the *ultima ratio* was resorted to, the neck of the bottle was knocked off, and then, with three times three, we drank to the health of the Viescherhorn, in half a tumbler of froth apiece. The names of the party having been written and placed in the bottle, which was then deposited in the cairn for the edification of future comers, we turned to descend at 8.50, after three-quarters of an hour of the most intense enjoyment I have ever experienced. The descent of the wall of rocks was more difficult than the ascent, but was accomplished without a serious slip on the part of anyone. The ice-slope beyond was traversed with our faces to the ice, looking between our legs for the steps; at 10.30 we dropped across the *bergschrund*, and at 11.20 A.M. reached the spot where we had left our baggage, having found the snow-bridges over the crevasses in a very different state to what they had been a few hours earlier.

At 11.40, after another attack on the provisions, we started across the smooth snowfields of the Trugberg glacier. The snow was soft, the heat great, and Kaufmann led at a very slow pace; but in due course we reached the foot of a steep wall, about 100 feet in height, which formed the head of the glacier. The usual *bergschrund* was crossed with some little trouble, we floundered up through the snow, and at 1.45 P.M. were standing on the ridge connecting the Mönch with the Viescher-grat, over which lies the pass of the Mönch-joch. The descent of the great wall of séracs leading down to the basin of the Viescher glacier was most exciting; indeed, what with stones falling from above, and blocks of ice slipping from beneath our feet, almost too much so.

We perhaps encountered more than the usual proportion of difficulties, in consequence of following the tracks made by Mr. Stephen's party a few days before, in descending after the passage of the Jungfrau-joch. Having a ladder, they had been able to take liberties with many of the huge crevasses, on the upper edges of which we found ourselves suddenly brought up, with no such facility for getting across. Altogether we were not sorry when, thanks to Almer's skilful guidance, the more level portion of the glacier was reached at 4.5 P.M. After skirting snow-slopes, the débris of avalanches, on the left bank for some distance, we at 4.45, in order to avoid the final ice-fall, got on to the rocks forming the base of the Eiger, whence a steep and toilsome descent led us by 5.50 to the edge of the lower Grindelwald glacier at a point nearly opposite the Eismeer châlet. The passage of the glacier occupied twenty-five minutes, but so soon as the opposite bank was reached, our difficulties were at an end, and nothing remained but a rapid walk down the steep but well-made path leading to Grindelwald, where we arrived at 7.10 P.M., after one of the most delightful expeditions I have ever had the pleasure of making.

In conclusion, let me express a hope, that this imperfect narrative may induce other mountaineers to follow in our steps. Although the final climb is so steep as to call into play all the energies of both guides and travellers, especially in the descent, it occupies a comparatively short time. No other of the great Oberland peaks is therefore accessible with so little actual difficulty, and, owing to its central position, perhaps from no other can so good an idea of the topography of the district be grasped. If the Viescherhorn were made the object of a distinct expedition from the Æggischhorn, it would be quite possible, after sleeping at the Faulberg, to regain Wellig's Hotel the next night. But anyone wishing to combine the ascent from that side with the passage of the Mönch-joch, as we did, would do wisely to pass the first night on the Trugberg, as the work would otherwise be almost too much to accomplish in a single day unless there is moonlight enough to start from the Faulberg before dawn. Indeed, such a course would always be *advisable*, as the crevasses which intervene between the level of the Trugberg glacier and the base of the rocks are so large and complicated, that the importance of passing them early, before the sun has had time to gain much power, can scarcely be over-estimated. The quarters are certainly rough, but looking merely to the superiority of the view in the early morning, the advantage of arriving at so elevated a point in little more than four hours from the time of starting is so

great, as amply to compensate for a considerable amount of discomfort. From Grindelwald, the time required for the ascent would principally depend upon the state in which the wall of the Mönch-joch might be found. In certain conditions of the ice, forcing a passage up this might be a very long job, and in that case it would probably be necessary to pass two nights in the cave under the Eigher, or, if the object were to reach the Æggischhorn, to sleep the second night at the Faulberg. But under favourable circumstances the traveller might fairly rely upon reaching Grindelwald or the Æggischhorn the second night, though the day's work would be long and laborious. In any case, however, I am convinced, that no one who may be so fortunate as to reach the summit in fine weather, will ever regret the time and trouble which may have been expended in the ascent.

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EXPEDITION TO CAPE REYKJANES. BY T. W. EVANS, M.P.,  
F.R.G.S.

AT about 11.30 on August 18, 1863, our party, consisting of Dr. Hjaltalin of Reykjavik, Sir Charles Anderson, Bart., Mr. F. Anderson, Mr. F. Gisborne, and myself, started from Reykjavik for the well-known sulphur mines at Krisuvik. We were accompanied by my English servant, Dr. Hjaltalin's Icelandic servant, and four guides. Dr. Hjaltalin, whose professional engagements took him at this time into the Gulbringu Sysla, very kindly modified his journey to suit our convenience, and we thought ourselves singularly fortunate in having the society of so amiable, accomplished, and instructive a companion. We followed the well-known route to Krisuvik, and having spent about an hour at the hospitable house of Mr. Sivertson at Hafnafjörða, we arrived in a pouring rain at the sulphur mines about 7 P.M., and passed the night in Mr. Bushby's iron house. These mines, and also the route to them, have been described by so many travellers that I think it unnecessary to say anything about them.

*August 19.*—The weather this morning looked promising. We visited the sulphur mountain and set off for Stadhr at 12.45. Our route lay for a short distance to the S. We then turned to the W., and crossed a very rough field of lava called the Ogmundarhraun. In this we passed a small hollow rock, then, and as it is said always, containing pure water. We descended to the sea shore and arrived at Hraun. To the E. of Hraun is a mountain called Festorfjall which overhangs the sea in fine

basaltic cliffs. In the evening we arrived at Stadhr, which is situated on the low sea coast. The fields are very scanty in this neighbourhood, and I am afraid that the keep of our horses even for a single night was a serious inconvenience to our hospitable host, the clergyman. We slept in the church.

*August 20.*—This morning we sent our baggage direct to Njardhvik and set off ourselves for Cape Reykjanes soon after 11 A.M. The road to-day lay entirely over broken lava and sand, and is one of the roughest I ever travelled. We kept for the most part near the sea shore. We passed a small lake of brackish water, near which is a most curious sea beach. It consists of a bank of large rolled boulders, many of them weighing several tons, heaped up several feet above the country immediately inland, and having a level top. There is a similar beach farther inland, and others to the W. These beaches afford unmistakable evidence of the tremendous seas which sweep this coast. Much drift wood is found hereabouts, often at a considerable height above the sea. It looked to me like Scotch fir. Some of the sticks were as much as 30 feet long. After passing the beaches just mentioned we kept slightly inland and passed a low crater of very regular form. From thence we proceeded to the Hver or hot springs, and mud volcanoes, from which Reykjanes (the Cape of steam or smoke) takes its name. They are called Gunna on Olsen's map, but I have never seen any description of them, or met anyone who has visited them except, I believe, Mr. Gunnlaugsson, from whose surveys the map was constructed. The Hver consists of a mound of clay or bolus, upon and round which the principal mud volcanoes are situated. They emit steam and much sulphurous vapour. Some of them are several feet in diameter, others smaller. The mud is of various colours, brown, grey, reddish, and nearly white. In some holes it boils violently, in others more gently, and in others throws up large bubbles at intervals. Its consistency is sometimes that of muddy water, sometimes of cream, sometimes of mortar. A large quantity of magnesia in a very pure state is deposited by one or two of these volcanoes; also a thin bed of sulphur here and there. A few hundred yards to the W. of this mound are other volcanoes of a similar nature. The whole surface of the ground is soft and treacherous, and great care should be taken in walking over it. The Hver is situated in the midst of a lava field of the roughest and wildest character. To the NE. it rises into a hill called Sýrfell. To the West, South and North are numerous small cones and craters. On the sea shore the rocks are broken into the most fantastic shapes. No vegetation is to



be seen except a few blades of grass near the Hver. After leaving the volcanoes we rode in a northerly direction, passed the end of the Hauksvörðhugiá, a rift in the lava some miles long, and arrived at Kalmanstjörn. This is the first house after leaving Stadhr. The district between the two is entirely without inhabitants. At Kalmanstjörn there is a little grass. We arrived at Kirkjuvogr about 6 P.M. There is a good church here. The inhabitants are three fishermen and their families. They are men of substance, and their houses are by far the best I have seen in any part of Iceland except at Reykjavik and Hafnafjörda. We were most hospitably entertained by these kind people, who invited us to an excellent dinner of roast mutton and biscuit, with the agreeable accompaniment of port, claret, punch, coffee, and chocolate. At night we rode on to Njardhvik, where we slept in the church. Between Kirkjuvogr and Njardhvik we parted with regret from Dr. Hjaltalin, who passed the night at Keflavik, intending from thence to visit his patients in Sudhrnes.

*August 21.*—We returned to Reykjavik, where we arrived about 7 P.M.

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THE FINSTERAAR-JOCH. By H. B. GEORGE, M.A.

SWITZERLAND is grievously in want of a rationalising historian to evolve a systematic and common-sense narrative out of the misty legends with which her mountains abound. Mr. Thackeray has done something of the kind for another familiar region, in his immortal *Legend of the Rhine*; but Switzerland still pines neglected, awaiting the rise of her Bunsen. Fully to accomplish so great a work would require much mental activity and boldness, the prehensile powers of a monkey in holding on to a fact, and the agility of a well-trained hunter in jumping to a conclusion. But small and isolated scraps of bygone history may be gathered by the most ordinary observer who has ever accustomed his eyes to see through stone walls. For instance, what is easier than to explain the Grindelwald legend of St. Martin, in connection with the traditions of close and constant intercourse between Berne and Valais over the glaciers? Is it not clear that St. Martin was a popular preacher in the valley of Grindelwald, whose fame drew crowded and fashionable audiences every Sunday afternoon? To enable the Valaisans to attend his ministry, he induced the Pharaoh of the period to order the severance of the Eiger and Mettenberg (the place where the good man sat to superintend the work

is still shown on the Mettenberg), so that the devotees of the Valais might stroll comfortably in by the Mönch-joch, without the extra trouble of climbing over the Eiger. The people of the Grimsel, at that period a large and thriving settlement of road-makers, who broke up the Sidelhorn into small stones, and piled them ready for macadamising (as they remain to this day), were similarly attracted by the reputation of the Grindelwald divine, and came down the New Cut between the Eiger and Mettenberg from the other quarter for the same purpose.

Such is the obvious and unquestionable meaning of the Oberland traditions concerning the great passes, which the Alpine Club have been obliged to rediscover of late years, nothing more valuable than rumour having descended from the good old times. About the Mönch-joch there is no doubt: it is the only route by which people could ever have habitually passed between Grindelwald and the Valais, if the tradition that reports such an intercourse be founded on fact. But from the Grimsel to the lower glacier of Grindelwald it is not so clear which was the original passage, though it has always borne the well-known name of Strahleck. From the Schreckhorn there runs out towards the Finsteraarhorn a long spur, called indifferently Strahl-grat, or Mittel-grat, which was long supposed to form a continuous wall between the two mountains; but it really terminates at some distance from the Finsteraarhorn, leaving a wide field of *névé* at the foot of that peak, which forms the common reservoir of the Finsteraar and lower Grindelwald glaciers. The familiar pass, second in reputation only to the Col du Géant, which is now known as the Strahleck, crosses this spur very near the Schreckhorn, and the traveller ascends the famous wall from a lateral valley, filled with a glacier tributary to the Finsteraar. It seems very extraordinary that the Swiss should deliberately have adopted a route over a place so high, and at first sight so inaccessible as the Strahleck, when it was open to them to turn the end of the long spur from the Schreckhorn, instead of diverging into a lateral valley on purpose to climb over it. Of course it would be intelligible enough now: we have pretty well exhausted all real passes, and there is hardly a chance for a new one, except by going up one side of a mountain and down the other. But the aim of the first crossers of the Strahleck must have been, not practice in holding on by their eyelids, but communication between two inhabited places; and tradition accordingly asserts that the present line was only adopted in consequence of changes in the glacier on the old route. In the map of the

Oberland, given in 'Peaks, Passes, and Glaciers,' 2nd series, the Old Strahleck is marked, on the authority of Melchior Andereg, as the pass round the end of the Strahl-grat, which forms the subject of this paper. But seeing that every previous map had fallen into the error of continuing the Strahl-grat to the Finsteraarhorn, and that the first hint of the mistake was given by observers from the summit of the latter mountain, it seems better to follow the other tradition, in reliance on which Christian Almer pointed out to me as the *Alte Strahleck* a gap in the Strahl-grat, about two-thirds of the distance from the present Strahleck to the end of the spur, which, however, looked about as contrary to common sense as the real Strahleck. But whichever is right in the abstract, there is no record or tradition of any concrete individual having gone either way, until our passage; and it seems better to avoid repeating in the Oberland a method of nomenclature so unsatisfactory as the one new and two old Weiss-thors, and to introduce the new and appropriate title of Finsteraar-joch.

Being much interested in this vexed question of geography, I determined, during the summer of 1862, to do my best towards settling it, and accordingly consulted Christian Almer, who concurred in my belief that the line of glacier was continuous from Grindelwald to the valley of the Aar, and agreed with great satisfaction to attempt a passage that way with me. As much of the route was likely to be very broken glacier, and Almer had no wish to burden me with a second guide, we took the precaution of sleeping at the now well-known hole under the Kastenstein; but this is wholly unnecessary in future, as the pass proved to be shorter than the Strahleck. On the 28th of July we descended about 5 A.M., into the oft-trodden route to the Strahleck pass, and followed it for about an hour, to the place where it begins to ascend steeply, almost at right angles to the previous direction, towards the point under the Schreckhorn where it crosses the ridge. We however continued straight on for some distance, intending to make our way, if possible, up the icefall directly to the plain of *névé* that we believed to lie under the Finsteraarhorn. Presently, seeing that the ice-fall was very much broken up, we determined to keep to the slopes under the Strahl-grat, and for that purpose turned up to the left, and ascended for about an hour one of several rocky ribs which descend at right angles. Up to this point we had been, so Almer said, pursuing the route to the old Strahleck—we had been, in fact, ascending in a line nearly parallel to the ordinary way to the Strahleck, but some distance further from the

Schreckhorn. We now diverged still more to the right, crossed a secondary glacier, well covered with snow, again ascended a short distance up a rocky rib, off which we had a very awkward scramble on to the snow-slope beyond. We were now about on a level with the head of the ice-fall, but distant from it by an hour's diagonal march along the face of the slope, that rose pretty steeply on our left. It was generally firm snow, but occasionally a bit of bare glacier gave a little trouble.

One little place especially may serve to give the unexperienced an idea of a small but real difficulty, as compared with sensation pictures of the Mur de la Côte and the like, and at the same time to illustrate the powers of a first-rate guide. The slope we were traversing was cut across by a crevasse, too wide in most places to cross, and extending so far that we must have made a very long détour to turn it. At one place only was it narrow enough for us to get across, and here a low wall of *névé*, ten or twelve feet high, and verging on the perpendicular, rose from the brink of the crevasse, slightly bulging out over it. Taking my alpenstock, Almer drove it firmly into the wall, so as to bridge the crevasse, and, standing on it, proceeded to pick out some holes for his fingers and feet in the ice, the inclination of which was too great to allow of hewing steps in the usual way; I meanwhile planting myself firmly in the snow a little way off, ready to sustain a jerk on the rope, should Almer slip off his narrow footing. Partly mounting by the holes he had cut, partly pulling himself up by his axe head driven into the flatter surface above, Almer contrived to scale the wall, and clearing away the loose surface snow, made a great hole in the *névé* beneath, in which he sat down with his feet stretched out and firmly fixed, and got a good grasp of the rope to help me up. As I evidently could not stand on my alpenstock, and also bring it with me, there was nothing for it but to make a spring at the foot and hand holes, and trust to the rope to support me, if I could not get well into them. As I was considerably the heavier of the two, this looked awkward, but Almer made light of thirteen stone odd, and if we did come down, we could not hurt ourselves much; so over I sprang—one of the foot-holes gave way, and I found myself dangling by three fingers in one hole and two in another, and by the trusty rope round my waist. I soon got my feet into sounder holes, and scrambled up to where Almer was squatting in a heap of hard snow, looking as calm and comfortable as if he was in a luxurious arm-chair.

At length we reached the head of the ice-fall, and in a few minutes, after about 4½ hours' actual walking, stood on the

plateau of snow-covered *névé*, from which stream in opposite directions the Finsteraar and lower Grindelwald glaciers. The first part of the descent is very easy, skirting closely the end of the Strahl-grat: but after some little distance it is necessary to cross the glacier, and then round the lower ice-fall very close under the Finsteraarhorn. About this place of crossing the crevasses are rather troublesome, but nothing to perplex a good guide; and the whole descent on to the familiar part of the Finsteraar glacier only occupied an hour and twenty minutes.

For the sake of the pass, it was probably fortunate that my original plan of trying it from the Grimsel was frustrated by bad weather. The best and easiest way of taking it is certainly in the direction in which it was actually crossed, and as the Strahleck is generally considered pleasantest in the opposite direction the rivalry between the two is not very marked; the mountaineer may after all say,

How happy could I be with either  
Were t'other dear charmer away.

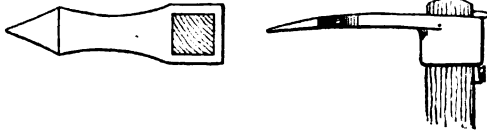
Of course, however, I feel bound to insist on the superior merits of my own particular charmer. The view of the Finsteraarhorn over head is finer than the corresponding sight of the Schreckhorn; the distance is decidedly less, for though we had to find our way, and from various causes wasted a great deal of time, we arrived on the lower level of the Finsteraar glacier sooner than, according to the average calculation of time, we should have done by the Strahleck; and the route was, to my taste at least, far more amusing than the long pull up snow slopes, and the awkward descent of the wall, on the other pass.

## NOTES AND QUERIES.

THE BEST FORM OF ALPENSTOCK FOR THE HIGH ALPS.—There seems to be a great variety of opinion amongst Alpine travellers as to the best form of alpenstock. Every man is, of course, attached to his own theory; and it is as dangerous to criticise a man's alpenstock as his sonnet. I venture, however, to make a few remarks in a dogmatic spirit, with the hope of calling forth, if not criticism, at least flat contradiction. In my opinion, then, for walks of the Gemmi and Righi order, the best thing is a walking-stick. Where more effort is required, the alpenstock, which is properly a two-handed walking-stick, becomes useful. In high snow expeditions, the axe may sometimes be called for. I must here take the liberty of observing that I do not myself ever cut steps when I can get a guide to do it for me, first, because a

guide can do it very much better; and secondly, because he is paid to do it. Consequently, I only wish for an axe capable of being used occasionally, as in a walk to the Jardin, or a stroll over the Aletsch glacier, and not one fit for cutting an elaborate staircase up the Eigerjoch. There are two main conditions that an alpenstock must fulfil, whether combined with an axe or not; 1. It must be strong enough. 2. It must not be unwieldy. The ordinary alpenstock of the chamois-horn tribe generally fails to fulfil the first condition. The alpenstock of the ambitious "Bergsteiger" very often fails in the second. Take first the alpenstock simple, i. e., without an axe. The substance required to give strength will depend on the length. It is impossible to lay down rules absolutely for this. My opinion, however, is that an alpenstock is amply long enough, if the proprietor thereof, standing upright, can place his chin upon the top of it, also standing upright. The test of strength is (as usually and rightly given) that when supported at both ends, it shall bear its proprietor sitting on its middle. Of course, the longer it is, the heavier and more unwieldy it must become to bear this weight. I think that the length as given above will be found amply sufficient, and an alpenstock determined by these conditions will be found thoroughly handy and convenient. The test of handiness should be to run violently down a steep place with it as hard as you can go—the said place being covered with enough stones and obstacles to render steering a matter of difficulty. You will then see whether you can change direction rapidly, and pull yourself up quickly. The problem is complicated when you come to add an axe. I have seen many friends of mine, first-rate mountainers, who carry alpenstocks six feet long, with an axe at the end, heavy and big enough for the 'headsman' of historical novels. I can only state my own opinion, that they have utterly spoiled their alpenstock without getting a good axe. Their implement, considered as an alpenstock, is hopelessly clumsy, for it requires a great muscular effort to bring it from left to right in case of a sudden emergency. As an axe, the length of its handle makes it unwieldy and awkward. I should prefer carrying a lighter alpenstock, and a handy axe slung round my shoulders. I should very much prefer carrying a lighter alpenstock and allowing my guide to carry an axe. Every Alpine traveller, however, will agree that it is useful to have some instrument capable of cutting steps on emergencies, as when you find yourself pounded on a glacier alone, or your guide breaks or loses his axe. Such an instrument as I will now describe has this advantage, without sacrificing the good qualities of an alpenstock. I have found it perfectly handy in both capacities. It has the further great advantage of immensely increasing the firmness of your hold on steep ice or snow slopes. A use of it for a season convinced me that it gave great additional security in difficult places. I will only add that it was given to me by Mr. R. Liveing, who has also used a similar one with equally good results. My alpenstock, then, is of the following dimensions, and, I may add, is as nearly perfect as the frailty of human nature will allow. It is four feet six inches long, without the spike. It is about four inches in circumference through most of its length. At the head it is

squared to fit the axe-head, and rather thicker than, below. The axe-head is six inches long (rather too long, if anything), one and a-half



NEW FORM OF ICE-AXE.

inches broad in the broadest part, and pointed at the end. It is flattened horizontally, not vertically, and extends only on one side of the stock. By a simple arrangement it can be made perfectly firm with a piece of iron between it and the wood, secured by a screw; or by taking out the screw the axe-head can be removed when not required. The whole thing resembles the common Oberland pick, but is long and light enough to be used perfectly as an alpenstock, the axe-head being diminished so as to be still very useful as a kind of extra claw, and to cut steps on occasion, but not being heavy enough to use as a regular ice-axe. Mr. Ball suggests a form of alpenstock with a flattened spike. My objections to this are, first, that the spike is more likely to hitch between rocks, &c., especially during rapid motion, and secondly, that it does not fulfil the object of improving the hold on slopes of ice or snow.

LESLIE STEPHEN.

THE PIZ ROSEGG.—*To the Editor of the Alpine Journal.*—Sir,—Some of your readers may be interested to read a few notes of the ascent of this new mountain; and I should myself like to furnish additional testimony to the merits of Jenni and Flüri, whose conduct has been the subject of letters in your two last numbers. On the 31st of August last, I left the Misauna Chalets, at the foot of the Rosegg glacier, at 4 A.M., in company with P. Jenni and A. Flüri, to make an attempt upon the Piz Rosegg. Having reconnoitred the mountain a day or two previously, I came to the conclusion that the ascent might more easily be made from the foot of the rocks on the SW. side, former attempts having, I believe, been made from the Tschierva glacier on the N. side. So, keeping the Aiguialoup, or commencement of the spur dividing the Rosegg and Tschierva glaciers, on our left, we followed the former glacier for about  $3\frac{1}{2}$  hours, till we arrived at the foot of the rocks descending from the sides of the P. Rosegg, at a point nearly opposite the peak of La Sella. Here our real work commenced, the summit of the Rosegg not being visible till we reached the arête on the crest of the spur which runs down from the mountain at 12 o'clock. From that point our route was plain, for to our right rose the peak, some 1,500 feet above us, comparatively easy of access. We reached it at 1.30 P.M., having left the glacier at about 8 A.M.; and, descending by the same route, arrived at the Châlets de Misauna at 7.45 P.M. The difficulties of the ascent lie entirely in climbing the rocks, from the glacier to the arête; thence to the summit the route, though steep, is plain sailing. I should think that the finest weather is necessary for success: the step-cutting is almost perfectly continuous from the Rosegg glacier to the summit of

the Piz, and the rocks themselves, thinly coated with ice, form no ordinary difficulties. We were at one time in some danger from showers of pieces of rock, which crossed our path several times, but, luckily for us, a few feet to our right or left. In my opinion, the ascent from the glacier of the Rosegg is certainly easier than that from the Tschierva, though I have not actually tried the latter. Being tied together for some 10 hours, I had ample opportunity of confirming the previous good opinion I had formed of my two guides, whether as *first-rate* ice-men, or as cheerful and unassuming companions. The payment for their services they left entirely to me, the tariff (250 francs) being preposterous, but framed by Colani, I believe, though all the guides have made themselves parties to the arrangement by signing their names thereto.—Yours truly,

F. T. BIRCHAM.

ALPINE BYWAYS. V.—*Andeer on the Splugen to Vico Soprano, Val Bregaglia.*—The following short account of an Alpine Byway may be interesting to those travellers who prefer byways to high-ways, and who, on their way to the Val Bregaglia or the Bernina, wish to avoid the somewhat uninteresting portions of the Splugen, without missing the Via Mala. In 1861, on June 21, we left Andeer in the morning, and, after crossing the first bridge on the ascent of the Splugen, turned to the left into the Val Aversa, which runs about east from the main road. The scenery of the Val Aversa is not grand, but is nevertheless most charming, rock, wood, and water being combined in the most picturesque manner. Passing the villages of Ausser and Inner Ferrara, we reached, in six hours, Cresta, the chief place in the valley. The distance can easily be done in five hours, but as the day was one of the hottest we ever experienced in Switzerland, we stopped frequently. Besides which, the picturesqueness of this kind of scenery is very alluring to those not pressed for time. The situation of Cresta is not striking. It stands on high table-land, consisting of some of the finest pastures we ever met with. There is a *soi-disant* inn, the last house but one in the village, where bread, wine, cheese, butter, and milk can be obtained, but no fresh meat; the beds did not look inviting; but the Protestant pastor, who lives next door, was good enough to ask us to occupy a room in his house—a decided improvement. Next morning we started early, and proceeded up the valley till we came near the 'Podestats Haus,' when we turned to the right, and in two hours from Cresta reached the Bregalga Alp; two hours more (the last in snow) brought us to the top of the pass. We had a splendid view. The Monte di Zocca, the Cime del Largo and di Rosso, and the Disgrazia were opposite to us, and the Val Bregaglia at our feet. There is not much snow on the south side of the pass, and Soglio may be reached in two hours and a half, and Vico Soprano in another long hour. It is possible to descend direct to Vico Soprano, but it is not advisable; the path may be easily lost, and one may get entangled in the intricacies of a large wood, from which it will take some time to escape. In this, as in many other cases, 'the longest way round is the shortest way home.' A good walker will easily go from Andeer to Vico Soprano in a day by this route. The Val Aversa, from Andeer to Stalla on the Septimer pass, is described in Murray.

F. WALKER.



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A ROUGH SURVEY OF THE CHAIN OF MONT BLANC. By  
A. ADAMS-REILLY. Read before the Alpine Club, May 3,  
1864.

IT is strange that the chain of Mont Blanc should be the most visited, and at the same time the worst mapped, portion of the Alps. No district has been more worried by all sorts and conditions of men, from De Saussure to Albert Smith, actuated by all sorts and conditions of motives, from gaining health to gathering infusoria. But though this had been going on for years, when the other mountain chains of Switzerland were yet almost unvisited by tourists, yet the maps of this district have, up to the present time, stood pre-eminently forth as untrustworthy, and contradicted each other on most points in a direct, not to say vituperative, manner. Before the publication of Sheet XXII. of the Carte Fédérale, the only portion which could be said to be correctly laid down was the Mer de Glace and its tributaries; but Principal Forbes's excellent map of these glaciers only made 'the consummation' of the rest 'more devoutly to be wished;' and when the Mont Blanc sheet of the Federal map was announced, I looked for it with great interest, for it was reported that General Dufour had in this instance worked beyond his boundary line, and at least established the position of some of the principal points in the chain with reference to his own survey.

This, however, he did not do. When the map was prepared for engraving, he sketched in some outlines from the unpublished sheet of the Sardinian Ordnance Survey, in order to take

off the bald effect produced by suddenly running elaborate engraving into blank paper; but he made no attempt to reconcile his peaks with theirs, and the result was, one of the most incomprehensible pieces of mountain topography that ever puzzled the human race in general and the Alpine Club in particular. The last state of that map was worse than the first.

I had signally failed in all attempts to reconcile the existing maps with one another, and I had failed not less signally in attempting to reconcile the Glacier d'Argentière, as laid down by the Sardinian engineers, with the same glacier as laid down by the hand of nature. I need not trace the steps by which I arrived at the conclusion that some extraordinary blunder must have been committed, which nothing but an exploration of the localities could clear up; I therefore resolved to devote a part of last summer to the examination of the regions lying between the Mer de Glace and the Swiss boundary line, to hunt down the Pointe des Plines, to see whether the enormous length given to the Glacier du Tour was fact or fiction, and to discover whether the Grande Aiguille de Triolet, the point of junction of four great mountain ridges, had not some better representative than the disreputable little peak shaped like a cocked-hat, which appears from the Jardin to occupy its place.

I was also anxious to examine the glaciers on the western and southern sides of the chain, and make such shots at the topography of those regions as circumstances would permit. But as to how I was to clear up these doubtful points, my ideas were of the vaguest description; and that they ever assumed a definite and practical form, is entirely owing to the kindness of Principal Forbes, who interested himself in my plans, and whose advice and assistance were at my disposal throughout the whole period of my operations. He pointed out to me that no trustworthy results could be obtained without determining the real position of the doubtful peaks, by means of the theodolite, and drew up for me a system of triangulation which would connect his survey of the Mer de Glace with the Carte Fédérale, and fix the intermediate points with some certainty. As this plan was based on the assumed correctness of the Sardinian map, I was unable to carry it out in its integrity, but from time to time he supplied me with further advice, to which the success I met with is entirely owing.

I was furnished with a theodolite by Troughton and Symms, the telescope of which was of greater power than those generally employed, and furnished with a non-inverting eyepiece, an arrangement which I found most useful, in fact almost

indispensable when it was necessary to distinguish signals at long distances, and on broken ground. I was also provided with a boiling water apparatus by Casella, which gave excellent results, though it was rather addicted to toppling over at critical moments and upsetting the boiling water over my fingers, a proceeding occasionally productive of violent language. I also carried an aneroid barometer by Spencer and Browning, which, though more peaceful in its behaviour, was much less satisfactory in its results: for the errors to which aneroids are generally liable have not I fear been got rid of by the employment of gold for the vacuum chamber, and there was always a constant, or rather inconstant error, which vitiated all readings from it. As far as my experience goes, the boiling water apparatus is by far the most portable and satisfactory instrument for determining heights, and the unpleasant qualities I have mentioned may easily be got rid of by a slight modification of its construction.

On June 29 I arrived at Chamouni, where I was met by my old guide Albrecht of Visp, and having cast about for a strong man to bear the theodolite, I found him in the person of Henri Charlet. I had the theodolite packed on a thing suggestive of a very young five-barred gate with a bracket at the bottom, ordered some long poles for marking the position of my stations, and prepared for action.

At first the weather was decidedly unpropitious, but, after two days which I spent in searching for Principal Forbes's stations on the Trélaporte and Brévent, it took a favourable turn, and I set up my first station on a little peak known as the Aiguille des Grands Montets, which rises above the Glacier de Nant Blanc, and is visible from Chamouni just above the Aiguille Bochart. It can be reached either from the Mer de Glace, by ascending the Glacier de Nant Blanc, or from the Argentière Glacier; or again by the Glacier des Ognons, the route we selected on this occasion—not indeed wisely, as we found the bergschrund on that side rather difficult to cross. I have often wondered that this point is so seldom visited: I know of no view like it in the whole valley, for while towards the south-west the Chamouni Aiguilles are seen massed together into a clustering pyramid, above which rises the great white dome of Mont Blanc: towards the east the view is more novel and striking still, for from this point only can be seen from top to bottom the magnificent Aiguilles beyond the Glacier d'Argentière. The summit of the Aiguille Verte appears scarcely an hour's climb distant, and the double-headed Dru, though not so graceful in form as it is when seen from the valley, rises

close at hand like a ruined tower above the séracs of the Glacier de Nant Blanc.

I spent many hours on this point, and before leaving it, set up a great *homme de pierre*, surmounted by a 'signal' of imposing appearance, the first of a series which might have been observed by the casual tourist until their destruction by perils of tempest some weeks afterwards. They resembled railway signal-posts in the act of announcing the line blocked, and were elegantly painted red and white by Albrecht, whose taste in decorative art was rather gorgeous than otherwise.

My original plan had been to observe the angles of a triangle between the Pointe des Plines, Aiguille de Triolet, and some point on the Aiguilles Rouges, from which both could be seen: but as I observed that the Aiguilles Rouges did not lie sufficiently opposite the Glacier du Tour to afford any probable view in that direction, I fixed upon a small hill which separates the Col de Balme and Tête Noire passes, called in the Federal map 'L'Aiguillette,' but known in the valley as 'Les Possettes,' for my next station. This I visited next day, but though it commanded an excellent view of the Tour Glacier, it was not high enough to show more than the summits of the peaks which bound the upper end of its basin; but I could still see enough to confirm an idea I had long held that it extended no further than the Aiguille d'Argentière. I had also an excellent view of the peaks west of the Argentière Glacier, but was still unable to recognise the Grande Aiguille de Triolet, and judging that all attempts to discover it from this side would be only lost time, I resolved to attack it personally by ascending the snow col which lies at the eastern angle of the Glacier de Talèfre.

Mr. Hodgkinson and Mr. Birkbeck, who had just been driven back from the Mur de la Côte by disastrous weather, agreed to share in the attempt, and we arranged to meet on the following Tuesday at the Jardin, where we intended to sleep, as I was anxious to spend some hours on the summit should we succeed in reaching it. My brother-in-law, who had come to Switzerland with me, now started for a campaign in the Oberland, and as Albrecht accompanied him, I promoted Charlet to the brevet rank of guide, and sought again for a victim on whose shoulders the theodolite might descend.

Now the theodolite was not popular at Chamouni—in fact I have heard it alluded to in native circles under the short but expressive name of 'Le Diable.' It was not its weight to which objection was taken, but the legs conveyed the idea that the bearer had chosen a bâton of an absurd and dropsical kind, and his supposed taste in this respect (a tender point with a

mountaineer) was made the subject of native chaff of a galling nature; and when it is considered that, in addition to this, the unfortunate individual had to carry a pole about eight feet long, and two boards folio size, the component parts of a 'signal,' pointed at by the finger of scorn, and lacerated about the small of the back, his condition could not be looked on as an enviable one. At length I found a victim, whose name was Tournier, and whose most remarkable attribute was a beard, which would have been bright red if it hadn't been bright yellow, and having laid upon him his melancholy burden, I went up to the Montanvert on the afternoon of Monday, intending to sleep there, and visit Principal Forbes's old station at the Trélaporte on my way to the Jardin.

It was on this occasion that I succeeded in laying hold of a mysterious person of whom I had before heard, and though the rumours concerning him were very vague, they had excited in my mind a great desire to come in contact with him. He was known as 'M. le Capitaine,' and was believed to spend his days in doing some work of darkness on the neighbouring Aiguilles, in company with a native, and certain instruments of an incomprehensible nature. He had been met in unexpected places by men going to the Jardin; he had been seen at great heights on the Charmoz by parties crossing the Mer de Glace, and pointed out to ladies as a remarkably fine specimen of the chamois, but as to who he was, or the nature of his occupation, I could obtain no information. On the present occasion, I discovered recent traces of his presence, in the fact of his having carried off Mr. Forbes's large map which generally hangs in the salon of the Montanvert inn; and on making further enquiries, I learned that he was expected to sleep at the Montanvert that night. I accordingly awaited his arrival with great curiosity, and soon after dusk he was seen coming down from the Charmoz, followed by his attendant spirit.

It does not take long to establish a considerable intimacy between the only two occupants of a mountain inn; but in this case we met on common ground, as it appeared that we were both working for the same end. I found him to be M. Mieulet, a captain of the French Etat Major, and then employed in surveying for the great Ordnance map of Savoy, now in the course of preparation by the French government. I now heard for the first time of this survey, and made anxious enquiries as to the scale and probable accuracy of the map; but what I learned from him suggested some fears that it might not turn out as perfect as I had hoped. As far as regarded himself, and his immediate district, I had nothing to fear. The Etat Major

naturally attached comparatively little importance to anything above the snow line, and the district assigned to each engineer was very large. Indeed in M. Mieulet's case it extended from Mont Blanc to the Argentière, and from the Grandes Jorasses to the Brévent, comprising an area of 100 square miles; and the small sum allowed him for the payment of guides and porters would sound ridiculous in the ear of an Alpine tourist.

I devoted myself to the expansion of his mind in an Alpine sense, and suggested plans of 'grandes courses,' which were not at all according to the Cocker prevailing at the Etat Major: he had before shown strong symptoms of the Alpine fever, and it was not long before he became a very bad case—so much so, that when I mentioned our expedition in search of the Triblet, he eagerly agreed to accompany us; for this peak had puzzled him just as much as it had me, and moreover formed an important point in his boundary line.

The next day was spent by him on the Couvercle, and by me on the Trélaporte, and in the evening we formed a large party on the Jardin. After a brew of portable soup, about which, being the cook, I am privileged to remark that anything more detestable I never tasted, we turned into a variety of dens and caves in the rock, in which nature had been partially assisted by art, under the auspices of M. Bisson, who had passed some nights there. We got under weigh at an early hour next morning, and leaving the Jardin at its eastern side, set off in the direction of the col. Skirting the rocks of Les Courtes, which here shoot up into the most fantastic shapes, we passed over the hard, crisp névé to the lowest séracs, cluster after cluster of which we passed without difficulty. Our upward progress was, however, soon stopped by a great bergschrund, or rather precipice of ice, which extended from side to side of the glacier, and appeared quite unscalable. We were therefore obliged to turn to the right, and mounting a rather steep slope of snow, we reached the narrow arête which bounds the séracs on their southern side.

Between this arête and another, which lay still further to the south, there extended a concave slope or curtain of snow, of excessive steepness, a perfect playground for avalanches, which had scarred and seamed it in every direction. The snow on this lay at a measured angle of  $55^\circ$  and in some places  $60^\circ$  (the steepest snow I have ever crossed); and as for some distance we were obliged to leave the arête and zigzag up it, our progress was extremely slow, and it was a quarter to eight before we reached the plateau of the col.

I had fallen some distance behind, and when I came up I

found the whole party halted under the shadow of an immense sérac, engaged in discussing a startling opinion pronounced by Victor Tairraz, that if we went any farther we should in all probability be unable to return, as the slopes of snow by which we had mounted would be in a most uncomfortable state a very short time after the rays of the sun had rested upon them. The fact was most disagreeable, but it was equally undeniable. The snow which had fallen two days before rested on very steep ice, and it was not without one or two unpleasant slips that we had surmounted it: so that it was pretty clear that a short exposure to the sun, which was now pouring down on it with unclouded brilliancy, would destroy all its tenacity and land us on the Talèfre in an interesting compound avalanche of snow and human nature. Many of the guides wished to return at once, but M. Mieulet and I were determined to see whereabouts we were relatively to the Argentière glacier; so all the knapsacks and instruments were cast off, and we set off across the plateau towards the foot of nameless peak A, edging away towards the spot which ought to overlook the Argentière glacier. As we crossed the plateau, it struck me that peak A looked much broader and somewhat higher than before, and a second glance showed me that these additions to its stature were not its own, but belonged to something immense which lay immediately behind it, and had been up to this point invisible. A few steps more, and a little peak of rock disengaged itself entirely from the little cocked hat which had hidden it from our view, and stood boldly forth, joined to the plateau on which we were by a snowy arête, sending one serrated ridge down towards the Val Ferrex, and meeting the Mont Dolent with another, resembling the Dru in shape but exceeding it a hundred-fold in size, the Grande Aiguille de Triolet. I recognised it at a glance, for I had so often sketched the western peaks of the Argentière, that I was perfectly familiar with their forms, and I knew the exact spot on which we stood.

The plateau of snow starts from the summit of the glacier by which we had ascended, and may be in extent about a quarter of a mile; and after stretching up to the foot of peak A, it divides into two branches, one of which overlooks the Glacier d'Argentière and the other the Glacier de Triolet, in the Val Ferrex. I had been particularly requested by old Auguste Simond to examine these cols from the top, and I fully endorsed his opinion that the possibility of descending them was very doubtful; but I differed from him in considering the Argentière one as the best, or rather least bad, of the two. I do not, however, pronounce

either of them impracticable, and that towards the Val Ferrex might be a useful pass from Chamouni to the Grand St. Bernard; that to the Argentière glacier would be of course useless for all practical purposes.

The whole opposite side of the Argentière glacier lay before me. I saw the Chardonnet, Aiguille d'Argentière, and Tour Noire, and I soon found the plan I had been adopting might as well be given up, as neither the Pointe des Plines, nor anything beyond the Glacier d'Argentière, was visible. Whilst taking all this in, and doing a rapid act of sketching which I have never been able to decipher, M. Mieulet was hunting wildly for his boundary line: but we soon traced it to his entire satisfaction from Mont Dolent to the point on which we were. We then crossed over to the side overlooking the Val Ferrex, and traced it on to what we supposed to be the Aiguille de Léchaud.

The view on this side was most lovely; steep slopes of rock and ice descended from our feet to the Glacier de Triolet, which disappeared in a mass of broken séracs between two rocky peaks in the direction of the Val Ferrex, the bottom of which we could not see, and beyond it the whole mass of the Italian Alps lay cloudless in the morning sun. But we had little time to admire all this, for the sun's rays were pouring down on the steep slopes we had to descend, and the rest of the party were already some way down: so we started off, and plunged down to the large sérac where we had left our impedimenta.

The signal post I had brought up being now useless, was stuck in the snow, and we began to descend. We were only just in time, for the snow had got very soft, and we had often great difficulty in preventing the whole party from starting off at score. Once off the arête, there was no further difficulty, and we reached the Jardin at 11 A.M.

I had now found the Aiguille de Triolet, and the next thing to do was to find the Pointe des Plines; and looking about for some point which commanded a good view of the upper part of the Tour glacier, I fixed upon the ridge which extends in a northerly direction from the Chardonnet to the village of Argentière, and spent some days in making four stations upon it, which might serve as a base line for my survey of the glacier.

From the third of these, I had a superb view of its higher névé, and its southern boundary appeared to run nearly east and west from a small snowy bosse marked C in Principal Forbes's sketch from the Aiguille de Glière, and which I shall therefore call 'Peak C.' This appeared to lie at the south-east angle of the glacier, and from it the ridge ran westward, until it disappeared behind the Chardonnet. Did it join it? I began



to suspect that it did; but at all events, one thing was perfectly evident, that it did *not* stop short in the centre of the Tour Glacier—and then curve off again, giving to the glacier something the shape of a wasp. As a point from which this question was likely to be decided, I pitched upon Peak C, and as Mr. Hodgkinson and Mr. Birkbeck were going to cross the Col du Tour, I resolved to accompany them so far, and if possible, ascend the peak in question. We met accordingly at Argentière on Tuesday, July 14, and starting at half-past three, reached the summit of the col at 8.45. As the first two hours of the ascent are passed in a sort of gully between the moraine and the rocks, and the rest of the time in threading a series of natural valleys in the glacier, the view was not extensive, and I arrived at the col without having gathered any information. From the actual col I could see little, as it is niched in between two rocky masses which cut off all view towards the west. To the south and east, however, lay the snow-fields which feed the glaciers of Orny and Trient, and right opposite was the Col Fenêtre de Saléna, lying just between the Grande Fourche and the foot of Peak C, which appeared to command a good view of the glacier basin of the Saléna. I resolved, therefore, to fix a station on its summit; and accordingly, when the rest of the party had started on their way down to Orsières, I descended upon the névé of the Glacier d'Orny, recrossed the ridge a little further to the south, and, after a good deal of scrambling, we got upon the top of Peak C at about ten o'clock.

The questions which had puzzled me so long were now soon answered, for I was just at the south-eastern angle of the Tour glacier; the ridge which bounded its head was easily traceable; and I could see at once that, after cutting off the head of the Tour glacier from the upper part of the Saléna, it joined the eastern peaks of the Argentière, *not* at the Tour Noire, as the maps declared—*not* at the Aiguille d'Argentière, as I had suspected—but *at the Chardonnet*, a fact which placed the head of the Tour glacier just two miles and a quarter to the north of the position assigned to it on the map, and diminished the length of the glacier by as nearly as possible one-half!

I shall not dwell on the details of the view, which was very beautiful, commanding as it did the basins of four great glaciers—the Tour, Trient, Orny, and Saléna—with the more distant Vélán, and mountains of the Val de Bagnes. I spent the remainder of the day on the summit, and towards evening, passing across the head of the Glacier du Tour, and close under the rocks of the Chardonnet, we reached the moraine on the

north-western side, where we bivouacked; and after again visiting next day my stations on the ridge of the Chardonnet, I returned to Chamouni.

Although I had not yet explored the upper basin of the Saléna, or discovered the back of the Tour Noire, I had accumulated sufficient data for giving to the Glacier du Tour a form and extent widely different from that given in the Carte Fédérale. On July 16 I submitted these to an international congress, at which France was represented by M. Mieulet, Switzerland by M. Loppé the artist, England by myself; and as the chain of Mont Blanc, the map of which we were about, in diplomatic language, to 'reconstruct,' was considered an interested party, it was allowed to send deputies in the form of two bottles of champagne. The conclusions we came to were, that the rock represented on the map, at the spot where the Swiss boundary line appears to form an acute angle right in the centre of the Glacier du Tour, was in reality an arête of the Chardonnet, and that from this point to the Mont Dolent the boundary line followed the eastern peaks of the Argentière glacier. This being the case, 'the *Pointe des Plines* could be nothing else than the back of the *Aiguille d'Argentière*, though they appear on the Sardinian map with a space of rather more than a mile and a half between them, and a difference in height of 205 metres, or 672 English feet!

M. Mieulet afterwards examined the materials given to him by the Etat Major, to see whether they threw any light upon the matter, and the result was most curious. Among the list of well ascertained points given him as 'points de départ,' there was one supplied by the Swiss engineers called 'La Pointe des Plines,' with its latitude and longitude, and other means by which its position could be laid down. There was another, which had been determined by the French Etat Major in their preliminary survey, called 'L'Aiguille d'Argentière,' the position of which was indicated in a similar manner. But on laying them down on paper, he found that they were separated by a space representing only 500 feet, while their heights, as given, varied by only eleven metres, or thirty-three English feet, in a height of nearly 13,000 feet. The identity of these peaks may therefore be considered as established.

Before leaving this end of the chain, I may speak of two expeditions, which, though made some time afterwards, are best taken in connection with what I had before done. They are an exploration of the upper part of the Saléna, by which I determined the position of the Tour Noire relatively to it, and the passage of the col between the Chardonnet and Aiguille

d'Argentière, which forms a most useful pass between Chamouni and Orsières.

After carrying a chain of triangles round Mont Blanc, I found myself at Orsières on July 26; and as, according to all accounts, the lower ice-fall of the Saléna was in a most disreputable state, and I was likely to lose much valuable time among its difficulties, I thought it better to ascend to the Glacier d'Orny by the route usually taken in crossing the Col du Tour from that side, and pass thence to the Saléna by the Col Fenêtre. Adopting this plan, I next day reached the Saléna glacier without difficulty, and spent some hours in making observations from a place on the level of the glacier, a few hundred yards from its head. Having finished my work at this spot, I went further down the glacier, and scrambled up, theodolite and all, to the top of a spur which descends from the Grande Fourche, and from which a more extended view was likely to be obtained. I had been anxious to report on the appearance of three cols which led to the Saléna; one from the Lancuvaz glacier, and the other two from the Argentière; but of these we only thought that one—that between the Aiguille d'Argentière and the Chardonnet—was likely to be available. As for the col between the Aiguille d'Argentière and Tour Noire, we at once pronounced it impassable, the whole space between these peaks being filled by a great curtain or wall of ice, with scarcely any rock, which appeared to be from 1,500 to 2,000 feet high, and to lie at an angle uncommonly like  $50^{\circ}$ . It was seamed with the tracks of avalanches, and was, I think, without exception the most impracticable looking wall I ever saw. In fact I was so impressed with this idea, that when I found, next day, a statement in the 'Livre des Voyageurs' at Martigny that Messrs. George and Macdonald had succeeded in passing from the Argentière to the Saléna, I never once thought that they could have done so to the south of the Aiguille d'Argentière, but concluded that they had crossed the ridge at the only point at which it appeared possible to do so.

When I afterwards discovered that I had been mistaken, and that the pass between the Chardonnet and Aiguille d'Argentière had not been made, I resolved to take it *en route* for the Oberland; and accordingly Mr. Brandram and I slept at the upper châteaux of Les Ognons on the 23rd of August. We started next morning at a quarter past five, and crossing the Glacier d'Argentière to the foot of the Chardonnet, mounted for some time the vast slopes of moraine which lie between its rocks and the glacier. When these came to an end we took to

the ice, as the rocks on both sides were unavailable, being very smooth, and dipping straight down under the glacier, but the séracs were not generally very bad, though Jean Carrier, Brandram's guide, insisted on distinguishing one place by the name of the 'Pont du Diable.' After an hour's halt for the conversion of *poulets* into human nature, we passed over vast beds of avalanche snow, which had come down from the arêtes of the Chardonnet, and still fell at intervals, and, crossing the bergschrund by a good bridge, reached the summit of the col at noon.

The day was most lovely, and we spent a long time basking in the sun, and putting off as long as possible the disagreeable operation of finding a way down the other side, which dropped sheer down at an undeniably steep angle for some five or six hundred feet, at the bottom of which, according to all natural laws, there must be a bergschrund. At last we shook off our laziness, and finding the snow much better than we expected, we screwed down between the ice and rock on the Chardonnet side, and having floundered neck and crop over the bergschrund, set off across the sloping névé in the direction of the valley.

Even if I had not been warned by Mr. George's misfortunes, I should not have tried to descend by the lower icefall of the Saléna, for I had chosen a route which, though it involved the passage of another col, would still be an immense saving of time. In pursuance of this plan, we held on a straight course as far as the arm of the glacier leading up to the Col Fenêtre, and then, turning sharply to the left, crossed the col, and reached Orsières by the usual Col du Tour route at half-past eight—much later than we should have done had we not lingered long on the sloping névé of the Glacier d'Orny to gaze at one of the most lovely sights I have ever seen—sunset on the Combin and Vélan, and the great mountain chain of the Val de Bagnes. We had made frequent halts during the day, and walked very leisurely throughout, so that the twelve hours we occupied in actual walking could be easily reduced; and in any case it is perfectly easy to reach Orsières in time to go on either to Martigny or St. Pierre, a thing very difficult to do by the Col d'Argentière, and I should say *very difficult indeed* by the Col de la Tour Noire.

Starting from the Brévent and Flegère, I established a chain of twenty stations, which stretched on by the Col de Voza, Mont Joli, Mont Rosaletta, the Col du Bonhomme, Col des Fours, and Col de la Seigne, the Cramont and Mont Saxe, until they reached the Swiss boundary at the Col Ferrex. Their relative positions I established as well as I could, though as

the ground was new to me, and my time so limited that I was unable to visit any station a second time, I was obliged to take what observations I could get and be thankful. The hair of an engineer would rise up on his head at the unprofessional way in which, in some certain cases, my results were arrived at. But these results, however obtained, cannot be very far from the truth. My cordon of stations extended over a distance of about fifty miles, and after turning so many corners, I was very much afraid that my Col Ferrex would find itself at some enormous distance from where it ought to be. But this was not the case. It fell within 200 yards of the position assigned to it by General Dufour, a quantity exceedingly small when the rough nature of the work is considered.

But I had a better test than this. M. Mieulet had kindly supplied me with the position of a number of points, which had been carefully determined by the Etat Major as 'points de départ' for their operations;—points so scattered over the whole chain that any considerable error of mine could hardly escape detection. But in all these cases I found that the positions I had assigned to the peaks in question were almost identical with those given by the French engineers.

I was agreeably surprised by this discovery, though I had not cared so much that the map should be correct, or agree with others, as that it should be entirely original, and independent of them. It was not a correct map I wanted, but a fresh element of comparison. I accordingly started from the base line on the road between Les Tines and Les Praz, which had been carefully measured by Principal Forbes in 1842, for his survey of the Mer de Glace;\* and laying this down on paper on a scale of  $\frac{1}{40,000}$ , or 1.584 inch to a mile (a scale I had selected as sufficiently large for the protraction of small angles, and at the same time a convenient and manageable size, while, as it was the scale on which the MSS. of the French Survey were 'dessiné,' it would allow of direct comparison between the two) I fixed the position of the Brévent and Flegère by means of observations taken by Principal Forbes with which he kindly supplied me. The line joining these two points form the base-line of my survey, and though not actually measured by the chain, its estimated length of 15,950 English feet appears by its results to be sufficiently accurate.

All the points I have determined, about 200 in number, lie where my observations placed them, and I have not changed the position of one of them in deference to any map, however

\* *Travels in the Alps*, p. 105.

much I might differ from it. I was careful to do this, for I thought that a series of original observations would be far more useful—useful in its very errors—than any compilation of existing ones, for in dealing with these it is impossible to say whether any change one makes increases or diminishes the error. The details also are my own, with the exception of the rivers and villages, which I have taken from the Carte Fédérale, and the valley of Chamouni, for which I am indebted to Principal Forbes's map. M. Mieulet also kindly supplied me with the details of the Mont Blanc du Tacul, and Monts Maudits; with these exceptions I have not indicated the smallest feature for which I had not the authority of a photograph, or of a series of rough sketches which I had taken from nearly all my stations, and on which my theodolite observations were noted; a practice I had adopted in order that should my map turn out a failure, my work would not be thrown away, as I should still possess materials for making very correct drawings of the different sides of the chain. This departure from the system usually employed, I found to be of inestimable value, and had it been more generally pursued, nearly all the mistakes with which mountain maps abound, would have been avoided.

An engineer, for instance, points his theodolite at a rather blunt-looking rocky peak, and asks his guide its name. Guide, being a native of the valley, with small appreciation of scenery, and an utter disregard of all rocks which don't afford pasture for his goats, *doesn't know*; but, as he fears that a betrayal of his ignorance will damage him in the eyes of his employer, he says, 'On l'appelle ici, l'aiguille de' so-and-so. And this may be the name by which it is known in that valley, or simply a coinage of his own brain; but at all events, down it goes in the notebook, with an observation tacked on to it. In the meantime the engineer of the next district sees a sharp-looking snow-peak, and makes a similar enquiry. Guide, being a native of this valley, goes through the same process, and at best, gives it the name by which it is known there, a name, in all probability, totally different from that given in valley number one, and down *that* goes.

It is in this way that the Pointe des Plines and Aiguille d'Argentière, the Aiguille de Trélatête and Aiguille de l'Allée Blanche, have assumed separate existences, when they are in reality one and the same; but if the engineer had taken an outline of the peaks in sight, and distinguished them only by a letter, or figure, he would have been able, when laying down his map with these before him, to move from the northern side of peak A or B to the western, and so to the southern, seeing rock

gradually change to snow, and a perpendicular precipice to a sloping glacier, and group together the observations referring to the same peak, however different its name and appearance might have been at the points from which they were taken.

My impressions as to the value of this plan were fully endorsed by Colonel Borson of the French Etat Major, who came down to Chamouni about the middle of August, to inspect the labours of M. Mieulet, and his colleague on the Valorsine side. I had an interview with him after his return from his tour of inspection, and found him a most agreeable and liberal-minded gentleman. M. Mieulet and I pelted him rather unmercifully with our opinions, but he heard us very patiently, and confessed that the ideas prevailing at head-quarters on the subject of the mountain parts of the map were very much behind the age.

The old notion that everything above the snow-line was unimportant, was no longer tenable, for the limit of perpetual snow does not now, as it once did, coincide with the limit of perpetual tourists, and, while on the Couvercle with M. Mieulet, he had himself seen more than twenty people pass on their way to the Jardin, a greater number than he supposed would have visited it in a year. He had never heard of Principal Forbes's map, and he carried off my copy of it, in order to submit it to head-quarters as an instance of a *savant*, for whose observations a correct map was necessary, and who, finding none, had been obliged to make one for himself; a fact which he justly considered a disgrace to the Etat Major of the country.

The satisfaction with which I had heard of the French survey had been rather damped by the information I had received as to the scale on which it was to be engraved, and the extent to which it was to be carried. The scale was to be their usual one of  $\frac{1}{80,000}$ , which would prevent the published sheet from being fitted on to the Carte Fédérale, the scale of which is  $\frac{1}{100,000}$ ; while the survey was, as usual, to be carried up to the frontier line, and no farther, which would still leave the whole of the Italian portion in a very unsatisfactory state: for though M. Mieulet had visited several points in the Allée Blanche, for the purpose of correcting the boundary line, he left the topography of the glaciers on that side untouched, having quite enough to do in the district for which he was responsible.

I enquired whether there was any possibility of inducing the government to extend their operations so as to embrace the whole chain, but as it appeared unreasonable to expect them to alter in this instance the scale on which all their other Ordnance maps are engraved, and equally unreasonable to ask them to

expend a large sum of money for the benefit of few besides the Alpine Club, I could scarcely hope that they would depart from their original plan. They have been, however, liberal beyond all my hopes. For a letter from M. Mieulet states that the representations of Colonel Borson and himself have been so well received, that a sheet is to be published containing the *whole* chain of Mont Blanc on a scale of  $\frac{1}{40,000}$ , or an inch and a half to the mile, the Carte Fédérale being taken as authority for the Swiss portion, and M. Mieulet having received orders to survey the whole of the Italian side next summer, for the same purpose. I think the conduct of the French government in this instance sets an example of spirit and liberality, worthy of the highest praise.

With the exception of the extraordinary exaggeration of the Tour glacier, about which I have already said enough, I found the maps generally correct in the main, though the details are given in such a shy and sketchy manner, as to be almost unrecognisable. One glacier, however, that of La Frasse, or Armancettes in the Val Montjoie, which is usually drawn of considerable size, has entirely disappeared, being now only represented by two small patches of snow at the top of the vast slopes of moraine which once formed its bed.

One fine summit, the Aiguille de l'Allée Blanche, I have been under the painful necessity of removing from the map—'elle n'existe plus!' There is, besides the Aiguille du Glacier, but one Aiguille in the neighbourhood of the Glacier de l'Allée Blanche, and that is the beautiful three-headed peak which rises to a height of some 12,900 feet at its north-west corner, and which has rejoiced in more aliases than perhaps any other. It was called 'Mont Suc' by De Saussure, in which he is followed by Favre; the French Etat Major call it 'Le Petit Mont Blanc,' from its extraordinary resemblance as seen from the Col de la Seigne; in the Val Montjoie it is called, the 'Aiguille de Trélatête;' and in the southern valleys it bears the name of 'L'Aiguille de l'Allée Blanche.' Its three-peaked head suggests 'Trélatête' as the most appropriate name, and I have a strong conviction that De Saussure intended the name of 'Mont Suc' to apply to the blunt mass of rock, crowned with a cake-shaped glacier, which forms the lower end of the ridge between it and the Allée Blanche.

In briefly mentioning the fine peaks which yet remain unascended in the chain of Mont Blanc, I shall first notice the Aiguille Verte, a peak which has been often attempted, but seldom described. If the Aiguille Verte is ever conquered, I think it will be by the system usually adopted on the Matter-



horn, at the rate of about 200 feet per day—its rocks presenting difficulties in which I never believed until I had actually set my foot upon them. Last summer I had some intention of trying it, but before setting off with a 'drapeau' and all the rest of it, I resolved to make a reconnaissance in its direction. Accordingly Mr. Brandram and myself, accompanied only by Albrecht, left the Montanvert one morning about four, and from the moraine of the Couvercle made out with the telescope a perfectly easy route to the summit: insomuch that Albrecht, who was thoroughly confident that we should be on the top in a few hours, hurried us off at an unmerciful pace over the glacier in the direction of its foot. But he gradually became less sanguine as we got on, for the glacier was so bad, and the distance so great, that it was many hours before we came near enough to see what the bergschrund really was, and though I have seen some bad ones, I certainly never saw a worse. It swept right round, cutting off the Aiguille on all sides, and forming in some places a precipice upwards of 200 feet high; while, by an ingenious dispensation of providence, the only spots which appeared practicable, were met on the other side by perpendicular precipices of smooth rock. We at length settled on a vulnerable point, where we attacked it, and I don't know to this day how we got over it, much less how we got back again, for the only footing we had was on what appeared to be a series of icicles with their points in the air.

At last we got upon the rocks, and after clambering up them for about 100 feet, we gave it up. Their difficulty (which is only apparent on actual trial, for they seem perfectly easy from a distance) consists in their size. They lie in great convex flakes, the tops of which form, indeed, a charming flight of steps all the way up to the top, but in order to make use of them in this way, some member of the Alpine Club must be found whose legs are full twenty yards in length.

I never was so much astonished by anything as I was by the view from the point we reached, to which a boiling water observation gives a height of 12,200 feet. We looked right over the Aiguille du Moine to the magnificent pile formed by the Chamouni Aiguilles, Monts Maudits, and Mont Blanc, while the glaciers of Talèfre and Léchaud appeared to equal in size the vast ice-fields of Monte Rosa, and in the former the little speck occupied by the Jardin was completely lost.

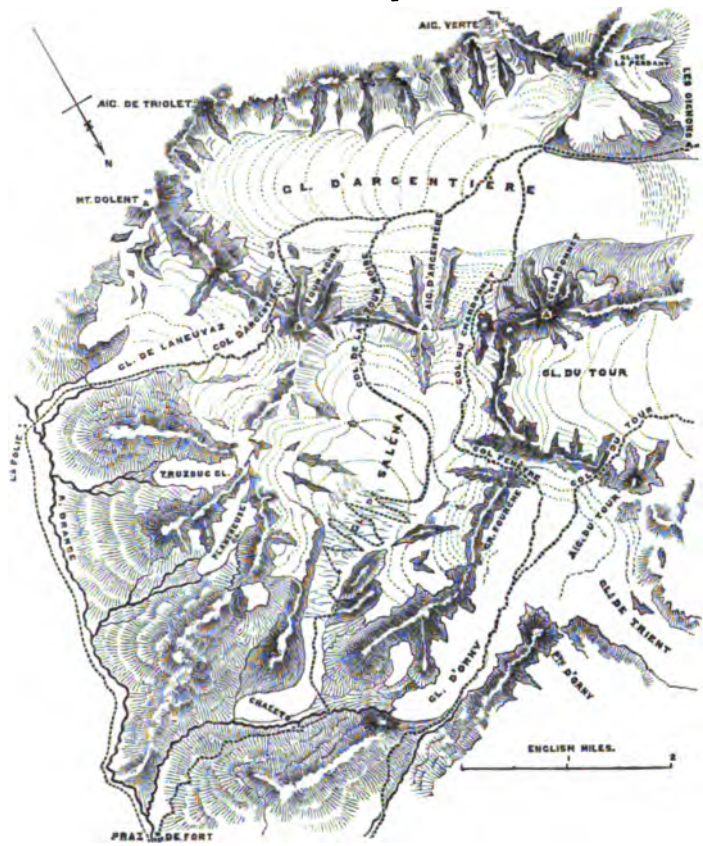
Two new passes, one by the Col de Triolet, the other by the Glacier de Pierre Joseph, close to the Aiguille de Léchaud, may perhaps be made from Chamouni to the Col Ferrex, but the descent on the southern side is doubtful. It would be

however easy to make a variation of the Col du Géant, by crossing near the second Flambeau from the Glacier du Géant to the Brenva, and descending by it. A new pass might also be made from the Glacier de l'Allée Blanche to that of Trélatête, as a route from Courmayeur to Nant Bourrant, Mr. Tuckett's Col de Trélatête lying at the other side of the Aiguille du Glacier. This expedition might include the ascent of the Aiguille de Trélatête, which, as well as the Miage, is quite practicable; I cannot, however, say as much for the Aiguille de Bionnassay.

There are many other summits in the chain which have been as yet untried; the Chardonnet, Aiguille d'Argentière, Mont Dolent, and lastly the Grandes Jorasses, the last home of the bouquetin in the chain of Mont Blanc, offer, I think, a very fair prospect of success, and I hope it will not be left to foreign Alpine Clubs to carry off the fine peaks which yet remain unconquered in the chain of Mont Blanc.

THE COL DE LA TOUR NOIRE. By H. B. GEORGE, M.A.  
Read before the Alpine Club, May 3, 1864.

ONE evening in last July, my friend Mr. Macdonald and I, emerging from the table d'hôte at Chamouni, took leave of a company of friends immortalised in the next Chamouni paper as 'the respected President of the Alpine Club, with a large number *de ses plus agiles grimpeurs,*' and mounted a vehicle to drive to Argentière. Guides always keenly enjoy being conveyed by other locomotive powers than their own legs, and it was with some amusement that we heard Melchior and Almer on this occasion praising us for asserting the dignity of Englishmen and Oberlanders before the eyes of the assembled natives. We had no idea, when we yielded to natural after-dinner laziness, and gave them leave to order a carriage, that we were being dexterously utilised by our guides to instil a moral lesson into Chamouni. Our destination was Martigny; but we knew the Tête Noire so well, that we thought it would be more entertaining and no real loss of time to cross the Col d'Argentière, instead of that charming but scarcely exciting pass. We should have missed a good deal of adventure, and others would have been spared the trouble of reading this paper, if any of us had known about the Col d'Argentière a quarter as much as we all knew of the Tête Noire. An hour's drive, some coffee, three or four hours' bed, and we were ready to start—earlier, very fortunately, than would usually be necessary for



THE EAST END OF THE CHAIN OF MONT BLANC.



reaching Orsières by the Col d'Argentière; for we had left everything we possessed to be carried over to Martigny by a passing mule, and intended ourselves to reach that haven of comparative luxury by nightfall, if all went well.

A native with a lantern, which for once was not altogether useless, showed us the devious track which winds up the left bank of the stream, and eventually of the glacier, and continued his attendance long after all signs of path had vanished, till at about 5.30 we began to think the glacier promised better walking. Accordingly the porter was sent back, and Almer and Melchior transferred to their own backs the scanty store of provisions which, in anticipation of a supper at Orsières and very likely another at Martigny, we had deemed sufficient for the day. After walking a short distance we found ourselves fairly on the upper level of the glacier, which being as flat as the great Aletsch or the Finsteraar, and equally free from crevasses, allows ample scope for observing the neighbouring mountains, during the somewhat long process of walking straight up its axis. First in prestige as in height was the Aiguille Verte, presenting on this side a rocky wall intermediate between its icy crown and the mixed slopes that cover its base, up which it seemed as if no human skill could devise a passage. Not many days before Almer and I had been gazing on the Grandes Jorasses from Courmayeur, and speculating how that could be climbed, and it seemed to both of us as if the Verte presented from this quarter a task somewhat similar, but rather more difficult. On the opposite side of the glacier rose a series of peaks which we, after some desultory guessing, gave up the attempt to identify, and turned our attention to the more practical problems of discovering the exact locality of our col. The head of the glacier, where I at least, on the delusive authority of our only map, was inclined to look for it, was closed by a semicircle of dark rocks, all the more forbidding from the deep shadow they cast at their feet, and rivalling in steepness the well-known 'cirque' of the Oberaarhorn. Nothing short of an eagle could be expected to cross such a place, and yet somewhere there, if the map was worth anything, lay the well known Col d'Argentière. The guides simply shook their heads when I showed them the map, and pointed up towards the frowning wall in front, and though I murmured something about the col being behind a shoulder (which it in fact was, though not where I placed it), I could not help feeling that the inexorable logic of facts was dead against me.

On our left there appeared easy access to either of two cols, very near together: and the guides, having been told by some

mythical friend to keep well to the left, were certain that one of those was our destination. After some hesitation we determined to go up to the nearest col, and if that did not promise well, to return and try our luck with the second. As we did not find it necessary to return, I may as well state at once that the second apparent col was a mere optical delusion, being simply a gap between two spurs of the Tour Noire, of which the summit was too far back to be within our sight. Almer seized a crust and pushed on alone to explore, while the rest of the party made a slight meal and followed more leisurely. The slopes of névé were not much broken by crevasses, and our progress was easy and rapid, though the space to be traversed proved considerably greater than we had anticipated from below. As we came in sight Almer appeared on the col, telegraphing to the effect that it was all right; and we presently mounted a few yards of broken rock and looked over to the east. Macdonald and I turned and gazed in each other's faces, as if expecting to find there a solution of the very difficult question where the way down was likely to be: and then we were suddenly reminded, by a gust that nearly settled the doubt in a manner more speedy than safe, that there are more convenient places for discussing geography than a narrow col when a hurricane is blowing. We scrambled along the rocks to the left and sat down in a nook, sheltered indeed, but most inconveniently constructed for human habitation, to consider the prospect for ourselves, and wait while the guides did a little private exploration. It certainly looked extremely ugly; a very steep slope, a great deal more icy than was pleasant, through which ribs and patches of rock projected slightly, descended from our feet further than we could see; for at some distance down the incline became greater, and our gaze passed abruptly to the level of the glacier far below. The sky was cloudy, so that we could not judge by the view; and we knew that the worst difficulties in crossing the Col d'Argentière were immediately below the summit on the eastern side. So without much hesitation we accepted the conclusion of the guides that we had come to the right col, and began to speculate how the wind would please our friends at Chamouni, who ought by this time to be on their way up the Aiguille du Goûté.

After a somewhat long delay the guides reappeared; and at 10:45 we left our lair, and began to descend the ice-steps which had been cut down to the head of the most eligible ridge of rocks. There was nothing of the arête and couloir pattern about the slope to which we were now committed. It was a smooth wall of ice, with very slight ridges of rock at wide and irregular in-

tervals protruding to break the regularity of the surface, and none of them continued to any great length, so that with the most dexterous steering it became frequently necessary to cut steps in order to pass from one ridge to another.

The process of descending was necessarily very slow and laborious—one guide in front spying out the way while the rest waited till he had reached his utmost tether, then Macdonald and myself in succession scrambling to where the leader was, and the last guide finally clattering down as best he could, while we all stood ready to check his career if he acquired too great momentum—and then the whole formula repeating itself over and over again like a recurring decimal. Once Macdonald let his axe fall, and the monotony of our operations was thereby varied to him for some three quarters of an hour by having to do without a pole. This naturally decided our course for some distance, in order that we might descend on and recover the truant. Great events proverbially often hang on small causes; but for the casual rock which knocked the axe out of Macdonald's hand, we might never have come in for the diversions incidental to the lower portion of our descent. It is at least equally possible, however, that we might otherwise have found far greater difficulties in escaping off the wall than those which we actually encountered; for on looking back from the level of the glacier at the slope down which we had come, no one line of descent seemed at all less ineligible than the rest.

Soon after the recovery of Macdonald's axe we reached the lower end of a line of rocks, all around which an unbroken surface of ice extended for a disagreeably long distance, so that it was clear a tedious staircase must be made. We accordingly settled ourselves in the least inconvenient seats available, and Almer began step-cutting, Melchior gradually paying out the rope which was fastened round his waist. After a little time Melchior grew impatient, and went off to help Almer, handing over the reins to me. He could, however, do very little to expedite matters, for on so steep a slope Almer was obliged to hew out very large and deep steps before he could safely stand in them to continue cutting below him. Presently, the whole of our rope, 110 ft., was paid out, and the staircase still far from complete. I shouted to Melchior, who came back and gathered up the rope, and then, returning to Almer, henceforth contented himself with keeping a firm hold, in order to render instant aid should Almer make the least feint at a slip. In course of time they reached the further rocks, having expended an hour in cutting fifty-nine steps, and returned with all speed to us. Almer's

labours had been so severe that he was naturally somewhat exhausted, and we therefore dined before advancing any further, consuming at this meal our last bottle of wine.

Two hours more of the same sort of work as we had gone through above brought us to the foot of the lowest rocks anywhere visible. But we were still very far from having reached the bottom of the wall. The slope at our feet seemed to become steeper at every step, so that we could see nothing of what intervened between us and the level basin of the glacier, still several hundred feet below. The various shades of colour showed that the surface of the slope was not uniform; welcome patches of shining snow were intermixed with unpromising pale blue, and the still more ominous dead dull white which betokens a rotten surface concealing hard ice. We picked our way as best we could, in whatever direction the snow lay widest, hewing steps where necessary, and making no very rapid progress downward, when all at once the terrible word *bergschrund* seemed to rise simultaneously to everyone's lips. Where the first definite suggestion came from I cannot tell; but there suddenly started into existence a fixed idea on the subject in all our minds, as if some chemical process had precipitated what had before been in solution. Presently as we edged down lower and lower, the space visible between us and vacancy gradually diminishing, we came to a patch of deep snow that extended downwards the thirty feet which were all that we could see. The guides proposed to make use of this spot, where we could fix ourselves quite firmly, and let down some one to reconnoitre below. Accordingly Macdonald was selected as being by some two stone the lightest of the party, the rope was fastened round his body, and the rest made themselves quite secure in the snow up to their knees. Macdonald lay down on his back, and was lowered slowly foot by foot, till, where the slope seemed to curve over, the strain on the rope increased mightily, and he sank out of our sight with ominous rapidity. He shouted to be let down faster, but this was easier said than done; after paying out some 60 feet, however, the strain ceased, and Macdonald announced that he was safe over the *bergschrund*, with nothing but a very steep slope of soft snow between him and the level of the glacier. To our enquiry whether any one else should follow, Macdonald returned a somewhat hesitating affirmative; so the rope was drawn up, and Macdonald cut off for the moment from all connection with the rest of the party.

The next step was the decisive one, in defiance of all the proverbs which attach pre-eminent importance to the first. For



though Macdonald might be dragged up again by the united efforts of the other three, it was impossible for Melchior and Almer, so situated, to pull my weight perpendicularly upwards, especially with the rope passing over an abrupt edge. However, without much hesitation, my axe and Macdonald's were flung far over, and the guides began to lower me down the channel of snow. I kept my feet raised in order to facilitate the sliding process, so that it was without the slightest warning that I suddenly found myself dangling quite free in air. A huge mass of icicles broke at the same moment under my weight, and went thundering down—on Macdonald's head, as I could not help fearing. But he had fortunately moved some little distance from the exact spot to which he had been lowered, and was out of harm's way. Macdonald showed me where the snow was firm, and I was speedily free of the rope and standing by his side safe over the bergschrund. The guides now began to ask what they were to do, a question which imposed on us a very serious responsibility; so in order to let them judge in part for themselves, we began explaining the nature of the place. The mouth of the bergschrund, which of course opened not vertically but at something approaching a right angle to the surface of the slope, was considerably choked with snow, so that as we dropped perpendicularly from the upper lip we descended on snow firmly adherent to the lower edge, and found ourselves practically safe beyond the chasm. But the height was, on a careful estimate, 30 feet, no trifling distance for a man to drop unchecked, even into soft snow; and not seeing how else the last man was to come, we hesitated to advise that either guide should be let down. As neither party could see the other, nor hear very distinctly what was said, the conference was carried on under considerable difficulties, none the less so because, in the excitement of so peculiar a situation, the guides relapsed into Oberland patois, and we felt a strong inclination towards our mother-tongue; and we could not feel sure that we had made the guides understand the exact state of affairs. Presently an axe flew over our heads to join the two that had been reposing for some minutes far below, and Almer soon appeared hanging in mid-air, and apparently as much astonished at his position as we had successively been. As soon as he reached *terra firma*, we held a hurried consultation as to the course to be pursued by Melchior, who was waiting above to be guided by our directions. Almer did not at all like telling him to creep down to the edge and drop the 30 feet, though, as it turned out, this would have been the best course, and shouted to him to make his way towards the right, where at some little

distance the bergschrund was much narrower, though the slope below as well as above consisted of ice, intending himself to work along the lower side of the crevice and meet him.

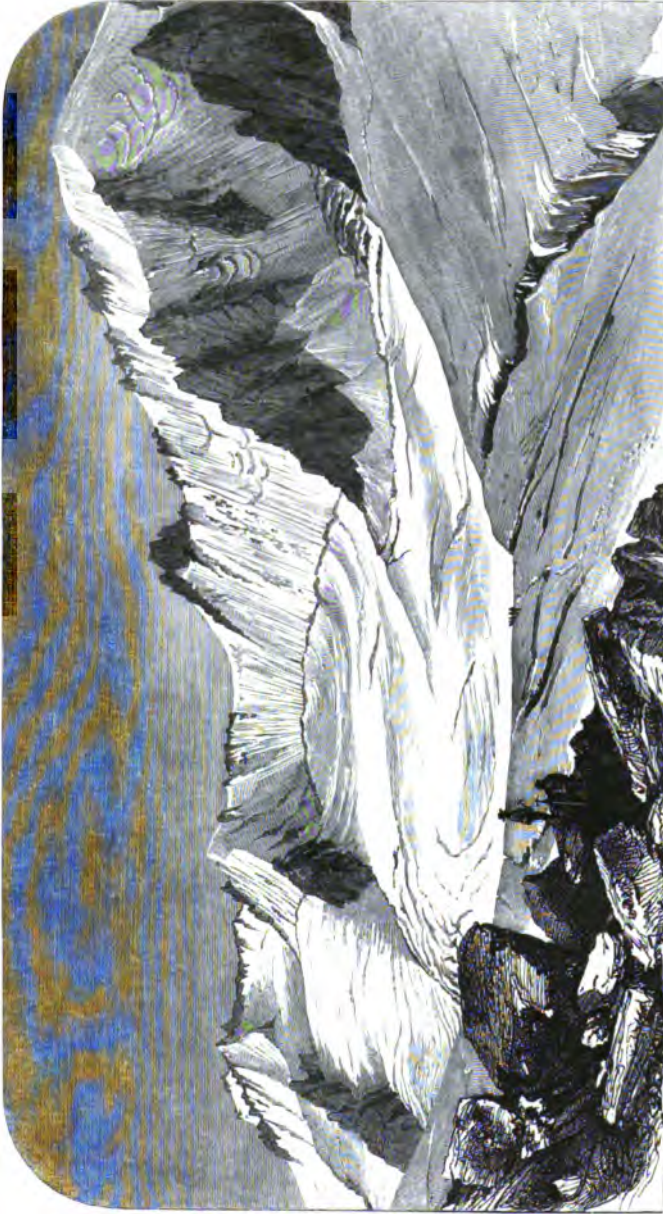
Before Melchior had gone many steps he had to begin cutting his way, and in his impatience to rejoin us was not very anxious to cut the footholes deep, but contented himself with mere scratches that gave very insecure hold, as the surface was rotten. As he was cutting the fourth or fifth step, the rotten ice gave way under one foot, the weight of some 70 feet of rope hanging to his waist pulled him downwards, he lost his balance, slid to the side of the bergschrund, and fell heavily over. Fortunately he had not gone very far, and the lower edge where he fell, as where we had been let down, was well cushioned with snow, but firmer and mixed with lumps of ice, rendering it by no means the perfection of a feather bed. We all rushed towards him, too eager to be frightened, and were delighted to find that, though shaken, he had suffered no serious injury. A little brandy soon restored him to activity, and he never felt, or at least confessed feeling, any subsequent hurt from his fall. One disagreeable result of the accident was immediately discovered; the axe had escaped from his hand in the struggle to regain his balance, and whether it had remained fixed in the ice above as Melchior believed, or had fallen into the crevasse as Macdonald thought he had seen, was at any rate irretrievably lost. It was Almer's axe, the companion of all the ascents he ever made, which Melchior had retained as a better ice-weapon than his own, and therefore the loss was especially grievous. But it was no use searching; the trusty servant had cut its last step, and found a not inglorious sepulchre. So we coiled up the rope, and each sliding separately down the steep bank of snow, in a few moments rejoined our remaining axes on the level of the glacier.

It was now 5.10 P.M.; we had been six hours and a half descending the wall, which we estimated at not much over 2,400 feet. We were nearly in the middle of the huge semicircle which bounds the head of the glacier, and the incline of the ice, such as it was, led us rather to the left, more or less in the direction of a col, which I now believe to have been the Fenêtre de Saléna, over which we at one time thought it might possibly be most desirable to pass. But the idea of reascending so late in the day was distasteful, and the sight of a track leading down the glacier (by whom made, or for what purpose, it baffles all ingenuity to conjecture), decided us against taking any line of our own. If we had had the faintest idea that we were on the Glacier de Saléna, or had followed the first impulse, we might

*La Tour Noire.*

*Col de la Tour Noire.*

*Alp. d'Argentine.*



**THE AIGUILLE D'ARGENTIERE, COL DE LA TOUR NOIRE, ETC.**



have spent the night at Orsières instead of in the middle of the glacier; for I believe the remaining three hours and a half of daylight would have taken us off the Glacier d'Orny. But the *Wildschütz*, or whatever malignant demon made the tracks on the snow, inspired us with fatal confidence, until it was far too late to change our minds. A little before six we found a pool of water on the glacier, which, as our wine had long been gone, was very acceptable; and, being then under the spell of the footprints, we sat down and made such a meal as our stores admitted. The bread was soon finished, and a bit of cheese eaten alone by way of supplement: and the water was faintly diluted with the few spoonfuls of brandy that remained in the flasks, which, being seldom used, had been long unreplenished. While eating we gazed, with a curious feeling that it was all a dream, at the wall\* down which our course had lain, and were unable to discover our own route, or trace out any that looked at all hopeful. 'Well, Melchior, do you think we came the usual way down?' said Macdonald. 'Nein, herr,' was the instant reply of both guides. 'Do you still think the Col d'Argentière is anywhere there?' Melchior dallied with his leathern cup, and grimly put the question by: 'You see, herr, it might be very different later in the year.' After all this was a merely speculative difficulty, and the question how soon we should get to the end of our day's work had much more practical importance in our eyes. We still hazily believed this to be the Laneuvaz glacier, short and easily traversed, and confidently pushed on downwards, as the treacherous footmarks led us.

For a short time it was all plain sailing; and the shape of the glacier being such as to prevent our looking far ahead, we did not see the difficulties that were coming until we were fairly entangled. When we reached the snow line all signs of the track which had so far guided us of course disappeared, but it was not until some time afterwards that we discovered ourselves to be completely trapped. The huge mass of the glacier squeezes itself, soon after the incline begins, through a narrow neck, producing the necessary results, total dislocation of its structure and smoothness of the steep bounding sides, as we should of course have anticipated could we have seen the shape of the valley. Even yet we did not know the whole of what lay before us; all hope of sleeping at Orsières that night had long vanished, but as we came to the beginning of the ice-fall,

\* See Frontispiece. Mr. Reilly's sketch was taken from a point somewhat more distant, but gives the same general view as we had from this spot.

and for the first time could see some way ahead, we fancied that we descried a chalet colony (nearly where we actually found one next day), and calculated pretty confidently on reaching it. But instead of a short and decisive ice-fall, with a level stretch of glacier below it, we had a protracted misery, the incline being decidedly less than that of the Glacier du Géant, and the length indefinitely greater.

When we found ourselves among crevasses any number of feet deep and wide, averaging in length half the width of the glacier, we began to recognise the fact that we were in for a very pretty business. Melchior first, and then Almer, took to rushing off to inspect each side of the glacier alternately, in order to discover if possible a way off it to the rocks, or a moraine which might admit of more direct progress. Very little time was lost by these manœuvres, fruitless as they were, since the guides thereby obtained hints for our guidance through the labyrinth, and our progress, though slow, was tolerably sure. During all these operations I had one private source of satisfaction which gave me a decided advantage over Macdonald: since the loss of Almer's axe, mine had become by common consent the leading ice-cutter, on the strength of which fact I laid much flattering unction to my soul, as the axe was of my own devising. It must be confessed, however, that the most triumphant reflections are not half so useful a support as a stout ash pole, when one is walking along a narrow rib of ice, loaded with coils of wet rope; and I was most ignominiously glad when either Almer or Melchior could spare me an axe, or an occasional grasp of the hand. The work was frightfully hard for the guides, as owing to the enormous length of the crevasses it was frequently necessary to descend into them and scale the opposite side, operations which involved continual step-cutting, all the more as the fading light rendered it harder to see accurately where we were placing our feet. The guides were most zealous in rendering us all the assistance in their power; and it was probably good economy of time for them merely to scratch the footholes, and supply the deficiency to us by a hold on the rope or an outstretched hand. We never took the trouble to fold up the rope, which, as it was very wet, would have been a long job, but kept it attached to Macdonald and myself, each of us dragging superabundant coils as best he could, while the guides at intervals linked themselves on, or cast it off again, according to the convenience of the moment.

It was very nearly dark, when going on a few steps before Almer, who, having helped me down an awkward place, was waiting to render the same aid to Macdonald, I caught sight of

what at once struck my fancy as the very ideal of luxury and comfort. Down in a hollow of the glacier, so that probably the wind would blow over and not through the surrounding domain, rose a magnificent hotel, built of fine masses of granite. I instantly shouted to my companions that here we should do very well for the night, and hastened to ensconce myself in an airy upper chamber. The guides silently disappeared in opposite directions, leaving Macdonald and the rope shivering before the front door, but returned in two or three minutes to say that they could see nothing elsewhere nearly so comfortable; and in fact it had grown so dark that further progress would have been simply impossible. Melchior now brought his genius for discovery to bear upon our palace, and soon showed Macdonald a snug ground floor apartment, even better furnished than mine above, of which he took immediate possession. Some few compliments passed between us on the subject of my boots, which persisted in hanging out of the window, in a manner highly indecorous but under the circumstances perhaps excusable, and endangering the symmetry of Macdonald's nose. And then, partly for company, and partly because the rain began to beat in an irritating manner upon the roof, I went down the back staircase, came round to the front, and took up my permanent abode alongside of Macdonald.

Our hotel consisted mainly of a mass of rock, having an irregular flat surface seven or eight feet square, inclined at an angle of about  $40^{\circ}$ ; across it ran a slight ledge, just sufficient to give us a little support as we lay, and prevent all our weight from being sustained by our feet. Against this rock rested another, which so far overhung the first as to form a decided acute angle with our bed, and sheltered Macdonald, who on all legal principles whatever was the rightful owner of the warm corner, from most of the rain that fell. I put on my gloves, gave Macdonald as a substitute for gloves a pair of socks which were in my pocket by mistake; and then, having thus warmly wrapped ourselves up, we hitched ourselves on to the ledge across our stony Bed of Ware, and pretended we were going to sleep. The guides declined lying down, and preferred to seat themselves on some outlying fragments of stone, whence, to the best of my belief, Melchior never stirred till daylight. Almer once or twice came and took a nap lying on my legs, a manœuvre which tended to make me a trifle less cold, but also crushed my unfortunate limbs to an extent only endurable for a little while at a time. Macdonald, well squeezed into the angle, and with me lying outside him, slept in a manner which excited my ardent admiration, and grumbled sleepily whenever

I pulled the blanket off him by rising to select a new position in which to fight the losing battle between my bones and the granite. Most of the night it rained more or less; and gradually the comfort of being fairly wet through made us indifferent on this point, and even well satisfied with the presence of the heavy clouds, which at least tended to render the air less chilly.

At length, though from our position and the state of the weather no visible signs of dawn appeared, it became light enough for me to read the figures on my watch, and we hailed this as a criterion of being able to see our way sufficiently for a start. Half-past three! we had been seven mortal hours crouching wearily there, and longing for this blissful moment, and now we were almost unwilling to move. Macdonald paid the penalty of his comparatively long sleep, by being even colder and more miserable than the rest; but we were none of us at the moment thoroughly grateful for our night's entertainment. It is true there was no bill to pay, but then there was no breakfast, there had been no supper, and we bade adieu to our palace without feeling the least wish ever to visit it again.

For the first few minutes we tumbled about as though we had been indulging not only in supper, but in an extensive sequel thereto, but before long we recovered our glacier legs, and found a repetition of our evening's performances warming at least, if not so amusing as usual. After about an hour and a half of dodging and scrambling among the séracs, zigzagging along the deep but unscientifically formed trenches in a manner worthy of the most orderly approaches to a besieged fortress, we found ourselves able to effect a lodgment on the solid ground of the left bank of the glacier. For the first time in my life I was heartily glad to quit the ice, while Macdonald, whose attachment to rocks is notorious and constant, and not, like mine, the mere result of a temporary quarrel with glacier, was loud in his exultation, though, as it turned out, his triumph was somewhat premature. In a few minutes we came upon a tiny rill of water, trickling down to hide its dirty self under the glacier, and of course halted to quench our burning thirst. Drinking very naturally suggested eating, and it was proposed and carried unanimously that the provision knapsacks be carefully overhauled. The search brought to light the following articles:—

- 1 lump of cheese, amounting by estimate to six cubic inches;
  - 1 scrap of mutton, rather smaller;
  - 1 small tin containing remnants of butter;
- all of which were displayed on a convenient stone, and devoured



by our hungry eyes long before the slow material knife had done its work of partition. After consuming the two first courses, with plentiful draughts of fine old Adam's ale, from a tap which probably no human being ever tried before, or ever will taste again, came the final treat of butter, which Macdonald and the guides ate with the relish of Esquimaux, while I vainly envied their all-accommodating tastes, and found consolation in abusing the delightful food which I could not persuade myself to swallow.

We had not made more than ten minutes' further progress when we found that our valued *terra firma* was turning into moraine, almost as much crevassed as the glacier itself, and that in fact the balance was against our present line, on account of the impossibility of cutting steps. So we once more returned to our old enemy in despair and weariness of spirit, and recommenced trench-work. However we were now very nearly out of the labyrinth; a quarter of an hour's advance brought us at length on a fairly level and unbroken reach of the glacier, and we pressed on eagerly. The surface was glassy-smooth with the rain which had fallen during the night, rendering a deliberate slide the safest and easiest mode of passing over every portion at all inclined, and forcing us to cut many a step that in an ordinary way would have been quite unnecessary. We were now so much nearer to the spot where, on the preceding evening, we had imagined châteaux, that sundry unmistakable traces of human neighbourhood were clearly visible, felled trees, and cattle straying about, and a scratch on the hillside that looked like a path. But we could not make out with certainty the châteaux themselves, and beguiled the time by asserting that we could see them, now here and now there, as the imagination of one or the other ran away with his sober judgment. In fact, as we afterwards saw, they were so far hidden, both by the shape of the ground and by trees, that it was hardly possible for us to have made them out, had we known their exact situation. At length, nearly three hours after our first start, we finally quitted the glacier, and found ourselves on a rough apology for a path along its left bank, which in about forty minutes led us to the long-desired châteaux.

Some little shouting brought to light a stolid youth, the sole occupant of the establishment, who in reply to our eager demands afforded us the delightful tidings that there was no milk, no bread, and no cheese. We were on the point of starting off in despair, infinitely more hungry and tired than we had felt five minutes before, when his good genius prompted some one to ask the lad if he had anything at all to eat. He unwillingly

confessed that there were some potatoes, which he said he was forbidden to sell, though it is hard to imagine what customers his master expected to have applying for them; and, fortunately for us, he had just been cooking his full supply for about two days. An iron pot, full of very dirty pieces of potato, was speedily produced, and we proceeded to consume a large portion of its contents, dirt and all, lubricated with the last scraps of our all-sufficing butter. When hunger was so far appeased as to give our jaws leisure to perform other work than munching, we began for the first time to debate about what we had done; and as the map did not materially assist us, the native was called in as umpire. 'What's the name of this glacier?' we asked, other questions having failed to elicit a spark of intelligence. 'Glacier de Saléna, messieurs,' said the youth, brightening up at being asked something he knew. The confession is ignominious, but the first thought which found expression from both Macdonald and myself was—'Thank goodness, then we're two hours nearer Orsières and breakfast than we supposed.' Almer and Melchior showed a much more fitting sense of what was due to the occasion, and soon recalled our thoughts to the curious fact that we had made, entirely by mistake, a new pass which no one had even known to exist.

The performance, from a geographical point of view, was well worthy of some consideration; we had finally settled the long-debated question about the relative positions of the heads of the Argentière, Tour, and Saléna glaciers, which every successive map had professed to explain in a different way, with no practical result beyond throwing a fresh shadow of doubt over the whole affair. By a novel application of the stereoscopic principle we had fused the Savoyan Aiguille d'Argentière, and the Swiss Pointe des Plines into one homogeneous mountain, and reduced the broad expanse of no-man's-land, supposed to lie at the junction of the three glaciers, to a stony ridge some four feet wide. We knew long before from the logic books that a fallacy, under certain circumstances, *solvitur ambulando*: and here was a startling practical illustration of the way to do it. The upper half of the Tour glacier, and all the array of attendant delusions, had vanished off the face of nature under the disenchanting touch of our prosaic boot-nails. We did not of course at the time understand the whole geography of this intricate region, which Mr. Reilly's careful explorations have now fully explained. I hope that sheet XXII. of the Federal map will some day be altered according to his survey, and leave no longer a debateable land to tempt the French fancy for annexation.

After paying about four times their value for the potatoes, we set off down the path, which the lad assured us would lead in a 'grande heure' to Orsières. And a very great hour we found it; for though Macdonald and I walked at a tearing pace, leaving the guides to follow as they pleased, it was nine o'clock by the time we reached Orsières. After washing till all the water allowed us was on the floor, and breakfasting leisurely, we ordered out a char for Martigny. As the guides did not answer to repeated calls, we went in search of them, and found them sitting, with a loaf and some wine standing untouched on the table between them, both sound asleep. Never had men a much fairer right to be dead tired; we had been thirty-one hours crossing from Argentière to Orsières, more than twenty-five of them on ice, or the still less easily traversed rocks of the wall; and during the whole time they had worked with a good-will and cheerfulness which no difficulties or fatigue could impair, ever ready, as much after their sleepless night as on the first steps down from the top of the pass, to offer us every possible help, and never allowing a word of despondency or grumbling to escape their lips. The skill of both Melchior and Almer as guides is so universally known to be beyond all praise, that it might seem almost insulting for me to say a word in honour of it; but our wonder at their extraordinary powers was nearly lost in admiration for those still higher qualities to which a most crucial test had been applied. Rivals in reputation, they yet work together like brothers; and whether it be for utter absence of all mean jealousy, for willingness to work and care for the safety of their *Herrschaft*, or for thorough honesty and unselfishness, either of them may be regarded as the very standard of excellence to which all other guides are to be compared.

A hot sleepy drive to Martigny, and an afternoon of loafing, brought to a luxurious close a day which had begun so differently. And here, with the first passage, the history of the Col de la Tour Noire will, I am afraid, virtually terminate. That it is a pass, which some of our friends have been rash enough to deny, may be proved by unanswerable syllogism, as thus:

Between every two adjacent peaks there is a pass.  
The Tour Noire and Aiguille d'Argentière are adjacent peaks.

∴ There is a pass between them.

But I fear I must admit that it presents few advantages as a practical through route between Chamouni and the St. Bernard valleys, though to the mountaineer in search of novelties it offers some very pretty scrambling, and the chance of one

or two strong sensations. To those intending to try it I can only suggest one piece of advice: insure your lives before starting, or, what is the same thing, take Almer and Melchior as your guides.

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NARRATIVE OF THE FATAL ACCIDENT ON THE HAUT-DE-CRY, CANTON VALAIS. By PHILIP C. GOSSET.

IT has often occurred to me, when walking on hard snow in winter, that a mountain ascent at that period of the year might be made with much less difficulty and trouble than in summer. With this view I made several excursions in winter, and came to the conclusion that the mean temperature at a certain elevation, up to 8,000 feet, is not so low as might be expected. In some cases I believe it to be higher than in the plain of Switzerland. The plain is covered with fog for weeks in winter. In the morning the fog lies close to the earth, at noon it rises to the height of a few hundred feet, and in the evening it comes down again. During three weeks running, often longer, you cannot see the sun, and the ground is frozen hard. Above the fog the sun is shining brightly on the mountain peaks. It is therefore easy to understand that unless the fog is kept off by a strong NE. wind (which is generally not the case in winter at least), the temperature of the upper regions is higher than that of the plain. As an example tending to prove this assertion, I may mention that I have found flowers blooming on arêtes on the Rothhorn and Niesen at the height of 7,000 feet, when there was not a flower in the plain of the Canton of Berne (on December 31, 1861, and on February 4, 1860). Amongst these flowers were the *Gentiana verna* and *Viola calcarata*.

My friend B. was familiar with mountains in winter; he had been up the *Æggischhorn* and *Riederhorn* in December, 1863: easy as these points may be to reach in summer, in winter, if the snow is not hard, the question is very different. On February 28, 1864, we left Sion with Bennen to mount the Haut-de-Cry. We started at 2.15 A.M. in a light carriage that brought us to the village of Ardon, distant six miles. We there met three men that were to accompany us as local guides or porters, Jean Joseph Nance, Frederic Rebot, who acted as my personal guide, and Auguste Bevard. We at once began to ascend on the right bank of the Lyzerne. The night was splendid, the sky cloudless, and the moon shining so as to make walking easy without the use of a lantern. For about half-an hour we went up through the vineyards by a rather steep

path, and then entered the valley of the Lyzerne, about 700 feet above the torrent. We here found a remarkably good path, gradually rising and leading towards the Col de Chéville. Having followed this path for about three hours we struck off to the left, and began zigzagging up the mountain side through a pine forest. We had passed what may be called the snow-line in winter a little above 2,000 feet. We had not ascended for more than a quarter of an hour in this pine forest before the snow got very deep and very soft. We had to change leader every five or six minutes, and even thus our progress was remarkably slow. We saw clearly that, should the snow be as soft above the fir region we should have to give up the ascent. At 7 A.M. we reached a *châlet*, and stopped for about twenty minutes to rest and look at the sunrise on the Diablerets. On observing an aneroid, which we had brought with us, we found that we were at the height of about 7,000 feet: the temperature was  $-1^{\circ}$  C.

The Haut-de-Cry has four *arêtes*: the first running towards the W., the second SE., the third E., and the fourth NE. We were between the two last-named *arêtes*. Our plan was to go up between them to the foot of the peak, and mount it by the *arête* running NE. As we had expected, the snow was in much better state when once we were above the woods. For some time we advanced pretty rapidly. The peak was glistening before us, and the idea of success put us in high spirits. Our good fortune did not last long; we soon came to snow frozen on the surface, and capable of bearing for a few steps and then giving way. But this was nothing compared to the trouble of pulling up through the pine wood, so instead of making us grumble it only excited our hilarity. Bennen was in a particularly good humour, and laughed loud at our combined efforts to get out of the holes we every now and then made in the snow. Judging from appearances, the snow-field over which we were walking covered a gradually-rising Alp. We made a second observation with our aneroid, and found, rather to our astonishment and dismay, that we had only risen 1,000 feet in the last three hours. It was 10 o'clock: we were at the height of about 8,000 feet; temperature =  $-1.5$  C. During the last half-hour, we had found a little hard snow, so we had all hope of success. Thinking we might advance better on the *arête*, we took to it, and rose along it for some time. It soon became cut up by rocks, so we took to the snow again. It turned out to be here hard frozen, so that we reached the real foot of the peak without the slightest difficulty. It was decidedly steeper than I had expected it would be, judging

from the valley of the Rhone. Bennen looked at it with decided pleasure; having completed his survey, he proposed to take the eastern arête, as in doing so we should gain at least two hours. Rebot had been over this last-named arête in summer, and was of Bennen's opinion. Two or three of the party did not like the idea much, so there was a discussion on the probable advantages and disadvantages of the NE. and E. arêtes. We were losing time; so Bennen cut matters short by saying: 'Ich will der Erste über die arête!' Thus saying, he made for the E. arête; it looked very narrow, and, what was worse, it was considerably cut up by high rocks, the intervals between the teeth of the arête being filled up with snow. To gain this arête, we had to go up a steep snow-field, about 800 feet high, as well as I remember. It was about 150 feet broad at the top, and 400 or 500 at the bottom. It was a sort of couloir on a large scale. During the ascent we sank about one foot deep at every step. Bennen did not seem to like the look of the snow very much. He asked the local guides whether avalanches ever came down this couloir, to which they answered that our position was perfectly safe. We had mounted on the northern side of the couloir, and having arrived at 150 feet from the top, we began crossing it on a horizontal curve, so as to gain the E. arête. The inflexion or dip of the couloir was slight, not above 25 feet, the inclination near 35°. We were walking in the following order: Bevard, Nance, Bennen, myself, B., and Rebot. Having crossed over about three-quarters of the breadth of the couloir, the two leading men suddenly sank considerably above their waists. Bennen tightened the rope. The snow was too deep to think of getting out of the hole they had made, so they advanced one or two steps, dividing the snow with their bodies. Bennen turned round and told us he was afraid of starting an avalanche; we asked whether it would not be better to return and cross the couloir higher up. To this the three Ardon men opposed themselves; they mistook the proposed precaution for fear, and the two leading men continued their work. After three or four steps gained in the aforesaid manner, the snow became hard again. Bennen had not moved—he was evidently undecided what he should do; as soon, however, as he saw hard snow again, he advanced and crossed parallel to, but above, the furrow the Ardon men had made. Strange to say the snow supported him. While he was passing I observed that the leader, Bevard, had ten or twelve feet of rope coiled round his shoulder. I of course at once told him to uncoil it and get on the arête, from which he was not more than fifteen feet distant. Bennen then

told me to follow. I tried his steps, but sank up to my waist in the very first. So I went through the furrows, holding my elbows close to my body, so as not to touch the sides. This furrow was about twelve feet long, and as the snow was good on the other side, we had all come to the false conclusion that the snow was accidentally softer there than elsewhere. Bennen advanced; he had made but a few steps when we heard a deep, cutting sound. The snow-field split in two about fourteen or fifteen feet above us. The cleft was at first quite narrow, not more than an inch broad. An awful silence ensued; it lasted but a few seconds, and then it was broken by Bennen's voice, 'Wir sind alle verloren.' His words were slow and solemn, and those who knew him felt what they really meant when spoken by such a man as Bennen. They were his last words. I drove my alpenstock into the snow, and brought the weight of my body to bear on it. I then waited. It was an awful moment of suspense. I turned my head towards Bennen to see whether he had done the same thing. To my astonishment I saw him turn round, face the valley, and stretch out both arms. The ground on which we stood began to move slowly, and I felt the utter uselessness of any alpenstock. I soon sank up to my shoulders and began descending backwards. From this moment I saw nothing of what had happened to the rest of the party. With a good deal of trouble I succeeded in turning round. The speed of the avalanche increased rapidly, and before long I was covered up with snow. I was suffocating when I suddenly came to the surface again. I was on a wave of the avalanche, and saw it before me as I was carried down. It was the most awful sight I ever saw. The head of the avalanche was already at the spot where we had made our last halt. The head alone was preceded by a thick cloud of snow-dust; the rest of the avalanche was clear. Around me I heard the horrid hissing of the snow, and far before me the thundering of the foremost part of the avalanche. To prevent myself sinking again, I made use of my arms much in the same way as when swimming in a standing position. At last I noticed that I was moving slower; then I saw the pieces of snow in front of me stop at some yards' distance; then the snow straight before me stopped, and I heard on a large scale the same creaking sound that is produced when a heavy cart passes over frozen snow in winter. I felt that I also had stopped, and instantly threw up both arms to protect my head in case I should again be covered up. I had stopped, but the snow behind me was still in motion; its pressure on my body was so strong, that I thought I should be crushed to death. This

tremendous pressure lasted but a short time; I was covered up by snow coming from behind me. My first impulse was to try and uncover my head—but this I could not do, the avalanche had frozen by pressure the moment it stopped, and I was frozen in. Whilst trying vainly to move my arms, I suddenly became aware that the hands as far as the wrist had the faculty of motion. The conclusion was easy, they must be above the snow. I set to work as well as I could; it was time, for I could not have held out much longer. At last I saw a faint glimmer of light. The crust above my head was getting thinner, but I could not reach it any more with my hands; the idea struck me that I might pierce it with my breath. After several efforts I succeeded in doing so, and felt suddenly a rush of air towards my mouth, I saw the sky again through a little round hole. A dead silence reigned around me; I was so surprised to be still alive, and so persuaded at the first moment that none of my fellow-sufferers had survived, that I did not even think of shouting for them. I then made vain efforts to extricate my arms, but found it impossible; the most I could do was to join the ends of my fingers, but they could not reach the snow any longer. After a few minutes I heard a man shouting; what a relief it was to know that I was not the sole survivor! to know that perhaps he was not frozen in and could come to my assistance! I answered; the voice approached, but seemed uncertain where to go, and yet it was now quite near. A sudden exclamation of surprise! Rebot had seen my hands. He cleared my head in an instant, and was about to try and cut me out completely, when I saw a foot above the snow, and so near to me that I could touch it with my arms, although they were not quite free yet. I at once tried to move the foot; it was my poor friend's. A pang of agony shot through me as I saw that the foot did not move. Poor B. had lost sensation, and was perhaps already dead. Rebot did his best: after some time he wished me to help him, so he freed my arms a little more so that I could make use of them. I could do but little, for Rebot had torn the axe from my shoulder as soon as he had cleared my head (I generally carry an axe separate from my alpenstock—the blade tied to the belt, and the handle attached to the left shoulder). Before coming to me Rebot had helped Nance out of the snow; he was lying nearly horizontally, and was not much covered over. Nance found Bevard, who was upright in the snow, but covered up to the head. After about twenty minutes the two last-named guides came up. I was at length taken out; the snow had to be cut with the axe down to my feet before I could be pulled out. A few minutes after



1 o'clock P.M. we came to my poor friend's face. . . . I wished the body to be taken out completely, but nothing could induce the three guides to work any longer, from the moment they saw that it was too late to save him. I acknowledge that they were nearly as incapable of doing anything as I was. When I was taken out of the snow the cord had to be cut. We tried the end going towards Bennen, but could not move it; it went nearly straight down, and showed us that there was the grave of the bravest guide the Valais ever had, and ever will have. The cold had done its work on us; we could stand it no longer, and began the descent. We followed the frozen avalanche for about twenty-five minutes, that being the easiest way of progressing, and then took the track we had made in the morning; in five hours we reached Ardon.

I have purposely put apart the details I have been asked to give on certain points.

1. The avalanche consisted only of snow; the upper stratum was eleven days old. At the moment the avalanche started it was about twelve o'clock, probably a few minutes before. The temperature was then above freezing point, and we were within 300 or 350 feet from the summit. The snow was thawing, and the whole snowfield in a state of uncertain equilibrium. By cutting through the snow at the top of the couloir we cut one of the main points by which the snow of the two different layers held together; what led us into the error was, as I have before said, the fact that the snow was quite hard in some places, and quite soft in others. The avalanche may have taken a minute to descend; I can give no correct estimation on this point.

2. The rope was in my opinion the cause of my poor friend's as well as of Bennen's death. The following facts may prove it:—At the moment the avalanche started the first and last guides merely held the rope; Bennen had not seen the use of a rope at all, so we had been less strict than we should otherwise have been in its use. During the descent the rope caught, probably on a rock below the surface. This happened between Bennen and Nance, that is to say between the second and third man in the marching line. Nance told me afterwards that this was the worst part of the descent; he had the pressure of the snow on his body, whilst the rope nearly cut him in two. I believe it was at this moment that Bennen and B. lost their upright position, owing to the pressure of the snow on their backs. Nance also lost his position, but was fortunate in being thrown out horizontally, and that almost on the surface of the avalanche. I was between Bennen and B., but not tied to the rope, as I

had iron rings to my belt through which the cord ran. Rebot, who was last in the line, was thrown clean out of the avalanche; he was carried during the descent towards one of the sides of the stream. He was the only one of us who escaped unhurt. Thus, when we stopped in our descent, two only were tied to the rope, B. and Bennen—the very two who perished.

3. The congealing of the snow happened by pressure. The fore part of the avalanche stopped first, and the rest was forced against it. The circumstance I can least understand is the sudden fall in the temperature of the air after the accident. I can give no estimate of it, but it was intense.

4. The bruises Bevard, Nance, and I sustained were slight, but our feet were severely frost-bitten. Bennen has been accused of rashness in this unfortunate accident. It is not the case. He was misled by the total difference of the state of snow in a winter ascent from what is to be met with in summer.

THE GRANDES ROUSSES OF DAUPHINE. By WM.  
MATHEWS, JUN., M.A.

WHEN I had the happiness of standing on the summit of the Mont Pourri with my friend the Rev. T. G. Bonney, in August 1862, and of gazing upon the noble panorama of the Dauphiné Alps from that admirable point of view, our attention was attracted by a vast mass of glacier-clad mountain standing out by itself to the west of the main chain. We subsequently identified it as the Grandes Rousses, and when we drew up our programme for the campaign of 1863, we resolved that the ascent of its highest peak should be one of our first expeditions.

The district is so imperfectly represented upon all the maps hitherto published, that it was important to us to obtain some more trustworthy information, and I spent a day in Paris at the end of last July for the purpose of consulting the manuscript map of the French Government at the *Dépôt de la Guerre*. By the courtesy of the authorities I was permitted to inspect not only the Dauphiné sheets, but also those of the Maurienne, the survey of which had just been completed, and to make a rough tracing of them, which has formed the groundwork of the map accompanying this paper.

The Grandes Rousses is not a single peak, but a mountain range about eight miles in length, running NNE. by SSW., and steeper on the western than the eastern side. On the former it presents a lofty wall of crystalline rock, supported by projecting buttresses which rise out of a shelf of glacier rest-

ing upon a lower rocky wall. At the base of the latter is a narrow and nearly level tract, dotted with small lakes, west of which the country again falls rapidly. The whole of this side of the mountain is in Dauphiné, and most of the streams which flow from it find their way into the Olle, and thence into the Romanche below Allemont. On the eastern side the slope is



MAP OF LES GRANDES ROUSSES, SHWING MR. MATHEWS' ROUTE.

less rapid, and the glaciers are consequently more considerable. Of these the largest and most northerly is in the Maurienne, the remainder belong to Dauphiné.

According to the French engineers, the chain of the Grandes Rousses culminates in four principal peaks. The first or north

peak, situated on the boundary line between Dauphiné and the Maurienne, is 3,473 metres, or 11,395 feet above the sea, and the second or south peak is exactly the same height. The two remaining ones are still more to the south, and of inferior elevation.

Our travelling party consisted of my friend Mr. Bonney, my brother George and myself, with our guides, Michel Croz and Joseph Basile Simond of Chamouni. After spending a few days very pleasantly amid the charming scenery of the Grande Chartreuse, we crossed the Grésivaudan to Alleverd, and on the afternoon of August 4 walked up to La Ferrière, where we found tolerable quarters at the little inn of M. Jourdan. As our baggage included a theodolite and mercurial barometer, as well as a couple of aneroids and several smaller instruments, in addition to the usual personal luggage of mountaineers, it was necessary to secure considerable extra assistance in the way of porters, and we engaged a son of Jourdan's to take charge of the theodolite, and another man to carry provisions.

On the morning of the 5th we quitted the village at 4.30, and ascended the beautiful valley of the Breda to the Sept Laux, reaching the fisherman's hut at 9.45, after about four and a half hours' actual walking. Our barometer observation gives 7,179 English feet for the height of the col, which agrees tolerably well with 7,144', a previous determination of Professor J. D. Forbes.

The next point in our route was '*La Grande Maison*,' a chalet near the head of the valley of the Olle, where we expected we should have to sleep. From the Col of the Sept Laux a very steep descent of 3,000 feet leads into the valley near Le Rivier, which is much lower down than the Grande Maison. Anxious to avoid an unnecessary descent, as well as a great detour, we availed ourselves of the services of a native whom we found at the Cabane, who volunteered to take us straight to La Grande Maison over the intervening mountain ridge. We accordingly detached one of the porters from the party, and sent him down to Le Rivier, to get more provisions and carry them up to the Grande Maison, where we should await his arrival. After a halt of an hour we started off again, under the direction of our new guide, and after descending to the lower lake, we climbed up a quantity of stones and shingle to a gap in the ridge immediately to the east of it, which we reached at noon. This ridge is called by Bourcet '*Roche de Billian*,' and we may therefore call the gap the Col de Billian. We spent an hour upon it very pleasantly in taking our mid-day meal, observing the barometer, and studying the

interesting features of the Grandes Rousses. I find the height of the col to be 8,028', or about 850' above that of the Sept Laux. The descent turned out to be rough, troublesome, and circuitous, and it was three o'clock before we reached the Grande Maison, a chalet with so high-sounding a title, that we were scarcely prepared for the miserable and filthy hovel by which we were greeted. It may be doubted whether, after all, we had saved any time by our short cut, but at any rate the absent porter did not bring up the provisions until two hours after our arrival. The idea of passing the night at the Grande Maison was unanimously scouted, and by the advice of the local guide, whose engagement had now terminated, we crossed the valley and ascended the gorge of La Cochette to the upper chalets of the same name, where we arrived at 6.

I cannot recommend this resting-place to any future travellers. The alp upon which it stands is only a sheep pasture, and is consequently incapable of affording the luxury of milk to the tired and thirsty mountaineer. Moreover, the building is so small that only a portion of our party, in addition to the numerous Provençal shepherds who lived in it, could find sleeping-room inside. Bonney disposed of himself under the eaves, and my brother and I extemporised a mattress out of a pile of wood adjoining, where we should have doubtless spent a tolerable night but for a heavy shower of rain, which lasted about two hours, and drove us crouching to the door for shelter. Happily, the sky cleared again: at the first glimpse of dawn we left our beds, took a hasty breakfast, and at 4.10 on the morning of the 6th turned our backs without regret upon the chalet of La Cochette.

A walk of about half an hour brought us to the Col du Couard at the head of the valley of Vaujany, where we placed our knapsacks upon the backs of two porters, and sent them down to Allemont with instructions to engage a carriage to take us to Bourg in the evening. We continued ascending the valley of La Cochette until we reached one of the small lakes, I believe the Lac de la Sasse, where, judging that we were nearly abreast of the northern peak of the Grandes Rousses, we turned to the east to the foot of a very steep glacier, which flowed through a gorge in the lower wall of rock, from the more level névé above. Michel was soon at work cutting steps in the ice, which was exceedingly hard, a proceeding which consumed a great deal of time, as many more steps were necessary than we had any idea of from below. When the slope abated a little we found a moraine upon our right, and made straight running for it, in order to avoid the labour of

step cutting, which we were speedily forced to resume by a rather startling incident. A number of outlying blocks, resting upon a higher part of the slope showed symptoms of unsteadiness, and in a few seconds about a dozen of them began to slide, and dashed down the ice with frightful velocity before our very faces. Selecting a safer line of ascent we at last reached the névé, and gained the moraine at its origin near the base of the peak, from which it was separated by a narrow belt of snow. We reached this point at 7.40, and halted at once for breakfast. An observation with Bonney's aneroid makes it 9,754' above the sea.

At 8.30 we started again, and crossed the snow to the foot of the northern peak, whose summit we gained at 10.15, after a fatiguing and rather difficult climb up steep and broken rocks, which recalled to our minds the ascent of the last cone of the Grivola. We now looked down upon the extensive glaciers clothing the eastern flank of the mountain, of which that belonging to the Maurienne was the most striking, and descended in graceful sweeps towards the valley directly from our standing place. This glacier would certainly afford the easiest and most natural route to the summit, to gain which, by the side on which we had mounted, involves a labour altogether disproportionate to the height. I believe it flows into the Vallon d'Arves, but the small lakes shown in the plan, to the north of it, communicate with the Olle, which winds round the northern extremity of the chain.

Our eyes were quickly diverted from the Grandes Rousses to the magnificent and almost boundless mountain panorama by which we were surrounded. The more distant portions of the Pennine and Graian Alps were concealed by clouds, but Mont Blanc, the Pourri, and the Grande Casse were immediately recognised and welcomed as old acquaintances, and south of the latter we distinguished the Dent Parassée, the peak terminating on the south the glacier de la Vanoise. In the south-east, and very near at hand, rose a remarkable group of peaks, one of which is the highest point of the range of alps that separates Dauphiné from the Maurienne. These are the Aiguilles d'Arves, three precipitous pinnacles of secondary rock, almost devoid of snow and glacier, the two highest of which, when seen from certain points of view, have been fancifully compared to a nutcracker. These, according to the French engineers, are respectively 11,513' and 11,529' in height. On the manuscript map the former is decorated with a triangle and the letters 'Sig<sup>1</sup>,' from which I presume we may gather that it has been ascended, and as certainly that the higher peak has not. I

strongly recommend the latter to the attention of the Alpine Club.

To the right of the Aiguilles d'Arves, we looked upon a rolling sea of lower summits, and across them in the far away distance to the towering Viso, and then turned southwards to gaze upon the most beautiful portion of the panorama, the magnificent cluster of the high Alps of Dauphiné. To gain this view had been one of the principal objects of our ascent, nor were we disappointed. Immediately opposite to us was the lofty range dividing the waters of the Romanche from those of the Vénéon, commencing on the left with the Meije or Aiguille de Midi de la Grave, the second peak of Dauphiné, a mountain crowned by a score of steep and shattered pinnacles, and streaming with noble glaciers. The central portion of the range was occupied by the Râteau, and it was terminated on the right by the immense snow-field of the Mont de Lans, which we traversed a few days after. Beyond this gigantic outwork we had glimpses of the more central summits of the group; the gap between the Meije and the Râteau disclosed the Pelvoux, the Crête de l'Encula and the Pic des Ecrins, while on the right of the Râteau appeared the well-known form of the Allefroide.

While Bonney was making outline sketches of the most interesting portions of the panorama, my brother and I set up the barometer and theodolite. At 11.45 the height of the barometer, reduced and corrected, was 509.26m. with an air temperature of 5.0 cent. Comparing this with the mid-day observations at St. Bernard, Aosta, Geneva, Turin, and Grenoble, and taking the mean, we get

3,472m. or 11,391 English feet,

only one metre less than the determination of the French engineers.

The theodolite was placed with its optic axis about two feet above the summit, and we took with it the azimuths and altitudes of the most interesting points in sight. Anxious to ascertain whether the French engineers were correct in attributing to the south peak an elevation exactly equal to that of the one we were standing on, I brought the cross wires of the instrument to bear upon to the top of the former. The reading was  $-0^{\circ} 5'$ . The horizontal distance being 2,000m., the corresponding vertical is 2.9m., which is reduced to 2.64m. by correcting for curvature and refraction. Deducting the fraction for the height of the theodolite, we arrive at the conclusion that the south peak is 2 metres lower than the other. This result cannot be regarded as finally established until the reciprocal

observation has been performed from the other peak. It must, however, be borne in mind, that as neither peak had previously been ascended, and consequently no signals erected upon them, some amount of uncertainty must attach to the measurements of the French engineers.

We left the summit at 12.10, after nearly two hours of perfect enjoyment. When about half-way down the rocks we discovered a snow-filled couloir, down which we glissaded, saving much time thereby, and crossing the glacier considerably to the south of our line of ascent, we hit upon the lower rocks at a point where they were quite free from difficulty. They were gay with the golden flowers of the Alpine poppy, a plant said to be frequent in Dauphiné, but which I had never seen before. At 2.30 we were seated by the pretty little lake of Balme Rousse, overlooking the valley of Vaujany, where we rested half-an-hour to bathe and enjoy the scenery. We then commenced the descent to Allemont, in which I believe we should actually have saved time by going round by the Col du Couard. We were prevented from getting down to Vaujany itself by a range of steep precipices, which cut us off from the opposite side of the valley, and as our route was crossed by a number of lateral ravines, we were constantly walking up and down hill in succession, which at that time of day was extremely fatiguing. The valley of Allemont, with its picturesque villages, embosomed in walnut groves, came at last into sight, but it was ten minutes to seven before we reached La Fonderie, and found the carriage waiting to drive us into Bourg, where the fatigues of the day were soon effaced by the comforts of the Hôtel de Milan, and the admirable cuisine of M. Martin. I should be wanting in justice if I did not bear testimony to the excellence of this inn, the moderation of the charges, and the anxiety of the proprietor to provide for the comfort of English travellers.

It may be gathered from the preceding description, that the ascent of the Grandes Rousses is an expedition that may be strongly recommended to Alpine travellers who are visiting Dauphiné, but if I were to repeat it, I should approach the peak from St. Sorlin d'Arves by way of the north-eastern glacier, and I should endeavour to descend directly upon Bourg, by the Granges of Huez.



Table of Heights calculated from Barometric Observations made in the Dauphiné Alps. In Illustration of the Papers of Messrs. Bonney and Mathews.

Date 1864	Hour	Name of Station	Method	Barometer reduced and corrected		Air Temperature		St. Bernard, 2478.3 m.	Aosta, 600 m.	Geneva, Planinaour, 408 m.	Turin Academy, 284.24 m.	Grenoble, Demaschi, 215 m.	Means		Remarks	
				mm.	cent.	metres	English feet									
Aug. 4	6.30 p.m.	La Ferrière, Anberge .	Mer.	687.15	20.5	931	m.	903	m.	917	3,009		917	3,009		
"	5 10.15 a.m.	Col des Sept Laux .	"	593.43	17.8	2,173	2,181	2,190	2,210	2,188	7,179	7,144', Forbes	2,188	7,179		
"	5 1.0 p.m.	Col de Billian .	"	576.10	16.0	2,424	2,435	2,450	2,470	2,447	8,028		2,447	8,028		
"	5 6.15 "	Chalet of La Cochette dessus	"	602.35	16.2	2,044	2,048	2,048		2,046	6,713		2,046	6,713		
"	6 4.45 a.m.	Col du Couard .	An.	589.35	11.0	2,240	2,228	2,228		2,234	7,330		2,234	7,330		
"	6 8.30 "	Top of moraine below N. F. of Grandes Rousses .	"	540.00	7.0	2,965	2,971	2,975	2,981	2,973	9,754		2,973	9,754		
"	6 11.45 "	Grandes Rousses, N. Peak	Mer.	509.26	5.0	3,449	3,457	3,475	3,496	3,472	11,391	3,473 m. Et.-Maj. Français	3,472	11,391		
"	8 9.0 "	Gap in ridge leading to Grand Glacier .	An.	542.50	9.0	2,963	2,977	2,965	2,970	2,969	9,741		2,969	9,741		
"	8 11.15 "	Col de la Lauze, or de la Selle	Mer.	508.20	5.0	3,505	3,508	3,504	3,539	3,508	11,509	Turin result rejected	3,508	11,509		
"	8 noon	Pic de la Lauze (compared with last station) .	An.	506.00	5.0					3,543	11,624		3,543	11,624		
"	8 2.30 p.m.	Peak called Jodri, on French map .	"	522.50	12.0	3,288	3,293	3,315	3,323	3,305	10,843	3,292 m. E. M. F.	3,305	10,843		
"	10 10.0 a.m.	Plan des Cavailles 'Barraque' .	An.	600.00	18.0	2,116	2,136	2,142	2,143	2,134	7,001	2,137 m. E. M. F.	2,134	7,001		
"	10 3.0 p.m.	Col de la Casse déserte .	Mer.	508.35	6.5	3,494	3,506	3,523	3,518	3,510	11,516		3,510	11,516		
"	12 12.15 p.m.	Col des Cavailles .	"	525.90	10.5	3,168	3,187	3,195	3,210	3,193	10,476	3,128 m. E. M. F.	3,193	10,476		
"	12 6.0 "	La Béarde .	"	624.88	19.6	1,721	1,695	1,695		1,708	5,604	{ 5,669', Mar', 1860 (Turin) { 5,791', Tuckett, 1862. { 5,702', E. M. F.	1,708	5,604		
"	13 noon	Col de Sélé .	"	519.08	7.5	3,274	3,282	3,285	3,312	3,285	10,794	{ 10,834', Tuckett, 1862. { Boiling point	3,290	10,794		
"	14 2.30 p.m.	Col de l'Echauda .	"	576.60	11.8	2,416	2,418	2,417	2,425	2,418	2,417	7,936		2,419	7,936	

The heights contained in the accompanying table refer, not only to the ascent of the Grandes Rousses, but also to the excursions described by Mr. Bonney. The larger part of the observations were taken with a mercurial barometer by Casella, the remainder with an aneroid by Negretti, belonging to Bonney, and another by Browning, belonging to me. The two aneroids were kept constantly compared with the mercurial barometer, and corrected accordingly. The calculations have been made by the tables of Delcros, based on the formula of Laplace. Considering the present imperfect state of our knowledge on the subject, I have not attempted to correct the air temperatures for the *horary equation*, but the effect of this inequality, in the midday observations, is very conspicuous in the table. The results agree remarkably well with the determinations of previous observers, except in the case of the Col des Cavalles, where the figures on the Government map must, I think, refer to a different point from that at which we made the passage.

WM. MATHEWS, Jun.

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THE RANGE OF THE MEIJE, DAUPHINE.—By the Rev. T. G. BONNEY, M.A., F.G.S.

THE Alpine traveller, who has had the good fortune to obtain a clear view of the mountains of Dauphiné from one of the summits of the Graian or Tarentaise Alps, will doubtless remember that the range formed by the towers of the Pelvoux, Ailefroide, Ecrins, and Meije, is terminated by a vast sheet of snow, covering like a cloth a table-like mass of precipitous rock. This is the great Glacier du Mont de Lans, lying between the valleys of the Romanche and the Vénéon, with its tributary, the Vallon de la Selle. Before describing our excursion over it, I shall venture to add a few words to the account which I have already given of the Pelvoux district.\* I compared the configuration of the mountains in the neighbourhood of that summit to an E, and resume the simile for one moment. From the NW. corner of this letter, a high ridge, starting from the Roche-Faurio, runs northward, dividing the Vallon des Etançons from the upper part of the

\* 'An Excursion in Dauphiné.' The 'Alpine Journal,' vol. i. page 66. I may also refer to the paper on that district by my friend, Mr. Tuckett, vol. i. page 145, which contains an admirable account of the main mass of the Dauphiné Alps; and gladly take this opportunity of expressing my gratitude to him for much valuable information, communicated with his usual liberality.

Valley of the Romanche; the head of which is formed by three small valleys; one, an upland glen coming from the Glacier and Col d'Arcines, another from the Glacier de la Plate des Agneaux, and the third from the Glacier du Clos des Cavalles. To the north of the Col de la Cavalle or des Cavalles this ridge widens out into an enormous mass of rock and glacier, forming a great wall running westward, and dividing the valley of the Romanche from the Val de Venéon. In this mass are the Meije, the Râteau, and the Glacier du Mont de Lans. A spur from it, running to the SW., divides the Vallon de la Selle from the Vallon des Etançons.

On the 6th of August last, Messrs. W. and G. S. Mathews and myself, accompanied by Michel A. Croz and Joseph B. Simond, of Chamouni, ascended the northern peak of the Grandes Rousses, which commands a magnificent view of this portion of the Dauphiné Alps. We then saw that the Mont de Lans Glacier appeared accessible either from La Grave or from a point on the high road east of Bourg d'Oysans, whence a small valley runs up towards it. On arriving in the evening at Bourg, we made enquiries about the accommodation to be found in this valley and other matters connected with the proposed expedition, but without success. Accordingly, we changed our plans, and determined to drive to La Grave, where we knew that we should probably find some one who was acquainted at any rate with the eastern end of the glacier. After doing full justice to the good fare of the comfortable Hôtel de Milan, we started next day in a carriage for La Grave, and on arriving at Freney (12 kil.), obtained some information about the valley, which I record for the benefit of future travellers. It was, that the highest châteaux were three hours' walk from Freney, and three-quarters of an hour from the glacier, and bore the name of the Châteaux de la Selle. The path to them leaves the main road a short distance beyond Freney (nearly 63 kil. from Grenoble), and, crossing the Romanche by a wooden bridge, ascends the right bank of the lateral valley. The horror that the good folks of Freney expressed, when they learnt our intention of crossing the glacier, was most amusing; and such a chorus of 'impossible, crevasses, affreux, énormes, &c.,' was raised, that Croz became quite excited, and after 'chaffing' them unmercifully, regaled them with sundry narrations of experiences on the ice, which, I fear, would be considered poetic myths by an unprejudiced historian.

Just after passing the limit of the departments of the Isère and Hautes Alpes (8 kil. from La Grave), we obtained a view of some off-shoots of the Grand Glacier, high up in a narrow

gorge, above the wretched huts of La Balme.\* After carefully examining the precipices, broken here and there with steep slopes of turf, down which the streams from the ice above fall in cascades, we determined that this at any rate was not a promising point of attack. Further on, near the Auberge au Chamois des Alpes, another arm of the glacier is seen.†

On our arrival at the Hotel 'chez Juge,' La Grave, we sent for a chasseur named Alexandre Pic, who was said to be well acquainted with the neighbouring mountains. This worthy demands a few words of description. He is a tall, powerful fellow, willing and good-humoured; an excellent cragsman, but timid and useless upon ice; a capital porter, but worse than useless as a guide, because, either from a defective memory or a vivid imagination, his information on points of topography has always proved so contrary to facts, that I fear he appears to merit the title, conferred upon him by Mr. Mathews, of the most unblushing liar in Dauphiné.

The view from the little inn at La Grave is, in my opinion, one of the finest pieces of road-side scenery in the Alps. The jagged pinnacles and smooth precipices of the Meije, and the long crête of the Râteau, rise above steep masses of shattered glacier, the torrents from which seam the polished cliffs of protogine. Below, dark slates, twisted and riven by the force that burst them asunder and elevated the older rocks five thousand feet above, appear as purple scars among the Alpine pastures which slope down to the turbid waters of the Romanche.

An excellent path leads from the inn across the river, and up the pastures and banks of shale on the opposite side. This has been constructed for the sledges, which bring down ice from the glaciers; and a brisk trade is carried on in this material, which is sent, packed in matting, to Grenoble, Lyons, and others of the larger towns in south-eastern France. A valley, well seen from La Grave, has been excavated by the torrent issuing from the glaciers of the Meije and Râteau, which has not only stripped the shale from the crystalline rock on the western bank of the valley, but also sawn a deep channel in it.

We left the hotel at 4.24 A.M., and at 5.13 arrived at a small group of châteaux in the above valley; and then after a slight descent, crossed the stream and proceeded along the hill-side on its left bank. In a little while we reached an old turf-

\* The Glaciers des Sausettes and de Mousset, according to Joanne, *Itinéraire du Dauphiné*, 2me pte. p. 127.

† The Glacier de la Girauze. Joanne, *ibid.*

covered moraine, forming a kind of causeway, along which we walked for some time. Within this is another, which bounds the heap of rubbish below and over the extremity of the glacier formed by the ice-streams from the side of the Meije, the Râteau, and the Brèche between them.\* After keeping to the moraine for some time, we left it and followed a little stream between it and the hillside. We then ascended stony turf slopes, with the moraine on the left and rocks on the right; and after once more following and quitting the moraine, halted for breakfast upon it at 7.50. The rock and glacier scenery during the whole of the walk through this miniature Allée Blanche, is of the grandest kind, and the western pinnacle of the Meije is no unworthy rival of the Aiguille du Dru. At 8.50 we tore ourselves away very reluctantly, and, turning our backs on the view, began to ascend some steep slopes of broken rock. This part of the day's work, though varied by a small snow couloir, was rather monotonous, but we rose rapidly, keeping rather to the right, and steering for a notch in the ridge, which cuts off the Glacier du Mont de Lans from those about the Râteau; so that all the snow-fields to the west of it drain down directly into the valley of the Romanche. We reached this notch at 9.10, and halted a few minutes to take a last look at the beauties of the glacier basin we were quitting, backed up as it was by the dark crags of the Meije; and also to enjoy the new view of the serrate ridge of the Grandes Rousses on the other side of the Romanche. A smooth snow-field, apparently running down towards that river, lay on the other side of the ridge, up which some of our party ascended, the rest keeping to the rock for a time, until at 9.40 we came to a patch of black shale, forming a kind of island in the glacier, called 'million' by Pic. During the ten minutes' halt for donning gaiters, we had leisure to observe the long spur from the Râteau which terminates at the Col for which we were bound. This, with the ridge mentioned above, encloses the south-eastern part of the Mont de Lans glacier. The ice in this basin was rather crevassed, but by a circuitous course, steering first left and then right, we avoided all difficulties, and reached the Col at 11.10, in  $5\frac{1}{2}$  hours' actual walking from La Grave. It is a snow-saddle between the spur mentioned above (metamorphic

\* It will be seen that this statement does not accord with the map of the French Survey, *Alpine Guide (Western Alps)*, p. 63. I hesitate to criticize so admirable and conscientious a work, to the general excellence of which I bear most grateful testimony; but at the same time I confess that in this part it does not correspond in several small particulars with my recollections, or with my notes and sketches.

rock), and a hill of black slate, identical with that in the neighbourhood of La Grave. This is the pass briefly described by my friend, Mr. Blackstone,\* under the name of the Col de la Selle; but I have given a somewhat minute account of the ascent because, as he had not the advantage of a good map or of fine weather, it is not very easy to understand the line which he followed. I also venture to object to the name that he (followed by Joannet) has conferred upon the pass. It is known to the natives as the Col de la Lauze,† and as the route in descending appears to have very little to do with the Glacier de la Selle, while the outlier of black slate is so curious and marked a feature in connexion with the Col, it would, I think, be better to retain the local name. The hill rises about a hundred and twenty feet above the Col, and commands a more extensive view; so, after taking some observations, and glancing down the funnel shaped 'corrie' which Mr. Blackstone descended, we climbed up the loose splinters of slate, and sat down to enjoy and sketch the scenery.

The first conspicuous object on the left, after clearing the confused mass of peaks close at hand about the head of the Vallon de la Selle, was Les Ecrins, which towered up like a huge pyramid, with its three points rising one above another, and with the snow-slope seen in profile, up which we had toiled the year before. A tremendous wall of cliffs, rising from the Col des Ecrins and culminating in the north-western summit of the mountain, fell down towards the Glacier de Bonne Pierre, some of the upper snows of which were just visible beneath the long spur that forms its southern boundary. Above this was seen the Crête de la Bérarde, between which and the Ecrins appeared the great house-like mountain on the immediate west of the Grand Pelvoux; just on the right of the Crête was a portion of the lowest peak in the Pelvoux chain, and then came the huge wedge of the Ailefroide, with its one square patch of snow on its steep side. Beyond this was a long snowy ridge, enclosing the head of the Glacier de la Pilatte and culminating in a singular peak,‡ which is the highest point in the Crête des Bœufs Rouges. After passing over some lower summits, near the eastern Col de Sais, our eyes rested upon a fine snowy mountain, resembling the Ecrins; except that (to use Mr. Tuckett's simile)

\* 'Peaks, Passes, and Glaciers,' Second Series, vol. ii. p. 215.

† Itin., p. 168.

‡ Lauze (patois)=Ardoise. The name occurs in other parts of Dauphiné, *vide* Itin., pp. 153, 220, 416.

§ Sketched in 'Peaks, Passes, and Glaciers,' Second Series, vol. ii. p. 189.

'it is an expurgated edition with the objectionable parts omitted.' I think this must be the Sommet des Rouies\* at the head of the Glacier de l'Étre (11,874 E. M. F.), and strongly recommend it to explorers. I believe it would have to be attacked from the Glacier du Vallon, and would not be a difficult undertaking. Beyond it lay a mass of glacier-streaked crags south of S. Christophe to the west of the Vallon de la Muande. As a foreground there was a dark rugged ridge, striped with snow couloirs and hanging glaciers, rising on the other side of the Vallon de la Selle. On the north we had a fine view of the peaks and glaciers of the Grandes Rousses, of Mont Blanc, and part of the Pennine chain; and further to the east a number of snowy mountains, very much obscured by clouds; among which we identified (with tolerable certainty) the Pourri, the Grande Casse, the Dent Parassée, and the Glacier de la Vanoise. The Mont de Lans glacier, curving down towards the deep cleft of the Combe de Malaval, formed the foreground on this side.

At 12.33 we quitted the hill and walked along the edge of the glacier, looking down into the Vallon de la Selle. The upper part of the great glacier hardly merits that name, as it is rather a vast billowy plain of snow, which slopes gently down towards the Combe de Malaval, and only assumes the appearance of a true glacier at its extremities. The section of the beds of stratified névé, forming a cliff, perhaps 60 or 80 feet high, over the Vallon de la Selle, was most interesting. The descent into that valley appeared practicable in several places. At 1.50 we arrived at the summit of a small peak, called on the French map Jodri (10,801 E. M. F.), near the western end of the glacier, overlooking a part of it, which drains down towards S. Christophe by a rift, some distance below us, named the Brèche de S. Christophe; and also a small plain, dotted with little ponds, beyond which lay the rounded alps of the Mont de Lans, and the peak dividing the Romanche from the Vénéon. The view from this point did not differ much from that which I have already described, except that the greater part of Les Ecrins was concealed by a peak on the other side of the Vallon de la Selle, and the highest summit of the Pelvoux was seen between it and the Crête de la Béarde. A thunder-cloud began to break over the craggy heads of the Goleon and the Aiguilles d'Arves, making them look even blacker and more desolate than usual.

Leaving this point at 2.50, we crossed the glacier in a nearly

\* North of the Col de la Muande. Joanne, p. 199. He gives the height as 3,634 metres = 11,923 feet.

straight line, steering rather to the east of the Grandes Rousses, and quitted the ice without the slightest difficulty at 3.32. We then traversed a moraine for a short distance, and descended some very steep and difficult rocks, working gradually to the right, until, after some extremely awkward scrambling, we found ourselves at the head of the glen that we had observed from La Balme on the previous day.

Here the storm, which had for some time been raging over La Grave, burst upon us; and after a long descent down difficult and steep slopes of débris, we arrived, after crossing one or two smaller streams, at a torrent from the glacier, so much swollen that we were obliged in fording it to use the rope as a balustrade. It was nearly knee-deep, so that when we arrived on the other side, we halted to empty our boots and wring the wet out of some of our garments, although the pouring rain threatened to render the latter a useless ceremony. This done we descended more rocks and slopes of débris, often overgrown with grass and brushwood, until at length we began to draw visibly nearer to the valley, and to hope that we should soon exchange the glen for the stony slopes on the right, down which we could see a path. Suddenly, however, a most formidable obstacle presented itself; we were indeed close to the track, leading up to a mine, but were separated from it by a chasm with nearly vertical walls, some thirty feet deep, through which rushed a torrent, perhaps twenty feet wide; above, at the distance of a few yards, the water fell in a cascade at least fifty feet high, bringing down large stones, which were bounding about like corks in the foam, within a few feet of the only place where it was possible to cross. A little further down, the stream disappeared over a rock, whence we knew it fell for several hundred feet in a series of leaps to the valley below. Across this abominable place was our only way of escape. On each side of the torrent was a small ledge, on which there was standing room for the party. One by one, we were lowered down by the rope, and then Croz, followed by Pic, forded the stream, though evidently with much difficulty, availing themselves of the shelter of a large boulder; the rope was thrown across to them, and grasping this with one hand I followed. The water rose above my knees, and I could hardly keep my footing; however, I got under the lee of the boulder, where the spray splashed over me in a perfect shower-bath. After a moment's halt, I proceeded cautiously, and was within two or three steps of the land, when I trod upon a loose stone, which turned up, and of course threw me off my balance. Knowing that it was a matter of life or



death, I clung tight with one hand to the rope, my chief fear being lest I should be struck and stunned by a stone from above, and Croz, advancing a step into the stream, grasped my coat-collar. Then I found that I was safer than I had thought, for the same stone which had caused my fall had rolled over on to my foot and wedged me fast: he pulled and I pulled, until I began to fear my boot would be left behind; at last, however, my foot came out like a tooth, and in another moment I was landed on the bank. The rest of the party crossed without misadventure, but got drenched to the skin; I confess, however, that I did not like to watch them. We were then hauled up the other bank, and, after a tedious descent down a most execrable path, arrived at the huge blocks, against which the miserable huts of La Balme are built, and reached the high road at 6.20. Here a carriage had been ordered to await us, but we did not meet it until we had walked some five kilometres in the rain; however, a change of clothes and some warm potations soon set us to rights.

This line of descent had been followed under Pic's guidance; it was doubtless shorter than the valley coming out upon Freney, but I cannot recommend it to travellers. Croz's opinion of it was, that no guide who understood his business would ever have attempted it in such weather; and I am not ashamed to confess that it would take a great deal to induce me to cross that torrent again, without a rope tied round my waist. Even in the finest season this course should only be attempted by those who have perfect confidence in their feet and heads, for there are many places where a slip or any nervousness would be very dangerous.

If, however, the descent to Freney be found as simple as I believe it to be, an easier or more delightful excursion could not be found; for until we quitted the glacier, we did not meet with the slightest difficulty. The comparatively long period during which the more extensive views remain in sight would render this a most interesting high level route from Bourg d'Oysans to La Grave, and the effect of the varied scenery would, I believe, be increased by making the expedition in this direction.

The next thing in our list of *agenda* was to make an attempt on Les Ecrins. Two routes offered themselves, to the base of this peak, the first by the Col du Glacier Blanc to the 'Hôtel Tuckett,' the second by the Col de la Cavalle to La Bélarde, and thence to the Col des Ecrins. Objections existed to each of these: the first would have led us over the ground which we had traversed in the contrary direction the year

before; the second involved two hard days' work, and two bad nights, a poor preparation for an attack on a difficult mountain. In this dilemma we took counsel with Pic, not having yet lost all confidence in his local knowledge; and he unhesitatingly replied that he was well acquainted with a col at the head of the Glacier de la Casse Déserte, which crossed the ridge between it and the Glacier Blanc exactly opposite to Les Ecrins, at the top of which were some shattered red rocks furnishing excellent *gîtes*. Six or seven hours, he said, would amply suffice to reach them from La Grave, and an easy descent of two hours would take us from the col to the base of Les Ecrins. We had no recollection of having seen any place of this kind from the mountain in 1862, and Croz expressed a strong opinion against the truth of the statement, but the repeated and positive assertions of the fellow determined us to make the attempt.

Accordingly we started at 6.35 A.M. on the morning of Monday, August 10, with provisions for two days; and passing the wretched hamlet of Villard d'Arène at 7.8, turned aside from the ascent to the Col du Lautaret, and followed the right bank of the Romanche along the path leading to the Col d'Arcines. A fine snowy mass, broken by dark crags, appears in front up the valley, soon after the village is left. This is part of the group of summits just on the east of the Col du Glacier Blanc. The path runs over black shales, but at 8.5 we reached and crossed a large moraine of metamorphic rock, formed no doubt in days long past by the united ice streams from the glaciers in the main valley and that of Tabuchet on the right. We arrived at 8.20 at the foot of a steep wall, forming the first break in the level of the valley; down this the Romanche, which may be said to rise at the terminal ice-cave of the Glacier de la Casse Déserte, falls in a fine cascade. The traveller who intends to go either to the last-named glacier, or to the Col de la Cavalle, must not follow the path to the top of the wall, but after ascending for some distance must turn to the right and make for the stream.

Our climb led us out on a grassy plain by the side of the stream, commanding an excellent view of the above-named snow mountain. A delightful walk over the smooth turf brought us at 9.15 to some old huts and sheds, formerly connected with a mine in the neighbourhood, standing at the entrance of the valley which, dividing into two glens, leads to the Col de la Casse Déserte and the Col de la Cavalle. Behind this *baraque* are four or five moraines arranged concentrically opposite to the opening of the above valley.

Here we halted for breakfast until 10.5, then after following a faint track over a rockstrewn plain on the right bank of the Romanche, arrived in 20' at the junction of the streams from the valleys which lead to the two cols, and are divided by a spur of the Grande Ruine. Following the one on the left, we arrived at 10.50 at a grassy meadow called the Plan des Anes at the foot of the Glacier de la Casse Déserte. According to the French map the ice streams, flowing down into this basin from the sides of the craggy amphitheatre in which it lies, all unite at the bottom, and are called by the general name of the Glacier de la Plate des Agneaux. We, however, observed that the large ice-field in the recesses of the mountain dividing us from the Glacier d'Arcines on the east, did not join the glacier on which we stood, but was separated from us by steep rocks and slopes of débris. This, according to Pic, was the true 'Plate des Agneaux,' while the one on which we were was known to the natives as the Casse Déserte. The lower part of the glacier is covered with broken blocks, over which we scrambled until we reached the smoother ice, and at 12.23 halted a few minutes to reconnoitre. On the left, was a craggy range, streaked with hanging glaciers, cutting us off from the Glacier Blanc; in front, a bare smooth wall of cliffs; and on the right, slopes of ice and snow leading up towards the Grande Ruine and its eastern spur. We began to wonder where the proposed col could lie, and interrogated Pic, who only muttered something about the glacier having sunk greatly of late, and the road having formerly gone up the wall of cliffs front; and then said that a snow saddle on the right would do as well. Thereupon we unanimously voted him a humbug, and informed him of the fact in terms more pointed than polite; for we were tolerably certain that the Vallon de la Bonne Pierre lay on the other side of the cliffs, and positive that the snow saddle would conduct us back to La Grave by the Rif de la Cavalle. We determined, however, to do something: the wall, after careful examination, was pronounced impracticable, but further to the right there was a gap under the Grande Ruine, which we supposed to be above the Vallon des Etançons. This point appeared accessible, so climbing up some rocks, succeeded by steep slopes of débris, we arrived, at 1.20, at the base of the steep glacier descending from the col. During the ascent of this we saw a herd of at least 17 chamois on the peak at the end of the eastern spur of the Grande Ruine. The gap, which seemed quite close on starting, obstinately refused to come nearer; each wave of ice surmounted shewed another in front, and the glacier became steeper and more crevassed, till at last we saw

that a formidable snow couloir led up from it to the col. After crossing one or two awkward crevasses in the usual position at the base of the couloir, we began to ascend it, sometimes up the snow and sometimes up difficult crumbling rocks on the right side, where once or twice the footing was so bad, that we had to be hauled up with the rope for a few feet. We climbed up singly, and I for one was not sorry to reach the col, where we arrived at 3.7. This is the lowest point on a ridge of yellowish quartzose rocks connecting the splintered pinnacles of the Grande Ruine with the huge tower of the Tête de la Charrière. Of course, our first business was to glance down on the other side, and the prospect was not encouraging; a couloir rather less steep than that which we had ascended opened out into the névé of a glacier, which, about 2,000 feet below, disappeared down a gully between two walls of polished rock, some shattered séracs being the last thing visible. Food and a few minutes' rest, however, were absolutely necessary, and Mathews in his zeal for science insisted on setting up the barometer; so we ate a hasty meal, and I secured, by his request, a slight outline of Les Ecrins, whose three summits were very well seen from this point. Part of the range of the Pelvoux and the upper snow-fields of the Glacier de la Pilatte were also visible. Looking down the valley we had ascended, we saw the Cottian Alps overshadowed and partly concealed by a purple thunder-cloud. Over the Vallon des Etançons were the crags about the head of the Vallon de la Selle, which, however, did not present any important features. We now mounted a little peak of rock and held a consultation with Croz. Descent to the furthest point visible was possible, though not very easy; what lay beyond we could not tell, except that the glacier was very much crevassed and the rocks on each side impracticable. The storm-cloud was beating up towards the Pelvoux, and rain was already falling over that range. It was now nearly four o'clock, and the sky threatened a wild night, which, if any difficulties awaited us below, would have to be spent on the glacier. Accordingly, after much hesitation, we determined to return to La Grave, wisely, as I thought then, and still think.

Fastening ourselves together with the rope, we commenced the descent at 4. Great caution was necessary, but Michel led the way with his usual skill and strength. All the morning he had been as surly as a bear, feeling convinced that the whole affair was a delusion; and now that he had proved himself a true prophet and found an opportunity of astonishing a native, who was fairly frightened by the couloir, he, like Mark Tapley, 'came out jolly under difficulties,' and kept up a running fire of

small jokes all the way down. His knowledge of topography is something extraordinary: though he had never been in this valley, and had only once, the year before, obtained a good view of the other side of the range, he predicted from the first that the expedition was impossible; and again, as we were toiling up the glacier, he pointed out to W. Mathews the exact spot over which the summit of Les Ecrins would rise into view.

As we descended the weather improved, and we caught a glimpse of the distant Viso, thickly powdered with fresh snow. At 4.50 we reached the foot of the couloir, and after passing the crevasses, halted at 5 and took off the rope. All difficulty was now at an end, but no time was to be lost if we were to reach home before nightfall. We hastened down to the Glacier de la Casse Déserte, and at last by walking very quickly reached the *baraque* at 7.25, just as it was becoming dusk. Here we halted to refresh, but my recollection of the discomforts of our night walk down that valley the year before was too vivid to make me desirous of repeating the process, so after swallowing a little food, I started again with Simond at 7.35, and by quick walking, just succeeded in passing the worst bit of the road before it got quite dark, and reached La Grave at 9.40. The rest of the party left a quarter of an hour later, and did not arrive till 10.25, having had some difficulty in finding their way to the path from the *châlets*.

In consequence of the failure related above, we determined to go to La Bérarde by the Col de la Cavalle and to complete the exploration of the neighbourhood of the Meije. Starting at 5.28 A.M., August 12th, we followed the now familiar road as far as the junction of the streams from the two glacier basins, where we arrived at 8.25. Here we halted for breakfast on a little stony plain, called the Plan de la Cavalle, and at 9.13 resumed our walk up the *débris-strewn* bed of the valley. After crossing an old moraine we reached, at 9.48, a small grassy plain, nearly overwhelmed with stones, called the Clos de la Cavalle. The head of this valley is a kind of cirque, filled by a large glacier descending from the col on the west and the spur of the Grande Ruine on the south, with cliffs on the north, over which, in one place, appears the end of a small glacier.\* The position of the col is obvious, being at the lowest part of the ridge. The upper part of the glacier is steep and much broken by crevasses, and the disappearance of one of the party up to the shoulders warned us to put on the rope. At 11.58 we

\* The division between these two glaciers is not marked on the French map.

reached the col, a shattered ridge of protogine rock, split into great square blocks along the planes of the talcose laminae. On the eastern side the snow-field reaches to within a few feet of the summit, but on the western a cliff of considerable height overhangs the steep snow slopes that terminate in a small glacier of the second order.

The col commands a grand view of the Meije, whose precipitous cliffs, on which scarcely a patch of snow can rest, rise abruptly above the ridge whereon we stand. I have now carefully examined this summit on all sides, but have been unable to discover any promising line of ascent, so I recommend it to the attention of those Alpine climbers who succeed in conquering the Matterhorn. On the left of it a peak rising just above our col impedes the view; after this comes the chain dividing the Vallon de la Selle from the Vallon des Etançons.\* Further to the left are the mountains near St. Christophe, east and west of the Col de la Muande, and then the view is closed by the pinnacles of the Grande Ruine. Looking back, we see the mountains dividing us from the Col du Lautaret, and above them a range with several small snow-fields and one strongly marked depression, but without any prominent peak.

Pic had previously informed us that he knew this pass well, but as usual he was at a loss when questioned, and while we were reconnoitring we saw four chamois on the glacier below. We left at 1.28 and clambered down the cliff until we reached a steep snow slope, the inclination of which gradually diminished as we went on, and at 2 we quitted the ice. After this we descended sometimes by climbing down steep rocks, at others by sliding down long slopes of débris in small avalanches of pebbles, until, when within a few hundred feet of the bottom of the valley, further progress was arrested by a precipice. This obstacle obliged us to re-ascend slightly, and work to the left; but at last, after a few awkward bits of scrambling, we reached the bottom of the valley at 3.35, where we had a fine view of the Glacier des Etançons and the Meije. The Brèche de la Meije appears practicable from this side. Nature certainly intended it for a pass, but she has left the northern side in a shamefully unfinished state. At 4.48 we started again, and after walking for about 40' crossed to the right bank of the stream; a few minutes later we came in view of the opening of the

\* After examining both sides of this range, we have been unable to find any trace of the Glacier du Col of the E. M. F. map. The ridge dividing these two valleys is a rocky spur of the Râteau, and it would be very difficult, if not impossible, to scale it in any place.

Vallon de la Bonne Pierre and Les Ecrins; we also made out the Col de la Casse Déserte, the descent from which appeared practicable though difficult. Shortly after, a few patches of grain were seen on the left bank of the stream, and then the huts of La Béarde appeared below. Here we arrived at 5.50, and were hospitably received by the Rodiers. The evening was lovely, and we lay on the grassy hillocks watching the rosy tints of sunset fading through every gradation into the tender purples of a summer's night, as star after star shone out in the darkening sky.

After an undisturbed night on new hay in the well remembered *grange*, we crossed, next day, the Col du Sélé to Ville de Val Louise in 9 hours' actual walking. After the excellent description given by Mr. Tuckett, I need only say that the diminished quantity of snow made the pass more difficult than he found it; the rocks near the top being rather troublesome. The scenery, however, surpassed our utmost expectations.

## NOTES AND QUERIES.

DISCREPANCY BETWEEN FRENCH AND ENGLISH BAROMETRIC STANDARDS.—I would draw the attention of the Alpine Club to an apparent anomaly between the heights of the French and English barometers compared with the boiling-point, as given by the best authorities, which I have been at some pains to investigate.

		Barometer.		
Boiling-point.	inches.	mm.		inches. mm.
212° Fahr. or 100° Cent.)	{	29.905 or 759.58 as given by the Kew Committee of the British Association.	}	{ 29.922 or 760 as given by Regnault in his tables of the elasticity of va- pour, and adopted by Guyot in his tables.

A boiling-point thermometer, therefore, compared and adjusted at Kew, will not be *precisely* accurate when compared with Guyot's table, but will require the addition of 0.0283° Fahr. = 0.017 inches of the barometer. The larger portion of this discrepancy arises from the difference of the standard temperature of the scale of the English and French barometers; the remainder is accounted for by the difference of latitude producing a variation of gravity.

First, as to the discrepancy arising from the standard temperatures. That of the English barometer being 30° Fahr. higher than that of the French scale: when the mercurial column is reduced to the freezing point the scale of the French barometer is also reduced to the freezing point, but the scale of the English one is only reduced to the temperature of 62° Fahr. The consequence is that the French barometer, when reduced, will always read higher than the English barometer.

Let A be the height of the barometer observed ;

B the linear expansion of brass for 1° Fahr. = .0000104344 ;  
as given by Laplace and Lavoisier ; or .000018782 for 1° cent.  
The French barometer, when reduced, will, on account of the difference  
of standard temperatures, read higher than the English barometer by  
an amount = 30 A B ; e. g. :

$$B = .0000104344 = \log. \overline{5} \cdot 018467$$

$$A = 29 \cdot 905 \text{ in.} = \log. 1 \cdot 475743$$

$$30 = \log. 1 \cdot 477121$$

$$\begin{array}{r} \text{inches.} \\ 3 \cdot 971331 = .009361 \text{ excess of French reading.} \end{array}$$

By changing A it will be evident that we get the excess for any height  
of the barometer ; but for the average height at the sea-level it may  
be taken as .009 inches.

For exact observation, therefore, it is useless to have a barometer  
marked with a double scale, the French and English : they *cannot* be  
made to coincide, e. g. :

Let the barometer read 29 inches = 736.59 mm. (temp. 62° Fahr.  
= 16.67° cent.).

In the English scale at 62° (the temperature of the standard) no  
correction is made for the brass scale. The only correction is for the  
expansion of the mercury — .087.

$$\begin{array}{r} 29 \cdot \text{inches} \\ - .087 \\ \hline \end{array}$$

$$\text{reduced } 28 \cdot 913 = 734 \cdot 38 \text{ mm.}$$

But in the French scale, the temperature of the standard being 32° Fahr.,  
the correction to be made is, for the expansion of the mercury — the  
expansion of the scale :

$$\text{Expansion of the mercury for } 16 \cdot 67^\circ \text{ cent.} = 2 \cdot 212 \text{ mm.}$$

$$\text{Expansion of brass scale for ditto} = - \frac{.231}{1 \cdot 981}$$

$$\begin{array}{r} 736 \cdot 59 \text{ mm.} \\ - 1 \cdot 981 \\ \hline \end{array}$$

$$\text{reduced } 734 \cdot 61 = 28 \cdot 9224 \text{ inches.}$$

To reduce the barometer to the freezing point we have then the  
following formula :—

Let M = the cubic expansion of the mercury for the number of  
degrees centigrade, or Fahr., by which the observed tem-  
perature differs from the freezing point.

B = the linear expansion of the brass scale for the number of  
degrees by which the observed temperature differs from  
the standard.

H = the observed height of the barometer, in inches, or  
millimetres.

The formula for the reduction of the English barometer will be :—

$$\begin{array}{ll} \text{above } 62^\circ \text{ Fahr.} & - (M - B) \times H. \\ \text{below } 62^\circ \text{ and above } 32^\circ & - (M + B) \times H. \\ \text{below } 32^\circ & + (M - B) \times H. \end{array}$$



For the reduction of the French barometer :—

$$\begin{aligned} &\text{above the freezing point} \quad - (M - B) \times H. \\ &\text{below the freezing point} \quad + (M - B) \times H. \end{aligned}$$

By the difference in the standard temperatures we can thus account for .00936 inches out of the .017 by which the Kew equivalent to the boiling point differs from that of Regnault. This remainder is almost exactly accounted for by the difference of gravitation.

The increase of gravitation, i.e. gravity as diminished by the centrifugal force, is from the equator to the pole = .0052005, or .00260 to the 45th degree of latitude.

Adopting the law that it increases as the square of the sine of the latitude, we find that in 51° 30', the latitude of London, the increase of gravity is = .0031852; in latitude 49°, that of Paris, the increase of gravity is .0029621.

Let D be the difference of these two gravities = .0002231.

B the height of the mercurial column at London equivalent to a given pressure.

B' the corresponding height of the mercurial column at Paris.

B' will be = (B + BD), e.g. :—

Gravity in lat. 51° 30' = .0031852 —

Gravity in lat. 49° = .0029621

Difference . 0002231 = D = log.  $\bar{4}.348305$

29.905 = B log.  $1.475744$

$\bar{3}.824049 = .006688 = BD$

To compare, therefore, the barometric column at London with that representing a corresponding pressure at Paris, we must add two corrections—one for the difference of the temperature of the standard, and a second for the decrease of gravity.

The corrections will be as follows :—

Barometer at London observed,	}	29.905 inches.
and reduced to freezing point		
Correction for temperature of standard . . . . .		+ .009361
Correction for decrease of gravity . . . . .		+ .006668
		<u>29.921029</u> equivalent pressure at Paris.

This is very close to the equivalent pressure which Regnault gives in his tables, viz. 760 mm. = 29.922 inches.

I have adopted the increase of gravity as given by Guyot in his tables, as that most likely to be referred to. This gives the ellipticity of the earth as  $\frac{1}{288}$ . Plantamour and others differ slightly from this; and if we take the ellipticity of the earth as given by the British Ordnance Survey,  $\frac{1}{288}$ , we shall get the increase of gravity from the equator to the pole = .00527919; the difference between that of Paris and London = .00023642, and the amount of correction = .007070, a still nearer approximation.

In the correction for temperature, I have made use of the coefficient

for the cubic expansion of mercury given by Laplace and Lavoisier, viz.—

0·000180180 for 1° cent., or 0·0001001 for 1° Fahr.,

this coefficient being adopted by all the tables both English and foreign. Regnault's determination, however, of the expansion of volume of mercury is 0·00018158 for each degree centigrade; but from this he deducts the superficial expansion of the glass tube = 0·000017226, giving the correction for the dilatation of the mercurial column = 0·000174304 for each degree centigrade. This seems the more correct plan, and was adopted by Mr. Stewart in some experiments for determining the melting point of mercury ('Transactions of the Royal Society for 1863,' p. 430), but of course we travellers shall make use of the old tables.

CHARLES PACKE.

ALPINE BYWAYS. VI.—*Sertig Pass from Davos to Scansf.*—It seems to be the popular belief that there are only two direct ways from Davos am Platz to the Engadine, viz. the Fluela and Scaletta passes; and of these the Scaletta is the only one available for those going to the Bernina country. The Scaletta has certainly the merit of being combinable with the Schwarzhorn; but those who have devoted a day to this expedition, and in so doing been over the finest part of that pass, may be interested in hearing that there is a much more beautiful and scarcely longer way leading to the same point.

The way lies down the Davos Thal for some two miles, crossing the stream at the first bridge below Am Platz, and leads into the Sertig Thal opposite Frauenkirch. A char road ascends this valley to the inevitable Dorfi; so far the valley preserves a soft and pastoral character, but here it completely changes, both the branches into which it divides being overhung by rocks of the wildest forms. Up the southern branch or Ducan Thal a pass leads to Bergün, which Theobald speaks of as very savage and grand. Our way lies up the eastern branch or Küh Alp Thal. This is followed to its head, and in about 4½ hours from Davos the grat which forms the summit of the pass is reached. The last part of the climb is over *geröll* and beds of snow, and this is the only part of the expedition which would be difficult for ladies. A glorious view of Piz Kesch with the Vadret da Porchabella hanging from it is gained from the col, and is sufficient of itself to make this the preferable way to the Engadine. A quarter of an hour's steep and sharp descent brings us on to the watershed between the Vals Tuors and Sulsanna; on either side of which are the two small lakes so common on the summit of Grison passes. Down the Val Tuors lies a second way to Bergün; and there is probably a third and very fine one skirting the Vadret da Porchabella and leading into another branch of the same valley, but I have not heard of its ever having been made. Another hour and ten minutes bring us to the Bergamesque hut, where the path from the Scaletta joins the one we have followed; thus far the left side of the valley should be kept. The rest of the way is well known. I will only add one word, that no inn in Scansf can furnish more than two beds; parties requiring larger accommodation must therefore go on to Zutz, where the Schweizerbund will supply all that is wanted. The Piz Kesch well deserves attention: in August last it had not been

ascended; but a party of Germans were then employed in blasting steps in the last hundred feet, which form the real difficulty.

F. L. LATHAM.

THE FINSTERAARHORN.—The ascent of this mountain is usually made, either by the Grünhorn Lücke, after passing the night at the Faulberg Cave, or by the Viescher glacier, using the hole on the east of the Rothhorn for the night's bivouac. Both resting-places are inconvenient; the Faulberg is so far removed from the base of the mountain as to throw an unnecessary additional distance into the following day's work. There is the further detriment of having to ascend to the Grünhorn Lücke, with a corresponding descent on the further side to the base of the Finsteraarhorn. On the other hand, the Rothhorn Cave, being the one used for the ascent of the Oberaarhorn or the passage of the Oberaar Joch, is out of the direction for the Finsteraarhorn. Impressed with these disadvantages, in an ascent of the Finsteraarhorn, which Messrs. Hopper, Chater, and I, with Christian Michel and Peter Baumann, both of Grindelwald, as guides, made from the Eggischhorn last season, we sought a shelter for the night nearer the base of the peak. We diverged from the Oberaar route, where the Viescher glacier is again struck, after clambering up the well-known waterfall, and crossing the mountain slopes beyond. Traversing the glacier diagonally towards the Finsteraarhorn, we were successful in finding, on the extreme west slope of the Rothhorn, and within 15 minutes of the glacier flowing down from the Finsteraarhorn, a detached rock, resting on a kind of keel, from which its sides sloped upwards at an angle of about 45°. This shape and position allowed us, by building a low surrounding wall, to convert the enclosure into a tolerable gîte. Leaving it the following morning at 4.15, we were enabled, despite a detention of nearly three hours by snow-storms, to effect the ascent, and return, by the Grünhorn Lücke, to the Eggischhorn Hotel at 7.45 that evening. I conceive that this is preferable either to starting from the Rothhorn Cave (east side), or to making the excursion the reverse way from the Faulberg; and a knowledge of the existence and locality of the gîte may be of use to some readers of the *Alpine Journal*.

FREDK. WM. JACOB.

SECOND ASCENT OF THE VIESCHERHORN.—On August 3, 1863, Mr. Hopper and I, with Ulrich Kaufmann and Peter Baumann as guides, slept at the Eiger Hole, and on the following morning reached the top of the Mönch Joch at 6.30. When we had descended the Trugberg Glacier for nearly an hour, the ascent of the Viescherhorn looked so tempting that we determined to attempt it. Accordingly at eight we left our knapsacks on the level of the Trugberg Glacier, and struck up a steep and rather crevassed glacier to a point about half way up the north-western arête of the mountain. We gained the arête at 9.30, having a steep ice-wall to surmount after crossing the bergschrund. We reached the summit at eleven, remained half an hour, and returned to our knapsacks at 1.25. If the start be made from Grindelwald, our route would be found the most direct, and Kaufmann, who accompanied Messrs. George and Moore in the first ascent,\* gave it as his opinion that our arête presented fewer difficulties than the wall by which they

\* See *Alpine Journal*, No. V. p. 236.

ascended, while the glacier by which we reached the arête was much less broken. No words can do justice to the magnificence of the view.

GEORGE CHATER, JUN.

This, the highest of the Grindelwald Viescherhörner, or Walcherhörner, the sixth of the Oberland peaks in the order of height, has hitherto remained without a distinct name. That of Gross Viescherhorn has been appropriated on the Federal Map to the point most conspicuous from the lower Grindelwald Glacier, which is but the fifth in order of these peaks, being 12,707 ft. above the sea. It being necessary to distinguish the more important summit, the writer suggests, with the concurrence of several of those best entitled to give an opinion on the subject, that the most appropriate name to connect with this hitherto neglected peak, is that of Christian Almer, the first man who reached the summit; and one who has shown in the passages of the Jungfrau Joch, the Sesia Joch, and many other difficult expeditions, that he has no superior among living guides to the high Alps. The *Almerhorn* (13,281') will probably be readily admitted by that name into the local topography of Grindelwald.

JOHN BALL.

THE TÖDI.—Amongst the many excellent arrangements which the Swiss Alpine Club are making for facilitating exploration, is the erection of a hut on the Grünhorn, nearly 3 hours higher up than the Sand Alp, from whence the ascent of the Tödi is usually effected. At the time of my visit (1863) the building had only progressed so far as its outer walls, and was roofless. There was, however, a piece of tarpaulin; and, as I sat there 16 hours in the rain, I was thankful for even this limited shelter. Let into the walls are receptacles for a standard barometer, cooking apparatus, and other unusual luxuries, which it is the intention of the club to keep there permanently. From the registry-book in one of the cupboards, I appear to have been the first visitor. To reach the hut, it is not necessary for the traveller to ascend to the Sand Alp, which involves a détour and subsequent loss of level; he should turn off at the chalet near the bifurcation of the streams, a little beyond the Unter-Stafel, and, ascending the slopes on the right bank of the stream issuing from the Biferten glacier, cross to the left bank, and mount, by the Biferten Alp and a secondary glacier beyond, to the hut, in less than 3 hours from the bifurcation. I may add that M. König, the doctor at Stachelberg, is a member of the Swiss Club, and will gladly give valuable information regarding the district, but that the local guides, Thüt and Leonhard Vogeli, are not to be relied upon in any attempt to diverge from regulated routes, and have not the qualities which distinguish men of their class in other parts of the Alps.

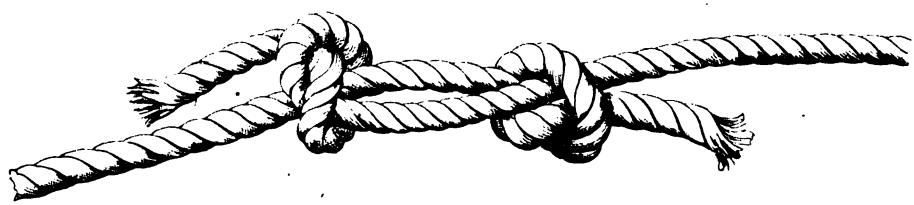
FREDK. WM. JACOMB.

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\* \* \* *In the September number of the Alpine Journal will be published a summary of all new ascents and remarkable expeditions made during the summer, to as late a date as may be found possible. For this purpose the Editor requests mountaineers to furnish him, at their earliest convenience, with short memoranda of any such expeditions. He would also be glad to receive notes of any new Alpine Byways, by which are intended expeditions practicable for ladies, or at any rate for moderate walkers, which are not described in the guide-books.*



Nº 1.



Nº 2.

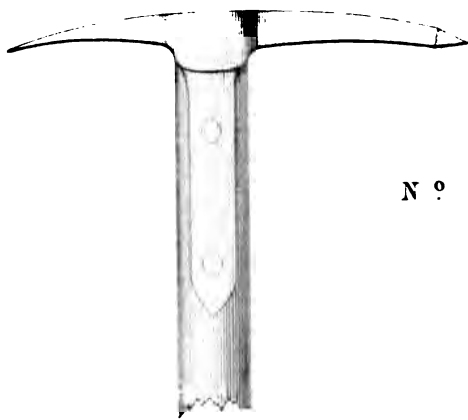


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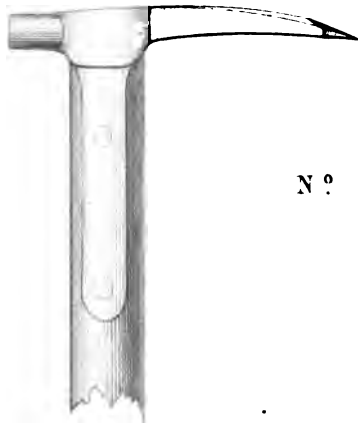


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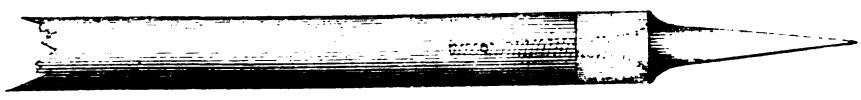
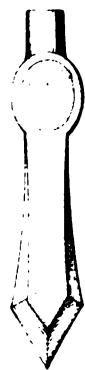




Nº 2.



Nº 1.







THE  
ALPINE JOURNAL.

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SEPTEMBER 1864.

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REPORT OF THE SPECIAL COMMITTEE ON ROPES, AXES,  
AND ALPENSTOCKS. Read before the Alpine Club on  
July 5, 1864.

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[\*.\* In May last the Committee of the Alpine Club invited the members to send to the Club-rooms for exhibition any specimens of axes and ropes which they might think worthy of notice. A large number of different axes being thus collected, opportunity was afforded of carefully comparing their various qualities. A committee was specially appointed to discover by experiment the kind of rope best suited for alpine purposes, and to consider in detail all the conditions to be fulfilled in the construction of an ice-axe. The report presented by this committee was adopted by the Club and ordered to be circulated among all its members, and we have thought it probable that most readers of the Alpine Journal would be to some extent interested in the questions discussed in it. This report has therefore been inserted in the present number, in the hope that the information contained in it may prove more widely useful than if it had remained in exclusively private circulation.]

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MR. PRESIDENT AND GENTLEMEN,

In the REPORT which we now have the honour to present to the Club, we have endeavoured to state what kinds of ROPES, AXES, and ALPENSTOCKS will be found most safe and useful for mountain work.

It has seemed to us that it did not fall within our province to express an opinion as to the particular circumstances under which the rope should or should not be used; whether it is ever productive rather of danger than safety; and whether it is desirable that every traveller of a party should be provided with an axe.

We have simply attempted, therefore, to lay before the Club the result of our enquiries as to the material, mode of construction, and form of these important alpine accoutrements.

### *Ropes.*

As to the facts which it was necessary to ascertain with regard to ropes, there can be, we presume, very little difference of opinion: we had only to determine what is the strongest kind of rope which is light enough to be carried about.

To solve, however, this problem, apparently so simple, we found it requisite to make a large number of experiments, the nature and result of which we propose now to state.

It appeared to us that we should best determine what sort of rope is most suited for mountain expeditions by finding out which would best sustain, not a steady and gradual, but a sudden and violent strain. Most of the good light rope sold in London will support a dead weight far greater than any which it is ever likely to have to sustain in the Alps; but in estimating its strength it is always assumed that the strain will be gradually applied. The alpine traveller's rope, on the contrary, if tried at all, will have to resist a sudden jerk, which may be a very violent one: and it is against this danger that the most careful precautions should be taken, as some lamentable accidents too clearly show.

We have therefore endeavoured to ascertain what ropes will best stand the sharp jerk which would be caused by a man falling suddenly into a crevasse, or down an ice-slope: and on this subject we can now lay before the Club the result of nearly a hundred experiments, made with various kinds of rope purchased of the best London makers.

We considered that the least weight with which it was practically useful to test ropes was twelve stone, as representing the average weight of a light man with his whole alpine equipment. In the preliminary experiments, therefore, all ropes were rejected which did not support the strain produced by twelve stone falling five feet. Under this trial, all those plaited ropes which are generally supposed to be so strong, and many most carefully-made twisted ropes, gave way in such a manner

as was very startling to some of our number, who had been in the habit of using these treacherous cords with perfect and most unfounded confidence.

Only four ropes passed successfully through this trial; these were all made by Messrs. Buckingham and Sons, of 33 Broad Street, Bloomsbury, and can be procured only of them.

We confined our further experiments to these ropes, one of which failed under severer tests, while the remaining three, made respectively of Manilla hemp, Italian hemp, and flax, proved so nearly equal in strength that it may fairly be doubted which is on the whole to be preferred.

Each of these three ropes will bear twelve stone falling ten feet, and fourteen stone falling eight feet; and it may be useful to say that the strain upon a rope loaded with a weight of fourteen stone, and suddenly checked after a fall of eight feet, is nearly equal to that which is caused by a dead weight of two tons. None of these ropes, however, will bear a weight of fourteen stone falling ten feet; and the result of our experiments is, that no rope can be made, whether of hemp, flax, or silk, which is strong enough to bear that strain, and yet light enough to be portable. We believe that these ropes, which weigh about three quarters of an ounce to the foot, are the heaviest which can be conveniently carried about in the Alps.

We append a statement of the respective merits of the three kinds, all of which are now made by Messrs. Buckingham expressly for the Club, and marked by a *red* worsted thread twisted in with the strands:—

No. 1. MANILLA HEMP.

Weight of 20 yards, 44 oz.

*Advantages.*

Is softer and more pliable than 2. Is more elastic than 2 and 3.  
When wet, is far more pleasant to handle than 2 and 3.

*Disadvantages.*

Has a tendency to wear and fray at a knot.

No. 2. ITALIAN HEMP.

Weight of 20 yards, 43 oz.

*Advantages.*

Is less bulky than 1 and 3. Is harder, and will probably wear best, being least likely to cut against rocks.

*Disadvantages.*

Is much more stiff and difficult to untie than 1 and 3. When wet, is very disagreeable to handle, and is apt to kink.

No. 3. FLAX.

Weight of 20 yards, 44 oz.

*Advantages.*

When dry, is softer, more pliable, and easier to handle than 1 and 2, and will probably wear better than 1.

*Disadvantages.*

When wet, becomes decidedly somewhat weaker, and is nearly as disagreeable to handle as 2.

As it is a very desirable thing that ropes intended for the Alps should, if possible, be made waterproof, we enquired of several makers as to the possibility of covering or saturating the rope with a waterproof mixture. They all informed us that any kind of waterproofing is highly injurious to either flax or hemp. Silk, however, becomes stronger by being made waterproof in the ordinary way.

While we were making our experiments upon the strength of ropes, we took the opportunity of observing what effect was produced by different kinds of knots upon the rope, and how far they affected its strength and tenacity. In consequence of these observations, we made some special experiments upon knotted ropes, and we are inclined to believe that it may be useful to many Members to inform them of the results.

The results we have obtained from our experiments upon knots are not such as to enable us to make a detailed report, or to add any information to that already in the possession of any man who has been accustomed to handle ropes. We are only enabled to state, positively, one or two important facts, of which many travellers and guides appear to be strangely ignorant.

There can be no doubt that every knot in a rope weakens its power of resisting a sudden jerking strain. How great a loss of strength results from a knot we cannot undertake to estimate, but that the loss is a very serious one the following statement will show:—These ropes, which we report will resist the strain of fourteen stone falling eight feet, will *not* resist it if there is a knot in any one of them; or even if the knots used in attaching them to the point of support, or to the weights, be roughly or carelessly made. The rope in these cases breaks at the knot, for two reasons: partly because the folds, as they cross in the knot, are strained suddenly across each other, and one of them is cut through; and partly because the rope is so sharply bent that the outer side of each fold in the knot is much more stretched than the inner side, so that the strain comes almost entirely upon one side only of each fold.

For the first reason, we found it necessary to put a pad of some kind inside the knot—leather, linen, or a little tow or waste rope will do. For the second reason we preferred knots in which the folds are least sharply bent round each other; that is, in which the curves are large.

We therefore conclude that:

- 1st. No knot, which is not absolutely necessary, ought to be allowed to remain on the rope:
- 2nd. The tighter and harder a knot becomes, the worse it is:
- 3rd. The more loose and open a knot is made, the better it is:

and we append diagrams of those knots which we found by experiment to weaken the rope least. For alpine ropes, only three sorts of knots are ever required, and we suggest one of each kind.

No. 1 is for the purpose of joining two ends.

No. 2 is for the purpose of making a loop at one end.

No. 3 is for the purpose of making a loop in the middle when the ends are fastened.

No. 4 is a knot, of which we give a diagram in order that no one may imitate it. It is one of those which most weaken the

rope. The only one which seemed to be equally injurious, is the common single knot, of which no diagram is necessary.

As the ropes which we have recommended are very liable to become untwisted, unless the loose ends are secured, we advise travellers, in order to avoid knots, to have the ends of every piece of rope bound with waxed twine.

It should also be known that it is very unsafe to join two pieces of rope by looping one end through the other, so that, when the jerk comes, they will be strained across each other as two links of a chain are strained across each other. Unless a pad of some kind divides the loops, one will cut the other through.

#### *Axes.*

With regard to axes our task was less easy. There is no subject on which the Members of the Alpine Club seem to have such divergent opinions, and we proffer such suggestions as we have to make with considerable diffidence, trusting that nothing we say may be considered in any way to slight the inventors of those ingenious but not always intelligible instruments which have of late adorned the Club rooms.

It is unfortunately true, as stated by Mr. Stephen and Mr. Ball, that the authorities are by no means agreed as to the best form of ice-axe; and it may be added, that not even are any two men who ever climbed a mountain agreed on the subject at all, as there is no case on record of anyone having met in Switzerland two Members of the Alpine Club armed with the same kind of weapon.

As, however, we recommend three kinds of axes, we trust that we may be considered to have done our best to harmonise the considerable diversity of opinion which exists on the subject.

The axes made in England for the purpose of being taken out to Switzerland, may be divided into two classes, namely: travellers' axes, intended to be used for chipping a few occasional steps, for enlarging and clearing out those imperfectly made, and for holding on to a snow-slope,—and guides' axes, which are the heavier implements required for making long staircases in hard blue ice.

We have had three models prepared, of which diagrams are

appended; the first two represent the lighter axe, or what we have termed the travellers' axe; and the third, the heavier instrument required for guides' work. Diagram No. 1 represents a light axe or pick, of a kind somewhat similar to that recommended by Mr. Stephen, in a paper published in the fifth number of the Journal. It has, in the first place, the great advantage of lightness and handiness, while its single blade, to some extent, combines the step-cutting qualities possessed by the two cutters of the ordinary double-headed axe, though the latter instrument is on the whole decidedly superior. The small hammer-head at the back is added in order to balance the pick, and in some degree to improve the hold when the axe-head comes to be used as a crutch handle.

This form, it should be understood, we recommend on account of its lightness and of its convenient shape. Diagram No. 2 represents a travellers' axe, slightly heavier than the first; and as this is the shape which appears to us the best adapted for mountain work of all kinds, we desire shortly to state our reasons for recommending it to Members of the Club.

In the first place it is absolutely necessary that one of the cutters should be made in the form of a pick, as this is by far the best instrument for hacking into hard ice, and is also extremely convenient for holding on to a snow-slope, or hooking into crannies, or on to ledges of rock.

For the other cutter we recommend an adze-shaped blade, and we are convinced that this is the form which will be found most generally useful, as being best suited for all the varieties of step-cutting. The hatchet-shaped blade used by the Chamouni guides is no doubt a better implement for making a staircase diagonally up a slope, but on the other hand, it is exceedingly difficult to cut steps downwards with a blade set on in this manner; and as mountaineers rarely come down the way by which they went up, if they can help it, it is obvious that this objection to the Chamouni form of axe is conclusive.

We recommend that the edge of the blade should be angular instead of circular, although the latter shape is more common, because it is clear that the angular edge cuts into frozen snow more quickly and easily.

The curve, which is the same in all the axes, approaches to coincidence with the curve described by the axe in making the stroke. A curve is, in our opinion, desirable, in order to bring the point more nearly opposite the centre of percussion, and to make the head more useful for holding on to rocks or a slope.

The axe shown in diagram No. 2, though slightly heavier than No. 1, is not of sufficient weight or strength for cutting a series of steps in hard ice. To those gentlemen, therefore, who do not object to carrying weight, but who desire to have an axe fit for any kind of work, we recommend No. 3. As this is exactly similar in shape to No. 2, differing from it only in size, we have not thought it necessary to give a separate diagram of No. 3.

As to the mode of fastening, which is the same in all the three axes, we should have felt some diffidence in giving an opinion had we not been fortunate enough to obtain the advice of an experienced metal-worker, by whom we were strongly recommended to adopt the fastening shown in the diagrams, as being the method generally considered best in the trade for attaching the heads of hatchets, or large hammers likely to be subjected to very violent strains. It will be seen that the axe-head and fastening are forged in one solid piece, the fastening consisting of two strong braces or straps of steel, which are pressed into the wood about one-eighth of an inch, and are secured by two rivets, passed through the wood and clenched on each side. The braces are put at the side, instead of in front of and behind the axe, because, by this means, the strain which falls on the axe acts against the whole breadth of the steel fastenings, and not against their thickness merely.

We believe that this is the firmest method of fastening which can be adopted, and that, so long as the wood is sound, it is scarcely possible for the head of the axe to get loose or to come off: and it has the further advantage of strengthening the wood instead of weakening it, and of distributing the strain produced by step-cutting over a large bearing. It should be added that these axe-heads and fastenings ought to be made entirely of steel. These models have been manufactured by



Mr. Leaver, metal-worker, of Maidenhead, who has the plans and scale.\*

The dimensions of the axe-heads are as follow :—

No. 1.

Length of blade measured from the wood	4½ inches
Breadth of blade at widest part . . .	1½ ”
Weight, including the braces . . .	13¼ oz.

No. 2.

Length of blade measured from the wood	3½ inches
Length of pick ” ” ”	4½ ”
Breadth of blade at widest part . . .	1¾ ”
Breadth of pick ” . . .	0½ ”
Weight, including the braces . . .	15¼ oz.

No. 3.

Length of blade measured from the wood	4 inches
Length of pick ” ” ”	5 ”
Breadth of blade at widest part . . .	2¼ ”
Breadth of pick ” . . .	0⅞ ”
Weight, including the braces . . .	21¼ oz.

We much desired to recommend to the Club some means by which the axe-head might be made movable, so as to be capable of being put on and taken off the handle quickly and easily. We regret to say, however, that we were unable to discover any plan by which this can be effectually done. We examined very carefully the numerous and formidable weapons which have been sent in by Members for exhibition, most of which had elaborate contrivances for fastening on the axe-head. These were all, however, liable to very serious objections. Some were evidently insecure; with others it was necessary that the axe-head should be surmounted by a huge knob, which would

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\* Mr. Leaver will manufacture the axes, complete, at the following prices :—

No. 1 . . . . .	£1 1 0
No. 2 . . . . .	1 2 6
No. 3 . . . . .	1 5 0

prove a most serious impediment in step-cutting; while in the best and firmest which we found, the axe-head was attached to the pole by means of nuts and screws projecting at the side or over the top of the axe. This latter method of fastening seems to us awkward and possibly dangerous, as the nuts, from their position, are very likely to become loose or to get broken off, and cannot, except when dangerously loose, be fastened or unfastened without a key or wrench—a troublesome article, certain to be lost on the first expedition.

#### *The Handle of the Axe*

should, we think, be made of ash. We recommend this wood, in preference to deal, which is lighter and nearly as strong, because in choosing a piece of ash it is easier to select with certainty thoroughly sound and well-seasoned wood; and in preference to hickory and lance-wood, which are stronger, because those woods are extremely heavy.

The handle should, we believe, be of a very slightly oval form, as it is then more convenient to the grasp than if round. As to the thickness of the wood, we are satisfied it ought nowhere to be less than  $1\frac{3}{8}$  inches, since a pole of that diameter, made of ordinarily good ash, is the smallest which cannot be permanently bent by a heavy man's most violent effort; although we have seen some pieces of unusually strong ash of a less thickness which proved inflexible.

We recommend, then, that the oval section of the handle should have a shorter diameter of  $1\frac{3}{8}$  inches, and a longer diameter of  $1\frac{1}{2}$  inches, and that the thickness should be the same from one end to the other. The length of the handles for Nos. 1 and 2 should be such that they will reach to just under the arm at the shoulder. The handle for No. 3, which is intended to be used exclusively as an axe, should be between  $3\frac{1}{2}$  and 4 feet long. The lower end of the handle should be strengthened in the usual way by a ferule, and armed with a spike.

The spike should be from  $3\frac{1}{2}$  to 4 inches long, clear of the end of the handle, and should have a shank of the same length to be screwed into the wood. The screw should be prevented from moving by a slight rivet passed through it near the upper

end after it is fastened in. The exact form of the spike and ferule are represented in the diagram.

We have further to recommend for axe-handles an addition which is liable to suspicion as an entire innovation, but which, we are confident, will be found valuable at those critical moments when the axe is required to hold up two or three men. It has happened that when the axe has been struck into the snow a man has been unable to keep his hold of the handle, which slips out of his hand, and leaves him perfectly helpless. To guard against this mischance, we propose to fasten a band of leather round the handle, at a distance of a foot from the ferule at the lower end. This leather should be about an eighth of an inch thick, and will be quite sufficient to check the hand when it is sliding down the handle. It should be lashed round the wood and strained tight when wet.

*Alpenstocks.*

What we have said about the handle of the axe applies in all respects to the alpenstock, except that the length of the latter should be different, and that the leathern ring would of course not be required. It is generally thought most convenient that the alpenstock should be high enough to touch the chin of its owner as he stands upright; but this is a matter on which it is scarcely possible, and, were it possible, scarcely necessary, to lay down an absolute rule.

We have now laid before the Club the result of our enquiries upon the subject which we were appointed to consider, and we hope that it may not be too late for some of our suggestions to prove useful to Members during the present season.

E. S. KENNEDY (*Chairman*)

F. C. GROVE (*Secretary*)

J. J. COWELL

H. B. GEORGE

W. E. HALL

R. C. NICHOLS.

ON SOME RELICS OF THE GUIDES LOST ON MONT BLANC.  
By J. J. COWELL, B. A. Read before the Alpine Club on  
April 5, 1864.

THE relics which are the subject of this paper are a few out of a large number of miscellaneous articles which have been found on the lower end of the Glacier des Bossons, near Chamouni, since the year 1861; and some of which have been recognised and identified by friends of the three guides who were lost on August 20, 1820, during Dr. Hamel's attempt to ascend Mont Blanc. These relics have not been submitted to anyone at Chamouni for examination; they were found lying upon the surface of the Glacier des Bossons on August 7, 1863, by Mr. Browning, of Eton College, and Mr. Blanford, and were brought by them to England. These gentlemen presented to the Alpine Club the five relics here described, namely—a piece of paper, a fragment of an alpenstock, a piece of bottle-glass, a large portion of the iron frame of a lantern, and a small bit of one of the poor fellows' skulls. All these five objects were found at the same time, on a part of the glacier some distance below the level place where ladies are usually taken across; in fact, very near the foot of the glacier, and about the middle of its width. They were all partially imbedded in the ice, and had to be disengaged by chipping it.

In order to trace their career it will be necessary to commence with a short account of the accident in which they were lost. Of this I have often heard the history from Joseph Marie Couttet, now seventy years old, who was the leader of the expedition, and was himself thrown into the crevasse. Nevertheless, the exact spot where the accident happened, curiously enough, I have never been able to ascertain satisfactorily: but it certainly was near the foot of the western Rocher Rouge.

The party was ascending obliquely over the back of the western Rocher Rouge, and was bearing to the left, having Mont Blanc on the right. Five minutes before the accident Dr. Hamel measured the angle of the slope,\* which was then 28°, but increased in steepness at every step. None of the party were tied. It is certain that it was not an avalanche which fell on them. Couttet says: 'The snow was crusted hard to the depth of half an inch, but all soft below, being only twelve hours old. The surface cracked all along the line of men, just where we stood.' Below the crack the whole mass of snow slid

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\* Angle of slope on Haut de Cry, on which Bennen was killed, 35°.

away downwards, then the snow above slid down into the empty space, and so, acquiring momentum, turned the whole snow-slip into a powerful avalanche, in the manner strikingly described by Mr. Tuckett, in his account of the great avalanche which fell during his descent of the Aletschhorn. (Peaks, Passes, and Glaciers, second series, vol. ii. p. 65.)

Dr. Hamel's whole party was carried an enormous distance, no less than 1,200 feet\*—Couttet and other authorities are positive on this point—and then the whole avalanche was engulfed in one vast crevasse, which it filled up to the brim, and formed a heap over it. The three leading guides were on the steepest part of the slope, and the snow in its descent gradually worked itself towards that part, and so thickened the avalanche there that they were hopelessly overwhelmed. This thickening in one part lessened the quantity of snow that was carrying down the rest of the party, most of whom stopped short of the crevasse. Four guides were thrown in, of whom Couttet alone was rescued, with his face blue from suffocation. The three guides lost were Pierre Carrier, Pierre Balmat, and Auguste Tairraz, brother to Jean Tairraz, now of Aosta, and to Frédéric Tairraz, who was killed on August 15, 1860, in the accident on the Col du Géant. It is remarkable that the only three accidents to travellers, in which more than one life is known to have been lost—namely, Dr. Hamel's, the accident on the Col du Géant, and that on the Haut de Cry last February—seem to have happened almost exactly in the same way.

I think that the first idea which arises on seeing these relics is one of curiosity as to the distance which they travelled in the ice. We must not expect to receive any accurate answer on this point—that is, accurate to within 200 or 300 yards; for, besides the difficulty that we cannot exactly fix upon the spot whence they started, we must acknowledge the impossibility of accurately tracing their sinuous descent down the glacier-bed.

Let us, however, assume the position of the crevasse to have been where I suppose, near the foot of the western Rocher Rouge. The distance from there to the spot where they were found, in a straight line, is, by measurement on Mr. Reilly's new map, 8,513 yards; and the inclination of this straight line to the horizon is 23°. We know, then, that the relics must have travelled, had they moved quite straight, these 8,513 yards, or 4 $\frac{7}{8}$  miles; and, when we remember the irregular course of the Glacier des Bossons, its inclination varying from the horizontal to 70°, we may, I should fancy, increase the distance by any amount à *discretion* from half a mile to a mile. We may safely

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\* The avalanche on the Haut de Cry fell 1,000 feet.

estimate it at not less than half a mile more, or  $5\frac{1}{2}$  miles: this would give an annual movement of 225 yards for 43 years, or  $22\frac{1}{2}$  inches a day. If these distances are correct, the average rate of motion of the Glacier des Bossons may be pronounced about equal to the summer (maximum) rate of the Mer de Glace, as determined by Professor Tyndall, which may easily be accounted for by the much greater steepness of the former.

These relics have a special interest for us, in so far as they throw light upon the difficult questions that still remain unsolved, about the condition of the interior inaccessible parts of the glacier. The main questions are these two: 'What is its temperature? and, consequently, its degree of fluidity?' 'What amount of pressure pervades it?' I propose chiefly to note the bearing which the relics severally have upon these two questions; which, for brevity's sake, I will call the 'Fluidity Question,' and the 'Pressure Question,' respectively.

These objects were buried in snow, and entirely covered by it. A sheet of snow several hundred feet in length entered the crevasse before them; and a heap more than forty feet high lay upon them. They were lost then in snow, not in ice; but they were found in ice. We enquire how this change took place, and are thus led at once to examine the answer that is afforded by the Regelation Theory.

Now the regelation theory supposes that dry snow is gradually converted into ice by the combined agencies of pressure and cold. Severe compression causes the snow to become capable of melting slightly, at a temperature colder than  $32^{\circ}$  Fabr. This slight melting wets the whole mass, so that when a hard frost occurs, the wet snow is changed into hard névé. The same névé, being repeatedly thus moistened and frozen, at last is turned into ice. Throughout the process one indispensable agent is 'pressure;' and one (theoretically) necessary consequence is moisture.

The relics were found scattered over a large surface of the glacier, roughly estimated at fifty yards square; and we at once ask why, if the things were constantly being compressed, they were not found in a condition of closer contact with each other than when they were first imbedded? Since ice is much more dense than a mass of snow, a large volume of snow will become pressed into a comparatively small volume of ice. Let us suppose, for argument's sake, that we must take three cubic feet of snow in order to press out one cubic foot of ice; and that a number of chips have been scattered at random throughout the mass of the three cubic feet of snow. We know that when that mass has been compressed into one cubic foot of ice, we

shall find all the chips much closer together; and we suppose that the result would be the same if the experiment could be tried with 100,000 instead of three cubic feet. But, in the case before us, the experiment has been on this immense scale, and so we ought to find the three men, or each man singly, crushed up into a small lump with all his things; and yet we do not find this result. On the contrary, the men and all their things are torn to pieces, and widely separated by intervals of many feet. All round them the ice was covered, in every direction for twenty or thirty feet, with hair from one knapsack, spread over an area three or four hundred times greater than that of the knapsack.

This is not an isolated example of the scattering that takes place in—or on—a glacier; for I saw myself on the St. Théodule glacier, at the foot of the Breithorn, the remains of the syndic of Val Tournanche and his mule, scattered over a space of several acres. I am here surprised, not at the breaking up, but at the scattering of the pieces; which suggests, either that they never were compressed, or that their icy envelope has, since compression, expanded on the surface in some manner which has hitherto escaped observation. If there be such an expansion, may not the following well-known fact suggest an explanation? Sometimes, when a school of mackerel comes into shallow water, they swim so close to each other, and crowd and press together so much, that the middle of the school is raised quite out of the water, as a slight convexity, like the back of a whale. Thousands of fish, being thus lifted up, keep struggling and flapping, and as they are very slippery they gradually slide away from the top of the convexity, down its sides, towards the edges. Thus the surface, looked at as a whole, is always spreading, and moving from the middle to the sides. Is it not possible that, when a glacier suffers under great compression from the sides of its bed below, its surface may bulge slightly up in the middle, and that the hump thus formed may, in analogy to the heap of mackerel, insensibly spread itself out towards the sides?

The preceding observations apply to all of the relics, but I now propose to describe each of them separately.

*The Paper.*—The piece of paper is perhaps the most interesting of all, because it is that one which was most likely (as might be supposed) to perish under the effects of moisture and pressure, both of which seem to have acted upon it. It consists of five or six pages of a Latin book, octavo size, and has been so compressed that the several leaves have been united into one thick substance, almost like crumpled cardboard. What

time, and how great pressure, were required to produce this result, I cannot estimate; but I attempted to gain some insight into the nature of the question by making an experiment on a very small scale. I chose some paper which had nearly the same thickness and texture as we may with probability ascribe to the relic; some French paper of the year 1818. This was placed in water, and then subjected to a pressure of 80 pounds to the square inch, which was maintained for ten days; and the question was whether this would produce any effect resembling such a solidifying of the several sheets as the relic exhibits to us. No such effect, however—and, in fact, no perceptible effect of any kind—was produced upon the paper tested. So the results of the experiment were purely negative.

The print on the relic is perfectly plain and distinct, showing that the surface of the paper has not been rubbed, and that the steady pressure cannot ever have changed into a pressure accompanied by any dragging and friction in the ice enclosing it. The texture of the paper does, however, appear to have been partially loosened, perhaps by moisture: for the surface on one side is covered with rough hairy tangles of the fibre, which have partly separated themselves from the paper, giving it an appearance of having been scratched up in a manner similar to that in which rag is picked into lint. Among these tangles remain some small fragments of glass, as small as pins' heads. On the whole, we may probably conclude that the paper has been sometimes wet; but I am inclined to believe that it cannot have been constantly thoroughly wet and severely pressed; because, had it been thus treated, it would, we may suppose, have been altogether sopped, squeezed, and dissolved away.

*The Wood.*—The piece of the alpenstock is about ten inches long. One end is the original top of the pole; the other is a broken end, which I have very carefully examined. In this fracture the uneven parts do not seem to have been crushed up. The larger splinters have been blunted, but not broken; while several of the small splintery points are perfect and unbruised, as far as I can judge after examination with a magnifying glass. They do not exhibit any marks of having been much compressed, and as for friction against them, I am convinced that there has been none. The fracture itself is not necessarily to be ascribed to pressure, because the pole may very probably have been broken in the fall.

During the six months that have elapsed since the wood was recovered, one remarkable change has taken place in it. Its surface is covered with cracks both along and across the grain.



It is four months since I first saw it, and there were no cracks in it then. Certainly the natural inference is that it was then thoroughly moist and swelled, and has since cracked while drying. If this be the fact, it is perfectly conclusive on the fluidity question.

There are in the wood two peculiarities for which, after much speculation, I despair of accounting. Close to the fracture, and for a distance of about five inches, there is an appearance of the surface having been singed, for the wood is quite black. I asked Couttet if poles were ever hardened by being passed through the fire, and he thought not. It has been suggested that the pole may have been used to stir a fire within a bivouac—and this may often happen, no doubt; but, in such a case, the part singed would be the very end; whereas, in the case of our relic, the five inches near the end are not singed at all.

Besides this, on some parts of the wood there has been formed a thin brown skin, which easily flakes off, and most resembles the dried-up crust in a wine-bottle that has long been emptied. It is a hard, horny substance, somewhat like a dry inner bark, and it suggests the idea of a growth of some kind—of some vegetable efflorescence. Can it be a kind of lichen? I am neither chemist nor botanist enough to give an opinion on these points. If it be a vegetable growth, it certainly has arisen under very extraordinary circumstances, and would probably imply the presence of moisture.

*The Bone.*—I do not learn anything from the fragment of skull on the fluidity question; but that is probably owing to my ignorance. On the pressure question, the same inference may be drawn from the piece of skull as from the broken end of the pole; that the pressure on it, since it was first detached from the remainder of the skull, can never have been rough and suddenly crushing. Here we have a part of one side of a suture of the bone. All the delicate teeth of the serrated border are perfect and unbroken, even unblunted, I believe. But a still more curious circumstance remains to be pointed out. A small piece of the adjacent bone, on the other side of the suture, has been broken away from its own side, and remains fastened to our piece by two interlacing teeth; but fastened so loosely, that when it is gently touched it is plainly seen to shake, and work up and down. Yet this delicate, quivering piece of workmanship has been dragged five miles over plain and precipice, down the tremendous ice-fall below the Grand Plateau, and through the region of wildest disruption and confusion below the Grands Mulets. Surely it must have been handled very tenderly, and

the violence of pressure must have been tempered in some way that we have hitherto not understood.

*The Iron and Glass.*—On the other hand, if we examine the iron and the glass, we certainly do observe traces of great violence, as a mere cursory inspection of these tattered strips will show. A strip of iron, of less thickness than this, is fastened round a bale of compressed cotton, and the whole bale, weighing four cwt., is lifted by it. Yet these strips are regularly torn asunder. It is not that they have rusted through, as I have carefully examined some of the fractures, and can see the lacerations of the fibre of the metal. The iron has been pulled in two.

The glass also has been very severely crushed, and large flakes have flown off from its convex surface. They have not been chipped off, but have left the well-known appearance of having flaked off under severe compression. Of these two relics, then, the testimony is emphatic on the pressure question; and that of the iron is equally emphatic on the fluidity question. It is covered all over with a thick rust. Some part of this is, no doubt, owing to exposure on the glacier, for the iron alone of all the relics was lying quite clear out of the ice, and not imbedded in it. So it may have lain rusting for several days, and I therefore particularly mention that the rust is very much thicker than a few days' exposure could make it. Of course, iron exposed to the air and constantly wetted rusts much more than it would if permanently immersed in water. I tried to get a piece of iron that had been for several years always under water, in order to compare its rust with that of the relic. I could not, however, find any piece with a trustworthy history. But, in the meantime, we must ask this question: Will iron rust in perfectly *dry* ice? Upon this I can find no scientific decision, and I can only say that I confidently suppose that the answer would be in the negative. If, upon experiment, that proves to be the right answer, then we can positively affirm that the ice inside the glacier has been moist. How often moist, and to what extent, I am not competent to estimate; but, perhaps a practical chemist, upon examining the rust, might give an approximate answer on both points.

Having thus examined the relics in detail, can we derive any positive conclusion on either of the chief questions to which I have so often referred? On the fluidity question I believe we can, almost with certainty. All the evidence that we have obtained points the same way, and implies that the ice about the relics has occasionally been moist; all the relics which could exhibit traces of having been moist, do exhibit them; and at present we have no evidence that points the other way.



GLACIERS OF THE BERGNA.



But on the pressure question I cannot feel satisfied, or informed enough to express any general conclusion. That there is some pressure, and that its amount varies considerably, we knew before; and that still appears to be all that we can assert, after inspecting the relics. Their testimony is to some extent contradictory. We are at a loss to conceive the varying conditions of a pressure which, while it solidifies so hard a substance as paper, omits to bruise the splintered points of a piece of deal; and, while it fails to separate two pieces of bone which a dozen ants could lift asunder, yet a few feet off tears up bands of iron like blades of grass.

Such are the vague conclusions derived from the merely superficial inspection, which is all that I am competent to bestow on these few relics. If they were submitted to a really scientific examination, some more definite results might perhaps be obtained. But as many other relics are now annually found on the Glacier des Bossons, it is probable that, if these are collected and carefully examined, the comparison of a large number of instances will gradually enlighten us on these doubtful questions.

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THE GLACIERS OF THE BERNINA. By E. N. BUXTON.  
Read before the Alpine Club on March 1, 1864.

THE left bank of the Morteratsch Glacier is surmounted for the most part by a line of cliffs and grass slopes, which rise steeply from the very edge of the moraine. At one point, however, just under the Piz Morteratsch, it recedes, leaving a comparatively level plain which is hidden from the lower part of the glacier. The ruins of the mountain have completely covered it, and it is now a wilderness of boulders, producing nothing but marmots. Two very large masses have, fortunately for mountaineers, fallen together—one slightly tilted by the other—leaving a sloping, and gradually narrowing, tunnel between them. Across the lower and larger opening the guides have built a rough stone wall, leaving a pretty large doorway. A pile of boulders blocks the other end and allows only too easy a passage for air, or smoke, or even human body, as I proved by direct experiment. At any rate the walls are thick, which should be one element of warmth.

To reach this lair, A. Johnston, W. E. Hall, M. Woodmass, W. F. Digby, and I left the Bernina road on the afternoon of July 23rd last summer, hoping to follow in the steps of Messrs. Kennedy and Hardy, and climb the Bernina itself. Alas! that

we had chosen the one week in the season of really bad weather for the exploration of this most perfect of mountain groups. We were accompanied, or rather followed, at intervals, as it suited their convenience, by Peter Jenni, Alexander Fleuri, and Walther, besides sundry porters. The track led along the left bank of the glacier, and when it vanished we followed the deep trench between the moraine and the hill-side, which was still half filled with the spring avalanches. In about three hours we reached the friendly rock. From the way the guides described it, we had given it the sounding title of 'Grand Hôtel du Club des Alpes.' From later experiences I would suggest the more fitting name of 'Rushing River Refuge,' or 'the dripping well.'

Two porters had been sent on in the morning to make things comfortable. They had been seen to start carrying an enormous scythe—intended to cut safe and roomy steps on the Bernina, it was supposed—but its real use now appeared, for at one end of the cave lay a great heap of freshly-mown hay. Our haven did not appear very inviting at first, for just as we reached it a bitter south-east wind began to blow. The porters, with our extra coats and shirts, had not yet arrived, and it was not pleasant to stand shivering, with nothing to do but to watch our hay being whisked away by the gusts. A little more and our remains, neatly folded in stalagmite, and associated with the bones of the chicken, would have afforded evidence of the antiquity of his race to the scientific Japanese of future ages. But the coverings came at last, and I suppose we never dressed for dinner in such a hurry before.

Some engineering works still remained to be executed. We found that a small rivulet had its rise at the upper end of the cave, and after turning the floor into a quagmire, finally emptied its waters into our bed, and was soaked up by the hay. A trench was scraped out by the help of our axes, and covered in with flat stones; a hole was poked out under the lower edge of the rock, and the unwelcome visitor let out by a side door. Then we lighted a fire and cooked some soup—such soup as can only be made in a flat frying-pan, critically balanced on two stones, and superintended by at least four cooks. Everybody has his own nostrum for soup. My nostrum is compressed vegetables. To the inexperienced eye it appears to be a hard cake of chopped hay, but only leave it half an hour in the pot, and behold there are extracted entire cabbages and turnips, large and succulent. After this, growing merry, we sang roaring choruses till a most imprudently late hour. But the weather was looking very bad, and we began to know,

though we did not say so, that our chances of the Bernina were small. At 3 A.M. the question was finally settled by a violent thunderstorm, and we lay down on the hay, determined at least to keep warm if possible.

The weather looked a little more promising when we woke. It was too late to start for the Bernina, but just opposite to us rose another giant—the Piz Palü. It had special attractions of its own, for it was an unconquered peak, and we determined to bring it to bag. It rises out of the main ridge of the chain, in shape and position not unlike the Lyskamm, and, like that mountain, it can only be ascended along the ridge from the east or west. Jenni said that we must get on to the ridge to the west of the summit and work eastwards along it, but the opposite course seemed to us so obviously the best that we overruled him. It was afterwards clearly shown that if we had not done so, we should have met with much greater difficulties, and might have failed altogether. I ought to mention that this was not the first excursion we had taken with Jenni, and he had already given us reason to doubt his judgment. At seven we were off—rather a late hour for a new ascent—and as we descended to the glacier bets were laid whether or no there was enough time to accomplish it.

We crossed the glacier and quickly reached the top of the *Isle Pers*. As we did so a delusive ray of sunshine broke through the clouds, and for a few minutes we even felt warm. But as we entered on the *névé*, and passed under the rocks of the *Gemsen Freiheit*, thick mists sank again on to all the higher summits, though not before some of us had taken a careful survey of the route to be followed. A comparatively level plateau extended along the base of the Piz Palü, and from the further end of it long slopes interspersed with a few easily avoided *séracs*, led up to the main ridge at a point to the east of the summit. It was severe work, for the snow had about the consistency of a bran-mash.

At length we reached the watershed and looked down into Italy, or rather should have done so if we had not looked into milky fog. It had seemed to us, as we neared this point, that the true way must lie, not along the edge of the *arête*, but up some slopes on the northern side. This was pointed out to Jenni, but, nevertheless, he began to lead along the ridge itself. We were rather surprised, but followed meekly. Perhaps being tied with a rope interfered with our freedom of speech. It certainly in a measure limited our freedom of action. We go on pretty well at first, but it was not the place to be on in that state of the snow. The blue ice cropped out here and there

through the thin and treacherous covering. Our pace grew slower, and the consultations more frequent, till at last our leaders fairly turned round and asked us if they were to go on. Now as they had brought us that way against our judgment, this was hardly fair. It was for them, not us, to answer that question; so they swallowed the pie of humility and turned, and we soon regained the point where we first mounted the arête. Another trial was suggested. It is proverbially hard to rally flying men. 'We can never reach the top to-night,' says Jenni. But he had tried his way, and we were determined now to try ours. So we moved along the bergschrund, recrossed it, and again attacked the slope. As we rose, our heads approached nearer and nearer to the heels of the man in front. It was much steeper than the top of the ridge. But there was not the dangerous element of hard ice underneath, and though our confidence in Jenni's *judgment* was somewhat shaken, his *powers* are unquestionable. His blood was up, and he worked admirably. Steps and finger-holds were rapidly kneaded into solidity. Hand over hand we rose, whither we knew not, for the mist was thicker than ever. Suddenly the slope curved over, and we emerged on a small level plateau which thinned out at its further end, and rose to a snowy boss, which was the desired summit. A few yards further a patch of rocks cropped out from the snow, and we sat down to gloat over our captive before we finally slew it. As we sat the veil of mist was lifted for a moment, and another summit was disclosed beyond; but we had no cause to be jealous, for ours was the highest. Then we rushed up and took possession. It is a well-ordered, neatly modelled cone, with none of that absurd attitude of curving and bowing, or ill-regulated desire to throw itself backwards. Nevertheless, we had carefully to clear away and stamp down the thin edge before a row of pedestals could be made convenient to stand on. Each guide dragged up a big stone, and the three were left tottering on the highest snowball before we returned to the friendly rocks.

Here we made an important discovery. Till now the southern side of the arête had appeared to be an unbroken line of precipices, but we now found that at one spot just below us, and apparently at one only, the névé of the Fellaria Glacier rose to within a short distance of the top of the arête, and that it might be reached by an easy descent over rocks. It was proposed that we should go down that way to Chiesa instead of returning to Pontresina, but Jenni opposed it, and I think he was right, for the glacier was totally unknown to us, or anyone else, and a thick fog lay upon it. It was no good



to look and long, so we turned our backs on the temptation.

At the extremity of the plateau we roped up, and the string of human beads was gradually paid out over the edge by the last man, guides being inserted at suitable intervals, as the red beads of superior sanctity in the rosary. Walther and I were the last on the edge of the plateau, and he now took the opportunity of Jenni's being out of hearing to inform me that he knew all along that my way was the right one, whence I first concluded that he was a timeserver and an old woman. But, to give him his due, he is a willing and good-natured man.

After passing the bergschlund, we hoped that all was now plain sailing. Our track of the morning was deserted, and we took a steeper and more direct line, which promised well for glissades. The slopes were so extremely soft and wet that only the steepest gave sufficient impetus. One of the necessary pitch was soon found. It was so long that we could barely see where it ended for the fog. The weight of each man as he sat raised a cushion of snow under his knees, which acted as a break. As we shot down these cushions gathered right and left, till at the foot of the slope we floundered out of an avalanche some twenty yards long and ten broad. Jenni was in the habit of carrying a large nautical telescope in the side pocket of his coat, and in his struggles to keep his head uppermost it fell out, and now lay buried at an unknown depth in any part of the heap, which had become bound together and hardened into big snowballs in its descent. We probed in all directions and scraped away the surface, but digging with an ice-axe is slow work, and it became evident what a hopeless matter it was. All patience was soon exhausted as well as animal heat, and worse weather appeared to be brewing. The three guides still persisted, and after an offer of a new telescope had failed to draw them off, we five tied ourselves together and left them to their fruitless search.

Presently we came to another slope. The bottom of it was not distinctly visible, but through the haze its surface appeared as unbroken as the last, and we started in full confidence that we had only to keep our heads above water and go ahead. Suddenly I saw that it was not all right, and that the slope curled over ominously in front. I pulled up as quickly as I could, but it was too late. Johnston was next behind, and before I could warn him he came in violent collision with my back. I was not proof against such swift bowling. In a moment my body was given up to the power of gravity, and I shot forward at an ungovernable rate. Then followed the rare

sensation of resting on nothing, and I fell straight through the air. With a thud my head penetrated the soft snow, and then it seemed to me that each of my companions in succession fell exactly on the top of me. We were followed by the snow, which came down like a cataract on our backs, and when I managed to right myself and look round, we were far down the slope, slithering away still, each the centre of a great wave of snow, with an absurd expression of pain and astonishment on our faces. It was rather startling to find there were only four of us, but, looking up, the head and fingers of Johnston appeared, looking benignly down on us from the edge of the crevasse at the foot of the cliff. Our impetus had carried us over it, but he had stopped himself against me, and dropped straight into the crevasse, which in that position was of course nearly choked with snow. The rope was broken in more than one place. The height of the cliff has been variously estimated from 12 to 40 feet; probably the mean of the two was about correct. We feared lest the guides should follow our lead and come to grief, so I toiled up again by a round-about way to warn them. We heard afterwards, however, that when they came to the place, Fleuri had disregarded the warning and taken our line, and he also fell on his head, which was some consolation to us, as he didn't hurt himself.

Before long we rejoined the track of the morning. Our troubles were not all over, for the threatened storm now broke. The peals of thunder came nearer and louder, though the cloud we were in still concealed the lightning. Suddenly there was a tremendous crash just over our heads, instantly followed by so blinding a flash of lightning that we feared lest the next should be attracted to still closer proximity by the metal of our axes, and we left them stuck in the snow for the guides to bring on. This may not have been a prudent measure,—it certainly was a selfish one. Let us hope that our fall first, and then the storm, had blunted our perceptions. Hail followed, and it was driven with such violence against our faces that I expected to find blood on mine every minute. Even our hands could hardly bear the stinging pellets. But there was more insidious evil in it than that. The wind carried the loose particles along the surface like desert sand, and quickly filled the deep track we were trusting to. Our eyes had to be more and more strained to make out the fading marks in spite of the hail which seemed to be cutting them out. A few steps further and the sharpest scrutiny failed to detect any inequality in the surface. Not a spot or streak indicated the true direction. A hopelessly smooth névé lay

before us, and a dense slate-coloured fog all round us. We could only do our best to keep on in a straight line, and this we had to do at a sharp trot to maintain circulation. In a few minutes we came to some crevasses which we certainly had not passed in the morning. As we looked about, a dark mass loomed above us on the left. At first we hailed it with delight, for it was evidently part of the jutting ridge of the Gemsen Freiheit. But then the question arose, Which part was it, and which direction were we now to take to strike the top of the Isle Pers. The glacier did not slope away from us in one plane. In that case we should only have to take the line of shortest descent. But we stood, as it were, on the outside of a dome, which curved away from us on more than one side. We could only get down from our present high level on to the Morteratsch Glacier by the rocky promontory of the Isle Pers, which could not be far below us. We knew that it was flanked on the left by a broad ice-fall, and on the right by a broader and more intricate one. These crevasses must be the beginning of one or other. But which? Had we deviated to the left or right? To hesitate long was to be frozen. Get down somewhere we must, and that at our best pace. We decided to keep more to the right, and I shall make it clearer if I say at once that we were quite wrong. We were already too far to the right. The crevasses were not formidable, and for a short distance we threaded them easily, but as they became larger and more frequent, instead of easier, we soon turned back. At the spot where we were first puzzled by the crevasses we again turned downwards, taking care to plunge our feet deeply that the marks might be as permanent as possible in case we had to return along them, and that the guides might know which way we had gone, though the chances of their passing near enough to see them were but small. We struck out more to the left this time, though still not nearly enough. For some distance our course was prosperous enough, and a lower point was reached before the glacier became difficult. Our hopes began to rise till we reached the edge of a deep trench. If we had had our axes this difficulty at any rate might have been easily passed or turned, but it is not pleasant to slide down a steep slope of hard ice with nothing but finger nails to check a too rapid progress, or a twice broken rope to haul you up again. We were here divided in our counsels. I was for trying to pass it, hoping that we might force a way beyond somehow. Had we done so, we must have got into far worse, if not hopeless difficulty. Fortunately I was overruled. It was discouraging to go up

hill again, but there was no help for it, and we did so, panting, though anything but hot. The first route was again tried. We passed the place where we had first turned and got some way below it. Then the ice began to be too much cut up into séracs and to be split in all directions instead of only one, and it became clear that if we went further we might lose the power of retreat. For the third time we turned up, doubtful and half confused, but still happily with a measure of self-confidence. It was now evident to us that we must make a bold cast in quite a different direction. Once more we reached the point of deviation, and, after a last vain shout for the guides, we led off much more to the left, and obliquely along the slope instead of down it. This time we met with the success we deserved, and so earnestly desired, for though after a long tramp we did get again entangled in séracs, and did relapse into a decidedly blue condition of mind as well as body, our spirits were suddenly raised to the yelling point by the sight of the highest rock of the Isle Pers looming over a big hummock of ice, and on the top of it the well known stone man, a sign of civilisation that was inexpressibly comforting. In a few minutes we stood on dry land. The thickest of mist and the most spiteful of hailstorms could not stop us now. We paused to cut away the rope, which had frozen into a rigid spiral coil impossible to untie, also to divide the last drop of brandy into infinitesimal bumpers, to clear out snowballs from our necks, and peel off charming casts of our faces made of hardened snow. A pure soft white shroud covered everything, even down to the foot of the glacier, as we afterwards saw; and as we descended no one could tell if his foot would next souse into a hole, crush a tuft of grass, or glide from under him on a slippery rock.

We were not long in crossing the glacier to the rock where we slept. Owing to our losing the way, we had taken almost as long to come down as to go up, and it was getting late, but it was out of the question to stay there another night in our half frozen but now dripping garments, as we had intended, and we only waited for the guides to come up. It had partially cleared, and after a time we made them out—three black specks on the brilliantly white glacier. They had continued the search for the telescope for a long time in vain, but as their knowledge of the glacier prevented their falling into the snares which had deceived us, they did not keep us waiting more than an hour; and about nine o'clock the united party reached the Krone at Pontresina.

A few days later we returned to the attack of the Bernina,

and slept under the rock a second time, but we were again unfortunate in our choice of a day, for in the early morning a lowering bank of clouds covered everything. We had made other expeditions since the one last described, and had become so hardened to bad weather that it was a matter of course that at least a start should be made. We wished to go straight up the ice-fall at the head of the glacier, instead of following the long circuit made on former occasions, and as a good deal of difficulty might be expected in finding a way, we sent on Jenni and Fleuri at 3 A.M., and after allowing them a start of an hour and a half, followed ourselves with Walther and a porter. As we reached the foot of the icefall they reached the top. It is so steep that it is swept to the very bottom by the masses of ice detached at the top. A fresh coating of snow had fallen in the last few hours, but it had already been disturbed and broken through in many places by the falling fragments. This is an advantage in one way, for, except just at the top, the clefts are kept filled up level by the ice from above, which made rapid progress possible. We kept to the guides' steps, and in about 20 minutes were nearly on a level with the projecting mass of ice where they stood watching us, and within easy shouting distance, but a long way to the left of them. So far there had been no special difficulty, and the steps had been all cut. But in front of us the alternations of toppling sérac and big blue hole were of the most stimulating character, and between us and the guides there was no very obvious way of passing these gulfs that were, not fixed, but ever changing. Jenni's track began to perform endless vagaries. After taking us with infinite labour to the top of a disintegrated pinnacle, it would vanish, leaving us to return and find where they had diverged, or it would strike out along a rickety wedge, and return to the starting point by the crevasse that ran underneath the same. Before long Walther entirely lost his head, stuck his feet against one side of the crevasse and his back against the other, and refused to move another inch. This was the more unpleasant as he had chosen to stop just below some séracs that looked like tilted wheelbarrows. It would not do to stay there a minute. So I formed myself into a party of progress, detached myself from the rope, and went on to look for the way. A few minutes later Hall did the same, and then I believe Walther, finding he would be left alone if he didn't recover, suffered himself to be dragged on again. I had left Jenni's track, as it only tended to confusion, but with a little patience the clue was found, and one after another we got to the sérac on which both guides were still perched.

There was an awkward hole at the foot of it, the upper lip being some four feet higher than the lower one, and nothing to cling to when you got there. The rope was dangled for each of us, and a long pull landed us on the top. How Jenni's rather fat legs first made the long stretch necessary without these helps is more than I can explain. From here there is a gentle ascent of about an hour to the col, making four hours altogether from the rock, but it would have been less with a smaller party.

We now turned to the right, up the slopes of the Bernina cone. These presently narrow considerably, and further on the arête becomes impracticable. It is this place which is so well illustrated in the frontispiece of the 2nd series of Peaks and Passes. A bergschrund runs across the face of the mountain, but comes to an end a little distance below the edge of the arête, and a mass of snow like an ostrich feather overhangs it. Round this Jenni began to make a great causeway, digging at the hard material with a spade which he had brought up, and looking like an ideal frozen out gardener. While we were waiting, the snow began to fall for the second time that day; and yet I should hardly say 'fall,' as that would imply some degree of stillness, and there was no stillness there. It flew horizontally through the air, driven by a shrieking north wind. We grinned and bore it for a little time, till Jenni looked round with a very blank face indeed. He said the place was quite a different shape this year, that it was impossible to cut steps down into the bergschrund, and that the only chance would be to make a tunnel through the roof, and drop into it. There would be no difficulty in this, but the only way to get up again would be to leave one man behind with a rope to haul us up. In ordinary weather we should of course have done this, but the thermometer was anywhere below the freezing point. He would have to wait at least two or three hours, and we agreed that the only chance the unfortunate would have of remaining alive would be to go down without us, while we should be left to admire the view, with the alternative of swarming up an icicle. This being the case, we executed a strategic movement. I need not give myself the pain of describing the funereal procession as it descended the glacier.

On the 27th of July we crossed the Canciano pass, being caught in a snowstorm at the highest part, as usual. We came out into sunshine at last above the valley which is headed by the Fellaria Glacier. A little way down it there was a village, which Fleuri said was the Fellaria châteaux which we were in search of. But it was not high enough for our purpose, and

besides we did not think he was right. This belief was confirmed by sundry faint lines, on the opposite side of the valley, leading up to a gap in the hills, whence we inferred that there was a habitation of some kind higher up. This proved to be the case, and in  $1\frac{1}{2}$  hours we found the true Fellaria châteaux at a considerable height in a little valley which runs parallel with part of the glacier of the same name. It was the quaintest little settlement I ever saw. In a circle of 30 yards were collected a score of châteaux, so small that they appeared as if they only could accommodate gnomes or fairies. Every chateau that we explored was complete in all its arrangements, that is, it contained its own separate fireplace, pots, and raised bed. Only everything looked as if it was stunted from the cold. One only was differently furnished, and that contained a large red cotton umbrella and nothing else, suggesting the idea that it must have been brought up here by a whirlwind from the dwellings of mortals, and put in a museum by itself by these little mountain men. We were brought back to mundane reflections by the attentions of an old black pig, who came forward to do the honours. She was the only live thing about the place, and had evidently had a very dull day of it. She became quite merry at our arrival, so much so that we had to establish ourselves on the roof of her sty (or her master's sty, I don't know which) to avoid her embraces.

Late in the afternoon the owner appeared—a jolly old man, and well supplied with firewood. After supper we distributed ourselves about the place, two in a chateau. I was the first awake. I gave a general call outside, not knowing where each was billeted, and in a few minutes we four were collected. Not so the guides. They could not help hearing our shouts, but they answered faintly, or answered not at all. Our programme for the day was rather an ambitious one, and we chafed considerably at the delay. When at last they did appear, they showed an unaccountable desire to shirk preparation and a disposition to quarrel with us which we could not understand. They soon found a *casus belli*. We had rather objected to their taking a chateau man as porter, as we had only the day's provisions to carry, and on the strength of this Fleuri favoured us with a philippic which I shall not soon forget. Omitting the abuse it amounted to this: that Engadine was superior to all the world; that Pontresina was a Paradise, and England a desert; that the dwellers in Pontresina were all ladies and gentlemen, and the English all snobs; that Jenni and he were the top-sawyers of all—landowners, magistrates, and members of parliament, and their ancestors before them;

in short that they were of *bonne famille*, lords of creation, and not meant to carry burdens. As we didn't want our excursion altogether stopped, we acknowledged their extremely blue blood, and to hasten the start we also yielded the porter. To do Jenni justice, he did not take part in this scene, though he remained sullen the rest of the day.

But it was evident that there was a deeper cause of displeasure still. The *châlet* man was only too well stocked with the good things of this life. Among other luxuries he had a private store of a succulent compound which is called 'polenta,' and is dear to the heart of the Italian. It seems that our host had agreed, for a consideration, to sit up and prepare a mess of this pottage, that it might be ready in time. I don't know whether he went to sleep, but there had been some delay, and while the stuff yet seethed in the pot, we were cruelly urging them with angry words of impatience. Who can wonder that the eyes of the young man flashed with righteous indignation, that his hand stole unconsciously to his axe, and that he licked his lips as though he thirsted, partly for our blood, partly for the pulpy dish? When fresh polenta was weighed in the balance with raw food and a successful day, who can ask which turned the scale?

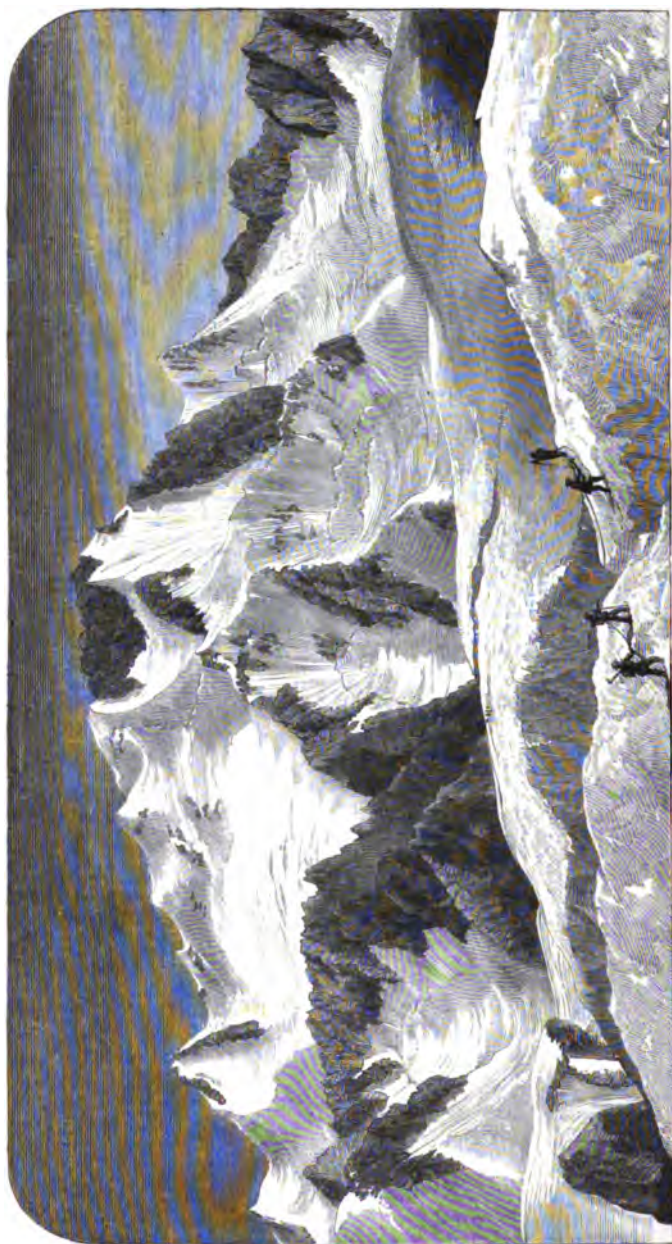
After being girded and gaitered for two hours, we were told we might proceed. Taking this to mean that they were ready, we did so. But after going just too far to come back, we found that they were not following. Nor did they, till our bodies were still further cooled and our tempers heated by standing at attention for a quarter of an hour under the stars.

At last we were fairly off. We followed the little rocky valley we were in till we reached the glacier filling the head of it. On our right was the ridge which divided us from the Fellaria Glacier, and we now turned up the side of it, and got to the top as the sun rose. We were pleasantly disappointed to find that we had not to go down on the other side. The upper névé filled the basin to the brim, and we stepped straight on to it from the rocks.

There is one notable advantage about this Fellaria Glacier. It has no length. It is, in fact, far broader than it is long. For this reason it is almost all névé, as there is no time for the regular consolidation into ice to take place, and that disagreeable feature of most large glaciers—an interminable ice-stream rolling its dreary length through a straight and level trench—is here absent. The glacier is roughly an amphitheatre which is turned towards the south, and the sun allows no tail of ice to escape into the valley. It was a magnificent morning—almost the only one we enjoyed on the Bernina glaciers. The ridge we







THE BERNINA, FROM CRESTA AGIUZA.

were on stood out so far from the mountain that our view to the east was quite unobstructed. We saw the Orteler Spitze of course. I don't mean in the vague sort of way in which people 'see all the mountains from Monte Viso to the Orteler Spitze,' but we really did see the Orteler Spitze. There were two principal peaks. One was sharp and slight, the other blunt and surrounded by buttresses. Speaking roughly, you might say that one was like the cathedral of Strasburg, the other like that of Milan.

We hoped to cross the range by the Cresta Agiuza Sattel, but did not know whether it must be reached from the Fellaria or Scerscen Glacier. We now saw that the pass in question was not in this part of the chain. In fact, there was no marked depression at all, and we must cross to the other glacier before we could get even to the foot of it. This did not give us much trouble, however, for we found that higher up the two névés were connected by a broad snow col. It involved a slight descent on to the Scerscen Glacier, and then rounding a promontory we had our work before us—the Bernina on the left, the Cresta Agiuza on the right, and the Sattel between them. We were about 2,000 feet below it. A buttress projected from the face of the cliff a little to the right of the pass, and was clearly the only way to get up to it, but it never entered our heads that we should fail in doing it by this way. This buttress was scored by couloirs, separated by little ridges of rock which merged into one near the top. Up one of the couloirs we cut a tedious staircase for two hours, at the end of which time the rocks on our left became practicable, and we ascended by them till we were about fifty feet lower than the pass, and perhaps 100 yards to the right of it. There was a couloir on each side of us, and the arête we were on was continued above us as far as we could see. In our humble judgment the right course seemed to be to ascend this till we were level with the pass, when we should be able to see better what lay between. But Jenni preferred to cross the couloir on our left at once, and told us to sit down where we were till he came back.\* It took him rather more than an hour to get across, and then he disappeared round the corner. In a few minutes he came back, and shouted to us that it was quite impossible, and that we might go down at once if we liked. We waited till he joined us, and then enquired what should prevent our going up the rocks, and getting across from there. He

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\* One of the party took advantage of this halt to make the sketch of the Disgrazia which forms the frontispiece.

answered that we might do so, but that he had seen every inch of the way, and that there were immense ice-cliffs intervening which made it quite hopeless. When a man of Jenni's social position says he has seen a place, you cannot tell him he has not; so this verdict was decisive, and we went down to the glacier again in grief and vexation of spirit.

We had previously made an observation which was now turned to good account. We had noticed below the Piz Roseg, a likely-looking col, which must communicate with the Roseg Glacier, and it was only separated from us by an extensive snow-field. It was the next best alternative, and two hours' walking placed us on the top of it. When we got well away from the scene of our failure, we looked round at it. The whole place was visible now, and we instantly saw that had we but gone up those rocks, we should have had nothing but a slope of snow to cut steps across to the top of the pass—a long slope, it is true, but not nearly so steep as the couloir Jenni had crossed, or so dangerous. On his being appealed to he was very angry, and offered to give us 2,000 francs if we got over there; but as we advanced the fact became more obvious at every step that we might have accomplished it, had it not been for that fatal acquiescence in his word; and Jenni, being an honest man, could no longer deny it. First he said, 'Well! he might possibly have got one Herr over, but it was very dangerous.' Then he said he would take us all over another day for 600 francs, and finally he offered to do it for 300.

It remains for me to say what I can for the pass we did make. It will save a great deal of dull valley walking to anyone making the tour of the Bernina, and if a descent were found from the upper to the lower Scerscen Glacier, I fancy it would also prove the most direct pass to Chiesa. I have avoided all descriptions of scenery, but I think all who try it will acknowledge that it is a walk of uncommon beauty. There are no confining ridges, and you can see far away into Italy the whole morning, the Monte della Disgrazia making a foreground of peculiar magnificence. At the time I fear we hardly appreciated these advantages from utter mortification at having failed with the higher game.

Before I conclude I must touch once more on a subject that I would I could leave alone—I mean the behaviour of these Pontresina guides. We felt it a duty we owed to other members of the Club to lay before them our experience. In the note we sent to the Journal we complained, mainly, of want of judgment, faults of temper, and attempts at extortion. On the

two first points I need hardly enlarge after what I have already said. Of the extent of their demands I will give one instance. I said above that the rope we had on when we fell over the ice-cliff on the Pers Glacier was broken to pieces. So damaged was it, and so rotten, that we threw it away on the Isle Pers as of no further use. Jenni said it had been given to him by Mr. Kennedy, and therefore it must have been in his possession at least two years. It was about 50 feet long, had probably cost five shillings when new, and might then have been a good rope. But it was now quite thin and frayed and rotten with age and use. For this rope they insisted on having 15 francs. That they wished to preserve a rope at all which had broken under the trial is a significant fact. I should also say that the demands made on us were not instigated by Colani, as has been supposed. Our payments to Jenni were principally made at the Boval gîte, where we finally parted with him, far away from all ulterior influences, and were nearly all for expeditions not mentioned in the tariff. From the letters inserted in the Journal by Mr. Tuckett and Mr. Winkworth, some may have inferred that our complaints were harsh, but I trust from the facts I have here narrated it will not be thought that they were uncalled for.

P.S. I think it right to add that I have given Jenni a further trial this year, and was delighted to find a great change in his behaviour. He made himself very pleasant, and showed a spirit of enterprise and a willingness to work very different from what I saw last year. This of course does not lessen his fault on that occasion, but it leads me to hope that it was exceptional.

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THE BIETSCHHORN AND BLÜMLIS ALP. By the Rev.  
LESLIE STEPHEN, M.A.

THE two mountains of which I propose to give some account in this paper are amongst the most beautiful of the lower summits. Though close neighbours, the contrast between them is striking. The Bietschhorn is a pyramidal mass, conspicuous all down the valleys of Saas and Zermatt. Its sharp needle-shaped summit is so remarkable that Mr. Ruskin picks it out as one of the (I think) five really pyramidal mountain-tops of the Alps, a statement of very questionable accuracy. The Blümlis Alp, on the other hand, seen from the Lake of Thun or the terrace at Berne, displays a noble curtain of glacier, pouring down from three summits of nearly equal height. These

mountains, which look at each other across the low flat ridge of the Petersgrat, had one point of resemblance in the summer of 1859, viz. that no one had yet ascended either of them.

It was with a special view to the Blümlis Alp that I had crossed the Lötsch Sattel to Kippel, in the beginning of August, 1859, in company with Messrs. W. and G. Mathews. After whittling at certain dried bits of stick, which are the prevailing substitutes for meat in those parts, accompanied by loaves whose consistency suggested that a Kippel father of a family would be doing a really humane action in giving his children stones for bread, we washed down our meal with draughts of vinegar, and went to call upon the priest, one Lener. The priest was, he told us, a friend, and in some degree an imitator of Imseng of Saas. He showed us a collection of sturdy alpenstocks and a rifle, an ancient and portentous weapon, which he had formerly used against chamois. Proceeding to talk of the wonders of his village, he told us that he had attempted the ascent of the Bietschhorn the year before, and had been driven back within a few feet of the summit. The voracious Peter Bohren had since informed him that there was in England a society called the Alpen Club, and that its president had announced that the Bietschhorn must, could, and should be ascended, and had even sworn a solemn oath that, if not ascended within the current year, he would come and do it himself. I confirmed the general accuracy of this report, and added that the secretary of the club was already at Kandersteg, and would return with me in a few days to inspect the mountain. Next morning we crossed by the Petersgrat to Kandersteg, and (after resolving to postpone for the present our attack on the Blümlis Alp, which a hot summer had transformed into a mere pillar of ice) I returned to Kippel. Various circumstances prevented Hinchliff, whom I had gone to meet at Kandersteg, or any other friends, from joining me; as, however, I had expected to have a larger party, I had rather weakly consented to Lener's eager request to be allowed to engage two guides and two porters. He seemed to be somewhat perplexed to find so large a number of natives endowed with what he called *courage*. Some of the best mountaineers had lately disappeared. One had been ordained priest, another had been married, and though a married man might do for a porter, he was not, in Lener's opinion, to be relied upon as guide. At last one Johann Zügler was sent for to act as guide, with a married brother to serve as porter. An old fellow, named Joseph Appener, was added, on the ground that his name was in 'The Book;' the book being, of course, Murray. A youth, who seemed to be the priest's footman, curate, and slavey in general,

completed the party. Next morning I started, in company with the priest, two of my very queer-looking guides, and a cat, which volunteered at the last moment to follow us. The cat, however, was puzzled by a glacier stream, which we crossed in the dark by tumbling in on one side and out on the other, and ignominiously retreated with pitiful mews. Leaving Kippel at 4 A.M. we took to the southern side of the valley, and gradually ascended by the forests towards the foot of the Nest glacier. [See the Federal map, in which the mountain is very clearly laid down.] The day was just dawning as we left the forests and entered the clearing through which the stream flows from the Nest glacier. The Bietschhorn may be compared in shape to one of those four-sided steeples which terminate, not in a point, but in a short horizontal ridge, and which are in fact an exaggerated roof. The ridges marking the angles between the different sides of the spire correspond to the three or four great spurs which radiate from the summit of the Bietschhorn. We were about to attempt the ascent by following the spur which runs due north from the summit to form the eastern boundary of the Nest glacier. A conspicuous mass of red rocks marks the point where this spur sinks into the broader buttress along which our ascent began, and the principal difficulty seemed to be the necessity of circumventing a great rocky tooth which, at this point, interrupted the continuity of the arête.

As we crossed the stream below the glacier a wild shout announced the approach of our remaining guides, and a queer lot they certainly were. They all appeared in full dress—dress coats and ‘chimney-pot’ hats, or such imitations of those civilised articles of torture as pass current in the Lötschenthal. A certain air of shabby respectability was thus communicated to the party, in singular contrast to the wild scenery around; and with our clerical guide, in shorts and a shovel hat, we had the appearance of being on our way to some outlandish Young Men’s Christian Association, rather than the ascent of a new mountain. The most singular characteristic of my guides was, perhaps, their conversational power. During the ten or twelve hours we passed together, they seemed to be conversing at the top of their voices in the unknown tongues, a few words of German dropping out at intervals with a discordant twang. I may as well say at once that I found one of them, Johann Zügler, to be a good mountaineer. Of the others, the less said the better.

We ascended over grass slopes, changing gradually to rocks and long patches of snow. They were tolerably easy to climb, but seemed to punish the poor old priest and his henchman severely. My guides had an eccentric trick of getting so exceedingly

animated in their conversation as to be obliged to sit down to have it out better. During these halts, certain small barrels of wine circulated rapidly, whose contents were only attainable through the bung-hole. A glass had been carefully provided for the 'Herr,' the convenience of which was no doubt counterbalanced in their view by its transparency. The halts allowed the priest and his follower to catch us up occasionally, on which occasions the poor old gentleman began to complain of cramps in his legs, and to give other unmistakeable symptoms of distress. I was obliged, however, to cut the halts as short as possible, as time was evidently of importance, and we pressed on without adventure till at 10 A.M. we reached a little snow col, just below the rocky tooth I have already mentioned; once round this tooth I had little doubt of ultimate success, and I had been for some time impatient to reach it. My guides, however, to my no small irritation, considered this to be a favourable opportunity for a fuller explanation of their views to each other than any in which they had yet been able to indulge, and sat resolutely down with apparently the full intention of enjoying a comfortable chat. My impatience was increased by the fact that the weather was growing rapidly worse; masses of cloud were rolling up and concealing from us even the Aletschhorn glaciers which had till then been visible. Examining the rocks above us, I thought that they looked tolerably practicable, and began scrambling up by myself. The first step or two was difficult, but I had hoisted myself over one or two obstacles when, looking round, I saw that the priest had come up, and that my guides were preparing to start. Just at that moment my hand was on a large flat piece of rock, wedged in like a volume on a book-shelf between two others; I trusted my weight confidently to it, when, with a bound like a wild cat, it made a spring of some thirty feet through the air and caught poor Johann Zügler fairly on the side; a second bound took it right down the eastern cliffs, whilst Johann staggered over and subsided; fortunately for him a knapsack which he wore had guarded the blow, and received all the injury actually inflicted. It rather frightened us, however, and seemed to act strongly on the poor old priest's imagination. When you are following a man who is detaching loose stones there are obviously only two courses open. Either stick close to him, that the stones may not have accumulated much momentum, or keep as far off as possible. The priest unhesitatingly chose the latter alternative with regard to me; and I think that this was the last we saw of him and his follower. Meanwhile I was joined by the remainder of the



party, and the serious part of the climb began. It appeared to be impossible to keep along the ridge much farther, and we accordingly left it and proceeded horizontally along the face of the cliffs, above the upper plateau of the Nest glacier. Having turned the difficulty, we again struck directly upwards. The rocks we were now climbing sloped steeply above us, sometimes in sharp rib-like ridges, sometimes in broad faces of rock intermixed with patches of snow. Loose crumbling stone, which gave way at every step we took, covered the whole mountain-side. Zügler was getting warmed to his work, and we raced each other up the rocks as hard as he, or at least as I, could go; he kept me at my full stretch, sometimes walking upright over an easy bit—sometimes using our hands, knees, and eyelids. The other two followed us in a state of profuse perspiration, and with their flow of talk perceptibly checked for the time. Behind us the stones went skipping and rattling down the rocks, starting heavy cannonades of avalanches, or starting off by themselves and going off with irregular rocket-like bounds over the ice and snow. 'Isn't the Herr Pfarrer somewhere down there?' I asked. They thought he probably was, but that he most likely would get out of the way. They took occasion to add significantly that the Herr Pfarrer's infirmities had been the cause of their want of success in the previous year, and that the Herr Pfarrer's servant was a very bad man in difficult places. Meanwhile, we progressed steadily, and at 11.15 A.M. reached once more the crest of the ridge. A long snow arête, like that of the Weissthor, rose gradually from our standing place to the top of the mountain. The long snow-slopes sank down on the east into the rolling mists below us, and on the west to the upper névé of the Nest glacier. A few yards below us on the western side ran a rocky ledge, broken by occasional couloirs of ice. The snow on the ridge was pretty firm, and Zügler led us with much courage and judgment, becoming, as I was glad to see, more cheerful the further we went, and the wilder grew the cliffs amongst which we were wandering. Once or twice we left the actual ridge and slid down to the rocky ledge below us, rather a nervous feat, as there was nothing but bare ice under a thin covering of snow, and if once shot over the ledge we should have had a fair chance of being ground to powder. We followed the ridge without serious difficulty, till a couple of steps, cut across the last couloir with an axe, enabled me to grasp one of the huge broken rocks of the summit, and land myself upon it at 12.30. I have been on wild enough mountain-tops before and since, but I doubt whether I ever saw one so savage in

appearance as that of the Bietschhorn. It consists of a ridge some hundred yards or so in length, with three great knobs, one at each end, and one at the middle—the articulations from which the great ribs of the mountain radiate. It was hard to say which of the three knobs was highest, and at first sight it also seemed hard to pass from one to the other. The sharp-backed rocky ridge was splintered and torn into the wildest confusion. It looked like the mockery of a parapet, in which the disfigured ruins of grotesque images were represented by the distorted pinnacles and needles of rock. The cliffs on each side sank steeply down into the broken masses of cloud which concealed from us all distant views; and the distant views from the Bietschhorn must, as Mr. Ball remarks in his 'Alpine Guide,' be some of the most beautiful in the Alps. Some compensation for the loss might be derived, as is often the case, from the extreme wildness of the immediate prospect of jagged black cliffs emerging in every variety of grim distortion from the heavy masses of cloud. We waited more than an hour in hopes of obtaining a fairer view, and employed the time in erecting three cairns on the three rival summits. Not a glimpse of the distance was vouchsafed to us, and at last we turned reluctantly to retreat, with a vow on my part to return some day for better luck. I was rather out of training, and was conscious of a strong disposition in my legs to adopt independent lines of action, which could not be too severely reprehended. I felt rather nervous on commencing the snow arête, and made a stumble nearly at the first step. Old Appener, emitting a fiendish chuckle, instantly gripped my coat-tails—with the benevolent intention, as I am willing to believe, of helping me, and not of steadying himself. If so, his design was better than his execution. He did not progress very rapidly, and whenever I made a longer step than usual, the effect of his manoeuvre was to jerk me suddenly into a sitting position on the ice. I denounced the absurdity of his actions, both in German and dumbshow, but, as I only elicited more chuckles and a firmer grip of my coat-tails, I finally abandoned myself to my fate, and was truly thankful when, at the end of the arête, my equilibrium ceased to be affected by the chances of tumbling down a precipice on either side, or being lugged over backwards by a superannuated and inarticulate native. The descent was only varied by one incident. My legs having developed more decidedly erratic propensities ended by deserting their proper sphere of duty altogether, during a race down the rocks. I consequently found myself sliding at railway pace, on my back, over a mixture of ice and rough stones, and was much

gratified on being stopped by an unusually long and pointed rock, which ran through my trousers into my thigh, and brought me up with a jerk. My pace was rather slackened by this incident, and we finally reached Kippel at 7.30, where old Lener, on the ground that it was a fast day, provided me with a dinner consisting entirely of soup and cabbage stalks. The latter, with the benevolent wish not to hurt his feelings, I was compelled to bestow surreptitiously on the cat. Poor old Lener is now, I believe, dead. I hope that some enterprising innkeeper may, before long, offer better hospitality to those who visit the Lötschenthal.

It was not till the next year, 1860, that I was able to resume my postponed attack on the Blümlis Alp. Although one of the most agreeable excursions that I ever made, there were not many incidents of the expedition that are worth relating. An admirable account of the first ascent of the Doldenhorn and the middle peak of the Blümlis Alp, with excellent illustrations, has lately been published by M. Abraham Roth, who made the ascent in company with M. E. von Fellenberg. I must refer to it any of my readers who wish to obtain an accurate knowledge of the various peaks and glaciers of this beautiful block of mountains. I will confine myself to a few very short notes of my own adventures. My companions were Dr. Liveing, and a young American gentleman, Mr. J. Kent Stone, of Boston, one of the very best walkers that it was ever my good fortune to meet. Our guides were my old friend, Melchior Anderegg, and a Simond of Chamouni. We slept at the little chalet above the exquisite Oeschinen Lake—a lake, so far as I know, of a beauty quite unrivalled in any of the high alpine districts. Stone and I, who measure a good deal over four yards in the aggregate, were invited to make ourselves comfortable on the bed of the inhabitant, which measured about 4 ft. 6 in. in extreme length, and was closed at each end by a high board. We turned out at 2 A.M., and, preceded by a lantern which performed its usual office of effectually dazzling our eyes, and making the big stones in our path invisible, we climbed the Dundengrat by 4.30 A.M. Here we were treated to one of those sublime sunrises which never reach the eyes of the wretch who sneers at alpine travellers, and crawls contentedly along the valley to enjoy what he calls the beauties of nature. A broad band of orange light ran round the distant horizon, dividing night from day. The great plain of Switzerland lay half seen below us, still wrapt in mists and darkness. Above us the Oberland giants stood out white and clearly defined in the early dawn. We watched the rosy alpine glow as it touched peak after peak, with more than usual

interest. We did not yet know for certain which of the three peaks of the Blümlis Alp was the highest. Suddenly the western peak caught the flush of the sunrise. The middle summit did not hang out an answering signal till after a perceptible interval. 'There's no doubt about it now, Melchior,' I said, and accordingly we steered for the western summit, that which is visible from Kandersteg. The Federal map, I may observe, also assigns the greatest height to this point. Our path lay round the head of the glacier plateau, which lies at the foot of the great backbone ridge of the Blümlis Alp, and up to the notch between the mountain marked as Rothhorn on the Federal map and the highest summit. An arête (visible from Kandersteg) leads from this notch to the top of the mountain. It presents no unusual difficulties, but it might call for a good deal of step-cutting if the snow was not in good order. As it was, we mounted with the loss of only one of the party. This was a thermometer which a benevolent but weak disposition had induced me to carry with me 'for scientific purposes.' To my inexpressible delight, it escaped from my hands, which were rather numbed with the cold, just as I took it out at the summit, and, rattling merrily down the glacier slopes, disappeared from our sight. It may probably be found by any scientific gentleman who will drag the Eschinen See, immediately under the waterfalls in the south-eastern corner, and I will make him a present of it for his trouble. We reached the top at 8 A.M., and enjoyed a view much like that from the Altels, which, however, is somewhat higher. The great charm of these views is that, standing as they do on the northern edge of the high mountain district, there is a beautiful contrast between the comparative plain involved in the northern semicircular sweep of the horizon and the wild confusion of peaks to the southward. A detailed description would be simply a catalogue which can be easily supplied from a map. We descended at our ease, and after an interview with a herd of chamois, returned comfortably to Kandersteg by 2 o'clock P.M.

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ASCENT OF BAULA, in Iceland.—By T. W. EVANS, M.P.  
F.R.G.S.

THE following account is translated and slightly abridged from the work of Preyer and Zirkel, 'Reise nach Island im Sommer 1860, Leipzig 1862,' p. 116. The ascent was made from the farm of Dalsmynni, situated at the base of the mountain on the SW.

‘ At 2 P.M. we left our tent and undertook the difficult task of ascending Baula. The weather was unusually fine. Not a cloud in the sky; and the heat of the sun not oppressive. We first went up a slope, ascending by terraces, which led us to a plain thickly covered with juniper bushes. Here the drift-sand made it not only unpleasant but even dangerous to go farther. We were, however, fortunate enough to find a place from whence we could without risk reach the foot of the actual cone. We were two hours in reaching this. The walk was very monotonous and wearisome. Of plants, insects, or even birds, we found nothing worth mention, except some Carabids. The only thing which affords some variety is a waterfall, which leaps from one terrace to another. The brook which forms it served as our guide to the foot of the cone. This last rises at an angle of  $38^\circ$ , and is formed of trachyte, which is here and there split into large columns, heaped one upon the other in the wildest disorder. It appears as if some mighty giant had amused himself with throwing one stone upon another till he had made the high hill of them. For those who, like many tourists, speak of the ascent of the cone of Vesuvius as exceedingly exhausting and wearisome, the ascent of Baula would be a task almost approaching the impossible. A traveller in 1809 (Hooker) says that no one had succeeded in reaching the summit. Ebenezer Henderson and Sartorius von Waltershausen attempted the ascent, but were stopped by bad weather.

‘ The columns of trachyte have from three to nine sides, and are very beautifully and regularly formed. The fragments often measure nine feet in length and one foot in thickness, and taper off to the thickness of a finger. They are used at Hvammr (in the Nordhrardalr), at Nordhtúnga, at Sidhimúli, and at Njardharholt, as building stones and grave stones; and these last are often covered with inscriptions. These inscriptions are not, however, as many assert, composed in runes, which throughout Iceland are of rare occurrence. Hardly a single traveller is known of who has climbed to the summit of Baula. In order to reach it, perseverance and fine weather are above all things necessary. We were favoured with both these requisites to-day, and we began the most difficult part of the ascent with the utmost caution. The ascent is not only exceedingly laborious and tedious, but also dangerous, because the loose stones constantly roll away from under one’s feet. We had, therefore, to take great care to ascend, not one after the other, but side by side; for the stones often at the slightest touch rolled down the hill-slope with terrific leaps. We reached the top of the cone about 6 P.M. . About half-way up it, the

thermometer placed upon the trachyte, which had been long exposed to the sun's rays, showed only 17° Cent., and on the top 12° Cent.

'The panorama is very striking. Our view embraced a considerable part of Iceland, snowy mountains, valleys, rivers, and lakes. The sea is not visible. The tops of the mountains were not all cloudless, but the majority were seen to great advantage. In the east lay Eyriksjökull, behind it the vast and as yet unexplored Langjökull and Geitlandsjökull, farther on Strútur. We also recognised Ok, and traced our route from Kalmanstúnga, as on a map. The curiously-shaped volcano Skjalbreidh, farther to the south, and also Skardhaheidhi, were hid in the mist. West and north are no very prominent hills. To the south lies the beautiful Bjarnadalur, which reminded us strongly of the valley of Lauterbrunnen. To the NE. and S. we counted no less than thirty-seven lakes.

'No one whose head turns ought to ascend Baula. On the NE. side there is a perfectly vertical precipice, at least 1,000 feet deep. On its brink the pieces of trachyte and the boulders lie so loosely that a gentle step is sufficient to set a great mass of them in motion. This vertical precipice is the most remarkable feature of Baula. We regretted very much that we had not the means of measuring its height. In the newest map of Iceland (that of O. N. Olsen), a triangle, denoting a trigonometrical measurement, is marked upon Baula, but the result, so far as we know, has never been published, and consequently the heights of the mountain and of the precipice upon its NE. side are as yet unknown. The conclusion that it cannot exceed 2,500 feet—because this height is in Iceland the lower limit of perpetual snow, and Baula is in summer almost free from snow—does not appear to be tenable, for the slopes of the hill are too steep for the snow to lie on. We estimate the height at from 3,000 to 3,500 feet. The little Baula (*Litla Baula*), which lies to the NNE., is out of all proportion lower and smaller. It is a pointed cone, surrounded on one side by a semicircular wall-like ridge, which reaches half-way up the cone. The bare rock forms a very striking contrast with the green of the meadows which surround it.

'Upon the top of Baula, the only reminiscence of former visitors, was a cairn three feet high, built of trachyte prisms. We placed in it a tin case, containing our cards, with the names, professions, and countries of the three travellers, and also the date of our visit. How long may it not be before future travellers find them! In Iceland we met no one who had ever ascended Baula. Tormented with a dreadful thirst,

which we tried in vain to quench with snow, we started on our return. This was even more dangerous than the ascent. As it would have taken too much time to descend by the same way by which we had climbed up, we bore rather to the west, where the mountain is covered with fragments of trachyte. Here we tried to make a slide, rolling great masses of rock down the steep descent before us. We were soon, however, obliged to give up this dangerous attempt, for we might easily have got a broken leg, by striking against some projecting fragment of trachyte. We were, therefore, obliged to descend step by step, taking constant care not to set in motion the rubbish above our heads, and when we arrived, after a walk of three hours, at our tent, we agreed that of all mountains which our feet had trodden, Baula was the most difficult to ascend.

I have not much to add to this interesting description of one of the most remarkable mountains in Iceland. For the guidance of future travellers, however, I may say that I think the difficulties of the ascent are greatly exaggerated. This mountain is regarded by the Icelanders with a kind of superstitious dread. My guide (Olavur Steingrímson) assured me that the ascent had been made by only one man, the clergyman of Hvammr, and that he left his house at 10 A.M., and did not return till 9 P.M. The strangest thing however of all is, that Olavur, although he had been guide to Messrs. Preyer, Zirkel, and Benguerel in 1860, stoutly denied that they had reached the top. He said that he had not accompanied them in their attempt, but he professed to point out the spot on the hill-side where they had stopped. He was filled with the greatest astonishment when we found their cards in the tin case mentioned above.

On August 12, 1863, Mr. F. Gisborne and I left Nordhúnga at 8.53 A.M., rode a short distance up the valley of the Thvera, crossed a low range of hills, descended into the Nordhádalr, forded the Nordhrá, and at 10.10 arrived at a farm situated at the southern foot of Baula. Here we got a guide to the foot of the cone. We rode up a steep ascent, crossed a narrow table land, and arrived at the foot of the cone at 11.5 A.M. Here we left our horses, and ascended in nearly a straight line to the summit, where we arrived at 12.20. The ascent of the cone occupied exactly one hour and a quarter, and the descent exactly forty-five minutes. It is very steep and somewhat laborious, but neither difficult nor dangerous if reasonable care be taken not to tread upon stones likely to roll. The cone is very perfect and very steep upon all sides. The precipice upon the NE. side is fine, but hardly comes up to the description of

Messrs. Preyer and Zirkel. It is not to be compared to those in the Alps and in Norway, and in my judgment it is inferior to those of Ben Nevis and Ben Macdhui. There is no appearance of a crater. On the E. is a ridge connecting Great with Little Baula. Little Baula is a very perfect cone situated in a crater. The trachyte of Great Baula is white. Little Baula is of a much darker colour. I was unfortunately unable to measure the height of Baula, an aneroid barometer, made by Browning (111 Minories), for this journey, having been rendered useless by the breakage of the connecting chain. The temperature of the air on the summit was 43° Fahr.; at the foot of the cone, nearly two hours later, 53°. I should suppose Messrs. Preyer and Zirkel's estimate of the height (3,000—3,500 feet) to be tolerably correct. There is no permanent snow on the mountain, but, as they observe, it is perhaps too steep for snow to lie upon, besides which it is well known that on small isolated peaks the snow-line is considerably higher than on extensive mountain ranges. This is strikingly exemplified in the case of Hekla. The description of the view is correct. Messrs. P. and Z. are, however, mistaken in saying that the sea is not visible from the summit. We saw Borga Fjord and Hvammr Fjord from it. In conclusion, I would recommend this interesting excursion to travellers visiting this part of Iceland.

NOTE.—Since writing the above I have had an opportunity of consulting the work of Herr G. G. Winkler, 'Island; der Bau seiner Gebirge und dessen geologische Bedeutung, 1863.' This book, p. 72, contains a minute description of the geological structure of Baula, to which I would refer those who wish for information upon this subject. Herr Winkler made an attempt to reach the summit, but did not succeed.

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#### THE STUDER JOCH. By F. CRAUFURD GROVE.

IT was my misfortune to find myself on a very rainy afternoon in the beginning of August 1863 in the remarkably close and dirty *salle à manger* of the Grimsel Hospice. That establishment, not a very lively one at the best of times, was on this occasion peculiarly unpleasant, owing partly to the bad weather which had driven everybody indoors, and partly to the fact that the well-meaning but stolid landlord was entirely new to his business. The problem of how to get through the day seemed even more difficult of solution than it commonly is on these occasions. The usual device of a protracted luncheon



could not be resorted to. 'Until seven o'clock,' said the host to an angry traveller, 'you can have nothing but a plate of raw ham, or the bill, both of which are at your service.' Not feeling inclined myself for either of these luxuries, which can be had in high perfection without going so far as the Grimsel, I endeavoured to discover what other facilities for passing the time the place might offer. Its advantages in this respect were not great; the library was decidedly limited, owing to most of the books having been torn up for cigar-lights, and the travellers' register had suffered from the same natural but reprehensible practice. While pondering over what remained of its instructive pages, I was fortunate enough to get into conversation with a very agreeable Frenchman, from whom I received some interesting and, to me, novel information concerning the achievements of a body of English gentlemen devoted to mountaineering, known as 'The Travellers' Club;' 'a member of which,' he added, 'is this very day ascending the Matterhorn, a lofty mountain in the immediate vicinity of the Grimsel.' As this statement, though plausible, slightly jarred with my few ideas on the subject of Swiss geography, I endeavoured to ascertain on what grounds it was made, but without any success, until my difficulties were ended by the appearance of my friend Mr. Macdonald and the famous Melchior Anderegg, both fresh from an ascent of the graceful Galenstock and, in spite of the unfavourable state of the weather, eager for fresh expeditions. After some discussion we determined to devote the next day, if fine, to a stroll to the top of the Strahleck and back, and to a passing investigation of the country round. When I communicated our intention to the landlord, and requested him to prepare the necessary provisions, that worthy smiled on me for the first time. Though but vaguely conscious of the existence of the mountains about the place, he had a firm belief in the Strahleck pass as highly conducive to the honour and welfare of the Grimsel Hospice. Crossing the Strahleck from his inn implies provisions, wine, and a thirty-franc porter, all supplied by the landlord; crossing the Strahleck to the Grimsel means in most cases a large consumption of champagne during the evening. Going to the top of the pass and coming back again seemed to him a happy innovation on the established practice, as combining both sources of profit. The next morning we duly started, favoured by the most magnificent weather, and honoured with the society of Melchior Anderegg and Peter Perrn, the latter of whom, more droll and ugly than ever, had arrived at the Grimsel late on the previous evening. We had not gone far before I discovered, from Macdonald's

absent manner—so totally different from his usual state of genial exhilaration—that something was preying on his active mind. A searching cross-examination, conducted as well as such a thing could be on a crevassed glacier, presently brought to light the nature of his grievance. Crossing the Oberaar Joch some days before, he had been much struck by the excessive dullness and insipidity of that uninteresting pass, and had ultimately come to the conclusion that the usually vigilant Alpine Club had for once betrayed some slight negligence in allowing two such important points as the Grimsel and the *Æggischhorn* to remain without better means of communication than the wearisome snow-trough through which it had been his misfortune to wade. He had now come out less for the sake of a walk on the Strahleck than in the hope of discovering some accessible point in the ridge between the *Finsteraarhorn* and *Oberaarhorn*, over which a col might be made, which would probably prove far superior in interest and beauty to the Oberaar Joch. His diligence was not without its reward; though nothing can be more uninviting than the greater part of the vast rampart which lies to the south of the *Unteraar glacier*, his careful investigation at length discovered a steep, but not apparently impossible, ice-slope, which seemed to reveal an available way to the top of the ridge, whence a descent on to the upper *névé* of the *Viescher glacier* could probably be effected. Melchior, called into counsel, said that the slope might be practicable or might not; and finding no one prepared to dispute this well-considered and not very hazardous proposition, went on to observe that, though there were some crevasses near the top which might give trouble, he thought the col decidedly worth an attempt. Further encouragement than this was not needed, and when on our return to the Grimsel we found Messrs. Buxton, Hall, and Woodmass, friends whose arrival from the Engadine I had been expecting, it was speedily arranged that a joint attempt on the pass should be made the next day. At 3.15 on the morning of the 4th of August, four of us accordingly started—namely, Buxton, Macdonald, Hall, and myself; Woodmass being unfortunately prevented from joining us by a sudden and severe illness. For guides we had Melchior Anderegg and Peter Perrn, and, to carry provisions, a sturdy but very taciturn porter from the Grimsel, who, during the whole time we were together, only made one observation, and that was at the conclusion of the day, when he expressed a decided wish to be paid immediately.

For the first three hours our way lay over the ordinary Strahleck route, along the flat surface of the *Unteraar glacier*, until we reached a point under a shoulder of the *Oberaarhorn*,

just opposite that portion of the glacier which leads to the foot of the well-known wall. Here we paused for a short time to reconnoitre the ice-slope up which we trusted that we should be able to force our way. For the benefit of any one who may wish to make the pass in future, I may state that the position of the col can hardly be mistaken. The Studerhorn is the principal elevation in the ridge which connects the Oberaarhorn with the Finsteraarhorn. Immediately to the east of the Studerhorn, and, consequently, between it and the Oberaarhorn, is a steep hanging glacier forming a slope which, stretching continuously from the top of the ridge to the ice plain at the bottom, is furrowed up in the higher portion by some huge crevasses. This would seem to be the only place at which there is any chance of surmounting the vast wall. At the foot of this slope we arrived at 7.30, and as we found that the lower portion was covered with tolerably frozen snow, and that no step-cutting would be necessary, we immediately started up the incline, Perrn leading, followed by Macdonald; Melchior, according to his wont, keeping behind in the easier part of the ascent, ready to step to the front, the recognised leader, the moment any difficulty should call for the exercise of his unequalled skill. Perrn, rather nervous about avalanches on the snow-covered portion of the slope, thought it necessary to lead up at a pace such as I have rarely seen maintained in the Alps, and which speedily produced unmistakeable signs of distress from the rest of the party, with the exception of Macdonald and Melchior; but the sturdy son of Zermatt held on nevertheless, and, deaf to the pathetic remonstrances which constantly assailed him from the rear, never slackened his pace until the outraged laws of respiration asserted their rights, and, in spite of himself, he was fairly obliged to stop for breath. A bench was formed by the simple process of scraping it out of the snow; that anomalous alpine meal, which may be described as a hybrid between breakfast and luncheon, was eaten, and we started to battle with the remainder of our route, Melchior leading this time, as there were some ugly séracs ahead. After a short interval of step-cutting we came to a huge crevasse, stretching across the greater portion of the slope, terminating on the right amid ice-cliffs, which were obviously impracticable, and on the left closed by a broken bit of glacier, which seemed but little less formidable. This latter obstacle, however, had to be crossed, or we must give up all idea of making the pass; so there was nothing left but to attempt it, which we did, and, owing to Melchior's inimitable skill, succeeded at last in forcing our way through it. Without some

kind of illustration I despair of giving any idea of the very peculiar ice difficulty with which we had to contend on this occasion. I can only say that Melchior had to perform a feat analogous to that of cutting steps up and round the sharp corner of a house just under a boldly projecting cornice, the area being represented by a symmetrical but highly objectionable crevasse which yawned some fifty feet below us. This overcome, no serious obstacle remained between us and the top of the col, which, to our great delight and relief, we reached at 10.15, the whole ascent from the Grimsel having occupied precisely seven hours. The otherwise undisturbed exultation which gaining the summit of our pass would have caused us was, however, mitigated by the circumstance that almost everybody was ill. Some of our party, who had been relieving the hard work of mountaineering by a short interval of idleness amongst the Italian lakes, had given themselves unlimited license as to figs and grapes. The result produced by this peculiar training diet, when tested by a struggle with a long and severe snow-slope, was something too painful to bear more than a distant allusion. The guides were in little better plight. The landlord of the hospice, exhilarated by the presence of two such distinguished men as Melchior and Perrn, had, on the previous evening, been remarkably generous with his liquor, and the effect produced next day was such as might be expected by anyone who has ever had the misfortune to drink a glass of the Grimsel brandy. Things got better after a time, however, and we were able to admire the rare beauty of the view, and to proceed to determine the question usually propounded on these occasions—namely, whether, having got up one side of a wall, we could get down the other. A descent straight from the spot where we stood was clearly impossible; to the west, or in the direction of the Finsteraarhorn, the rocks had a most forbidding aspect, but towards the Oberaarhorn there seemed to be some chance of finding a practicable funnel. After proceeding a short distance eastwards along the top of the ridge, we struck down an ice-slope to the right, and presently found ourselves at the head of a couloir leading to the upper névé of the eastern branch of the Viescher glacier. The descent of this rocky chimney gave us considerable trouble, for, though easy enough at the top, the lower part proved steep and difficult, the last forty feet in particular bringing forth the most peculiar and varied display of gymnastics from the whole party, as in attitudes more or less ungraceful we struggled, or were ignominiously lowered, down the slimy treacherous rocks, the unpleasant nature of our

situation considerably increased by the vision of a large, deep bergschrund waiting for us at the bottom. We got to the foot of the rocks at last, however, crossed the bergschrund by a snow bridge, and found ourselves in the great snow basin surrounded by the Oberaarhorn, the Finsteraarhorn, and the Rothhorn. Here, after a short time, our route joined that of the Oberaar Joch, and the rest of the day was occupied in the tedious walk along the interminable Viescher glacier, of which the weary memory must be so familiar to most mountaineers. Viesch was reached at eight in the evening, the pass having occupied us sixteen hours and three quarters, but I should state that, owing to the indisposition of some of the party, our progress was, with the exception of the rush up the snow slope, unusually slow, and we all agreed that, under ordinary circumstances, about fourteen hours would be required for crossing from the Grimsel to Viesch; going to the Æggischhorn would probably shorten this time by an hour. I may add that it was also the common opinion that the pass was far superior to the Oberaar Joch, not only from the more interesting nature of the country which has to be crossed, but, in addition, from the singular beauty and variety of the mountain scenery through which the route lies; as the earlier portion of the day's work is on that portion of the Strahleck route from which the Schreckhorn and Finsteraarhorn are so well seen; while the view from the summit of the col is of rare extent and magnificence.

In describing our ascent, I endeavoured to give some idea of the bearings of the col; a few words as to the position of the couloir by which we descended may not be out of place.

Immediately to the west of the Oberaarhorn, as seen from the Viescher glacier, a steep ice slope rises from the névé; just beyond this an abrupt wall of rock shuts in the glacier to the north; at the place where this wall sinks lowest a small sharp buttress stands out. Close to this projection on the west side is the couloir, which forms apparently the most practicable route to or from the top of the ridge.

I should mention that, in the table of the heights of passes contributed to the second series of 'Peaks and Passes,' by Mr. Tuckett, a col called the Roth Sattel is described as existing between the Finsteraarhorn and Oberaarhorn, and as connecting the Viescher and Unteraar glaciers. This we for some time thought to be identical with the pass which we had made, and I am indebted to Mr. Tuckett's kindness for the means of correcting the misapprehension. He took the description of the height and position of the col from a table of elevations, &c.,

given at the end of Hugi's work on the Alps, but having since carefully examined the actual text of that book, he has found that in this table the word Oberaarhorn is a misprint for Rothhorn, and that the pass referred to is one crossing the ridge between the Rothhorn and Finsteraarhorn, connecting the eastern and northern névés of the Viescher glacier. This I need hardly say is perfectly distinct from the pass for which the Studer Joch appeared to us to be the most appropriate name.

### THE DOLOMITE MOUNTAINS.\*

**T**HIS WORK is one of more than ordinary merit as a book of travels. It contains much valuable information respecting those remarkable mountains in the East of Europe, which have taken their name from M. Dolomieu, a French savant who more than seventy years ago first called attention to them, and is likely in consequence to be remembered as long as the Dolomites continue to engage the notice of adventurous mountaineers or thoughtful geologists. The places visited by the authors have been carefully observed, and the results are recorded by them with elaborate accuracy. A strong and delicate appreciation of the beautiful in nature is perceptible in almost every page, and under its impulse, Mr. Gilbert and Mr. Churchill, accompanied by their wives, have explored numerous valleys hitherto but little known, have endured privations and hardships which must have been very trying, at least to the ladies, and have in the end produced an elegant and readable book that will be found an invaluable *vade mecum* for all who intend to travel through the same district in the same manner. The book however is but of little value to the practised mountaineer, beyond pointing out where the places are that he should go to; for the authors made no difficult ascents, but were content to admire their favourite mountains by looking upwards at them from some spot below, without venturing on 'altitudes convenient only for the eagles' or members of the Alpine Club.

The principal Dolomites are comprised in the mountain ranges called the CARNIC ALPS, which lie to the East of Botzen and South of the Pusterthal. The famous Ampezzo Pass from the Pusterthal to Venice runs through the centre. Our authors, however, were not content to devote themselves to an exploration of the Carnic Alps, which, if done thoroughly, would have made their book more valuable; but they extended their journeys beyond the Tyrol and Carniola, and penetrated into the valleys of Carinthia and Styria, the descriptions of which occupy too much space. There most of the scenery is of inferior order, consisting principally of long interminable valleys girt on each side by mountains of second-rate height, which, when seen from below foreshortened, are not adapted to arouse any very powerful emotions, or

\* *The Dolomite Mountains: Excursions through Tyrol, Carinthia, Carniola and Friuli*, in 1861, 1862, and 1863. By Josiah Gilbert and G. C. Churchill, F.G.S.

afford adequate compensation for the bad inns and scanty ill-cooked food which have too often to be encountered. Even our travellers, notwithstanding their imperturbable good humour, and their evident desire to make the best of things, are driven to utter complaints of the 'inevitable lean fowl, and bread without vegetables' which constitute, with one exception, almost the only dinner to be met with in some of these regions, where dinner is to be had at all. The exception we refer to is the splendid trout, the finest in Europe, which abound in all the streams, and furnish the principal delicacy at the inns, where they may generally be obtained, if asked for. Strange to say, they are never once commended throughout the whole of this volume. They furnish excellent sport for the angler, and gave so much delight to Sir Humphrey Davy, during his frequent visits to Carinthia and Carniola, that he so far forgot his duties to science as never to trouble himself to make any close inspection of the gigantic Dolomites, which he was content to guess must be *granite*, whilst he pursued in their neighbourhood 'the gentle craft' undisturbed by any care whether his guess was right or wrong.

The Dolomites are, however, more worthy of a special visit than the philosopher supposed when he contemplated them from beneath his 'white hat lined with green,' and wound round with fishing lines and flies. The LANG KOFEL is truly a splendid object, and should unquestionably be approached by the Gröden Thal, although the view from the Seisser Alp is also very noble. The Gröden is one of the few interesting valleys which the authors have treated with undeserved neglect. It is celebrated not only for its scenery but also for its wood sculpture, which for exquisite finish and artistic grace puts to shame the ruder productions of the Swiss. Fortunately the *Pinus cembra* has not been extirpated in this district, and it affords the most perfect material for wood sculpture that exists. Not far from the Lang Kofel stands the majestic mass of the MARMOLATA, which is nearly 12,000 feet high. The Marmolata and the Lang Kofel hold among the Carnic Alps the dignified rank which Monte Rosa and the Matterhorn enjoy among the Pennines. Between the Marmolata and Vigo in the neighbouring Val Fassa, is however the greatest wonder of the whole country; for here are found the remains of what geologists pronounce to be 'the oldest extinct volcano in Europe.' The district is in fact full of charming and wonderful sights, but as it requires a bold and skilful cragsman to reach the precipitous summits of the Dolomites, we do not wonder that the feat has been so seldom performed. Their splendid picturesque forms have long been a theme of praise with those who, like Mr. John Ball and a few others, have taken the trouble to explore and climb them. Most of our readers have no doubt admired them from a distance, and wondered what they were, when, gliding along the railway from Milan to Venice, they have caught, on the left hand, glimpses of the Carnic chain stretching towards the East from the upper end of the Lago di Garda, and seeming to invite a more intimate acquaintance. Their appearance when viewed from the lagunes of Venice itself is also glorious beyond description, particularly at those seasons of the year when the mists which rise from the intervening plains are condensed or dispersed. A member of the Alpine Club (Mr. Cooke, R.A.) has made them, from this place,

his especial study, and in some of his finest pictures of Venice has introduced them into the background, glowing in the richest sunshine and resplendent with the most dazzling colours. But they lose nothing on a nearer approach, and we gladly hail the appearance of this book, which gives so interesting an account of them that we doubt not they will speedily become a new and favourite field for Alpine adventure. We cannot conclude this notice without expressing our admiration of Mr. E. Whymper's woodcuts, which adorn the volume. They could only have been executed by one who is himself a thorough mountaineer as well as a skilful artist, and we predict that he will speedily become as famous for woodcuts of mountain scenery as Bewicke was for animals.

H. W. C.

SUMMARY OF NEW EXPEDITIONS DURING THE  
SUMMER OF 1864, UP TO AUGUST 16.

*Mountains of Dauphiné.*

COL DES AIGUILLES D'ARVE, *June 21.*—Messrs. Moore, Horace Walker and Whymper, with Christian Almer and Michel Croz, left some châteaux at the entrance of the Vallon des Aiguilles d'Arve  $1\frac{1}{2}$  hrs. from Valloire, and  $4\frac{1}{2}$  hrs. from St. Michel on the Cenis road, at 3.55 A.M., and reached the head of the valley at the base of Les Aiguilles d'Arve at 5.30. Mounting thence along the left side of the valley and over a series of steep snow slopes, a col between the central and northern peaks was reached at 8.45. Estimated height, 10,450'. The descent was effected by a very steep snow couloir, and the party reached the châteaux of Rieu-blanc in  $1\frac{1}{2}$  hrs. from the col, and the châteaux of La Sausse, near the head of the valley of St. Jean d'Arve, in half an hour more. Total actual walking,  $5\frac{3}{4}$  hrs.

*June 22.*—The same party left the châteaux of La Sausse at 4.15 A.M. and ascending to the head of the Combe de la Sausse, mounted along a projecting buttress to the water-shed between the Maurienne and Dauphiné, a point on which, to the east of and above the Col de Martignare, was reached at 7.20. Thence a steep ascent over snow and rocks led in  $1\frac{1}{2}$  hrs. to the summit of a peak still further east, probably the Bec du Grenier. Estimated height, 11,000'. Further along the ridge there was a snow peak (Aiguille de Goléon?) somewhat higher. The descent was effected direct to La Grave in 3 hrs. over steep snow slopes, and along the left side of an extensive lateral valley which opens out a little below that place. Total actual walking,  $7\frac{1}{2}$  hrs.

BRECHE DE LA MEIJE, *June 23.*—The same party left La Grave at 2.40 A.M. and crossing the Romanche, reached the head of the gorge which receives the drainage of the glaciers of the Meije and Rateau at 4, and followed the moraine and snow slopes till 4.55, when they took to the eastern of two ridges of rock which, running up towards the Rateau, divide the glacier which flows down from the Brèche into two branches. At 6.20 the party got on to the western branch of this glacier, and traversed it to the col, between the Meije and Rateau, which



was reached at 8.50. Height, 11,054'. The descent to the Vallon des Etançons by the glacier of the same name was straightforward; the level of the valley was reached in  $1\frac{3}{4}$  hrs. from the col, and La Bérarde in  $1\frac{3}{4}$  hrs. more. Total actual walking,  $8\frac{3}{4}$  hrs.

PIC DES ECRINS, *June 25.*—The same party left their bivouac on the upper plateau of the Glacier de la Bonnepierre  $3\frac{1}{4}$  hrs. from La Bérarde at 3.55 A.M., and reached the Col des Ecrins at 5.55. Thence ascending a steep slope of broken glacier, the bergschrund running along the base of the final peak was passed, on the extreme left, at 8.10. Above this obstacle the difficulties were so great that  $4\frac{1}{4}$  hrs. were spent in getting to the arête at a point to the left of the summit, which from thence was reached in 35 min. at 1.25 P.M. Height, 13,462'. It was not thought advisable to return by the same route, and the party accordingly descended for 2 hrs. along the arête connecting the highest point with peak No. 2, and then in another hour cut their way down to the bergschrund, which was crossed at 4.45. The Col des Ecrins was reached at 5.25, and the top of the steep rocks above the lower ice-fall of the Glacier Blanc at 7.45. The party were finally compelled, by darkness to halt at 9.40 P.M., and bivouac in the middle of the Pré de Madame Carle,  $2\frac{3}{4}$  hrs. from Ville Val Louise. Total actual walking,  $15\frac{3}{4}$  hrs.

COL DE LA PILATTE, *June 27.*—The same party left the châteaux of Entraignes 2 hrs. from Ville Val Louise at 3.35 A.M. and followed the route of the Col du Célar till 4.55. They then turned sharp to the right, and mounting by a long slope of avalanche snow, succeeded by steep rocks, at 8.25 got on to a small glacier much crevassed, running down from the ridge between the peak called Les Bans, and the highest point of the Crête des Bœufs Rouges. The ascent to the head of this glacier occupied an hour, and from thence a very steep and difficult couloir led in  $1\frac{1}{4}$  hrs. to the col, a gap in the ridge above mentioned. Estimated height, 11,500'. The descent to the Glacier de la Pilatte by a steep ice-wall, followed by enormous séracs, was difficult, and occupied  $1\frac{3}{4}$  hrs. In  $1\frac{1}{4}$  hrs. the party quitted the ice, at a distance of  $1\frac{3}{4}$  hrs. from La Bérarde, which was reached at 3.55 P.M. Total actual walking,  $10\frac{1}{4}$  hrs.

#### *Graian Alps.*

DENT PARASSEZ, *August 3.*—Messrs. Rowsell, Cuthbert and Blandford, accompanied by Joseph Victor Favret of Chamouni and two chasseurs of Modane, left the châteaux of Fournache above Aussois in the Val Maurienne at 3.40 A.M. Having reached the highest part of the lateral valley, they turned to the left and gained a depression in the W. arête of the mountain by a couloir partly filled with snow. Crossing this col they worked up and across a number of steep rock buttresses, much broken by weather, to the main arête; hence a ridge of ice which required an hour of step-cutting led to the summit, consisting of an ice cornice leaning over to the SE. This was reached at 12.20 P.M. The ascent must always present some difficulty, but was rendered more tedious than it might sometimes be, by the frozen state of the snow on the arête and in the couloirs. In descending, the party went down the

opposite side of the col before mentioned (which they propose to call the COL DE L'ARPONT) by a short ice slope, and followed the Glacier de l'Arpont for rather more than two hrs. Not having been successful in their search for a châlet, they halted at 8.30 P.M. and remained in the rocks till the following morning, when they descended to the châlets of the Combe de l'Enfer, above Villard in the Val de la Leisse.

*Note.*—The Glacier de l'Arpont drains the whole of the northern and eastern sides of the Dent Parassée; a glacier-covered ridge bounds it on the north and separates it from the district whence the Glacier de la Vanoise draws its supply.

GRANDE MOTTE, *August 5.*—The same party left Entre deux Eaux at 3.30 A.M., reached the glacier above the Col de la Leisse at 6.35 A.M., and then ascended a series of snow slopes to the cornice of the Grande Motte. The highest point, which was not visible from the col, was gained at 10.20 A.M. The descent to the glacier was made in 1 hr. 20 min., and Tignes was reached at 4 P.M.

BEc D'INVERGNUON, *August 13.*—Messrs. Nichols, Rowsall, Neighbour, Cuthbert and Blanford, with Joseph Victor Favret of Chamouni and Michel Brunod of Courmayeur as guides, left the Chalet of Epines dessus above Val Grisanche at 5.15 A.M. Passing round the lower part of the ridge coming from the Bec de Mont Forchu, they ascended to the Glacier d'Invergnun, and reached the foot of the mountain at 7.30 A.M. Hence the ascent was up a steep and difficult glacier, much crevassed, and with slopes of hard ice. It required nearly six hours to reach the arête, and a point 30 feet below the summit was gained at 2 P.M. The last part of the arête consisted of a narrow wall of loose rock crested with blocks that were too unsteady to be safely crossed. The descent was commenced at 3.10 P.M., the base of the mountain reached at 6.15 P.M., and the châlets at 8.30.

#### *Range of Mont Blanc.*

COL DE TRIOLET, *July 8.*—Messrs. Reilly and Whympier, with Michel Croz, Henri Charlet, and Michel Payot (not the well-known guide of that name), all of Chamouni, slept at the Couvercle, and starting at 4.30 A.M. went up the Glacier de Taléfre to the left of the Aiguille de Triolet, which they reached at 7.50. Rounding its base for a quarter of an hour, they arrived at the col on its S. side (height, 12,162', according to the French survey now in progress), and descended a steep wall of rocks and snow for an hour, after which another wall of snow alone led them in half an hour down on to the Glacier de Triolet. Thence they went down the centre of the glacier, took afterwards to the cliffs on its left bank, but were compelled to return to the moraine, and reached Praz-de-Bar in the Val Ferrex at 3.55 P.M. Time, 8 hrs. 35 min. actual walking; but the snow on this and the following expedition was in such perfect condition that the time consumed was much less than might otherwise be the case.

MONT DOLENT, *July 9.*—The same party left Praz-de-Bar at 4.15 A.M., reached the Col Ferrex in an hour, thence went up the left bank of the Glacier de Mont Dolent, the upper part of which is a great level

plateau, distant about 2 hrs. from the Col Ferrex. Leaving this plateau, they turned to the left, ascended snow slopes directly towards the peak, crossed the bergschrund at 9.20, and immediately got on to an arête which led them to the summit by 11. (Height, 12,566', French survey.) They descended by the same way, reaching Praz-de-Bar at 8.10, and Courmayeur at 6.40 P.M. Time, 11 hrs. 15 min. actual walking.

**AIGUILLE DE TRÉLATÈTE, July 12.**—The same party bivouacked on Mont Suc, at a spot overlooking the Glacier de Miage, about 9,500' high, and distant some 5½ hrs. from Courmayeur. Starting at 4.45 A.M. they followed the ridge of Mont Suc for an hour, and then were obliged to quit it for a short distance, make their way over the north branch of the Glacier de l'Allée Blanche, and strike it again higher up. They gained the south summit of the Trélatète at 9, thence went along a narrow arête which led them in 30 min. to the highest peak. Returning to their *gîte* by the same route, they descended round the base of Mont Suc to the châteaux of the Allée Blanche, and reached Mottet by the Col de la Seigne at 5.35. Time, 9 hrs. 45 min. actual walking.

**AIGUILLE D'ARGENTIÈRE, July 15.**—The same party without Charlet, after sleeping at the châteaux of Les Ognons above Argentière, started at 3.15 A.M., and taking to the Glacier d'Argentière at 4.55, crossed it to the foot of the lateral glacier leading to the Col de Chardonnet. Having learned by a previous expedition that the lower part of the arête leading up to the Aiguille d'Argentière from the Col de Chardonnet was impracticable, they turned aside up the left affluent of the lateral glacier, directly towards the peak, and at 10.5 (the last hour having been spent in making steps up a steep couloir) gained the same arête, which led them in about 1½ hrs. to the summit. They returned the same way to the level of the Glacier d'Argentière, whence Mr. Reilly descended to Chamouni by the ordinary route, and Mr. Whympfer by a most unprofitable short cut to Argentière down the right bank of the glacier, where he arrived at 7.10 P.M. Time, 12 hrs. 35 min. actual walking.

**COL DU DÔME DU GOUTE, August 5.**—Messrs. Reilly and Birkbeck, with Michel Croz, Michel Clemence Payot, and Mark Tairraz, after sleeping at the châteaux of Miage, started at 8.10 A.M., and reached the Col de Miage at 9.5. Leaving it at 11.35, they passed diagonally downwards to the surface of a large glacier descending from the S. side of the arête joining the Aiguille de Bionnassay and the Dôme, gained the top of this arête at about its central point, and passing along it reached the Dôme at 4.35. Descending the Dôme on its N. side to the Grands Mulets, they arrived at Chamouni at 10 P.M. This proves the accessibility of Mont Blanc from the Miage side, a point which has long been in dispute; but it is doubtful whether it would be possible to repeat this expedition in a season less remarkable for the great accumulation of snow on the mountains than the summer of 1864.

It has also been satisfactorily shown that an active mountaineer may ascend Mont Blanc without the discomfort and expense of sleeping at the Grands Mulets, or on the Aiguille du Gouté,—Mr. Moore with Christian Almer having reached the summit viâ the Dôme, starting at 12.30 A.M. from the Pavillon Bellevue, and descending to Chamouni,

and Mr. Morahead having completed the ascent by the ordinary route, alone from the Grand Mulets onwards, and returned to Chamouni, in the extraordinarily short space of 16 hrs.

*Monte Rosa district.*

STEINBOCK, *July 8.*—Mr. Moore, with Christian Almer and Jean Martin of Vissoie, left some châteaux in the Val Moiry, at the foot of the Col du Torrent, at 3.55 A.M., to attempt the ascent of the Grand Cornier. Mounting by the 'gazon' and rocks on the right bank, they got on to the great Moiry Glacier, above the central icefall, at 7.30, and always hugging the right bank, reached the base of the final peak at 9.10. The summit proved to be inaccessible from this direction, and the party therefore ascended in 15 min. the point marked 3,484 metres on the Federal Map, which is called by the natives of the Val d'Anniviers 'Steinbock.' The view from this point, which may also be reached from Zinal by the Col de l'Allée, is most superb, and was considered by Almer the finest he had ever seen in the Alps. Two hours were then spent in endeavours to descend from the head of the Moiry Glacier on to an extensive glacier, running down from the W. face of the Grand Cornier towards Abricolla, by which the peak appeared practicable. No way of descent could be found, the precipices which support the upper plateau of the Moiry Glacier absolutely overhanging. Retracing their morning's route, the party crossed to the left bank of the glacier below the icefall, and reached Evolena by the Col de Bréona at 6.35 P.M. Total actual walking, 12½ hrs.

BIES JOCH, *July 15.*—Messrs. Gaskell, Moore and Morahead, with Christian Almer and Peter Perrn, left Randa at 8.5 A.M., and mounting by steep grass slopes and rocks along the left bank of the Bies Glacier, got on to that glacier at 6.40, but in an hour were compelled to abandon it, and again take to the rocks. The ascent of these was exceedingly difficult, but in 2 hrs. the upper plateau of the glacier was reached, and in 25 min. more, at 10.55, the col, 11,645' in height, between the Brunegghorn and the second peak of the Weisshorn (4,161 metres). The descent of an icewall on to the head of the Turtman Glacier occupied 1¼ hrs., but the glacier itself presented no difficulty. Following the right bank, the party quitted the ice at 3.10 P.M., and reached the inn at Gruben at 5.15. Total actual walking, 11½ hrs. The pass made from Gruben to Randa, in 1862, by two French gentlemen led by Franz Andermatten, lay considerably nearer to the Brunegghorn than that above described.

MOMING PASS, *July 18.*—Messrs. Moore and Whymper, with Christian Almer and Michel Croz, left the highest châlet on the Arpitetta Alp 2¼ hrs. from Zinal at 5.40 A.M., got on to the Moming Glacier at 6.15. and crossing it, took to the rocks which form the base of the Schallhorn at 8.40, after being exposed to considerable risk from avalanches. A difficult ascent led in 1 hr. 20 min. to a steep wall of snow or ice, up and along which, a col above and to the right of the lowest point in the ridge between the Rothhorn and Schallhorn was reached in 1¼ hrs. more, at 11.50 A.M. Height about 12,700'. The descent to the upper

plateau of the Schallenberg Glacier, by a steep snow-wall, succeeded by most formidable séracs, occupied  $1\frac{3}{4}$  hrs. The appearance of the lower icefall of the Schallenberg Glacier being unpromising, the party bore to the right, and in 45 min. reached a well marked depression in the ridge connecting the Rothhorn and Mettelhorn. From this point it proved impracticable to descend towards the basin of the Trift Glacier, but after following the ridge towards the Mettelhorn for 45 min., an easy descent was found on to the Rothhorn Glacier, over which and the grass slopes below, the foot of the Trift Glacier was reached at 5.40, and Zermatt at 7.20 P.M. Total actual walking,  $11\frac{3}{4}$  hrs.

*August 1.*—Messrs. J. Robertson and C. G. Heathcote made the first passage from Saas to Simplen, between the Weissmies and Laquinhorn. 'We left Saas at 2.15 A.M., with Franz Andermatten, Pierre Venetz, and Pierre Zurbrücken, as guides. After passing the Trift Alp we kept along a steep ridge of rocks between the two arms of the Trift glacier, and reached the summit of the pass at about 7.15. The snow-slopes above the rocks presented no difficulty. The point we reached on the grat was immediately under the Laquinhorn, and a little to the left of the lowest point of the pass. The rocks descending from the Trift-grat to the Laquin Glacier are exceedingly steep, but we found it possible to effect the descent by bearing to the left along the precipices of the Laquinhorn. Late in the day there would be danger of falling stones in crossing the numerous 'graben' which seam the mountain side. The descent of the rocks occupied about 3 hrs. We experienced some little difficulty in descending to the lower Laquin Thal, the sides of which consist of precipitous buttresses, alternating with impracticable watercourses. From thence a tolerable path leads down the valley to the Simplon road, about  $1\frac{1}{2}$  m. below Simplen. The whole distance from Saas to Simplen occupied about 10 hrs., exclusive of stoppages, and the pass can hardly be surpassed in magnificence of scenery.'—C.G.H.

This is apparently the same as the Laquin Joch, made by Messrs. Jacomb and Chater in 1863, but in the opposite direction, which is mentioned in the *Alpine Journal*, No. 4; but Messrs. Robertson and Heathcote seem to have found an easier way of traversing the rocks on the Simplen side, which form the main difficulty of the pass.

*August 10.*—Messrs. Riddell and J. R. King, with Johann zum Taugwald of Zermatt, and Auguste Dorsaz of S. Pierre, passed from the châteaux of Chanrion to Evolena, ascending to the Col de Chermontane by the usual route, but descending by the northern branch of the icefall of the Vuibez Glacier to the Glacier d'Arolla. Time occupied on the icefall, 2 hrs.; whole time from Chanrion to Evolena,  $11\frac{1}{2}$  hrs., exclusive of stoppages.

NEW WAY UP THE LYSKAMM, *August 16.*—Messrs. Stephen and E. N. Buxton, with Jakob Anderegg and Franz Biener, ascended the Lyskamm from the W. side. 'We left the Riffel at 3, reached the Col des Jumeaux at 7.45, and the summit at 11.15. The arête between the western (lower) peak and the real top is very tough, and would hardly be possible except under a favourable combination of circumstances.'—E. N. B.

Mr. A. G. Puller sends the following note of a complete tour of Monte

Rosa by high glacier passes, which has probably never been accomplished before, though each separate pass was already known:—

'August 4.—From the Riffel to Macugnaga by the Weiss Thor, and ascent of the Cima de Jazi.

August 5.—Passage of the Col delle Loochie, from Macugnaga to the châlets of Bours in the Embours Thal.

August 6.—From the Embours Thal to Gressonay la Trinité, by the Embours Glacier, and the passage of the Col delle Piscie.

August 7.—Rested, and in the afternoon walked up nearly to the summit of the Hohes Licht, where we passed the night.

August 8.—Ascent of the Gipfel des Lyakammes, and passage of the Col de Lys to the Riffel Hotel.

Except on the first day, I was unaccompanied by anyone except my two guides, Peter Taugwald of Zermatt and Alexander Lochmatter of St. Nicholas.—A. G. P.

#### *Bernese Oberland.*

BIRCHFLUH PASS, July 8.—Mr. Tuckett, with the two Michels of Grindelwald, and Johann Rubin of Ried in the Lötschenthal—('a right good fellow, thoroughly acquainted with the neighbouring mountains,' F.F.T.)—crossed from Kippel to the Bell Alp by this pass, which has been occasionally used by the hunters of the Lötschenthal, but is not known ever to have been made by a traveller. Mr. Tuckett suggests the name Aletsch Pass, but it is referred to in the Alpine Guide by the former and more distinctive title. The way from the Lötschenthal lies up the Distel Glacier, over the ridge, called Birchgrat on the Federal map, between the Schienhorn and Breithorn, and down by the Jägi and Ober Aletsch Glaciers. Time, 7½ hrs.' easy walking, exclusive of halts; so this pass is shorter than the Lötschsattel, and much more beautiful. On July 21, Mr. Moore, with Christian Almer and Anton Eggel, a Bell Alp porter, crossed this pass to Kippel after ascending the Aletschhorn, the Bell Alp route to that peak and the way to the pass being the same for a considerable distance. They took about 2½ hrs. to descend from the pass to the highest châlets in the Lötschenthal.

BALMHORN, July 21.—Messrs. Frank and Horace Walker and Miss Walker, accompanied by Melchior and Jakob Anderegg, made the first ascent of the Balmhorn. Leaving the Schwarenbach inn at 2.80 A.M. they proceeded by the Schwartz Glacier, which descends between the Altels and Rinderhorn, to the col at the head of the valley. From thence a ridge runs up to the summit of the mountain, which they reached at 8.20. The ascent thus occupied 5 hrs. 50 min. including several long stoppages, but it might be easily made in 4 or 4½ hours. The view is the same as from the Altels.

WETTER LUCKE, July 22.—Mr. Moore, with Christian Almer and Anton Eggel, of Blatten above Brieg, left the Guggi Staffel Alp in the Lötschenthal at 2.40 A.M., ascended the Inner Pfaffier Thal, keeping to the left bank of the torrent, and mounting by steep rocks and grass slopes, got on to the glacier from its left bank at 5.15. The passage of the glacier to the col between the Tschingelhorn and Breithorn, which was reached at 7.15, occupied 1½ hrs., the gigantic crevasses which un-

dermine the névé giving some trouble. The col appeared to be rather higher than the Petersgrat. The descent of the Breithorn Glacier, which, especially in its upper portion, is fearfully dislocated, was very difficult, and taxed Almer's powers to the utmost. The ice was quitted above the Oberhorn Alp at 10.30 A.M., and the party reached Lauterbrunnen, after a very long descent, at 3.20 P.M. Total actual walking, 10½ hrs. Later in the season, or with less snow, this pass might be impracticable on both sides.

**RIZLIHORN, August 3.**—Messrs. Sedley Taylor and H. de Fellenberg Montgomery, with Melchior Blatter of Meyringen, and Kaspar Neiger of Haaligrund, after sleeping at the highest châteaux in the Urbachthal, ascended this peak (10,744'). Going straight up the side of the mountain, which lies on the right or east side of the Urbachthal, they gained the summit in less than 5 hrs. The ascent is fatiguing, as it lies entirely over rocks and loose stones, but is free from serious difficulty.

**HANGENDHORN, August 4.**—The same party ascended this peak, which lies on the opposite side of the Urbachthal, overlooking the Gauli Glacier. 'After mounting for about 1½ hrs. over easy grass slopes, we traversed the Hangend Glacier, and reached the summit over snow slopes with a little rock scrambling, at the end in 4½ hrs. from the time of leaving the châteaux. The view is decidedly inferior to that from the Rizlihorn, especially as regards the Finsteraarhorn and Schreckhörner, which are seen to perfection from that mountain; the Hangendhorn is, however, the better placed for observing the Wetterhörner, and the ascent is much more interesting than that of the rival peak. The châteaux, which belong to the brothers Neiger, are at present very rough quarters, but the erection of a comfortable boarded hut, which is to take place before next summer, will make them very convenient for mountaineers.'—S. T.

#### *Tödi District.*

**SEEWELI JOCH, June 29.**—Rev. J. Sowerby went with Ambrose Zgräggen of Silenen from Unterschächen up the Brunni Thal. 'At the Brunni Alp (1 hr.), turning to the right, we ascended through the pine-woods for an hour to enter the Gries Thal, which we followed nearly to its head, then turning left we crossed the ridge called the Mantliser Grat (7,500') at a point immediately below the Great Windgelle (about 4½ hrs. from Unterschächen). Descending to the Seeweli See, and passing round a shoulder of the Little Windgelle, Amsteg may be reached by a rather rough path in about 3 hrs. The views of the N. side of the range of the Clariden are very fine. We took 10 hrs., but five were through deep fresh snow, and on one occasion we were nearly entangled in an avalanche. But generally there is no snow; 7½ hrs. would be ample time, and it is a walk quite practicable for ladies.'—J. S.

**GROSS RUCHI, July 12.**—Rev. J. Sowerby, accompanied by Ambrose Zgräggen of Silenen, and Melchior Trösch of Bristen, ascended the Gröss Ruchi (10,296'). 'Starting from a chätlet in the Maderaner Thal (about 3,500') at 2 A.M. we gained in 3½ hrs. the névé of the

Aelpli Firn (which descends towards the Hüfi Glacier some way above its lower end), then N. to the top of the Krükeli, and W. to the foot of the peak, which is a short narrow and very steep ridge running N. and S., surmounting several hummocks of névé. The soft snow made the last part difficult. Reached the top at 8.30.'—J. S.

#### *Leontine Alps.*

MARSHOLLHORN, *June 30.*—Mr. Morshead, with Peter Perrn, ascended the highest peak of this group from Hinterrhein by a stiff but not very long climb up the rocks. Thence he found a line of descent into the head of the Val Calanca, and returned over the ridge to Bernardino. 'There is a col to the NW. of the highest peak, leading to the head of the Val Malvaglia, but I could not explore it. The guides at Hinterrhein are worthless, but there is a chasseur, whose name sounds like George Tripp, whom I can confidently recommend.'—F. M.

PIZ VALRHEIN, *August 6.*—Messrs. D. W. Freshfield, J. D. Walker and M. Beachcroft, guided by François J. Devouassoud of Chamouni, ascended this peak from the Lenta Glacier. Having slept at the Lenta châteaux on the Lampertach Alp, they ascended by the centre of the Lenta Glacier, in 4 hrs., to a point on the ridge connecting the Piz Valrhein and the Guferhorn. This point has been gained from Hinterrhein on previous ascents, and the arête thence is the only way to the summit. Following the arête they gained the summit in 40 m. more, and descended to Hinterrhein by the Rheinwald Glacier in 4½ hrs. Those who wish to cross from Hinterrhein the pass thus made (which may perhaps best be called LENTA PASS) must look for a ridge of rocks somewhat to the E. of the apparent col, by which they may descend to the Lenta Glacier.

MUTTBORN, *August 9.*—Messrs. Taylor and Montgomery, with Melchior Blatter and Caspar Neiger, ascended this peak (10,181') from the inn on the Furka. 'We kept to the rocky arête on the right of the glacier descending from the peak until, the rocks becoming impracticable, we descended by a snow couloir to the glacier, and crossing it, reached the summit without much difficulty by its opposite side. The view, while it coincides in the main with that from the Galenstock, has the advantage of including a glimpse into the Italian valleys. Time of ascent 4½ hrs., of descent 3 hrs.'—S. T.

#### *Bernina District.*

BELLA VISTA PASS, *July 15.*—Messrs Hartman, Hoole and Cooke, with P. Jenni and B. Walther of Pontresina, and Anton Walther of Lax, starting at 5 o'clock from the lower châteaux of Fellaria, followed the route of the Sella Pass as far as the upper névé of the Fellaria Glacier, and thence proceeded in a north-easterly direction, leaving the Piz Zupo on the left, and having the Piz Palù immediately in front of them. They then turned slightly to the west, and reached the col between the Piz Spigna of the Palù group, and the snow points, called by the guides the Bella Vista, at 11 o'clock. Keeping to the west—i.e. in the direc-



tion of the Piz Bernina—they descended by steep snow slopes on to the Morteratsch Glacier, leaving the rocks known as the Gemsen Freiheit well to the right, and reached the level of the glacier at 1.30. 'It would no doubt be possible to ascend the Piz Palù from the Fellaria Glacier, descending on to the Morteratsch, but it would require a long day, and should be done when the upper Fellaria châteaux are inhabited.'—S. H.

PIZ KESCH AND ESCHIA PASS, *July 24 and 25.*—Messrs. Tuckett and W. Fowler, with Chr. Michel of Grindelwald, and Michel Payot of Chamouni, slept at the Platzli châteaux in the S. arm of the Val Tuora,  $2\frac{1}{2}$  hours from Bergtün. 'In  $3\frac{1}{2}$  hrs. from the châteaux we reached the ridge at the head of the Porchabella Glacier, just to the E. of Piz Kesch and immediately above the N. end of the Eschia Glacier. Thence we reached the summit of Piz Kesch without the slightest difficulty in 1 hour 10 m. (45 m. over snow and 25 m. up very steep but good rocks). On a second summit to the SE., which a level showed to be slightly lower than where we stood, was planted a baton; but on our peak were no traces of any previous visit. M. Coaz, I was told, had ascended Piz Kesch a few years ago, so that probably he climbed the second peak by mistake. Returning in 55 m. to the col, which I propose to call Eschia Pass, we reached Ponte in the Engadine from thence in 3 hrs. walking.'—F. F. T.

CRESTA AGIUZA SATTEL, &c., *July 28.*—Messrs. Tuckett and E. N. Buxton, with Peter Jenni, Christian Michel, and Franz Biener of Zermatt, having passed the night at the Fellaria châteaux, started very early for the Cresta Agiuza Sattel. 'We reached the ridge between the Fellaria and Scerscen Glaciers in less than 2 hrs., the foot of a couloir beneath the Cresta Agiuza in 55 min., and ascending the couloir gained the summit of the pass without serious difficulty in  $2\frac{1}{2}$  hrs. Instead of descending to the Morteratsch Glacier, we struck off to the right round the N. shoulder of the Cresta Agiuza, and gained the ridge overlooking the Fellaria Glacier, at the SW. foot of Piz Zupo. The latter peak was easily ascended in 45 min. from this point; after which, returning to it again, we skirted the NW. slopes of Piz Zupo until we came below the depression which separates that peak from the Bella Vista. Then again striking straight up to the right, over a bergschrund, snow, and rocks, we reached the depression in question (about 12,600'), which we propose to call the ZUPO PASS, and descended in  $1\frac{1}{4}$  hrs. upon the highest névé of the E. portion of the Fellaria. Going down this in an easterly direction, we exactly struck the head of the Palù Glacier, but as it was late we turned off to the right, partly descended the icefall of the Fellaria by its left bank, and then, taking up a glacier that came down on the left from the S. shoulder of the Pizzo de Verona, crossed the ridge at its head, thus making a third new pass, and thence reached Poschiavo in  $2\frac{1}{4}$  hrs. more by the valley through which lies the route of the Passo Rovano. Time, 14 hrs. 20 min. actual walking.'—F. F. T.

MONTE SISSONE AND FORNO PASS, *August 10.*—Messrs. Freshfield, Walker, and Beachcroft, with François Devouassoud and a porter from Val Bregaglia, started from San Martino to cross by the Forno Glacier to Maloya. 'Leaving the Zocco Pass to the left, we climbed steep slopes to the Piode Alp, and steered over rocky débris to a col lying

S. of Monte Sissone, and overlooking the Val Malenco. An hour from hence we reached the peak itself, which commands one of the grandest panoramas in this district. Steep and much crevassed snow slopes stretch down to the Forno Glacier. Keeping for some distance down the right arête, we found an easier descent, and followed the long Forno Glacier to its foot, near the châteaux of Piancaning on the Muretto Pass. Time from St. Martino to Maloya Inn, 11 hrs. exclusive of halts.' D.W.F.

Mr. Tuckett made the same pass the next day, but ascended Monte Sissone by a couloir lying on its W. side, thereby saving time.

#### *Orteler District.*

MONTE CONFINALE, *July 30.*—Messrs. Tuckett and H. E. Buxton ascended this peak from Sta. Caterina. The ascent, which is very easy, was made in  $3\frac{1}{2}$  hrs., the descent in  $2\frac{1}{2}$  hrs. It commands an admirable near view of the Orteler range, and a more distant panorama of nearly all the Rhetian and Lombard Alps.

MONTE CRISTALLO AND MADATSCHJOCH, *August 1.*—Messrs. E. N. and H. E. Buxton and Tuckett, with Chr. Michel and Franz Biener, leaving the Stelvio road at Spondalunga, went up the Vitelli Glacier for 2 hrs., then turning to the E. crossed the N. slope of the second summit of the Cristallo, and so reached the Madatsch Glacier. Ascending this to its head they gained a col overlooking the Val Zebbru, from which the Monte Cristallo was attained in 30 min. (This peak is only 11,400', much lower than has been usually supposed, and inferior to at least twelve others in the Orteler group.) Returning to the col (about 11,000') they descended the (Cristallo) glacier for 2 hrs. 50 min. into the Val Zebbru, and returned to Sta. Caterina over the ridge dividing that valley from the Val Forno. Time 12 hrs. 15 min. actual walking.

KÖNIGSSPITZE AND ZEBRU PASS, *August 3.*—The same party went from Sta. Caterina up the Val Forno, and ascended a glacier to the ridge immediately under the E. side of the Zebbru, or Königspitze, which they reached in  $5\frac{1}{2}$  hrs. Thence they gained the summit of the peak (12,660') by an hour's ascent of steep snow slopes. Returning to the ridge, and following it to a somewhat lower part (about 11,000'), they descended with some difficulty over rocks and soft snow on to the head of the Sulden Glacier. Traversing this nearly to its base, they descended to the Sulden Thal to Gomagoi, and reached Trafoi by the Stelvio road. Time, 13 hrs. 40 min. actual walking.

ORTELER SPITZE, *August 5.*—The same party ascended this mountain from Trafoi by a new route—the first ascent of the actual Hóchst Spitze for thirty-four years, as it is stated on good authority. Leaving the ordinary route to the right, they went up the valley or hollow beneath the cliffs of the Orteler, as far as the ridge bounding the Sulden Thal on the W. Thence they struck up steep slopes of snow and séracs to the right, straight for the summit of the mountain, which was easily reached in 6 hrs. 50 min. fast walking from Trafoi. The descent by the same course occupied 3 hrs.

*Pyrenees.*

NEW HIGH LEVEL ROUTE FROM LUCHON TO CASTANEZE.—Messrs. Charles Packe and Wm. Mathews with the guides Pierre Barrau and Bertrand Lafont, left Luchon on July 8, and bivouacked at the foot of the Maladetta near to the Trou de Toro. On the 9th, they crossed a snow pass between the Pic de Néthou and the Pic de Salenque to the head of a valley descending towards the Hospice of Viella. Keeping to the right bank of this valley, nearly on the level, they passed by a second col into the valley of Néthou, and followed the latter to the point where the river plunges in a cascade between two steep faces of rock. It was judged impracticable to descend farther, and they were obliged to remount and cross a third col which led them into a branch of the valley of Castanéze. Time from the Trou de Toro to the Granges of Castanéze, 10 hrs., exclusive of halts.

\* \* *This summary will be continued in the next number: the notes of Messrs. Bonney, Brooksbank, and Hornby, were received too late for present insertion.*

## NOTES AND QUERIES.

ALPINE BYWAYS. VII.—*From Gadmen to Guttannen by the Trift Thal and Furtwang Pass.*—About 6 o'clock on a fine morning early in July, Mr. Adams and I left the Bear at Gadmen, intending to make our way into the Trift Thal and by the Furtwang to Guttannen. Crossing the Gadmen Aar and following the road for a short distance, we took a path to the left, which led us at somewhat too great a height over the shoulder into the valley of the Trift, and about 9 we reached the highest châteaux at the foot of the glacier, which rivals that of Rosenlauri in purity. I had before seen the valley through which we meant to cross, both when descending from the Triftgletscher Joch and from the top of the Mährenhorn, but not feeling quite so certain of the locality as I expected, we obtained the help of the shepherds. We had choice of two paths, either to ascend the right bank and cross the glacier opposite the lateral valley, or to follow the left (or western) bank without touching the ice. The latter was chosen as being the shorter, and crossing the Triftbach by a snow bridge immediately below the glacier, we followed a path along the moraine. In about an hour we rounded a projecting spur of the Mährenhorn and saw before us a level stretch of glacier, surmounted by the grand ice-fall of the Trift, and flanked on either hand by the peaks of the Thierberge and the Steinhaushorn. The valley we were to follow lay on our right, but the pass itself was hidden by projecting ridges. Rounding these and crossing patches of snow and blocks, we came in sight of the col, which is formed by the depression between the Steinhaushorn and Mährenhorn. It is wrongly placed to the south of the Steinhaushorn, in the map to 'Peaks, Passes, and Glaciers,' second series. We made straight for it, but were turned back by cliffs, and had to descend into the valley, whence it took us rather more than an hour over snow to the top of the pass, which we reached about 2 P.M. The mists lay heavy and obscured the view over the vale of Hasli. We

made our way without difficulty to the first châteaux, where bread and milk were very gratifying to those who had unwisely started without provisions, and reached Guttannen about 4.30 P.M. The time might easily be shortened by two hours, since we twice missed our way, both times with considerable loss. This pass is referred to by Prof. Studer, but is scarcely mentioned in any guide-book. It leads without difficulty through some very fine glacier scenery, and would well repay any one for the few extra hours required to pass from Gadmen to Guttannen.

The observations taken with an aneroid barometer were as follows :

	Pressure.	Diff. of Height.	Correct Diff.
At Gadmen . . . .	25·8	4706 } 454ft.	477ft.
Top of Furtwang . . . .	21·58		
Guttannen . . . .	26·25		

Here the difference of height, given by the instrument between Gadmen and Guttannen, is correct to about 20 feet, and it appears that the Furtwang is about 8,700' above the level of the sea. J. SOWERBY.

FATAL ACCIDENT ON MONT BLANC.—There having been no time to make any separate enquiries, we publish the facts of this sad occurrence, as narrated in a letter addressed to the 'Times':

'A fatal accident occurred on Mont Blanc on Tuesday, Aug. 9, the first since Dr. Hamel's accident in 1820. Two Austrian gentlemen had made a successful ascent of the mountain, and were descending to the Grand Plateau. A young porter, Ambroise Couttet, was some distance in front, not attached to the rope. He took a direction too near the edge of the plateau, and just as the guide of the party shouted to warn him of his danger he was engulfed in a crevasse, before the eyes of the others. The crevasse was 90 ft. of sheer depth, and the rope was not long enough to reach the bottom. I was descending from the Corridor, and offered my rope. Another party arrived soon afterwards, and lent theirs. The guides approached the edge of the crevasse and leant over. They saw the traces of the man's fall, and called, but received no answer. The cold on the plateau was intense, and the guides feeling convinced that the man was dead continued their route.

'The same evening a party of guides left Chamouni to recover the body. Two, whose names should be mentioned, Michel Payot and Simon Pierre Benoît, descended 90 ft. to the turn of the crevasse, but could get no further from the badness of the air. They lowered a bottle 100 ft. more, which came up covered with hair. There is now no hope of recovering the body.'

It is quite manifest that this deplorable accident was due to neglect of the most universal and necessary of all precautions, proper use of the rope. Opinions may differ about the expediency of using the rope on difficult rocks, or a narrow arête; but all mountaineers will agree in thinking that the Grand Plateau of Mont Blanc is by no means the place where it can safely be dispensed with. Without more detailed information it is impossible to judge whether the guides were justified in leaving the unfortunate man to his fate, or whether the feeling of dissatisfaction at their conduct, mentioned by the writer who first made the accident public, was reasonable under the circumstances.

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DECEMBER 1864.

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CONTRIBUTIONS TO THE TOPOGRAPHY OF THE ORTELER  
AND LOMBARD ALPS. By F. F. TUCKETT, F.R.G.S.

“Der Ortler, aus Granit gewoben,  
Zur Gränzenhut emporgehoben,  
Ragt glorreich allen Nachbarn vor,  
Und trägt aus frommen Hirteuthale  
Des Dankes volle Opferschale  
Zu deinem Thron, o Gott! empor.”

*Beda Weber.*

IT is by no means one of the least of the benefits conferred on the geographer and the mountaineer by the publication of Mr. Ball's admirable 'Guide to the Central Alps,' that in directing attention to the topography and high attractions of the Orteler and Lombard Alps, it has thrown much new light on a district which has hitherto received a very inadequate share of notice. The construction of the great Stelvio road, indeed, familiarised the public with a portion of the country in question, whilst the valuable work of Schaubach ('Die Deutschen Alpen, B. IV. Handbuch für mittlere und südliche Tyrol:' Jena, 1850) afforded much useful information; but curiosity seems to have been limited to the immediate scenery of the pass, and though the summit of the Orteler Spitze itself has during the last sixty years been several times attained, few have cared to push their explorations farther, or to investigate the numerous other peaks which, whilst rivalling it in height, perhaps surpass in beauty the monarch of the group.

Stimulated alike by the charms of novelty and by the glimpses which a passage of the Stelvio last year had given me

of some of the grandest features of the district, I resolved at the earliest opportunity to devote a few days at least to the more thorough exploration of its recesses; and finding that my inclination was shared by my friends Messrs. E. N. and H. E. Buxton, whom I had arranged to meet at Pontresina about the end of last July, a combined scheme of operations was agreed upon, the results of which I now propose to lay before the readers of this Journal.

In pursuance of our compact, the various members of our band collected on the 25th July at Samaden, whence on the following morning we sallied forth a merry company of ten (five of whom were ladies), to establish ourselves for a week at that pleasantest of headquarters the Krone at Pontresina. Here, amongst other Alpine friends, we found Messrs. Tyndall and Hinchliff, and learnt from the former that Mr. Ball was actually at Santa Catarina in the Val Furva, whither he was himself bound, and that they had designs of a similar character to ours. The chance of obtaining such an accession to our forces at once decided us to cut short our stay in the Engadine; and accordingly, after devoting a couple of days to some new excursions in the Bernina, which previous expeditions had suggested, we reassembled at the comfortable establishment of Le Prese, and thence journeyed on the 29th to Tirano and Bormio. Arrived at the latter place, and hearing discouraging accounts of the chances of accommodation at Santa Catarina, it was thought most prudent for some one to proceed thither at once and ascertain the actual state of affairs. Accordingly, after despatching a hasty dinner, H. E. Buxton and I started at 9.25, in a char, for the Val Furva, whose torrent, the Frodolfo, joins the Adda at Bormio. The night was dark, and as we generally proceeded at a foot-pace it was past midnight when we drove up before a large plain-looking stone building, from whose goodly array of windows, however, many a bright gleam of light shone forth upon the silent valley and sparkled in the swift waters of the Frodolfo. It was a comfort to find a waiter still astir and to learn that, though the entire building was packed to the roof with a dense mass of humanity, something in the shape of beds might and should be improvised for us in the billiard-room. The result was very superior to anything we had a right to calculate upon under the circumstances, whilst we had afterwards the satisfaction of being undeservedly pitied by the other members of our party, amongst whom a legend long gained credit that the billiard-table itself had constituted our couch.

The next morning was everything that could be desired for

a preliminary investigation, and having sent a message to our friends at Bormio and discovered Mr. Ball, a consultation was held as to the first point of attack. He so strongly recommended us to begin with the ascent of the Monte Confinale, and the position of that mountain was so obviously calculated to give us a general insight into the topography of the Orteler chain that we resolved to assault it at once without awaiting the arrival of the main body. Some provisions were therefore hastily collected, and at nine o'clock we set out amidst suppressed excitement on the part of the inmates of the establishment.

Deferring for the present a general notice of the topography of the district, I must here premise that the Confinale is the loftiest point of a spur from the main ridge which, quitting the latter at the S. foot of the Königsspitze, and running for a short distance nearly due S., bends round more and more till it gradually assumes a westerly direction, thus dividing the Val Forno and the middle portion of the Val Furva from the Val del Zebbru, of which latter it constitutes the E. and S. boundary. Though the actual summit is invisible from Santa Catarina itself it dominates the whole neighbourhood, and being equalled in height only by the peaks of the main chain, which sweep round it in a semicircle from the Cristallo to the Corno dei tre Signori, it will be seen at once that no better point could be selected for a general survey.

We crossed the Frodolfo by a bridge close to the Stabilimento delle Acque, passed through the little village, and struck up the mountain-side by a path on the left bank of a torrent which comes leaping down in a series of cascades, and is derived from the snows of the Confinale. Traversing a little pinewood we soon came out upon beautiful grassy slopes, commanding views of constantly increasing beauty and extent of the head of the Val Furva and its S. arm leading up to the Gavia Pass, guarded by the noble peaks of the Tresero and Corno dei tre Signori. Comforted by sundry draughts of milk, which the burning heat rendered most acceptable, we held on our way towards a line of cliffs which form the E. boundary of a small elevated valley running right up into the heart of the mountain. Here our course became more level, but our progress was slow, as we had to traverse a succession of slopes of débris descending to the level of the stream, whose right or W. bank would have afforded better walking. Gradually the cliffs circled round in front of us, but were broken by gullies, through one of which we scrambled up, amidst a perfect chaos of fragments of huge size and fantastic arrangement, to the

level of the snowfields above. The actual summit was now seen for the first time, separated from us by the névé of a small glacier which descended to the left of our station in a south-westerly direction. Half an hour's steady but by no means rapid ascent across the snowfield, and then parallel with the S.E. ridge of the mountain, brought us to the foot of the final rocks. These were free from difficulty, and in five minutes more we stood upon the summit at 1.45, just four hours and three-quarters after quitting Santa Catarina. Our progress had been leisurely, and our various halts having amounted altogether to one hour and a quarter, it will be seen that the ascent may easily be accomplished in three-and-a-half hours' walking. The height of the peak is 11,076 English feet, according to Von Welden, and that of Santa Catarina being about 5,000, the difference of elevation is upwards of 1,000 feet greater than that between Pontresina and Piz Languard, with which it may be most conveniently compared. It seems difficult to suppose that so excellent a station should not have been made use of by the officers charged with the survey of the great military map of the Lombardo-Venetian Provinces; but we could discover no trace of any erection, and flattered ourselves with the idea of being the first to discover the great attractions, easy access, and admirable view which characterised the mountain.

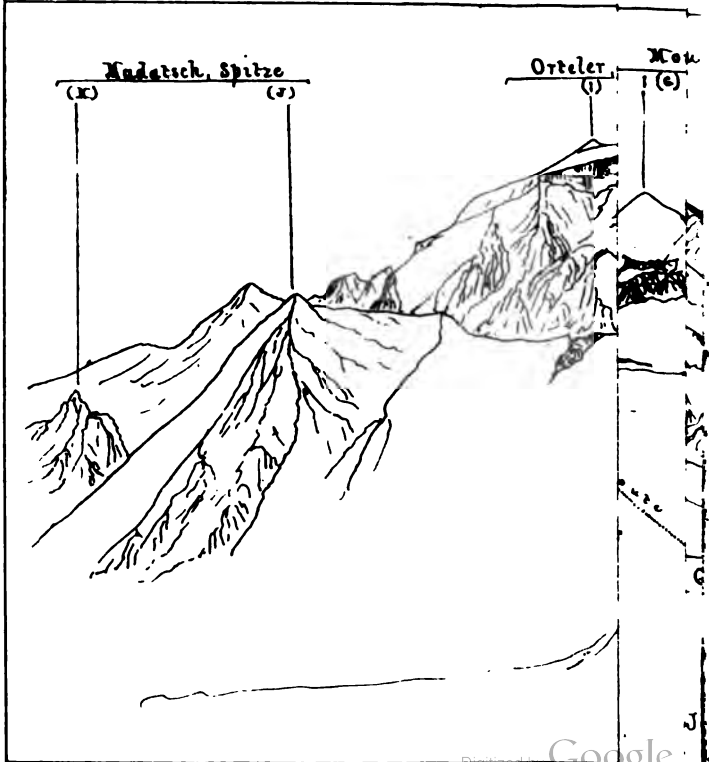
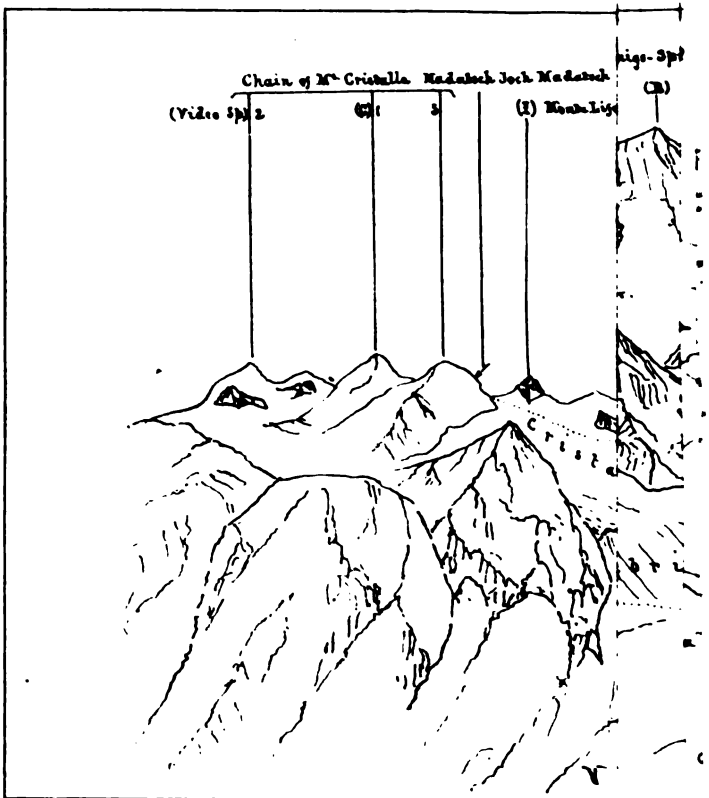
Whilst my companion set vigorously to work at the construction of a cairn, in which to deposit a record of our visit, I occupied myself for the next hour or two in transferring to my notebook an outline of the glorious succession of peaks, snowfields, and glaciers which stretched in an unbroken line around us through a horizon of something like 200°, and included nearly all the highest summits of the Orteler and Lombard Alps. Plate I. fig. 1 conveys, indeed, but an imperfect idea of the vastness and magnificence of the panorama; but it will serve, in combination with the map, to render more intelligible the details to which I must now direct attention.

A description of the topography of the group has, indeed, already appeared in the works of Schaubach and Mr. Ball; but the former is probably known to few English readers, whilst both still leave some points in obscurity which it seems desirable to clear up so far as our observations will admit.

In dealing with the *massif* of the Orteler the starting-point should, I think, be the double summit known as the Zufall Spitze (12,348 feet), occupying the angle between the Martell Thal and the Vals Forno and Della Mare, constituting in my opinion the true '*Knotenpunkt*' or nucleus of the







group, and lying about due E. of the Confinale. The chain, indeed, attains a greater elevation farther to the W., but the Zufall Spitze is situated at the junction of the principal ramifications of the entire group, and hence its choice as a point of departure. Let us now consider in succession the various ridges which radiate from it as a centre, commencing with the western branch, which comprises the loftiest summits, and is most directly connected with our station.

Looking over the head of the Val del Zebru, immediately to the left of the Monte del Forno, a long snowy wall or curtain is seen stretching from the Zufall Spitze to the Königspitze, and forming the N. boundary of the Val di Cedeh, as the head of the Val Forno is called on the great military map of Lombardo-Venetia. The uniformity of this ridge is but slightly broken in our view (plate I. fig. 1) by some projections, which rise a little above the general level, and scarcely seem to deserve the name of peaks; but when seen from the level of the Val Forno or the Sulden Thal these eminences detach themselves against the sky, thus presenting an appearance of greater individuality. One of them is designated on the Austrian maps both of Tyrol and Lombardy by the name of Monte Cevedale, or Sulden Spitze. Its true rank may be inferred from the fact that, according to the Kataster Messung or Cadastral Survey, its height is only 11,109 feet, whilst that of the lowest point of the ridge from which it rises can scarcely be estimated at less than 10,700 feet. It would, indeed, be almost needless to call attention to its existence but for the fact that it occupies the angle between the Val Forno and the Sulden and Martell Thal, and that at its W. foot a pass is indicated, on the maps just alluded to, as leading (at an elevation which I estimate at 10,700 feet) by a circuitous course round its N. flank into the head of the Martell Thal. The authorities in question give no indication of any direct pass from the Val Forno to the Sulden Thal, and it was one of the objects which we had in view, as will appear in the sequel, to effect such a means of communication.

Proceeding in a westerly direction, the eye next rests upon the noble form of the Königspitze (12,648 feet), with which the offshoot culminating in the Confinale is connected by a depression, separating the heads of the Val del Zebru and the Val Forno. In adopting the name of Königspitze instead of that of Zebru, which appears on the map of Lombardy and is introduced as a synonym on that of the Tyrol, I follow the more recent authority of the Cadastral Survey which assigns the latter to another summit farther to the W., and almost due S.

of the Orteler Spitze. At Trafoi, Gomagoi and Prad, as well as in the Sulden Thal, I found that this mountain, the second in height of the entire group, was constantly referred to under the name of the Königswand — a title which, perhaps, corresponds better with its flattened and blunted appearance as seen from the N. (plates II. fig. 3, and III. fig. 1). As seen from the Confinale, the Königsspitze presents a grand pyramidal form, the rounding of the summit just referred to being here concealed. Its sharpness, when viewed 'end on' from the W. or E., is excessive, as may be remembered by those who have examined it from the Piz Languard (compare also plate I. fig. 3); and as in the somewhat similar case of the Finsteraarhorn, few mountains are bounded by more formidable precipices than those which descend on the one hand into the head of the Val del Zebbru, and on the other to the upper portion of the great Sulden or 'Monte Martello' Glacier. Need I add that as we scanned its craggy sides and pictured the wondrous view which its summit would afford, we felt it to be a foe worthy of our prowess, and mentally resolved to scalp the noble savage!

Resuming our survey, we come next to the Zebbru Spitze of the Kataster (C of the outlines), 12,255 feet in height. A comparison of plate I. fig. 1 with plate II. fig. 3 would almost dispose one to consider the Zebbru as merely a subordinate part of the Königsspitze; but plate I. fig. 3, plate II. fig. 2, and, to a less extent, plate III. fig. 1 show them to be separated by a considerable depression; and as the Zebbru, moreover, occupies almost the exact point of the main ridge where the short spur culminating in the Orteler Spitze stretches away to the N., its distinctive name is convenient and appropriate.

The Orteler Spitze itself (12,814 feet) is a remarkable instance of elevation out of the true axis of the chain, and is well described by Mr. Ball as 'a very bold promontory connected with the vast snowfields of the upper level of this group by a narrow crest covered with névé.' This crest, which (on the E. side at least) is much steeper and loftier than Mr. Ball had I believe supposed, is well seen from the upper part of the Sulden or Martello Glacier (plate II. fig. 3), and a portion of it is also visible from several other points subsequently reached by us, such as the Madatsch Joch (plate I. fig. 3) and the summit of the Cristallo (plate II. fig. 1). The appearance of the Orteler Spitze from the W. reminded me repeatedly of the Tödi, as seen from the Clariden Firn; the upper portions of both mountains consisting of a great uniform

field of snow and névé sloping gently towards the N., and bounded on almost every side by steep and lofty precipices, of which a better idea may, in the case of the Orteler, be obtained by an examination of the outlines than could be conveyed by any verbal description.

A sudden and considerable dip to the W. of the Zeburu (by which a passage might doubtless be effected direct from the Val del Zeburu to Trafoi, though difficulties in the lower part of the glacier on the N. side would probably be encountered) discloses the Orteler Spitze, and next in order follows a double-headed mass\* (E and F of the outlines), 11,962 feet in height, visible from Trafoi, and occupying the head of the Orteler and Trafoi Glaciers, whose common névé covers its N. slopes. It is not easy to decide to which of the two peaks the figures of the Kataster refer, nor do I feel quite confident of the correctness of my identification (indicated by corresponding letters) of the summits of this portion of the ridge, as seen respectively from the Confine, the Madatsch Joch, the Stelvio Pass, and Trafoi; but after devoting a good deal of time and thought to the subject, I believe that, on the whole, the results I have arrived at are pretty near the truth, if not absolutely free from error.

Again the ridge sinks and reaches its lowest point between a prominence † (L), also visible from Trafoi, and a conspicuous rocky tooth, which appears to correspond with one of the two highest points of the Madatsch ridge, and is probably that marked I (11,245 feet) in plate I. figs. 1, 2 & 3, plate II. fig. 1, and plate III. figs. 1, 2 & 3.

Another spur, of which H and I are the loftiest and most southerly peaks, here quits the main ridge, and running northwards in a direction parallel to the Orteler itself, separates the Trafoi and Madatsch Glaciers throughout their entire length, and terminates, nearly opposite to the point on the Stelvio Road known as the Franzenshöhe, in a mass of splintered crags to which the name of Madatsch Spitze (plate I. fig. 2, plate II. fig. 1, and plate III. figs. 2 & 3) seems to belong *par excellence*,

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\* In the outlines (plate I. figs 1, 2 & 3; plate II. fig. 1, and plate III. figs. 1, 2 & 3) I have given the name of Monte Liferu (or Zuckerhut) as a synonym for H & I, the highest points of the Madatsch ridge. This is an error, as the name is applied to some point or points of the ridge visible from Trafoi to the east of I, and must be identified with either L, F, or E, or all three in combination.

† In plate III. fig. 1, the point marked L? is probably not that referred to in the text, but corresponds with either the summit or W. shoulder of F.

although the three loftier points of the spur (H I J) may all be fairly included under the same general appellation. As seen from Trafoi, the Heiligen drei Brunnen, or the lower portion of the Stelvio road, the appearance of this terminal buttress (K) is grand and colossal in the extreme, and suggests a comparison with the cliffs of the Wellhorn above Rosenlauri. It is possible that a pass may be effected between I and L or L and F to or from Trafoi; but, as before remarked in the case of the more easterly depression at the W. foot of the Zebbru Spitze, difficulties would probably be encountered in the lower portion of the glacier on the N. side. Seen from Trafoi, the mass of ice between the Orteler and Madatsch Spitzen, which derives its origin from their slopes and those of the connecting ridge, is divided pretty equally by a rocky excrescence, which rises towards the point marked L (plate III. fig. 3), but before attaining it gradually disappears beneath the snowfield constituting the common névé of the two glaciers, whose wildly-contorted extremities descend in a cataract of ice into the head of the valley above Trafoi. For the sake of distinction, and following the example of Schaubach, I have applied the term Orteler Glacier to the eastern and that of Trafoi Glacier to the western arm.

It will be seen by a comparison of plates I. fig. 2, II. fig. 1, and III. figs. 1 & 2, that the point I is situated in the direct prolongation of the ridge from K to J, whilst the snowy cone H, invisible from the Confine, lies somewhat to the W., and serves to connect it with the next group of peaks to which I must now direct attention. The actual link is a snowy *sattel* at the head of the Madatsch Glacier (plate I. fig. 2), subsequently crossed by us, and bounded on the S. by the loftiest of four peaks (G, 11,370 feet), which together constitute the mass of the Monte Cristallo. In the view from the Confine the actual pass is hidden by the third of these, whilst the fourth, or Nagles Spitze (10,687 feet), being of very inferior elevation, is in its turn concealed by No. 2, the Video Spitze (11,361 feet) of the Kataster. This Video Spitze, together with the broad ridge or gently-sloping plateau which connects it with the Nagles Spitze, constitutes the W. boundary of the upper portion of the Madatsch Glacier, and divides it from the fine basin of the great Vitelli Glacier, whose lower portion is visible from the Stelvio Road near Spondalunga. From the Nagles Spitze itself three spurs are thrust forward in directions varying from W. to NW. The most northerly of these, constituting the prolongation of the main chain, is crossed at its lowest point by the

Stelvio road which here attains its greatest elevation, and rises again on the other side into the well-known peak of the Monte Plessura (9,941 feet). The second spur terminates nearly opposite Santa Maria, and the third or most southerly sinks down to the level of the Val di Braulio, not far from the third cantoniera. A smooth gently-undulating snowfield caps the portion of the range just described, and pushes down at various points—especially near the summit of the Stelvio—several small and slightly crevassed tongues of ice, which, as well as the névé beyond, appear to be of easy access and traversable in all directions.

The Video Spitze is the last peak visible from the Confinale, but further to the left is a summit of nearly equal elevation, separated from it by a snowy depression, and constituting the highest point of a fine snowy rampart, which bounds the névé of the noble Vitelli Glacier on the S. as the Video Spitze does on the NE. Exhibiting magnificent masses of broken séracs, which reminded me of the E. slope of the Dôme du Gouté, it trends away in a nearly westerly direction till opposite the ice-fall of the Vitelli, when, bending back slightly to the southwards and becoming more broken by rocks and varied in outline, it terminates finally in the grand crags visible from Bormio, and separating the lower portion of the Val del Zebbru from the Val di Braulio. It will be seen in the sequel, as well as by a reference to the Table of Heights appended to this Paper, that the appearance of height assumed by the ridges on either side of the Vitelli Glacier when seen from the Monte Plessura, Monte Braulio, or Piz Umbrail, is wholly deceptive, and that the ideas of Mr. Hort on this point ('Guide to the Central Alps,' page 415) are not supported by facts. There are at least a dozen peaks of the Orteler and Lombard Alps which exceed in altitude the highest point (G) of the Cristallo, and yet more that of the Vitelli ridge.

As the offshoot which culminates in the Monte Confinale and Pizzo del Forno has already been noticed, and the topography of the southern slopes of the main ridge from the Video to the Zufall Spitze will I hope be rendered sufficiently clear by a comparison of the outlines (plate I. figs. 1 & 3) and an examination of the map, it will be unnecessary to describe them with the same minuteness as has appeared needful in the case of the northern spurs and glaciers of this the loftiest portion of the chain.

Returning then once more to the Zufall Spitze, a brief reference must next be made to the great branch which, extending southwards to the Corno dei tre Signori and Monte Tonale,

constitutes the E. boundary of the Vals Forno and Furva, and separates them from the Vals della Mare and Bormina or del Monte. The whole of this great mass, with its extensive snow-fields and glaciers, is still a *terra incognita*, and I have found it almost impossible in some cases to reconcile the details of the Lombardo-Venetian map with either the names and heights furnished me by Herr Mojsisovics, on the authority of the Kataster Survey, or my own observations from the Confinale, Königsspitze, Orteler Spitze, &c. Unfortunately, the time at our disposal was too limited to admit of our undertaking any explorations ourselves with the object of clearing up these difficulties, but there is no doubt that the dividing ridge may be attained on both sides of the Viozzi Spitze by following either arm of the great Forno Glacier; and though I can give no definite information as to the nature of the reverse slope, two very fine passes (of 10,500 to 11,000 feet) might thus in all probability be effected into the Val della Mare. The Viozzi or Vios Spitze (11,920 feet), the noble pyramid of the Palle della Mare (11,855 feet), and the graceful double-headed Monte Tresero (11,869 feet, according to Von Welden, but more probably about 11,700), which towers so superbly above Santa Catarina, besides the twin summits of the Zufall Spitze itself (12,348 feet), are all as yet unclimbed, and well worthy of the attention of mountaineers; whilst the Forno Glacier, which descends to a low level in the Val Forno, and may be reached in an hour and a half from Santa Catarina, is perhaps the finest in the entire group. The only pass direct from the Val Furva to the head of the Val di Sole which, as far as I am aware, has yet been effected is one which, quitting the track of the Gavia Pass near its summit, strikes off to the E., and traversing the ridge to the N. of the Corno dei tre Signori (10,912 feet), leads down on the other side into the head of the Val Bormina or del Monte, at whose junction with the Val della Mare the Baths of Pejo are situated. This pass is, I believe, referred to under the name of Sforzellina in the valuable work on the Hypsometry of the Tyrol by Trinker, who assigns to it a height of 9,594 Vienna or 9,950 English feet, which Mr. Ball's estimate would reduce to 9,700 feet.

It remains to say a few words on the third and fourth main divisions of the group, which separate respectively the heads of the Vals della Mare and di Rabbi and the Ulten Thal, from the Martell Thal, and the latter from the Sulden and Laaser Thal. As in their case I cannot speak from personal knowledge, I will be as brief as possible, referring the reader for



further details to the works of Schaubach and Mr. Ball, and the sheets of the Austrian map of Tyrol.

Between the Zufall Spitze, situated at the NW. angle of the head of the Val della Mare, and the Venezia Spitze which occupies a corresponding position to the NE., two passes are indicated on the tracing of the Kataster Survey. To the more easterly of these an elevation of 10,512 feet is assigned, whilst the height of the other is stated at 9,930 feet. From the Venezia Spitze an important spur diverges to the southwards, separating the Vals della Mare and di Rabbi, and culminating in the peaks of the Saent (10,441 feet) and Cima di Pontevecchio (10,414 feet). Continuing our examination of the chain to the E. of the Venezia, the next important summit is the Zufrid Spitze (11,262 feet), occupying respectively the NE. and NW. angles of the Val di Rabbi and Ulten Thal, and connected with the Venezia by a ridge which forms the N. boundary of the Val di Rabbi, and is traversed by a pass leading over a portion of the Gramsen and Zufrid Glaciers. As in the case of the Venezia, a considerable offshoot whose main summit, the Eggen Spitze (11,264 feet), slightly exceeds the Zufrid itself (11,262 feet) in height, runs at first in a SSE. and afterwards in an easterly direction, and separates the central and upper portion of the Val di Rabbi from the head of the Ulten Thal, into which at least two passes lead. East of the Zufrid Spitze two cols, the Soyputz and Soy Joch (9,454 feet), the former a glacier pass, connect the central portion of the Martell Thal with St. Gertrud in the Ulten Thal; but no peaks occur which require special mention here, and the range finally terminates nearly S. of Latsch, in the Etsch Thal, with the snowy summits of the Arzkor and Flatschberg.

The fourth main branch of the Orteler Group radiates rather from the Sulden than from the Zufall Spitze, and follows for some distance a NNE. direction, separating the heads of the Sulden and Martell Thal, and traversed to the S. of the Innere Peder Spitze (10,768 feet) by the Suldner Joch, which must command a glorious view of the E. side of the Orteler Spitze, Zeburu, and Königsspitze. At the Mittlere Peder Spitze (11,349 feet), which follows next to the NNE., the ridge divides—one arm trending away to the eastwards and constituting the N. boundary of the Martell Thal, whilst the other pursues a general northerly direction to the E. of the Sulden Thal. The space enclosed between the two is occupied by the Laaser Thal, a short valley which enters that of the Etsch or Adige, at the village of Laas. The principal elevations of the E. arm are successively the Aussere Peder Spitze (11,162 feet), the

Schluder Spitze (10,588 feet), the Laaser Spitze (10,827 feet), and the Weissmandl (9,101 feet). Those of the W. arm, proceeding northwards, are the Vertrain Spitze (11,371 feet), Ofen Wand (11,558 feet), Angelus Spitze (10,982 feet), Kompatsch (11,065 feet), Saurissl (8,642 feet), Wasserfall (10,194 feet), Praggischarte (10,282 feet), Schoneck (10,246 feet), &c.

I must now resume our personal narrative, with many apologies for the length to which these general remarks have run. It seemed, however, essential to clear the ground from the misconceptions which had previously existed in my own mind and been shared by others; and if to the general reader such details prove very wearisome, let me hope that they will be found of service to future explorers, for whom this paper is specially intended. I should, however, only do half justice to the panorama from the Confine if I omitted any mention of the view towards the W. and S., where range after range of noble peaks stretched away in far perspective. First came the countless summits of the Lower and Middle Engadine, followed by the glorious *massif* of the Bernina, the elegant Disgrazia, the Corno Brucciato, and then, on the E. side of the Valtelline, the ranges bounding the Val Camonica overtopped by the yet loftier summits of the Adamello Group, and finally terminating in the two graceful peaks of the Presanella (Cime di Nardis, 11,688 and 11,345 feet), set in a framework, of which the Corno dei tre Signori and Tresero form the sides. In fact, whilst few peaks of equal elevation are less difficult of access, its attractions as a point of view are second to few or none; and I feel the less hesitation in recommending it to the attention of future visitors to Santa Catarina, as our judgment was fully confirmed by Messrs. Ball and Tyndall, who subsequently made the ascent.

After a stay of rather more than three hours we started at 4.45, quitted the snow at 5.5. and at 7.15, after a quarter of an hour's halt, reached Santa Catarina—thus effecting the descent in two-and-a-quarter hours' walking. Here we heard that our companions had come up from Bormio in the morning; but finding the available accommodation less satisfactory than could be desired, some of them had returned to secure beds at the Bagni di Bormio, whilst the remainder had kindly waited for us. Our second detachment started in a carriage at 8.30, and, after a pleasant drive in the cool of the evening down the romantic Val Furva, rejoined the first at 10.45. Unfortunately, in the dark, both my barometers somehow contrived to fall from the carriage and get broken, so that during the remainder of our journey we were limited to an aneroid by

Browning, belonging to Buxton, which proved, however, to be a first-rate instrument.

The following day (July 31st) being Sunday, we spent the morning quietly between our capital quarters and the shade of a somewhat meagre pine-wood, and a little before five took our departure for the third cantoniera on the Stelvio road, which we proposed to make our starting-point for further explorations on the morrow. It was arranged that all the ladies, under the charge of Michel Payot and the two remaining gentlemen of our party, Messrs. Fowler and Waterhouse, should proceed to Santa Catarina on Monday, and establish themselves there as comfortably as circumstances, modified by the kind exertions of Mr. Ball, would permit; whilst Messrs. E. N. and H. E. Buxton and myself, accompanied by our respective guides—Franz Biener of Zermatt, and the gallant old Christian Michel of Grindelwald—devoted one or, perhaps, two days to clear up the mystery of the Cristallo, and investigate the Vitelli Glacier and Val del Zeburu.

Two-and-a-half hours' easy walking brought us to the third refuge or cantoniera, situated between the steep ascent known as the Spondalunga and the higher station of Santa Maria. The landlord is a decent fellow disposed to do his best, but the accommodation is of the most limited character, and appeared only to have reference to the wants of passing travellers. One bed was all that could be provided, but a mattress on the floor answered equally well, and after a good supper on our own provisions we laid ourselves down to rest.

It was just 3.15 on the morning of the 1st August when we issued forth upon the noble Stelvio road, and proceeded down it at a rapid pace till just before reaching the cantonier's house standing at the commencement of the zigzags by which the descent of the Spondalunga is effected. Here we turned off sharp to the left, and traversing slopes of débris by a path which in the faint light was barely distinguishable, found ourselves at 4.15 at the right or N. bank of the Vitelli Glacier not far from its extremity. The main body of the ice appeared to descend right in front from between a somewhat uniform ridge on our left and a fine snowy mass on the right, which we rightly conjectured to be the W. termination of the spur described by Mr. Ball ('Guide to the Central Alps,' p. 415 b), on the authority of the Rev. F. J. A. Hort, as 'including two principal summits, of which the E. peak, in form somewhat resembling the Lyskamm, may probably be the highest of the entire group.' Further to the right a succession of inferior

elevations sweep round till they terminate in the rocks which overhang the second cantoniera, and give rise in their intervals to two or three glaciers of secondary importance, the most easterly of which constitutes the W. affluent of the Vitelli. With these we had nothing to do, our course clearly lying up the main arm beneath, and to the N. of, the conspicuous snowy mass already referred to, which formed the centre of the picture. Buxton had indulged in the unusual luxury of a stereoscopic camera, which after doing good service in the Bernina was now again made useful, and after a short halt we stepped upon the ice at 4.40. The glacier, which is beautifully pure, presented no difficulty, and keeping straight up the centre we reached the foot of the ice-fall immediately to the N. of the western extremity of the Vitelli Ridge at 5.30. Here the rope was put in requisition, and at 5.40 we commenced the ascent. Keeping close under the S. boundary of the glacier, our progress was facilitated by the slopes of snow which obliterated the crevasses on this side of the ice-fall, and though the huge masses of overhanging séracs, towering high into the air on our right, were suggestive of avalanches, the débris of which we frequently traversed, this course would probably be at all times the best.

At 6.30 the level of the upper plateau was gained, and a glorious expanse of snow was descried sloping gently upwards towards a broad col, and bounded by two great ramparts of considerable uniformity of outline, but whose exquisite purity as they glittered in the bright clear morning light rendered them strikingly beautiful objects. Scarce a rock was to be seen, and it was at first very difficult to determine the relative altitude of the principal prominences or the scale of the scenery as a whole. As we progressed, however, it became more and more evident that of the two ridges, both of which attained their greatest elevation towards their eastern extremities, that on our left, which we afterwards ascertained to be the Video Spitze (11,361 feet) or second highest point of the Cristallo, was the loftier, whilst the conviction was momentarily strengthened that neither could rival for a moment either the Orteler Spitze or many other peaks of the group. The ridges in question are indeed but little more than great snowy hummocks, of exquisite beauty it is true, but scarcely attaining to the dignity of mountains.

Twenty minutes' steady walking at a rapid pace up the level floor of this noble corridor brought us at 6.50 to the depression at its head already mentioned, and all doubt as to our further course was at once set at rest by the discovery that we were looking down from a height of some 10,700 feet into the centre

and lower portion of the Val del Zeburu, from which, however, we were cut off by apparently impracticable precipices of enormous depth. Feeling anxious to investigate the other side of the Cristallo ridge, and not knowing how large might be the demands on our time and strength before night, we did not attempt to test the chance of effecting a descent by *force majeure*; but retracing our steps for a few hundred yards and then gradually bearing away to the N. we made for the ridge at a point between the Video (11,361 feet) and Nagles Spitze (10,687 feet) of the map. Turning round the NW. shoulder of the former peak we found ourselves at 7.15 standing on the W. side of the upper névé of the Madatsch Glacier, and separated by it from the series of summits terminating on the N. in the Madatsch Spitze proper, over which towered the grand mass of the Orteler Spitze itself. Farther to the right (see plate I. fig. 2) a depression was visible, and beyond it a dome-like summit afterwards identified with peak 3 of plate I. fig. 1. Next to this came a sharpish cone (G, 11,370 feet), through whose snowy mantle a few rocks cropped out here and there. Again the eye was puzzled to say whether this summit or its neighbour, the nearer Video Spitze (part only of which is seen in the outline), was the loftier; but on the whole the betting was in its favour, and the event justified our estimate, as it proved to be the highest of the series of eminences to which the name of Cristallo has been collectively applied.

A glance sufficed to show that our course would lie over the depression between G and the most westerly of the upper peaks of the Madatsch ridge (H), as from it the ascent of the former (which on the side of the Vitelli Glacier was impracticable) appeared easy of accomplishment, and it seemed besides to offer the greatest chance of effecting our intended subsequent descent into the Val del Zeburu. Again the camera was called into requisition, and operations were on the point of commencing, when the box containing the plates was suddenly seen to glide from its moorings, and set off on a voyage of discovery towards the névé beneath. Franz started in pursuit, forgetful that he constituted a link in a chain, and came to grief and the length of his tether at the same instant. Whilst he was detaching himself the rash adventurer slid merrily onwards, and laughter was mingled with vexation as we saw Franz wildly plunging downwards and, though gaining ground at every step, arriving at the upper edge of a crevasse just in time to see the object of his pursuit topple merrily over into the dark depths which he dared not approach more closely. We all rushed to the rescue, and after a short hunt Christian

appeared holding the truant aloft in triumph. Another attempt to photograph was more successful, and after sketching and indulging in a second breakfast we quitted our station at 8.45, and at nine reached the level surface of the Madatsch névé, over some steep slopes intersected by numerous crevasses.

Fifteen minutes' steady walking brought us to the foot of the steep wall leading up to the col. Here step-cutting became necessary, the slope being very rapid: our progress was slow, and it was 9.40 before we stood on the summit. The view (plate I. fig. 3) on the other side was at once magnificent and satisfactory — magnificent because it included the massive Orteler and glorious Königsspitze with the Zeburu and other intervening peaks, and satisfactory because the hope of being able to descend to the level of the Val del Zeburu was on the whole strengthened. For the third time the camera was set up, and two slides, forming a panorama of the chain from the Orteler Spitze to the Königsspitze, were rapidly secured by Buxton, whilst I worked away more slowly at the outline reproduced in plate I. fig. 3.

Depositing our various traps on the col, we struck off at 10.30 to our right, climbed a steepish ridge broken in its lower part by rocks, and then keeping a little to the left found ourselves at eleven on the summit of peak G. The Video Spitze appeared to the eye to be but little less elevated than that on which we stood; but the superiority of our position would have been indisputable even without the authority of the Kataster Survey, which assigns to the two points the respective heights of 11,370 and 11,361 feet. On the S. we looked down into the Val del Zeburu, from which we were cut off by enormous precipices, but could see nothing of the Vitelli ridge, even the highest point of it being entirely concealed by the intervening Video Spitze, which must therefore be the more elevated of the two. We spent a most enjoyable hour on the summit, in the course of which I secured the outline plate II. fig. 1, which, however, was cut short in the direction of the Königsspitze by clouds sweeping up from the S.

Starting again at twelve, we regained the col, which we propose to call the Madatsch Joch, at 12.30. Its height, as determined by an observation of Buxton's aneroid compared with Aosta and Turin, comes out 10,838 feet; but as the reading of the same instrument on the summit of peak G gives a height for the latter of 11,576 feet, or 206 in excess of the Kataster determination, these figures must be looked upon as probably too high by at least 100 feet, if not more.

Collecting our baggage we quitted the col at 12.35, and



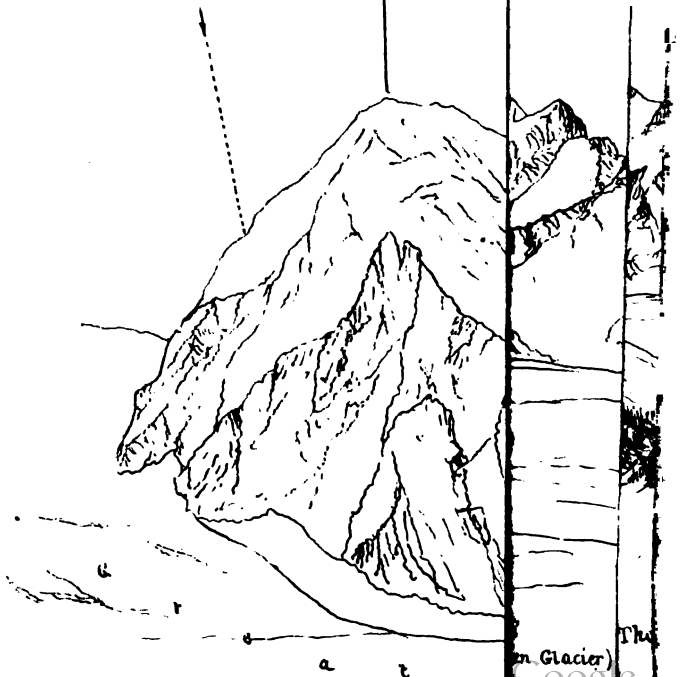
Videa Spitze  
(2<sup>nd</sup> peak of Cristallo)



View from summit of Me

Königs Joch

Königs Spitze (B)



en Glacier)



proceeded down the gently-inclined slopes of a glacier which, as it descends from the Cristallo and the ridge connecting its different peaks with the summits I, L, and F (plate I. fig. 1), I have ventured to name the Cristallo Glacier. Its termination towards the Val del Zebru is for the most part pretty uniform, but at the corner farthest from the Cristallo it thrusts forward a long narrow tongue of ice, forked at the end, which is well seen from the Confinale. Whether the valley may be reached at this point we did not attempt to ascertain, for our ultimate object being to cross into the Val Forno by the ridge separating it from that of the Zebru, it was obviously desirable to strike the latter as near its head as possible. We therefore kept well to the left, beneath the terminal cliffs of the points L and F (plate I. figs. 1 & 3), and at 1.15 halted on the summit of a ridge, part snow and part rock, dividing the Cristallo Glacier from another further to the east descending from the peak E (plate I. fig. 1). This last is in its turn separated by a similar barrier from the great mass of ice which has its source in the eastern slope of E, the southern side of the Zebru, and the south-western shoulder of the Königsspitze. In plate I. fig. 3 the second barrier is concealed by the first, which will be found immediately under the word Zebru (of Zebru Glacier), but in fig. 1 both will be at once recognised. An attack was now made on the provisions, and at 2.10 we again got under way.

The reconnaissance from the Confinale had satisfied us that it would be better to quit the ice by the lower edge of this small intermediate glacier, on whose W. boundary we were now standing, so we worked down diagonally to our right in the direction indicated in plate I. fig. 1, and at 2.30 got on to the slopes of débris below without the slightest difficulty. Here began the most troublesome and fatiguing work of the day. We had to traverse a seemingly interminable waste of unstable stones, inclined at a high angle and treacherous in the extreme. Our progress was thus slow, but at three o'clock we reached the singular and highly-attenuated tongue of the Zebru Glacier (like that of some gigantic ant-eater), traversed it without difficulty in five minutes, and at 3.15 gained some turf slopes. Round these we now wound at a tolerably uniform level, from time to time coming upon extensive patches of the detested *clapier*, till 4.15 when, wearied of this scrambling mode of progression which had now lasted nearly two hours, we reached to our delight the mass of ice occupying the head of the valley and formed by the union of a glacier descending on the NE. from the Königsspitze with two others from the

Confinale spur on the E. and S. The first was crossed in a few minutes, and then scrambling up the slopes on the left bank of the second or most easterly, and taking to the ice at 4.45, we gained the depression at its head at 5.30. We here stood upon the ridge separating the Val del Zebru from the head of the Val Forno or Val di Cedeh, and connecting the principal peaks of the Confinale spur with the main chain at the S. foot of the Königsspitze. For some distance to the N. the barrier maintains a pretty uniform elevation, and its passage might doubtless be effected at almost any point over a distance of half a mile or more. We kept as much to the right as the SW. boundary of the glacier permitted, in order to reach Santa Catarina with the least possible delay, for the day was already well advanced and we had no time to lose. On the Austrian maps a pass is indicated near the point selected by us for crossing, but as no name is given we have proposed to adopt that of Zebru Pass. The height calculated from an aneroid reading by comparison with Aosta and Turin comes out 9,908 feet, but judging by the error in the case of the Monte Cristallo observation, it would probably be safer to adopt 9,700 as the more probable figure.

The beauty of the view over the upper portion of the valleys on either hand as well as of the glorious peaks which form their respective boundaries, induced us to linger till 5.40, when we proceeded down the short and easy glacier on the E. slope and quitted it at 6.15. At 6.30, finding an excellent stream and remarkably sharp appetites, we disposed of the remainder of our provisions; but time was precious, and at 6.45 we once more set forth. We now kept more to the S. and pushed down the Val Forno at a rapid pace over lovely slopes of pasture and along the grass-grown summit of a beautifully-developed ancient lateral moraine, till we dropped at length into a well-defined path. This led us at 7.30 to a little village perched high on the mountain-side, whence a very steep track zigzagging downwards on the left over broken ground and amidst rocks and trees brought us at 7.45 to the main path, which is still, however, carried along the W. side of the valley at a considerable height above the stream.

By this time it was getting dark, and of the remainder of our tramp we saw but little more than enough to convince us that the lower part of the Val Forno possessed charms of the highest order. Stumping along over an unfamiliar road in that peculiar half-light which is almost more confusing than perfect obscurity is a process that soon becomes wearisome and monotonous, especially if one has been already seventeen hours

on foot; and it was therefore with feelings of lively satisfaction that, after traversing some meadows and turning a corner, we descried the lights of the Stabilimento delle Acque at Santa Catarina, and finally reached its hospitable door at 8.40, after a most interesting but somewhat fatiguing day.

Having as yet seen but little of the immediate neighbourhood of Santa Catarina, it was resolved to devote the following morning to the congenial occupation of lounging about, picnicking in the woods, &c. As the sunny hours sped rapidly by, the charms of scenery gaining new zest from those of the social circle which our goodly company of ten might fairly claim to constitute, one felt that it is good sometimes to be idle and go with the stream; but the lingering flavour of recent adventures, the consciousness that much yet remained to be accomplished in the very limited time still at our disposal, and above all the sight of the glorious mountains themselves encircling our little Capua, recalled us to a sense of duty, and reminded us that we must not allow ourselves to be more than temporarily demoralised in a climbing sense. In the evening we saw the ladies under the good escort of the same faithful squires drive off down the valley for the Baths of Bormio, with the intention of passing the Stelvio on the morrow, whilst we remained behind to explore more thoroughly the head of the Val Forno and, if possible, cross over to meet them at Trafoi viâ the Sulden Thal. Anticipating a long day's work we retired to rest soon after eight o'clock, and rising again at 11.30 breakfasted sharp at midnight—an arrangement which, whilst convenient for us, prevented the establishment from being unnecessarily disturbed, as the guests did not, and the waiters could not, get to bed till a late hour.

At 12.45 A.M. on the 3rd we quitted the house, led by a man with a lantern who was to accompany us up the lower portion of the Val Forno and return as soon as there was sufficient light to distinguish the track. We retraced our previous course, and passing the point where the small path already referred to led steeply up to the pastures on our left, we found ourselves opposite the foot of the Forno Glacier at 2.30. This is a noble stream of ice which deserves careful exploration, and might be investigated in conjunction with attempts to effect passes into the Val della Mare on both sides of the Viozzi Spitze, or with ascents of the latter peak and the beautiful pyramid of the Palle della Mare. Whether the summit of the Tresero could be gained from this side is I think uncertain, but there is little doubt of its accessibility from the direction of the Gavia Pass, or even by the glacier which descends

between its W. and SW. arêtes. Which of its two peaks is the higher I am unable to state positively: my own impression and that of Mr. Ball (though somewhat opposed to the evidence of plate III. fig. 1) is that the one visible from Santa Catarina is the lower, but it would certainly best repay the labour of an ascent, as everything may be seen from it which would be visible from its more easterly neighbour, besides much which it conceals from the latter.

For some distance beyond the Forno Glacier we stumbled uncomfortably onwards over slopes of turf, occasionally diversified with patches of débris and torrent-beds, till the increasing light rendered the use of the lantern no longer necessary, and enabled us to dismiss our attendant and improve our pace. It was just 4.30 when we reached the left-hand or most westerly glacier at the head of the valley, descending partly from the SE. slope of the Königsspitze, and partly from the adjacent portion of the ridge connecting that peak with the Monte Cevedale or Sulden Spitze.

We felt some doubt about the identification of this last, which is apparently a mere knob or projection, as may be inferred from the fact that its height is only 11,109 feet; whilst that of the lowest point of the ridge, where we supposed the Cevedale Pass to be situated, can scarcely be less than 10,700 feet. Time would not admit of my securing a careful outline of the amphitheatre of snow summits from the Königs to the Zufall Spitze, enclosing the head of the valley, which I the more regret as the scenery is very fine.

The ice proved extremely slippery, and the snow (which covered the glacier in patches) rather treacherous in places, so we halted for a quarter of an hour to put on gaiters. Keeping straight up the glacier—which was very slightly crevassed, of great width, and probably inconsiderable depth—we found ourselves about six o'clock at the foot of the steep slopes leading to the ridge near where it unites with the colossal mass of the Königsspitze. Up these we worked, bearing away slightly to the left so as to gain the ridge as near its origin as possible, and at 6.30 stood in a depression just beneath the peak. The view over into the Sulden Thal and away beyond to the mountains of the great Oetz Thal Group, the Vorarlberg, Lower Engadine, &c., as well as looking back towards the regions we had quitted, was most beautiful; and as we had the day before us, and were here tolerably sheltered from the high wind which was raving about the more exposed and lofty crests, we determined to enjoy it at our leisure whilst discussing a second breakfast, already almost too long postponed.

The height we had now attained appeared, by a rough observation with a level, to be about the same as that of the Tresero, or in round numbers 11,600 feet; and as that of the Königspitze is 12,648, according to the Kataster, there still remained 1,000 feet to climb. At 7.15 we addressed ourselves to the final tug, which proved steep, though presenting no serious difficulty. A snow slope at a high angle, occasionally assuming the character of névé and intersected here and there with incipient bergschrunds which were easily crossed or turned, led straight up to the summit, and is perhaps the only mode by which the latter can be attained, though on this point there was some difference of opinion amongst the members of our party; and I will not therefore insist on this view, which an ascent direct from the W. portion of the head of the Sulden Glacier by one of the glaciers between the Königspitze and Zeburu may possibly prove to be erroneous. At any rate, the result proved that we had selected the best and easiest course: and though, with snow in less excellent order or replaced by ice, the rate of progress might be very different, I think future travellers will do well to follow our example—as was done by my friends Messrs. Freshfield, Walker and Beechcroft, who repeated the ascent a few weeks later.

It was 8.20 when we reached the highest point, of the shape of which some idea may be formed from the outline plate III. fig. 1, and more imperfectly from plate II. fig. 3. The wind was here so furious and the cold so intense that it was impossible to remain still for many minutes without risk of frostbite. I managed with infinite difficulty to secure the outline plate II. fig. 2, which will give some idea of the majestic aspect which the Orteler here assumes as it towers grandly aloft on the other side of the W. head of the Sulden Glacier. In form it strikingly resembles the Piz Bernina as seen from the Piz Zupo, though more precipitous and far less accessible than the former peak. The view was of the grandest description, and, unless equalled or surpassed by that from the Zufall Spitze, must be decidedly the finest in the whole district, from the mere fact that whilst the Königspitze is second only to the Orteler itself in height, its situation on the axis of the chain gives it a far more commanding position than the latter peak, which only cuts off a small and comparatively uninteresting portion of the panorama in the direction of the Lower Engadine. To the N., S., and SE. the summit, which is narrow but drawn out from ESE. to WNW. into a flattened arête, sinks away in precipices of wonderful height and steepness, on which snow only rests in places. To the E. the slope, as

already stated, is more gentle, whilst to the NW. the ridge falls rapidly to the depression on the further side of which is seen the fine peak of the Zeburu. In this direction it might be practicable to creep down a few hundred feet, and then, turning to the right, effect a descent to the Sulden Glacier by a steeply-inclined and much-crevassed mass of ice which is seen half-way between the Königsspitze and Zeburu in plate II. fig. 3. Christian and Franz, however, both protested against any such attempt being made, and so, after exploring for a short distance without ascertaining anything very definite, we returned to the summit, and starting again at 9.10 regained our breakfast-place at 9.40. A descent to the Sulden Glacier at this spot appeared difficult if not impracticable, so we proceeded to a point further to the E. and several hundred feet lower, which seemed to offer a better chance and was reached at ten o'clock.

The exact locality, which we propose to call the Königs Joch, is distinctly marked by a conspicuous pointed rock like a gigantic cairn, which rises immediately to the E. of it to a height of 20 or 30 feet. The rocks here show indications of copper, and glowed with purple tints in the bright sunshine. Below us to the N., a very steep slope led down to the glacier, but the snow which covered it was soft and unstable, and moreover rested on hard ice at a slight depth below the surface. Here were all the conditions requisite for the dislodgement of an avalanche and the production of an accident, so we turned as an alternative to a ridge of broken rocks on the left which promised more secure footing for a portion of the descent, and till an involuntary glissade in company with a mass of snow would no longer be dangerous. After reading off the aneroid—which gave, by comparison with Aosta and Turin, a height of 11,063 feet (probably somewhat in excess of the truth)—we stepped over the edge at 10.10, and soon found that we had got our work cut out for us.

The rocks were very steep, but this we should not have minded if they had been trustworthy or our number had been smaller; but the fact was that a more utterly disintegrated, rotten, and untrustworthy collection of stones professing to be rocks I never saw. Not even the never-to-be-forgotten ridges of Monte Viso present such a complicated scheme of treachery and deception, and doubt and distrust were the garment of our minds. This state of things was all due to the circumstance that the ridge in question is composed of a very pure variety of dolomite, which I believe had not previously been observed in this portion of the chain, but of the character of which there can be no doubt, as, through the kindness of Mr. Ball, a small

specimen has been analysed at the Museum in Jernyn Street. We crept slowly downwards, those behind in constant fear of dislodging fragments upon those in front, and it was not till 11.15 that we stood on the more gently-inclined surface of the névé of the great Sulden Glacier.

An hour's halt was here called for lunch, and at 12.15 we again set forth, keeping rather to the left beneath the rocks of the Königsspitze, whose glacier-covered summits, however, forbade a too near approach. An hour's walk, varied by about the average amount of glacier difficulties in the shape of crevasses and other obstacles, took us to the central portion of the glacier amidst scenery of the highest order. The apparent height of the Orteler Spitze is, indeed, slightly diminished by the convex form of the back of the glacier descending from it, which conceals the lower portion of the mountain; but in close proximity the huge mass of the Königsspitze, followed by the Zeburu, was seen from base to crown, and formed a most imposing feature in the view.

Whilst I halted to complete the outline plate II. fig. 3, my companions, who were anxious to reach Trafoi with as little delay as possible, pushed on down the glacier, leaving me to follow at my leisure with Christian and Franz. Three-quarters of an hour thus passed away very pleasantly, and at two o'clock I started in pursuit. The glacier is of large dimensions but gentle inclination, and is fed, in addition to the two affluents from the Orteler and Königs Joch, by a third, which descends from the angle between the Sulden Spitze and the southern portion of the ridge dividing the heads of the Sulden and Martell Thal, across which further to the N. lies the Suldner Joch.

Following the right medial moraine for half an hour, we quitted the ice at 2.30 for the right bank, and at three o'clock reached the highest hamlet of the Sulden Thal just after passing the entrance of the Rosim Thal on our right. The Sulden Thal in its upper and central portions is a pastoral valley of considerable width, flanked on the W. by the magnificent snow-capped cliffs of the Orteler (see plate II. fig. 4), and on the E. by a series of minor summits which separate it from the Valleys of Martell and Laas. Fine pinewoods clothe the lower slopes; and these, with the broad expanse of bright-green grass that covers its nearly level floor, contrast most beautifully with the rugged grandeur of the higher regions. It is a striking scene of quiet peaceful beauty, enhanced by the charms of its setting amidst features of the highest order of grandeur. The peasants were all busily engaged in cutting or securing their hay-crop, and for miles the busy groups enlivened the solitude of this rarely-visited spot.

I halted for half an hour at the upper châteaux to indulge in some milk, and at 3.30 set off once more, halting for thirty-five minutes a little lower down to sketch the outline reproduced in plate II. fig. 4. At 4.25, just after crossing the torrent to its W. bank, St. Gertrud was passed on the left. The path still traverses the meadows for some distance nearly on a level, and then descending more rapidly, as the gradually contracting valley assumes more and more of a ravine-like character, again returns to the right bank, and continues along it as far as Gomagoi, which we reached at 6.10. Here we turned sharp to the left up the Stelvio road towards Trafoi, where I arrived at 7.15, shortly after my companions.

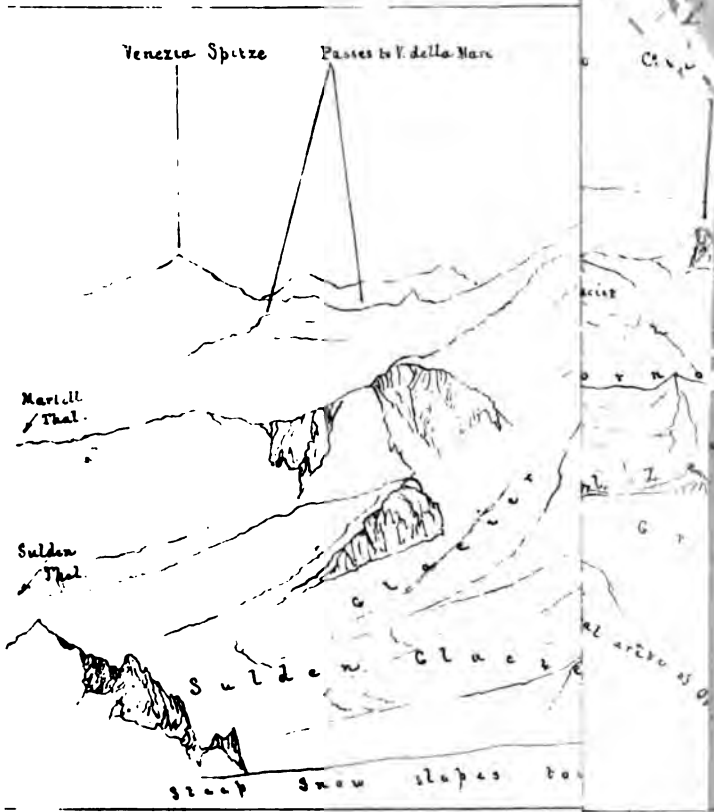
The rest of our party had arrived from the Baths of Bormio some hours previously, and thus our forces were once more united. The little inn at Trafoi and its excellent hostess, Frau Barbara Ortler, did their best to make us comfortable, and it was voted unanimously that we could not think of hurrying away, but would take up our quarters there for two nights at least; that the next day should be devoted to the quiet digestion of the beauties of the neighbourhood, and the following one to an ascent of the Orteler Spitze, with which we proposed to close our investigations for this season at least.

The next morning after breakfast there was a fresh arrival, whose appearance and equipment at once showed him to be a mountaineer. Entering into conversation I found, to my delight, that the stranger was no other than Herr E. von Mojsisovics, the well-known secretary of the Vienna Alpenverein. This was indeed a fortunate meeting: for though our friend's arrangements compelled him to be at Santa Maria on the 5th, and he could not therefore accept our invitation to unite with us in the projected ascent of the Orteler, I obtained from his travelling library, as well as from himself, much very interesting and valuable information, which might otherwise have never come to my knowledge. It was in this way that I became possessed of the hitherto unpublished hypsometrical results of the Kataster Survey, which will be found at the end of this paper, and constitute its principal value in the eyes of future explorers.

After several delightful hours spent in Herr von Mojsisovics' company I followed the rest of the party, who had started after breakfast for a stroll to the Heiligen drei Brunnen, and found them encamped in a fir-wood—the ladies busily engaged in sketching, and the gentlemen intent on abandoning themselves to the luxury of laziness. By-and-by we were joined by the Herr Secretär, who remained with us till it was time to return







Ridge N. of Sullen



to the inn. The walk from Trafoi to the Heiligen drei Brunnen, being described in all the guidebooks, scarcely comes within the scope of this paper; but the scenery is so indescribably grand, and the union of grass slopes, rock, and wood, which occupy the foreground of the picture in ever-varying combinations at each fresh turn of the path, is so exquisitely lovely, that I cannot refrain from urging others whose special object may be merely to cross the Stelvio, to halt at Trafoi for at least a couple of hours, and devote them to a stroll up the valley. The outline plate III. fig. 3 gives of course a miserably inadequate idea of the grand mountain barrier visible from Trafoi, but it will serve to illustrate the few remarks which it is necessary to introduce here on the topography of this side of the Orteler.

The slopes bounding the valley on the E. are merely the lower portion of the ridge which, descending from the summit of the Orteler in a nearly northerly direction, separates the Trafoi from the Sulden Thal, and call for no special remark here. Next to the right, and separated from them by a hollow or groove (called by Schaubach the Dobretta Thal) running up to the crest of the northern spur, is the mass of the Orteler, which presents the same majestic appearance characteristic of it when seen from every other point of view. The actual summit is invisible, but a portion at least of the extensive névé which caps the shoulders of the monarch is clearly distinguishable, whilst the 'Pleis' (misspelt 'Gleis' in figs. 2 and 3, plate III.), a steep tongue of ice or névé occupying a broad couloir by which the ascent is usually effected, is very conspicuous from the neighbourhood of Trafoi. On the W. the mountain sinks rapidly down in a series of step-like crags to the level of the Orteler Glacier, as (following the authority of Schaubach and other writers) I have ventured to designate the eastern of the two ice-streams which descend into the head of the valley from the main ridge, of which the Orteler itself and the Madatsch Spitze, on the E. and W., are only gigantic spurs. Further to the right the eye rests on a rocky ridge separating the Orteler from the Trafoi Glacier, and then on the various peaks of the Madatsch ridge seen in perspective, till all further view is cut off by a projecting buttress on the N. side of the valley round which the Stelvio road winds. In the angle between the foot of the Orteler Glacier and the Tabaretta Thal is a steep slope intersected by lines of cliff which stretch across it, and clothed with a mingled growth of pine and *legföhren* to a height of 1,000 feet above the valley. Up and across this lies the track usually taken in ascents of the Orteler. After attaining the

summit of the wood, the foot of the 'Pleis' is reached over masses of débris which have fallen from the cliffs in front. This 'Pleis' constitutes the main difficulty of the ascent, from its great rapidity and the frequent occurrence of falling stones and hard ice requiring caution and step-cutting; but when once its head is gained, there seems to be no difficulty in getting on to the upper plateau of névé; and to reach the highest point of the Orteler over this is simply a question of time and endurance, as no obstacles of a serious character are met with.

Herr Mojsisovics had engaged Josef Schöpf to accompany him in his various excursions during the next week or two, and on his arrival we all strolled up the road to reconnoitre the Orteler and decide on the route to be adopted on the morrow. A careful examination of the 'Pleis' with the telescope showed that almost its entire surface consisted of *glatt-eis* which would necessitate an enormous amount of step-cutting unless, as Christian suggested and affirmed, the rocks on its left bank could be climbed. We had previously almost determined to cut out a new route\* for ourselves by way of the Tabaretta Thal, and this idea became a fixed resolve ere we returned to the inn.

Some of our party had already started for Mals, and the remainder were to follow in the morning and then proceed over the Ofen Pass to Zernetz and Pontresina, whilst we rejoined them by way of Mals, Nauders, and the Engadine. At 9.30 we retired for a few hours' sleep, after bidding adieu to the ladies and Herr Mojsisovics.

We rose at 12.30 on the morning of the 5th of August, and at 1.45, headed by a lantern-bearer, proceeded along the now familiar path to the Heiligen drei Brunnen, which we reached at 2.30. Striking up into the wood above, we now commenced an ascent over the miseries of which it were perhaps better to draw a veil. Of course the guide contrived at an early stage of the proceedings to miss the way. Equally of course, the lantern was always glaring in one's eyes when it was not required and blinding one for the next few minutes, or mysteriously disappearing just when farther progress seemed impossible without its aid. Sometimes we tripped over the rotting

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\* Few mountains have so interesting a history as the Orteler Spitze, though the early ascents are almost unknown to English readers. I have been compelled, by want of space, to reserve for the next number of the Alpine Journal all mention of our predecessors in exploring this majestic peak.

stumps or fallen trunks of firs, or were brought up dead against miniature cliffs, or fell headlong over the long prostrate snake-like branches of the abominable *legföhren* (*Pinus Mughus*), which excited our especial antipathy, as the annoyance they caused us was infinitely varied in character. Their favourite trick was to curve round as each of us in turn would force his way through their interlaced foliage, and then execute vengeance on the next in the rank, against whose undefended face their heavy tufts of needles would sweep back with stinging effect. How hot we became, how cross we were, and how our unlucky leader fared at our hands need not here be told. Suffice it to say that at four o'clock we found ourselves clear of the wood and standing on the edge of the great débris-covered hollow leading upwards, in a southerly and easterly direction respectively, to the 'Pleis' and Tabaretta Spitze. Schaubach refers to this as the Dobretta Thal, but as the Austrian map of Tyrol calls the peak at its head the Tabaretta Spitze, I think we may fairly adopt that form of spelling.

The porter was now dismissed, and descending for a short distance, and leaving the route to the 'Pleis' on our right, we proceeded to traverse the slopes of débris diagonally in the direction of the rocks rising above the right bank of the glacier in front which fills the head of the valley. The ascent was by no means excessively steep, and several masses of well-consolidated snow (probably the remains of avalanches from the cliffs of the Orteler) facilitated our progress, and proved an agreeable exchange for the small rolling stones. At 4.50 the ice was reached, and a halt called till five, when we again proceeded rapidly upwards, keeping as near as possible to the rocks till forced by the dislocated state of the glacier to diverge a little to the right. This course was not altogether free from risk, as for some distance the surface was strewn with fragments of ice, which had evidently been recently detached from the overhanging masses of névé crowning the cliffs of the Orteler. There was, indeed, no fear of being caught unawares, as the source and direction of the danger were evident; and though the fall of avalanches is perhaps due as much to the state of the weather as to the direct action of the sun, yet as a general rule they are least likely to be encountered during the early morning hours, whilst in the descent the space exposed to them may be traversed so rapidly as practically to prevent any risk. Since our expedition, however, this source of danger in the new route has been entirely avoided by the selection of the next valley to the N. of the Tabaretta Thal as the line of ascent, and as this is doubtless the more direct course from Trafoi it will probably

be adopted in future. My friend Mr. Ormsby, who himself reached the summit of the rocks forming the N. boundary of the upper part of the Tabaretta Thal but was prevented by stormy weather from getting farther, informs me that this variation of our new route was for the first time struck out this autumn by the local guides, and a gentleman (whom I believe to have been Mr. Headlam, of University College, Oxford) who made an ascent of the Orteler shortly after us. Having thus reached the head of the Tabaretta Thal, they followed our track to the summit and, in proof of their and our success, brought back the bottle containing our names, attached to a small fir-tree which we had planted on the highest point. But this is anticipating.

The névé of the glacier we had been ascending was nearly level, and occupied a well-defined hollow between the rocky spur from the Tabaretta Spitze on the N. and the steep slopes of snow and ice descending from the upper portion of the Orteler on the S., which here take the place of the cliffs passed farther to the W. In front a low but precipitous and much-weathered ridge of rocks formed the eastern boundary of the névé of what I may perhaps term the Tabaretta Glacier, and cut off all view in the direction of the Sulden Thal. At 5.55, just before reaching this, we struck off sharp to the right, and addressed ourselves steadily to the real work of the day. The inclination was considerable but by no means excessive, and as the ice and snow were very hard at this early hour some step-cutting was necessary. Soon a bergschrund was encountered and crossed without the slightest difficulty, and at 6.40, after a steady and stiffish pull, we halted for breakfast at the edge of a crevasse where the surface was tolerably level.

The weather was, as usual, everything that could be desired, and the view had by this time become most magnificent, including range after range of peaks away to the east, as our present position enabled us to look over on the side of the Sulden Thal. In the sketch (plate III. fig. 2) the dotted line indicating our track is placed too far to the W., and, indeed, I doubt very much whether the curve of the mountain would not entirely conceal it from a spectator on the summit of the Stelvio. Probably, too, the old route by the 'Pleis' may be to a similar extent misplaced by being shifted too far to the left, but I could not get anyone to point out to me the actual course followed, and the line indicated must therefore be considered only an approximation to the truth.

At 7.20 we resumed our march, and winding steadily upwards without a halt, amidst and around some enormous crevasses and

magnificent masses of snow, without on the whole deviating much from a direct course to the summit or encountering any really serious obstacle, we stood on the highest point of the final arête at 9.27, just seven hours and three quarters after quitting Trafoi. We had been actually on the march for six hours and three quarters, and had, in fact, lost more than half an hour in the wood; so that our progress had been rapid, considering that the difference of altitude between Trafoi and the Orteler Spitze is 7,733 feet.

Let me here guard myself against the imputation of 'doing' mountains against time, a system which is, I fear, becoming not uncommon. It may be retorted that I have just dwelt on the comparative rapidity of our own ascent of the Orteler, but to this I would reply that the narratives of almost all our predecessors describe the expedition as a very long one; that we were attempting a new route, and, not knowing the nature of the obstacles we might encounter at any moment, could not venture to linger much on the way; and, lastly, that in order to effect a junction at Pontresina with the rest of our party on the following evening, it was essential that we should get back to Trafoi reasonably early.

The highest ridge runs from NNE. to SSW., and looks like a gigantic snowdrift blown up by the wind to a thin edge, capped on the NW. by a *corniche*, and sloping rapidly on the SE. to the fearful precipices which sink away towards the western head of the Sulden Glacier. It might not inaptly be compared to the keel of a boat turned bottom-up and broken-backed, so as to allow of the stern portion being tilted up. The foot of the rudder-post thus reversed would represent the highest point at the NNE. extremity, and the convex bottom of the boat itself, sloping away on all sides, would be no unfair illustration of the great dome-like mass of snow and névé which clothes the broad shoulders of the mountain. The arête subsides into the general surface at its SW. end, beyond which and in the direction of the ridge dividing the Sulden and lower Orteler Glaciers, there is a second and inferior elevation, which is indicated in all the outlines of the summit of the Orteler, and is given in some detail in plate III. fig. 1.

We struck the *hamm* at its lowest point, and turning sharp to the left proceeded along its gently-inclined profile, which presented no sort of danger to heads free from dizziness. The day was a lovely one; there was not a particle of wind, and as the sun shone warmly down upon us we resolved to take our fill of the enjoyment of the glorious panorama which our position commanded. This was the more needful, as our stay

on the Königsspitze had been brief, and we were desirous of atoning for the haste rendered necessary on that occasion by the intense cold.

Truth compels me to confess that the first portion of the two hours spent on the summit was devoted to the commissariat department, but hunger appeased, we set busily to work to make the most of the time. Clouds were already beginning to roll up here and there from the valleys, so the first thing to be done was to secure a sketch and a photograph. During our progress up the slopes of névé the legs of the camera had unfortunately slipped from the fingers of their bearer, and gone flying downwards over the hard-frozen surface, disappearing at last over a brow suspiciously like the upper lip of a crevasse. All our efforts failed to recover them, and so the future local New Zealander may some day fish them out from amidst the fragments of avalanches in the Tabaretta Thal. A stand was improvised for the occasion by driving three axes side by side into the ridge and piling snow upon their heads, which when pressed down formed, thanks to regelation, a level and stable support. Two stereoscopic slides, including the Zufall, Königs, and Zeburu Spitzen, with portions of the ridge between the first and the Tresero, were at length obtained by Buxton, and very successfully as the result has proved. Meanwhile I was busy with the outline plate III. fig. 1, which will give a tolerably correct notion of the southern half of the view, to the details of which I will not therefore allude further. In the opposite direction a wonderful array of peaks met the eye. It began on the W. with the summits of the Grisons, followed in succession by the Bernina group, the mountains of the Middle and Lower Engadine, and the still more distant Vorarlberg. Next came the remarkable depression through which passes the route of the Finstermünz, connecting the valleys of the Adige and Inn. The Malser Heide—its broad green expanse diversified by the lakes and bright-looking villages scattered over its surface, and traversed by the long reaches of the white road—was seen as on a map, bounded on the E. by the glittering snows of the Weisskugel (12,620 feet) and other giants of the Oetz Thal. Less familiar forms succeeded as the eye ranged over the peaks of the Stubayer, Duxer, and Ziller Thal to the broad snowfields of the Venediger, and finally rested on the sharp outline of the Gross Glockner, south of which a perfect forest of jagged aiguilles indicated the position of the glorious Dolomites, which stretch from Botzen on the W. to Villach on the E. Still nearer, the fine forms of the outlying members of the Orteler Group which cluster round the valleys of



Sulden, Laas, Martell, and Ulten, would have attracted yet more attention if the superior charms of the monarchs of the ice-world had not dwarfed their pretensions.

Besides the mere extent of the view and the beautiful grouping of the elements which composed it, there was on this particular day an indescribable charm of colouring which I have scarcely ever seen equalled. The atmosphere seemed to invest every object with the most wonderful harmony of tone, softening all asperities, subduing harsh contrasts, and blending the whole into the perfection of repose. Time flew rapidly by, and we could willingly have lingered; but much remained to be done, and at 11.10 we reluctantly quitted the summit, after securing an aneroid observation, from which, by comparison with Aosta and Turin, the height comes out 12,799 feet, or 15 feet less than the result of the Kataster Survey.

At 12.35, after a fruitless hunt for the lost legs, we reached the level surface of the névé at the head of the Tabaretta Thal, and running rapidly down the ice took to the moraine on the right bank of the glacier at 12.50. Here all doubt and difficulty were at an end, and we felt justified in halting for a pipe till 1.30. The wood was reached at two o'clock, the Heiligen drei Brunnen at 2.25 (the *legführen* now doing good service, as we swung rapidly down by their long supple arms), and Trafoi at three o'clock. Goodnatured Mrs. Ortler received us with warm congratulations, gave us an excellent dinner, and started us at 5.30 for Prad, which we reached at 6.45, after undergoing an examination of passports, and quitted at seven o'clock. The Orteler rose more and more grandly behind us; but the light was waning fast as we drove into Mals at 8.30. Tea was welcome, and the prospect of a long ride in the dark to Nauders did not look tempting. However, it was useless to grumble, as the exigences of our compact with our companions would not admit of our yielding to the seductions of Mals. Conscious misery was at least spared us, and I believe it was with a feeling of agreeable surprise that we found ourselves turned out at 1 A.M. into the road at Nauders before a gloomy rambling locked-up house, which for a long time gave no sign of life.

Thus ended our campaign in the Orteler district. Thanks to the almost uninterrupted fine weather and the able assistance of our guides, Christian Michel and Franz Biener, we had on the whole cause to be satisfied with the results attained, considering how short a time we had been able to devote to this object. It must not be supposed, however, that nothing remains to be accomplished, that the harvest has been more

than partially garnered by us, or that there are not plenty of objects left for the explorer and lover of novelties, and still more for those who are wise enough to believe that mountains are amongst those 'things of beauty' which 'will never pass into nothingness,' and are not unworthy of their attention because some one else happens to have previously trod their summits.

Since our return yet another peak—the beautiful Pressanella—has fallen (see p. 396); but the Zufall Spitze, the Zeburu, the Viozzi, the Palle della Mare, Tresero, Adamello, Peder Spitze, Venezia Spitze, and a crowd of other fine peaks are still unconquered, whilst passes remain to be effected from Trafoi to the Zeburu Thal of the western foot of the Zeburu, and the eastern shoulder of the point I (plate I. fig. 1), from the Val Forno to the Val della Mare by the Forno Glacier on either side of the Viozzi Spitze, &c. &c. The valley of Martell, on the N. side of the main chain, and those of Ulten, Rabbi, della Mare, di Genova, Rendena, &c. on the S., are but half explored, and in short, I know no district which, notwithstanding what has been already done, would better reward the attention of anyone able and willing to devote a few weeks to its careful examination. For that portion of it which is on Tyrolese ground the sheets of the 'General Quartiermeister Stab. Karte der gefürsteten Grafschaft Tyrol, nebst Vorarlberg und dem angrenzenden Fürstenthum Lichtenstein' (24 sheets, 1825-31, on a scale of  $\frac{1}{144000}$ ), and for the Lombard side those of the 'General Quartiermeister Stab. Topographische Karte des Lombardisch-Venetianischen Königreichs' (42 sheets, Milan, 1833-38, on a scale of  $\frac{1}{86400}$ ) will be found serviceable, though of course by no means comparable to the great work of Dufour. The map appended to this paper is based on a fusion of both those just mentioned with some corrections, the result of our own observations, which I hope will be found of service; but its execution requires an apology, and it is not of course offered as a substitute for the exquisite engraving of the Austrian engineers.

Table of Heights, determined by F. F. Tuckett.

Date	Hour	Station	Anerold	Air	Aosta	Turin	Mean	Probable
Aug. 1	9.45 A. M.	Madatsch Joch . .	20.49	5°	10850	10826	10838	10750
"	11 A. M.	Monte Cristallo (G)	19.97	5°	11583	11570	11576	11270
"	5.20 P. M.	Zeburu Pass . . .	21.15	9°	9871	9945	9908	9700
" 3	8.20 A. M.	Königs Spitze . . .	18.91	4°·5	12603	12621	12612	12648
"	10 A. M.	Königs Joch . . .	20.17	5°	11060	11067	11063	11000
" 5	10.45 A. M.	Orteler Spitze . .	19.05	3°·5	12722	12376	12790	12314

## HEIGHTS OF THE PRINCIPAL PASSES OF THE ORTELER AND LOMBARD ALPS, ETC.

Name of Pass	Position	Vienna Klaft.r	Vienna Feet	Eng. Feet	By whom and how deter- mined	Source	Remarks
1. Königs Joch	Sta. Catarina (V. Furva) to St. Gertrud (Sulden Thal) over E. shoulder of König's Sp.			11063?	Aneroid	F. F. Tuckett	Probably not above 11000.
2. Madatsch Joch	3rd Cantoniera, Sta. Maria, or Stillscher Joch to V. Zebru, between Madatsch ridge and Cristallo, over glaciers of same name			10838	Do.	Do.	Probably not above 10750.
3. Cevedale Pass	Sta. Catarina to Martell Thal, over ridge W. of Sulden Sp., round to the N. and E. of the latter, and down Zufall Gl.			10700	Estimate	Do.	
4. Martell Pass E.	Martell Thal to Vals della Mare and di Sole. Between Zufall and Venezia Sp.	1689.4		10512	K. Δ	E. v. Mojsisovics	
5. Do. do. W.	Do. Do.	1595.8		9930	Do.	Do.	
6. Sforzellina Pass	Sta. Catarina to Vals del Monte and di Sole. N. of Corno dei tre Signori and S. of Tressero.		8594	9950	Not stated	Trinker	9700 (Ball).
7. Zebru Pass	Head of V. del Zebru to head of Val Forno and Sta. Catarina. S. of Königs Sp., E. of Mte. del Forno and Confinale			9908?	Aneroid	F. F. Tuckett	Probably 9700.
8. Soy Joch	Gond (Martell Thal) to St. Gertrud (Ulten Thal). Between Zufrid Sp. and Gramser Berg.	1519.34		9454	K. Δ	E. v. Mojsisovics	
9. Bilsberg Pass	?		9026	9361	Not stated	Trinker	
10. Passo di San Valentino	Val di Fum to Val Valentino, Tioue, and the Giudicaria. SSW. of Caré Alto.			9300	Estimate	Ball	'Guide to Central Alps.'
11. Stillscher Joch	Prad (Etsch Thal) to Bormio (Valtelline). Between Mte. Plessaura and a ridge from the Cristallo.	1433.70		8921	K. Δ	E. v. Mojsisovics	9131 (Trinker), 9177 (Carte Fédérale).
12. Gavia Pass	Sta. Catarina to Vals Mazza and Camonica. W. of Corno dei tre Signori.			8500	Estimate	Ball	'Guide to Central Alps.'
13. Tonale Pass	Ponte di Legno (V. Camonica) to V. di Sole. N. of Mte. Sello, S. of Mte. Seroden.			6483	Not stated	Do.	Do.
14. Soyputz Joch	Gond (Martell Thal) to St. Gertrud (Ulten Thal). NE. of Zufrid Sp., SW. of Soy Joch.			?			
15. Suldner Joch	Martell Thal to Sulden Thal. SW. of Innere Peder Sp., by the Madritsch Thal.			?			
16. Gramser Joch	Martell Thal to Val di Rabbi, between the Venezia and Zufrid Sp.			?			

HEIGHTS OF THE PRINCIPAL PEAKS OF THE ORTELER AND LOMBARD ALPS,  
*Principally determined by the operations of the Austrian Cadastral (Kataster) Survey. K. = Kataster.*

Name of Peak	Position	Vienna Klaffer	Vienna Feet	Eng. Feet	By whom and how deter- mined	Source	Remarks
1. Orteler Spitze	A. of outlines. SSE. of Trafoi, W. of Sulden Thal, N. of Zebra Spitze, and NNW. of Königs Spitze	2059.33	12814	12814	K. Δ	E. v. Mojsisovics	12836 (Thurwieser), 12851 (Von Weiden), 12739 (Buxton, Aneroid), 12651 (Trinkler), 12694 (Ziegler), 12612 (Buxton, Aneroid), 12344 (Von Sonklar).
2. Königs Spitze	B. of outlines. At head of Sulden, Forno, and Zebra Thal. SE. of Zebra Sp., NW. of Zufall Sp., SSE. of Orteler Sp.	2032.7	12648	12648	K. Δ	Do.	
3. Zufall Spitze (I.)	Between Vals Forno and della Mare and Marzell Thal. SE. of Königs Sp., W. of Venezia Sp., SE. of Sulden Sp.	1984.35	12348	12348	Do.	Do.	
2. Zufall Berg	Marzell Thal. Opposite and NE. of Zufall Sp., S. of Innere Peter Sp., and NW. of Venezia Sp.	1833.28	11408	11408	Do.	Do.	
3. Zufall Spitze (II.)	Marzell Thal. W. of Zufall Berg, NE. of Sulden Sp., S. of Madritsch Sp.	1745.6	10862	10862	Do.	Do.	
4. Zebra Spitze	C. of outlines. S. of Orteler, NW. of Königs Sp. Between Sulden, Trafoi, and Zebra Thal	1969.4	12255	12255	Do.	Do.	12273 (Von Weiden).
5. Peak W. of Zebra (III. of Kataster)	E. of outlines. Between Trafoi and Zebra Thal. W. of Zebra Sp., E. of I. of outlines	1922.4	11962	11962	Do.	Do.	
6. Viozzi (or Vios) Spitze	At head of Forno Glacier, between Vals Forno and della Mare. S. of Zufall Sp., NNE. of P. della Mare	1915.6	11920	11920	Do.	Do.	
7. Salline	SW. of Viozzi Spitze and NE. of Pallo della Mare. M. (?) of fig. 1, places I. and II.	1909.6	11883	11883	Do.	Do.	
8. Monte Trevero	E. of Sta. Catarina (Val Furva), W. of P. della Mare, SW. of Forno Glacier	1905.2	11869	11869	Δ	Von Weiden	'Der Mte. Rosa.' Probably too high by about 200 ft.
9. Pallo della Mare	E. of Trevero, S. of Forno Gl., WSW. of Viozzi Sp. Between Vals Forno and Bormina	1903	11855	11855	K. Δ	E. v. Mojsisovics	
10. Giumentia	I cannot at all identify this peak, unless it is the Trevero under another name		11842	11842	Do.	Do.	
11. Adamello	WSW. of V. di Genova, N. of Val di Fum, E. of Edoio, SW. of Beolde Glacier, WNW. of M. Levaio	11409	11692	11692	Δ	Von Sonklar	11670 (Von Weiden).
2. E. Peak	ESE. of highest peak	11317	11737	11737	K. Δ	Do.	'Mithelungen des österr. Alpenvereines' II. B.
12. Pressana (Cima di Nardup) E. Peak	Between Val Vermiglio and Val di Genova. NW. of Pinzolo, E. of Mte. Paganella, SSE. of Fondale Pass	1878.3	11688	11688	K. Δ	E. v. Mojsisovics	
2. Do. W. Peak	Between E. Peak and Cima di S. Glesonno	1822.2	11545	11545	Do.	Do.	
13. Ofen W. (Wand?)	Between Sulden and Jasser Thal. S. of Angelus Sp., NE. of Verrain Sp., NE. of St. Gertrud	1807.4	11658	11658	Do.	Do.	
2. Do.	N. of former, and between Vals Forno and Angelus Sp.	1804	11926	11926	Do.	Do.	
14. Verrain Spitze	Between Sulden and Lasser Thal. E. of St. Gertrud, NW. of red Sp., SW. of Ofen, W. (Wand?)	1837.4	11871	11871	Do.	Do.	
15. Ortiedo (I. of Kataster)	G. of outlines. Between V. Zebra and Sclavio. SSW. of Malatzech ridge. At head of Malatzech Gl.	1877.3	11870	11870	Do.	Do.	12980, Topografia di Sondrio (Ziegler), 11676 (Buxton, Aneroid).

2. (Video Spitze of Katscher)	2. of outline, WNW. of G. SSE. of Stelvio. Between névé of Madatsch and Vitelli Glaciers	1925.8		11261	Do.	Do.	
3. (Nagles Spitze of Katscher)	Between Video Sp. and Stelvio, on plateau dividing Madatsch and Vitelli Glaciers	1717.5		10687	Do.	Do.	
16. Caré alto (Monte Caré of Wörl)	Between Val di Fium and Val di Borzago. ESE. of Adamello, S. of Monte Levante	1894.4		11353	Do.	Von Sonklar	'Mittl. des besterr. Alpenvertheins.'
17. Peder Spitze	Between Martell, Laaser, and Sulden Thal. E. of St. Gertrud	1923.8		11349	Do.	E. v. Mojsisovics	
2. Do.	N. Peak	1891.9		11337	Do.	Do.	
3. Auserer-PederSpitze	Between Laaser and Martell Thal	1793.76		11163	Do.	Do.	
4. InnerePeder Spitze	SSW. Peak. Between Sulden and Martell Thal	1780.49		10768	Do.	Do.	
18. Eggen Spitze	Between heads of Val di Rabbt and Uiten Thal. SSW. of Zutrif Sp.	1810.1		11254	Do.	Do.	
2. Do.	S. of No. 1.	1783.46		11098	Do.	Do.	
19. Zutrif	Between Martell and Uiten Thal. S. of Sta. Maria Sohmels, E. of St. Gertrud, SW. of Soy Joch.	1869.9		11262	Do.	Do.	
20. Madatsch Spitze (highest and most southerly point of ridge, II. of Katscher)	I. (?) of outlines. Between Madatsch and Trafoi Gl. SE. of Stelvio, NNE. of Cristallo	1807.1		31245	Do.	Do.	
21. Sulden Spitze	Between Val Forno and the Martell and Sulden Thal. NNW. of Zutrif Sp., SE. of Königs Sp.	1785.3		11109	Do.	Do.	
22. Venezia, or Konzen Spitze	Between Martell Thal and Val della Mare. E. of Zutrif Sp. and both Martell Passes	1782.69		11093	Do.	Do.	
23. Monte Confinale	Between Vals Forno; Furva and del Zebbru. N. of Sta. Catarina, S. of Cristallo, SW. of Zellru	10680	10680	11076	Δ	Von Weiden	'Der Monte Rosa.'
24. Kompatsch	E. of Sulden Thal, ESE. of Siba, WNW. of Angelus Sp.	1778.2	10601	11065	K. Δ	E. v. Mojsisovics	'Mitttheilungen,' &c.
25. Monte Levante	SW. of Val di Genova, NW. of Val di Borzago, E. of Adamello, SSE. of Madrot Glacier.			10994	Do.	Von Sonklar	
26. Angelus Spitze	Between Sulden and Laaser Thal, and Ofen W. and Kompatsch	1764.9		10982	Do.	E. v. Mojsisovics	
2. Do.	Between Laaser and Martell Thal. SW. of Schliuder Sp., NNE. of Auserer Peder Sp.	1739.8		10826	Do.	Do.	
27. Roth Spitze	Between Martell Thal and Val di Rabbt. E. of Venezia Sp. in Martell Thal. N. of former	1729.8		10866	Do.	Do.	
2. Do.	Between Val Borzina and Gavia Pass. S. of Sta. Catarina, and Mts. Tressio	1522.3		10844	Do.	Do.	
28. Corno dei tre Signori	Between Sulden and Laaser Thal, SW. of Cima di E. and Mts. Tressio	1755.6	10613	10912	Do.	Do.	
29. La Brunazza	S. of V. Veniglin N. of Bedole Alp. W. of Cima di E. Gliccio, E. of Cima del Deseon			10903	Not stated	Von Sonklar	'Mitttheilungen.'
30. Schonlauf Spitze	At head of Martell Thal. SE. of Innere Peder Sp., and E. of Sulden Joch	1760.6		10683	K. Δ	E. v. Mojsisovics	
31. Cima del Mandron	Between Val Cunicina and V. di Genova. NNE. of Adamello, SSE. of Mts. Plesanna, W. of Bedole Gl.	10600	10600	10629	Not stated	Von Sonklar	Do.
32. Monte Rumo	Head of Val di Fium. ESE. of Adamello, and between it and Mts. Levante. S. pt. of ridge between Bedole and Martzer Gl.	10600	10600	10629	Do.	Do.	Do.
33. Laaser Spitze	Between Laaser and Martell Thal.	1739.97		10627	K. Δ	E. v. Mojsisovics	
34. Cima Larda	Schliuder Sp. SW. of Weismandl N. of Val di Genova, SE. of Cima di Nardis (Presanella), and W. of Nardis Thal		10395	10781	Do.	Von Sonklar	Do.

## HEIGHTS OF THE PRINCIPAL PEAKS OF THE ORTELER AND LOMBARD ALPS, ETC.

Name of Peak	Position	Vienna Kilster	Vienna Feet	Eng. Feet	By whom and how deter- mined	Source	Remarks
35. Cima di S. Giacomo	S. of Val Vermiglio, N. of Bedole Alp (head of V. di Genova), W. of Cima di Nardis, E. of Brusasca		10873	10758	K. A	Von Sonklar	'Mittelhungen,' &c.
36. Amola Spitze	W. of Val Rendena, S. of Val di Genova, SW. of Pinzolo, E. of Mt. Levade		10334	10720	Not stated	Do.	Do.
37. Schluder Spitze	Do.		10198	10576	Do.	Do.	Do.
38. Monte Piscianna Cima	Between Laaser and Martell Thal. SW. of Laaser Sp., NE. of Ausserer Peder Sp.	1701.58		10588	K. A	E. v. Mojsisovics	
39. Suent	Between Vals Vermiglio, di Genova, and Camonica, S. of Tonale Pass, NW. of Bedole Alp, W. of Cima del Joosgn		10202	10580	Not stated	Von Sonklar	Do.
40. Cima di Brenta (or Nodis)	At head of Val della Mare, SSE. of Venesia Sp., and NW. of Cima di Pontevocchio	1677.9		10441	K. A	E. v. Mojsisovics	
41. Cima di Pontevocchio	W. of Molveno in Giudicaria, SW. of Bocca di Brenta		10061	10434	Not stated	Von Sonklar	10450 (Ball, 'Guide to Central Alps.')
42. Cima Tosa	Between Val della Mare and Val di Rabbi	1673.6		10414	K. A	E. v. Mojsisovics	
43. Madritsch Spitze	NW. of Molveno, N. of Bocca di Brenta, SSE. of Venesia Sp., and SE. of Saent		9974	10344	Not stated	Von Sonklar	'Mittelhungen,' &c.
Madritsch Berg	Between Suiden and Martell Thal. SE. of St. Gertrud, SW. of Innere Peder Sp.	1662.2		10843	K. A	E. v. Mojsisovics	
44. Flim V.	Martell Thal. E. of Madritsch Sp., SSE. of Innere Peder Sp.	1545.6		9814	Do.	Do.	
45. Fraggischarte	Between Martell and Utzen Thal. SE. of Gond, and NW. of Soy Joch	1634.7		10297	Do.	Do.	
46. Schoneck	Martell Thal. NE. of St. Gertrud, W. of Angelius Sp., NW. of Oren W.	1652.2		10282	Do.	Do.	
47. Wasserrill	SW. of Fraggischarte	1646.6		10246	Do.	Do.	
48. Wasserrille	E. of Suiden Thal. NW. of Kompatsch, N. of Fraggischarte	1638.3		10194	Do.	Do.	
49. Gramber Berg	N. of former	1378.98		8581	Do.	Do.	
50. Corno della Grannato	N. of former	1623.3		10171	Not stated	Ball	'Guide to Central Alps.'
51. Cima del Dosson	Between Martell and Utzen Thal. NE. of Soy Joch, SW. of Flim V.		9730	10101	K. A	E. v. Mojsisovics	
52. Monte Redorta	W. of Val di Genova, N. of Mts. Levade, S. of Stabiei, E. of Fimbria Mts. S. of Mts. C.			10091	Do.	Von Sonklar	'Mittelhungen,' &c.
53. Pis Umbrell	S. of V. Vermiglio NW. of Bedole Alp, ENE. of Mts. Piscianna, W. of Brusasca		10059	10059	Not stated	Von Sonklar	'Mittelhungen,' &c.
54. Monte Plesura	Between Valtellina and Val Seriano. SE. of Sondrio		9980	9980	Do.	Ball	'Guide to Central Alps.'
55. Rott Spitze (Both Spitze?)	NW. of Sta. Maria (4th Cantoniera on Stelvio), SW. end of Val Murana		9941	9941	Do.	Dufour	Swiss Federal Map
56. Lobbia (2nd peak from N. of ridge)	NNE. of Stelvio Pass, E. of Sta. Maria. Between Vals Murana and Costalnas	1595.6		9929	Do.	Do.	Do.
2. N. Peak	? Murana and Costalnas		9550	9904	K. A	E. v. Mojsisovics	'Mittelhungen,' &c.
	SW. of Bedole Alp, NE. of Adamello. Between Bedole and Matterot Gls.		9350	9697	Not stated	Von Sonklar	
	Do.				K. A	Do.	

57. Rochette	N. of Val di Genova, W. of Nardis Thal, and SE. of Cima di Nardis (Presanella)		9527	9880	Do.	Von Sonklar	'Mittheilungen,' &c.
58. Fallisch K. (Kogel?)	Between the Munster and Trafoi Thal. NNW. of Trafoi, and SE. of Sta. Maria, between Schafberg and Turkei Sp.	1581.8		9843	Do.	E. v. Mojsisovics	
59. Monte Braulio	W. of 3rd Cantoniera (Stelvio), NNW. of 2nd, and NNE. of 1st do.			9790	Δ	Dufour	Swiss Federal Map.
60. Jamerwand	E. of Laaser Thal, N. of Laaser Sp., W. of Weissmandl	1559.4		9704	K. Δ	E. v. Mojsisovics	
61. Schafberg	Between Munster and Trafoi Thal. NNE. of Trafoi, E. of Sta. Maria, WSW. of Stills, N. of Fallisch K.	1552.4		9660	Do.	Do.	
62. Monte Serrotini	Between Val Camonica and the Valtellina. N. of Vizzo			9616	Not stated	Ball	'Guide to Central Alps.'
63. Kor Spitze	Between Munster and Trafoi Thal. NW. of Trafoi, SE. of Sta. Maria, SW. of Stills. Between Tartscher K. and Stillfer Joch	1543.65		9606	K. Δ	E. v. Mojsisovics	
64. Turkei Spitze	Between Munster and Trafoi Thal. NNW. of Trafoi. Between Tartscher and Fallisch Kogel	1539.4		9579	Do.	Do.	
65. Pizzo del Diavolo	Between Valtellina and Val Sarcana. E. of Mte. Redorta, W. of Passo del Salto			9574	Not stated	Ball	Do.
66. Tartscher K. (Kogel?)	Between Munster and Trafoi Thal. NW. of Trafoi. Between Kor Sp. and Turkei Sp.	1537		9564	K. Δ	E. v. Mojsisovics	
67. Monte Grisa	Between Val di Fum and Val Breguzzza, and SSW. of Caré Alto			9471	Not stated	Ball	Do.
68. Verborgenes Pleis	E. of Gomagol, SE. of Stills	1520.28		9460	K. Δ	E. v. Mojsisovics	
69. Stabbel	W. of Val di Genova, S. of Bedole Alp, E. of Matterot GL, S. of Matterot, N. of Cioc		9062	9398	Do.	Von Sonklar	'Mittheilungen,' &c.
70. Monte Blumone	Between Val Camonica and Giudicaria. NE. of Breno, S. of Mte. Castello			9321	Not stated	Ball	'Guide to Central Alps.'
71. Hochleiten	Between Sulden and Trafoi Thal. S. of Gomagol, N. of Orteler Sp.	1472.56		9163	K. Δ	E. v. Mojsisovics	
72. Halm Spitze (Hahn Spitze?)	S. of Sta. Maria Schmelz in Martell Thal, N. of Zufrid Sp. and Ferner	1470.54		9150	Do.	Do.	
73. Weisswande (Weissmandl?)	In Martell Thal. N. of Sta. Maria Schmelz, NW. of Gond, NE. of Laaser Sp.	1462.62		9101	Do.	Do.	
74. Schludleck	In Martell Thal. NNW. of Sta. Maria Schmelz, W. of Gond, SE. of Laaser Spitze, E. of Schluder Sp.	1447.6		9008	Do.	Do.	
75. Frattasecca	In Val del Monte. S. of Viozzi Sp., SE. of Palle della Mare, E. of Corno dei tre Signori, W. of Pejo	1436.66		8940	Do.	Do.	
76. Monte Frerone	Between Val Camonica and Giudicaria. SW. of Mt. Blumone, ENE. of Breno			8676	Not stated	Ball	Do.
77. Saurissl	W. of Laaser Thal, SE. of Prad, SW. of Laas, NE. of Angelus Sp.	1388.82		8642	K. Δ	E. v. Mojsisovics	
78. Rott (Roth?) Stall	In Martell Thal. W. of Sta. Maria Schmelz, SE. of Aussere Peder Sp., S. of Schluder Sp.	1376.25		8564	Do.	Do.	
79. Stier B. (Berg?)	In Martell Thal. S. of Aussere Peder Sp., SW. of Roth Stall, SE. of Peder Sp.	1354.3		8427	Do.	Do.	
80. Cima di Vioz	Between Vals di Vioz and Tavietta. ESE. of Viozzi Sp., N.W. of Pejo.	1317.32		8197	Do.	Do.	
81. Ceridole	N. of Val di Genova, NW. of Pinzolo, SE. of Cima di Nardis (Presanella), E. of Nardis Thal and Rochetta		7610	7892	Not stated	Von Sonklar	'Mittheilungen,' &c.

••• 4 Peaks above 12,000 and under 13,000 feet; 32 peaks above 10,000 and under 11,000 feet; 7 peaks above 8,000 and under 9,000 feet.  
 28 " 11,000 " 12,000 " 25 " 9,000 " 10,000 " 1 " 7,000 " 8,000 "

## MISCELLANEOUS.

Name of Place	Position	Vienna Kilfter	Vienna Feet	Eng. Feet	By whom and how deter- mined	Source	Remarks
Upper névé of Orteler Sp. (Foot)			11085.4	11445	Bar	Thurwieser	Trinker's 'Hohenstim- mungen von Tirol und Vorarlberg.'
Caerene (Stelvio)	Between Franzenshöhe and summit of Fasa.	1336.6		8317 8163	K. A Δ	E. v. Mojsisovics Dufour	Swiss Federal Map.
Sta. Maria (4th Cantoniera, Stelvio)				7874	Not stated	Ball	' Guide to Central Alps.'
3rd Cantoniera (Stelvio)				6906	Do.	Do.	Do.
2nd Cantoniera (Stelvio)				5971	Do.	Do.	Do.
1st Cantoniera (Stelvio)				4708	Bar	Temp. di Sondrio	Le Alpi che cingono l' Italia.
Baths of Bormio	Head of Valtellina and N. of Bormio.			4018	Δ	Dufour	Swiss Federal Map.
Bormio	Do. At W. foot of Stelvio (Stilfser Joch). at the junction of the Adna and Frodolfo.			7163	K. A	E. v. Mojsisovics	7189 (Trinker), 7082 (Kreil).
Franzenshöhe	Between summit of Stelvio and Trafoi. Opposite Madatsch Sp.	1131.1		5081	Do.	Do.	5091 (Kreil), 5129 (Trin- ker), 5215 (Thurwieser), 5238 (Schmitt).
Trafoi	At E. foot of Stelvio. NNW. of Orteler Sp., SW. of Gomagol and Fradl.	816.5		4221	Not stated	Ball	' Guide to Central Alps.'
Gomagol	Between Trafoi and Fradl, at the junction of the Sulden with the Trafoi Thal and Fradl.			4273	K. A	E. v. Mojsisovics	
Stilfs	Between Gomagol and Fradl.	686.7		5684	Do.	Do.	
St. Gertrud	In the Sulden Thal. ENE. of the Orteler Sp.	913.4	8109	3299	Bar	Thurwieser	
Heiligen drei Brunnen	At NW. foot of Orteler, S. of Trafoi, and near Trafoi and Orteler Glaciers.			6743	Do.	Do.	Trinker ('Hohenstim- mungen'). Do.
Orteler Bivouac (ruined hut)	In upper portion of wood above the Heiligen drei Brunnen		8501.6		Do.	Do.	Do.
Im Zufall	In Martell Thal. ENE. of Zufall Sp., S. of Zufall Berg, E. of Sulden Sp.	1184.7		7372	K. A	E. v. Mojsisovics	
Unt Alm	In Martell Thal above Sta. Maria Schmelz.	960.5		5977	Do.	Do.	
Pontevechio	Val della Mare.	924.7		5754	Do.	Do.	
Foot of Bedöle Glacier	Head of Val di Genova. NE. of Adamello.		6347	5645	Do.	Von Sonklar	
Bedöle Alp	Do.		4898	5078	Not stated	Ball	' Mittheilungen des österr. Alpenvereins.'
Sta. Catarina	Val Furva. ESE. of Bormio, S. of Monte Confinale, NW. of Trafoi.			5000	Estimate	Do.	' Guide to Central Alps.'
St. Gertrud (Ulten Thal)	E. of Zufall and Eggen Sp., SE. of Soy Joch.		4473	4949	Not stated	Do.	Do.
Caroz Alp	Next Alp below that of Bedöle in upper part of Val di Genova.			4638	Do.	Von Sonklar	' Mittheilungen,' &c.
Rabbi	Val di Rabbi (a branch of Val di Sole).		4000	4000	Estimate	Ball	' Guide to Central Alps.'
Pinzolo	Val Rendena. W. of Cima di Brenta, ESE. of Cima di Nardis (Pissanella), and at foot of Val di Genova.	2470		2662	K. A	Von Sonklar	' Mittheilungen,' &c.
Eldoio	Val Camonica. W. of Adamello.			2293	Not stated	Ball	' Guide to Central Alps.'



LAVARS. IMP, BROAD ST HALL. BRISTOL.



ASCENT OF THE MÖNCH, by REGINALD SOMERLED  
MACDONALD.

**A**MONG the various discomforts that enhance the pleasure of mountaineering, few are more prized by the climber than those which attend a nocturnal bivouac in the Alps. To be fully impressed with the importance of the hills, one must have spent one night at least among them. Then indeed they solemnly assert their majesty, and man is fain to believe that his intimacy with them is founded more on their tolerance than on any prescriptive right of his own.

Never did I more fully enjoy these pleasures than on a superb night in July, 1863, when I found myself the solitary tenant of the lower of two caves which are held to constitute the Faulberg. I spent much time on a rocky shelf immediately above our resting-place, admiring the moon-lit glacier and its bounding ridges. No wonder that I somewhat reluctantly ceded to Melchior's humble appeal in favour of the practical advantages of the rocky bed which he offered me as a substitute for the magic beauties on which I was gazing. But it was already 9 P.M., and we were shortly to start for an attempt on the Mönch, whose sturdy and successful resistance to more than one attack made on him during the previous season, from more than one starting-point, had excited at once both my curiosity and my ambition. So I abandoned my chilly vantage-ground, descending into the rudely finished sarcophagus where I was to be for some few hours interred, and submitted to be solemnly wrapped up by Melchior and Almer in sundry blankets and waterproofs, much like an overgrown baby, swathed by male nurses, in an ill-formed cradle. Is it too much to say that I slept there as well as on any feather bed? I can at any rate assert that in my solid rock couch I slept continuously and soundly till I was roused by the guides at 12.30. But then there had been nobody to dispute with me the tranquil possession of my blankets, or to infringe on my allotted portion of rock. My only regret was that I had nobody to converse with during my waking moments. Melchior and Almer had retired to the upper sleeping place, and I now felt somewhat annoyed that there was no one at hand to whom I could communicate the fact that I had enjoyed a comfortable repose, which happy condition, to judge from written accounts, must be rare in the history of Alpine bivouacs.

Whatever my comforts or discomforts may have been, the stern necessity of an early start alone reconciled me to a

desertion of my warm resting-place, and to turn out, somewhat sulky, and still more shivering, into the cold night-air. I must confess that at that moment I almost envied those who in England were then talking over the last notes of the opera, or otherwise amusing themselves with the prospect of a long sleep in a warm bed still before them. But once in the upper cave all such unworthy feelings of dissatisfaction vanished, and I began to pity those poor mortals whose hard fate condemned them to London hours and London luxuries. Warmly welcomed by a bright fire, I eagerly drank a bumper of scalding wine, much as one swallows soup at Swindon, and then stepped out, believing myself eager for the fray. Even the guides discovered that a more substantial breakfast might come into collision with a recent supper; and at one o'clock we were fairly off, *en route* for the Mönch.

The moon still afforded us so much light that we proceeded for some time cheerily on our way, enjoying the charming effects produced by her beams on the neighbouring crags, till, by suddenly and vexatiously dipping behind the Löttsch Sattel, she obliged us to have recourse to our lantern. The crevasses we had to jump, and the steady though gradual incline of the glacier, caused us already sufficient exertion to keep us warm; but we had not left the Faulberg more than two hours ere the increasing depth of the fresh snow led us to suspect that aloft it might cost us some time and trouble. The Jungfrau Joch, our first goal, lay before us. We had rashly, as experience proved, determined to assault the Mönch by its south-western arête, hoping that, even were this route to prove impracticable, time would be left us to complete the ascent by the south-eastern ridge. I then imagined the latter to be the one by which Herr Porges, our only predecessor in this ascent, had successfully reached in 1858 the summit of the mountain. But Almer, who had been one of that victorious party, seemed to wish that the route should now be varied, and though he represented the rocks of the western face as formidably steep, still he thought that this way deserved at least a trial. And thus it came to pass that we found ourselves at 5.30 looking over the northern plains of Switzerland, with the Wengern Alp at our feet. Immediately to our left lay that depression which one whom I know has not hesitated to stigmatise as being 'obtrusively and almost offensively a pass.' *Entre parenthèse*, I must remark that I prefer even this invidious appellation to so hybrid a nomenclature as 'Col de la Jungfrau.' From our position we could well see and judge of the difficulties which had been encountered by the band of climbers who first forced

their way from the Wengern Alp to the Æggischhorn. On this perch we held a council of war as to the plan of attack we should adopt to vanquish the Mönch. Almer clearly wished us, for some reason of his own, to try from the west. He had accompanied Messrs. George and Moore during the previous season in an attempt to scale this mountain from the Wengern Alp, in which attempt he not unnaturally failed. But, on the other hand, he could boast that he was present on the only occasion when the Mönch had been climbed.

I may observe that I do not clearly understand the account of Herr Porges's ascent as given in the lately published Guide to the Central Alps. It is there stated that the first ascent of the mountain was effected by the eastern ridge, or that which descends towards the Mönch Joch. On the other hand, I understood Almer to say that he led M. Porges to the summit by the south-eastern arête, the one we eventually selected as our route. Now, Almer pointed out to me the very rocks among which his party had on the former occasion spent the night. These rocks were nearer to the col between the Trugberg and the Mönch than they were to the Mönch Joch properly so called. And it is almost inconceivable that the party of M. Porges, comprising first-rate guides, should have disregarded the nearer and easier ridge in favour of one both more remote and apparently more difficult. I may, however, have misunderstood Almer in this particular. But whether or not M. Porges ascended and descended by our route, I feel confident that he must either have gone up or come down by it, not only from the minute knowledge that Almer possessed of the most unimportant peculiarities of the ridge we chose (a knowledge he must have acquired on that previous expedition), but because I further remember how he laughingly described the nature of the system of progression adopted by that party on the ridge up which we were then going.

And I think I may add it may be inferred from the account given by Mr. Trotter of his unsuccessful attempt of the Mönch in 1862, that he believed M. Porges's ascent to have been made by the same route as that which he tried. He writes in a former paper of this Journal: 'Peter Bohren, who was one of the guides on the only previous ascent,' that of M. Porges, 'had reached the summit in about two and a half hours from the col; we had already exceeded that time, and were by no means at the top.' Now, Mr. Trotter certainly ascended by our ridge; for I can easily recognise the very features of which he elsewhere speaks in his paper, and yet he seems to think that his route, and that of his Austrian predecessor, were identical. Had I

thought, when on the Mönch, that M. Porges had undertaken the enterprise by the eastern arête, I should more easily have understood how he contrived to spend three days on the expedition. Of that ridge, suffice it to say, that I recommend nobody to try to follow in his footsteps.

But this digression has left us stationary on or near the Jungfrau Joch, not the place one would choose for so long a halt or so cold a morning. The north-west wind was unpleasantly chilly, and gave us a foretaste of what we might expect above. I was left to suffer alone, for Melchior and Almer had gone off to reconnoitre, and, if possible, to discover a path among the red rocks that towered above my head. When their voices and the clatter of their footsteps had died away in the distance, the sense of isolation that at once oppressed me was almost strong enough to make me regret that we had not accepted our good host Wellig's offer of such an additional number of porters and guides as would, in his opinion, insure our success and his profit. Still more did I miss George, my travelling companion, who should now have been with me, had he not been confined down below in duration vile by a bad attack of neuralgia. But my reverie was interrupted by the return of my men, who informed me that the cliffs above were very steep, and the probability of success by that route more than uncertain. So we made up our minds to try the surer though far more distant shoulder, which may, I think, most correctly be called the SE. one. Only a long trudge through deep, fresh snow was necessary to land us on the rocks at the base of this ridge. But this bit of snow-wading was most trying, even to trained muscles. I noticed that the guides exchanged the lead at what I considered to be ridiculously short intervals. Fired by an excusable rashness, I volunteered to lead the way. I fortunately stipulated that the distance during which I was thus to distinguish myself should not be long, and that the proceeding should be treated merely as an experiment. But much before I had led for the fifteen minutes that I had assigned to myself as the term of my labour, I mentally resolved that never again would I inflict on myself any such avoidable torture: not that the slope was steep, but a frozen crust covered over a deep and incoherent bed of fresh snow, and at each step one plunged knee-deep into a floury mixture, from which to free oneself required no small muscular exertion. I hailed with much pleasurè our arrival on solid rock at the foot of the buttress which was henceforward to prove our path to the summit. And here we breakfasted. I have heard it said that to the dweller in the

plains who has accidentally floundered into an Alpine Club publication, nothing is so tedious as the ever-recurring account of Alpine meals and Alpine views. Is it to be expected that he who normally looks on breakfast and dinner as a not unpleasing occupation for otherwise idle moments, who eats at predetermined hours as the result of an acquired habit—can such a one understand what it means to eat and drink when really hungry and really thirsty, what to feast on black bread and enjoy sour wine? Is it to be expected that he whose hard fate, or worse fault, has condemned him for ever to live on the level, can participate in the pleasures of those who have, ere now, seen fair lands spreading far and wide at their feet?

The Alps are ever ready to extend their benefits to those who seek them. Let mountaineers praise their meals—let them boast of the views that they have beheld; and let those who now complain of the mere mention of enjoyments they cannot understand try but for one season what mountaineering means, and then let them tell others what they then think of Alpine scenery and Alpine appetite.

From here our road was plain; we had but to follow the ridge that rose steeply above us till the very summit of the mountain. We had strong hopes of success. But the cold, strong wind led us to fear that on that edge we might find it hard to fight our way to the peak. Wrapped up in all our spare garments, with hats tied down, with warm gloves pulled well up on to our wrists, we started for the fray. We were at once greeted by a cutting blast, driving against us sharp particles of ice; the stormy mist settled down on our path, whitening us with both hail and snow: in fact, it seemed as if the spirit of the Mönch had called forth all his allies to aid him in his resistance. Our very standing-ground was not of the most secure. A narrow edge of ice, not much more than a foot wide, and steep into the bargain; falling away on either hand into a slope of ice that might well be called a precipice, each descending far into the neighbouring ice-valleys: such was the ladder which turned out to be sufficient for the occasion. Melchior, the first in the line, was hewing steps of such a size, that I remember at a desponding moment having fancied, though only for a moment, that he feared we might have to spend the night in one of them, and that he was therefore rendering them as habitable as possible. Next to him came Almer, polishing up the steps, and sweeping out of them the bits of ice that fell into them from Melchior's eager strokes. Last of all I came, wondering at the strength and skill with which these men wielded their long and clumsy-looking axes, and envying the

warming exercise which they most evidently enjoyed. Steeper and narrower still became the ridge, the cliffs on either side fell away further and steeper, when, as if by magic, the wind ceased howling about us, the mists drew off, were succeeded by the welcome sun, and Melchior cheerily shouted, 'Our difficulties are nearly over.' I gladly heard the news, for I was most undeniably uncomfortable in my then position. Even the noble views on either hand failed to make one entirely forget one's cold hands and still colder feet. But the knife-edge soon widened out into a broad and nearly level pathway; and here the deep snow, which below had been a foe to our progress, became our ally. It was no longer needful laboriously to cut out steps; we made the running at a quick pace, and almost before I knew it we were on the top.

Not the very top, however. We were standing in the centre of a small plateau, from which rose two small snowy peaks, neither of them more than a few feet higher than the snow on which we already stood. It was, however, necessary, according to strict Alpine law, to ascend each of these mamelons.

So the guides spontaneously stood back, and following me in Indian file, we each in turn ascended the southern peak, descended into the miniature valley, and then walked up its northern brother.

However, this process was carried out with a solemnity that completely failed in its object, and made me give utterance to a shout of laughter, which was not less heartily taken up by the guides.

Then Melchior insisted on beating me about the hands and feet till I began to doubt whether even frost-bite might not be more tolerable than its cure. The remedy once effected, we sent down howls of defiance from the northern edge of the plateau in the direction of a dog whom we distinctly heard barking at the Wengern Alp. It was now 8.50, but we could discern round the little hostelry no witnesses of our triumph. Almer was in tremendous spirits at our success, and recapitulated the account of his former ascent. He would hardly let me make use of the short time we had to stay to gaze around. Of the view we enjoyed I will not speak. A mountain that combines all the fine scenes of the Mönch Joch and the Jungfrau Joch requires no praise. But I consider that the view from the top is still finer. To see the Schreckhorn from this point is alone worth the ascent, even admitting that the very climbing is not an already sufficient reward.

After a halt of 25 minutes, we hurried down the steep and narrow arête to the rocks where we had left our provisions.



Dense mists now filled up the trough of the Aletsch, and the scorching we underwent in journeying through that cloud-land was almost more trying than the freezing we had suffered above. Nor was it easy to find our way through the mists, our footsteps being filled up by the newly-fallen snow. Still we reached the Faulberg safely and joyously at two; but not so joyously as we arrived at the *Æggischhorn*—to be welcomed by the greetings of friends, and by other luxuries which, at least, we considered ourselves to have deserved.

SUMMARY OF NEW EXPEDITIONS DURING THE SUMMER  
OF 1864—(continued).

*Alps of Dauphiné.*

COL DE LA MUANDE: *July 21.*—Mr. R. W. Taylor and the Rev. T. G. Bonney, with Joseph B. Simond of Argentière, made this pass from S. Christophe to Riou du Sap. It has been known to the natives for at least one hundred years, but is very rarely used by them; and has never (it is believed) been crossed by English travellers before this year. The glacier on the north side is difficult, and might at times be even impassable. The descent, at first down a steep snow slope and then over rocks and pastures, is easy. Ascent to col, 6hrs. 25m.; descent, 1hr. 55m.

*Graian Alps.*

COL DU RUITOR: *July 12.*—Mr. Bonney and party ascended to the col on the left of the highest peak of the Ruitor by the route followed by Messrs. W. Mathews and Bonney in 1862, and after climbing the peak descended a steep glacier into an upland glen. Following a steep and narrow goat track on the left bank of this, they reached the valley about a quarter of an hour above the village of Val Grisanche. They found that if they had followed the other side of the glen they would have descended to Fornet, three quarters of an hour higher up the valley. Ascent to col, 5hrs.; ascent and descent of peak, 50m.; descent to Val Grisanche, 2hrs. 35m.

*Range of Mont Blanc.*

AIGUILLE DU TOUR: *August 17.*—Mr. Heathcote, with Moritz Andermatten, ascended this peak on the way over the Col du Tour. From the great plateau which feeds the glaciers of Orny and Trient it rises in a double head, of which the one to the left or SW. is the highest. The ascent presents no real difficulty, and the view is far superior to that from the col; and as the whole expedition from Orsières to Argentière only took 13hrs., this ascent may very safely be recommended to future passers-by.

COL DE TRELATETE: *August 28.*—Messrs. C. E. and G. S. Mathews, with Michel Balmat and Jean Carrier, made a new and difficult pass

which has the best claim to this title. 'After passing the night of the 27th at the chalet between the Lac de Combal and the Col de la Seigne, we started at 5.30 with the intention of ascending the Aiguille de Trélatête, and descending by the glacier of the same name to the Pavillon de Trélatête. We took to the Glacier de l'Allée Blanche, and gained its medial moraine, up which we walked for some distance without difficulty. The glacier then became much broken, and we did not reach its upper level until 1.43. We now saw before us an amphitheatre of almost level névé, bounded on its eastern side by the Trélatête; and directly under its most northern peak lay a low col, which we reached without further difficulty at 2.26. Steep but not difficult rocks lay between us and the top of the Trélatête, but it was too late to make the ascent, and at 3 o'clock we began to descend the secondary glacier before us, leading down to the upper level of the Trélatête Glacier. This we found excessively steep and dangerous, and it was not until 6.30 that we gained the Trélatête Glacier. Darkness overtook us before we could reach the pavillon, and at 8.10 we were obliged to halt and bivouac supperless on the rocks of the Aiguille de Berenger. We started at daylight 4.15 the next morning, and reached the pavillon at 6.40.'—G. S. M.

A pass is described under this name in the Alpine Guide, which leads from the lower part of the Glacier de Trélatête southwards to the Glacier des Lancettes. This, it is thought, may more appropriately bear the name COL DE TONDU, from the Mont Tondu which overhangs it on the W. side.

COL DES PLANARDS: *August 31.*—Mr. Jacomb, with an Orsières guide, made a very convenient and easy pass from St. Pierre to the chalets of Ferrex, over the ridge at the head of the small valley called in the Federal map Les Planards. Time: less than 4hrs; height, 9,386'.

COL DES GRANDES JORASSES: *September 6.*—The ridge to the W. of the Grandes Jorasses, between it and the Dome des Grandes Jorasses, was reached by Messrs. Milman, A. Wills, A. W. Wills, and F. Taylor, accompanied by Michel Payot (des Mossons) and Claude Gurlié of Samöens, with F. Payot and E. Cupelin as porters. Starting from the Montanvert at 2.30 A.M., they reached the head of the portion of the Glacier de l'Echaud visible from the Montanvert at 6. Turning to the right they first passed through a very steep set of séracs, which brought them on to the ice-slopes immediately beneath the Grandes Jorasses. Partly ascending and partly crossing these slopes they first came in sight of the actual col at 11.40. Enormous bergschrunds compelled a very wide détour to the right, after which they turned again to the left and advanced straight towards the col, ascending by a steep snow-slope crowned by a bergschrund, above which was a *côte* of ice measuring a little more than 50° by the clinometer. They reached the base of this *côte* at 2.30, and the top of the col after nearly two hours more of step-cutting, during which they were exposed to a continual fire of particles of ice detached from the rocks above. The col is about 50 yards from side to side, and lies immediately under the rocks of the Grandes Jorasses; it was reached at 4.15 P.M., but the descent on the Italian side proved hopelessly impracticable. There was a sheer drop of many hundreds of

feet of smooth rock. The party were therefore compelled to return by the route by which they came, and reached the Montanvert at 11.30 P.M.

Messrs. C. E. and G. S. Mathews, a few days earlier, attempted to reach the col E. of the Grandes Jorasses by the ridge between the Glacier de Pierre Joseph and the secondary l'Echaud, but found themselves cut off by a precipice from the main ridge. According to their observations, the route followed by Mr. Wills is the only one that affords the smallest chance of attaining the watershed *vid* the Glacier de l'Echaud.

PIC DE TINNEVERGES: *September 24.*—Mr. Milman and Mr. Wills having slept at the chalets of Vojalaz, reached the top of the Sagéroux Pass at 6.10. Turning to the right they crossed the valley lying between the Sagéroux and the glacier of Mont Ruan, scaled the rocks on the opposite side, crossed the glacier, and climbing by a couloir reached the ridge of the Tinneverges at 9.10. Skirting the western side of the ridge, and crossing a great extent of glacier, they found a long and steep couloir, which led them to the ridge again at 10.40. Thence they kept along the ridge till it became too difficult, when they descended a short distance on the eastern side, and after clambering over the rocks for some time reascended and reached the top at 12.10. They descended by a series of shale banks and precipitous couloirs to the pasturages of Tinneverges, and making the passage of the Croix Moccand, descended to the foot of the Cascade de la Méridienne, and reached Sixt at 6.30, and the Eagle's Nest at 8.30 P.M. Mr. Wills had previously made the first ascent of the mountain on the 6th October 1863, starting from Sixt at 3.45, ascending and descending by the Croix Moccand, and returning to Sixt at 8.30 P.M. No other ascent of this peak has yet been made. The scenery is very remarkable. Guide: Claude Gurlie of Samöens. Joseph Bozon, of the hotel at Sixt, accompanied the party this year as a volunteer, and knows the way.

Mr. Whitwell sends a note recommending travellers intending the ascent of Mont Blanc to sleep at the Pierre Pointue, where there is now good accommodation; and suggesting that the principal advantage of the Goûté route may be obtained by ascending from the Grand Plateau to the ridge between the Dome du Goûté and the Bosse, and descending the usual way. This he found quite practicable, starting from the Pierre Pointue.

#### *Monte Rosa District.*

COL DU GRAND CORNIER: *July 27.*—Messrs. Hornby and Philpott, with Christian Lauener and Joseph Viennin, made a pass from Zinal to Evolena between the Dent Blanche and Grand Cornier. 'We left Zinal at 3.15 A.M., and went up the Zinal Glacier until opposite the line of séracs which stretch from the Dent Blanche to the Grand Cornier. We found a good but steep passage through these near the cliffs of the Dent Blanche, and, crossing a level plateau, reached the foot of a wall of rock joining the two peaks, well marked on the Federal map. There is a central snow couloir not unlike the Strahleck wall; but the rocks on the right are easy to climb. At 10 A.M. we reached the col, from which the Grand Cornier might probably be ascended without much

difficulty. Bearing to the right, we descended by easy snow slopes to the alp above Abricolla, and reached Evolena at 2.30 P.M.'—J. J. H.

COL DE MOIRY: *July 28.*—The same party left Evolena at 2.55 A.M., and, turning to the left about half an hour below Abricolla, ascended a steep alp to a small glacier. 'Crossing this, we went up steep rocks till, at a spot a little S. of the point marked 3570 on the Federal map, we looked down a very steep cliff of crumbling rocks on to the Glacier de Moiry. Descending this cliff with some little difficulty and danger from falling stones, we crossed the glacier above the great ice-fall to a col marked 3195 on the Federal map, just under the Pigne de l'Allée. Thence we descended by steep rock, shale, and snow to the Alp de l'Allée, reaching Zinal at 3.15.'—J. J. H.

BRUNEGG JOCH: *July 30.*—The same party left Zinal at 2 A.M., and, passing the Châlets de Tracuit, reached at 5.30 a col overlooking the Upper Turtmann Glacier. For this col Mr. Hornby suggests the name COL DE TRACUIT: it will be seen below that Mr. Heathcote describes a pass over the same ridge, if not identical, as Col des Diablons. 'Descending a little to round a spur from the Weisshorn, we remounted by an easy slope, and reached at 8.30 a col just N. of the Brunegg-horn, whence the Abberg Glacier flows down towards St. Nicholas. The descent of the upper ice-fall gave us some trouble. The lower ice-fall may be turned by the moraine and snow slope on its left bank. We reached Randa at 1.25.'—J. J. H.

SCHALLEN JOCH: *August 10.*—Messrs. Hornby and Philpott, with Christian Almer and Christian Lauener, made a pass from Zinal to Randa between the Weisshorn and Schallenhorn. 'We left Zinal at 3 A.M., passed the Arpitetta Alp, and made across the lower part of the Weisshorn Glacier to the rocks. Leaving these on our left, we ascended the very steep and hard snow and ice slopes which lead to the col marked 3751 on the Federal map. We did not reach it till 12, Almer having hard work with the axe all the way. The glacier on the other side is almost a continuous ice-fall, and heavy falling snow made it difficult to find a route. The descent must be made towards the right bank of the glacier, bearing towards the lower part of the Hohlicht Glacier, thence by the Schallenbach and Schallen Alp to Randa, which we reached at 5.'—J. J. H.

*August 12.*—Mr. E. N. Buxton and party, comprising two ladies, ascended the Moro from Macugnaga, and then, changing their plan, turned to the left and made their way over the névé of the Sewinen and Schwarzberg Glaciers to the Weisssthor, and crossed it to the Riffel. The distance from the top of the Moro to the foot of the arête of the Weisssthor would generally be about 3hrs., and all easy walking; and it would always be possible, if time failed, or it were otherwise desirable, to turn down the Schwarzberg Glacier to Mattmark. This may be strongly recommended instead of the usual route of the Weisssthor from Macugnaga to Zermatt, unless the snow should happen to be very soft and deep.

COL DES DIABLONS: *August 13.*—Mr. Heathcote, with Moritz Andermatten and a porter, left Gruben at 4 A.M., and ascended the Turtmann Glacier. Finding the lower ice-fall of the W. branch very difficult, they

ascended the E. one for a short distance, and, climbing over the dividing ridge, gained the plateau between the two ice-falls of the W. branch, and thence ascended under the cliffs of the Diablons to the col between that peak and the Weisshorn, which they reached at 11. The descent thence to Zinal is, as before mentioned, perfectly easy. It seems that this point alone is reasonably easy of access from the Grûben side, whereas the ridge can be reached at almost any point from Zinal.

ROTHHORN: *August 22.*—Messrs. Stephen and Grove, with Melchior and Jacob Anderegg, left Zinal at 1.55, and reached a col between the Rothhorn and Lo Besso via the Durand Glacier at 7.55. This col looks down on the Moming Glacier. 'Hence we ascended the arête of the Rothhorn, and gained the summit at 11.15, the last two hours being over the most difficult rocks I ever crossed. We got back to Zinal at 6.45 P.M.'—L. S.

COL TOURNANCHE: *August 25.*—Messrs. J. A. Hudson and Jacomb, with Peter Perrn and Ignatz Lauber of Zermatt, crossed from Zermatt to the head of Val Tournanche between the Matterhorn and Dent d'Hérens. Starting from Zermatt at 4 A.M., they ascended the Zmutt Glacier by the ordinary route, and, turning to the left beyond the base of the Matterhorn, ascended the E. branch of the Tiefenmatten Glacier to the col lying under the Matterhorn, which has been frequently gained from Breuil in attempts on that peak. Height 11,398'. This was reached at 1.10 P.M., and they arrived at Breuil at 5.40 P.M.

PASSES ACROSS THE FLETSCHHORN RANGE.—Some confusion having arisen about the new passes made in this region in the summers of 1863 and 1864, it is desirable to state distinctly the names which have been finally attached to them. Three passes have been made from the Laquinthal into the Saasthal, viz.: the COL DU WEISSMIES, by Messrs. Riddell and King, from the Laquinthal round the S. side of the Weissmies on to the route of the Zwischbergen Pass; the LAQUIN JOCH, by Messrs. Robertson and Heathcote, from Saas between the Weissmies and Laquinhorn (S. peak of the Fletschhörner) to the head of the Laquin Glacier; and the FLETSCH JOCH, by Messrs. Jacomb and Chater, between the two Fletschhörner, otherwise known as Laquinhorn and Rossbodenhorn.

#### *Bernese Oberland.*

MITTEL JOCH: *August 8.*—Messrs. Jacomb and J. A. Hudson, with Peter Perrn and Ignatz Lauber, both of Zermatt, after crossing the Lauteraar Sattel from the Grimsel, passed under the Rosenhorn and Mittelhorn to a bivouac on the rocks on the W. side of the latter mountain. Leaving this at 5.30 the following morning, they ascended, in two hours, to a col immediately under the Mittelhorn. Mr. Jacomb's measurements assign it a height of 11,495'. A short and easy descent led to the plateau whence the final ascent of the Wetterhorn is usually commenced; and, after ascending that mountain, the party crossed the N. slopes of the Mittelhorn to the basin forming the head of the Rosenlauri glacier, which they descended to Rosenlauri. In crossing the basin, Mr. Jacomb ascertained that the supposed connection between the Rosenlauri and Gauli glaciers really

exists, he having had last year an opportunity of visiting the Gauli side, but having then been prevented by mist from examining the Rosenlaur side also.

**JUNGFRAU FROM LAUTERBRUNNEN:** *August 9.*—Messrs. Stephen, Macdonald and Grove, with Melchior and Jacob Anderegg and J. Bischof of Lauterbrunnen, started at 1 A.M. from Lauterbrunnen and ascended the Roththal, intending to cross the Lawinen Thor. They discovered a couloir, however, leading straight up to the Roththal Sattel, and reached that point about noon, after four hours and a half severe climbing. There were some very difficult rocks to ascend from the Roththal Glacier before getting into the couloir, which ceases abruptly about three-quarters of the way down. From the col they ascended the Jungfrau in three-quarters of an hour, the snow being in perfect order, and reached the *Äggischhorn* at 7.15.

**ALETSCHEORN:** *August 13.*—Messrs. Hornby and Philpott, with Christian Almer and Christian Lauener, ascended this peak by the Bell Alp or Ober Aletsch route, and descended to the *Äggischhorn* by the Mittel Aletsch route, the one by which this peak was first climbed. The snow being in good order, the whole day's work, including an hour on the summit and other halts, was only 12hrs. 40m.: so that the expedition is by no means one of unreasonable length.

**JUNGFRAU JOCH:** *August 16.*—The same party, with J. Bischof to carry a ladder, succeeded in descending by this pass to the Wengern Alp. 'We left the Faulberg at 2, reached the col at 5.5, the great crevasse at 8.30, were off the ice at 10.30, and reached the Wengern Alp inn at 11.40. The expedition was made at Almer's suggestion, he thinking that by a forced march we might begin the descent soon enough to avoid any greater danger than is incurred by ascending from the Wengern Alp, though the difficulty is probably greater. We began the descent of the first great ice-cliff by the steep E. face overlooking the hollow separating us from the Mönch. Lower down we succeeded in turning the NE. angle of the cliff, and made the rest of the descent to the first plateau by the N. face. The great crevasse was far too wide for the ladder, but by a skilful use of it, combined with some step-cutting, Almer got us down on to some débris jammed in the centre, and so up the other side. I doubt whether any other guide, unless it be Melchior Anderegg, could have led us down from the col. The great crevasse had driven back a party on the previous day, headed by Peter Michel, and armed with a longer ladder than ours.'—J. J. H.

**FALDUM PASS:** *September 8.*—Messrs. Brooksbank and Hayward, with Franz Andermatten and Kasper Blatter, made this easy and very interesting pass from Leukerbad to Kippel. After ascending the *Torrenthorn*, they descended by the path for a few minutes, and then rounding the *Torrenthorn* to the E., reached in 2hrs. the col between the *Rothhorn* and *Laucherspitze*, whence 2hrs. more brought them to *Ferden* in the *Lötschenthal*.

The *Wetterlücke*, mentioned in our last number, has been again crossed by Mr. Whitwell, from the Lauterbrunnen side, and the *Birchfluh Pass* several times. Messrs. Brooksbank and Hayward, in crossing the latter, turned up the mountain side at *Kühmatten*, about

2½ hrs. above Kippel, instead of ascending to the highest huts in the valley an hour farther, thus saving some time. The Eiger also, in consequence of the great amount of snow, has been ascended several times with comparative ease—once by a lady. On the last ascent, by Messrs. Hornby and Philpott, the whole expedition including halts was completed under 9 hrs. The same was also the case with the Wetterhorn, as Messrs. Moore and Walker especially found—these gentlemen, led by Christian Almer, having started from Grindelwald soon after midnight, ascended the peak, gone down the little known route to Rosenlauri, and returned over the Scheideck to Grindelwald by 8.20 P.M.

#### *Alps of Uri.*

**SPANNORTER JOCH:** *August 4.*—Mr. Jacomb, with Johann Tannler of Meyringen and Eugene Imfang of Engelberg, ascended from Engelberg to the col between the Spannörter, to which his measurements assigned a height of 9,823'. Thence he descended by the glacier locally called Gummeren and the Erstfeld Thal, into the St. Gothard road.

**DAMMA PASS:** *August 6.*—Mr. Jacomb, with Johann Tannler of Meyringen and a porter, left the Geschenen Alp at 3.30 A.M., and, after passing up the Damma Glacier and ascending a high wall of rocks, reached the col at its head at 9.15 A.M., in the expectation of descending on to the Trift-Gletscher Joch. They found, however, that the ridge did not dominate that snow-field, but a large glacier descending from the SE. side of the Galenstock. Mr. Jacomb's measurements give the col a height of 10,571'. After several trials, a descent of the rocks to the large glacier was, with great difficulty, effected at 1.0 P.M. The glacier appeared to flow in the direction of the Furka route and Realp, but the party crossed it, and, keeping high along the mountain-slopes, joined the Furka route five minutes from the inn at 5.0 P.M.

**GESCHENEN LIMM:** *August 17.*—Mr. Brooksbank, with Kaspar Blatter of Meyringen, and Kaspar Luchs, son of the landlord at Stein, crossed from the Stein Glacier to the Kehle Glacier, which lies at the head of the Geschenen Thal. Time, 8½ hrs. actual easy walking from Stein to Geschenen.

#### *Tödi District.*

**SCHER JOCH:** *July 31.*—Messrs. Stephen, Grove and Macdonald, with Melchior and Jacob Anderegg, made this useful variation on the Clariden pass. 'We started from the inn at Urnerboden, and tried to ascend the Claridenstock by the arête which comes down to the top of the Klausen pass. Finding ourselves cut off by an impassable wall of glacier, we descended on the Gries glacier, and, mounting this, reached a col between the Scherhorn and Ramlistock. Descending from this, we joined the ordinary track of the Clariden pass a little above the great ice-fall of the Hufi glacier, and walked down to Amsteg. Time about 5 hrs. from Urnerboden to the top of the pass, and six or seven thence to Amsteg.'—L. S.

#### *Bernina District.*

**PASSO DI FERRO:** *August 9.*—Messrs. D. W. Freshfield, J. D. Walker and Beachcroft, with Francois Devouassoud, made another pass from Val

Bregaglia into Val Masino. 'Starting from Promontogno in the Bregaglia, we ascended by the steep and crevassed Bondasca Glacier to a col lying between two snow hummocks at its head. The descent lay at first over a small glacier. Leaving the ice for the rocks on the left we gained the Alp di Ferro, whence a path leads by the side of a waterfall into the eastern branch of Val Masino, half an hour above San Martino. This pass lies to the E. of the Passo di Bondo, which leads into Val Porcellizza. Time, 10hrs.'—D. W. F.

**PALU PASS:** *August 17.*—The same party crossed over the Piz Palù, the S. side being, as Mr. Buxton supposed (see *Alpine Journal*, p. 342), tolerably accessible. 'Leaving the Fellaria châteaux at 4 A.M., we ascended the Fellaria Glacier, and crossing from its upper névé on to that of the Palù Glacier, reached the foot of the peak in 4hrs. Thence we climbed the steep cliff which forms the southern face of the mountain to the gap between the central and eastern peaks. Passing over the latter we descended by the route of Mr. Buxton's ascent, expending 2½hrs. in cutting steps on the snow-wall, and reached the Bernina Inn viâ the Diavolezza Pass at 7 P.M.'—D. W. F.

**SILVRETTA PASS:** *August 16.*—Messrs. Girdlestone and Pilcher, with no guide, left Klosters at 7.30 A.M., reached the Sardasca châteaux at 9.45, and the foot of the Silvretta Glacier in 1h. 20m. more. 'At first we kept along the N. bank of the glacier, but in 30m. we left it and walked straight SE. to the col, crossing a considerable bergschrund near the top. Time, 3hrs. from the foot of the glacier. The summit of the pass consists of a snow plateau about 200 yards across, the only rocks being at the SE. corner of the plateau close under Piz Buin. The descent to Guarda occupied 3¼hrs., and was perfectly easy, the route lying at first E. across a snow basin to a snow col between Piz Buin and a nameless peak to the S., thence down the glacier into the head of Val Tuoi and by it to Guarda. No milk is to be had at any of the châteaux between the Sardasca and Guarda.'—A. G. G.

#### *Tyrolese Alps.*

**PRESANELLA:** *August 25.*—Mr. Freshfield's party started from Pizzano, the highest village in Val Vermiglio, and turning up the glen which opens opposite the new Austrian fort on the Tonale road, slept at a shepherd's hut 2hrs. walk from Pizzano. 'Starting at 3 A.M. we reached the glacier in 2hrs., and a col overlooking the head of Val di Genova in 2hrs. more. Turning due E. from the col we climbed steep slopes intersected by crevasses, until the ridge connecting the E and W. summits of the Presanella was gained. Thence the way to the foot of the eastern and highest peak lies principally along an ice arête, which required much step-cutting. A small plateau immediately under the summit attained, the final climb up the rocks on the SW. face of the peak is easy. We were 3¼hrs. in ascending from the col, ¾hr. in returning; 2hrs. more brought us into the head of Val di Genova, 3½hrs.' walk from Pinzolo.'—D. W. F.

*August 26.*—'We started for the Bocca di Brenta, but being misled by a local porter, were taken to a gap in the heart of the Brenta Alta, connecting the glaciers which fall into the heads of Val Brenta and



Val d'Agnola. Being caught in a snow-storm and unable to find a pass across the main chain, we descended over some troublesome rocks into Val d'Agnola, returning by the Brenta dell' Orso to Pinzolo. The pass thus made, lying close to the peak marked in the Austrian map *Cima Pra dei Camuzzi*, might be appropriately christened *BOCCA DEI CAMUZZI*.—D. W. F.

PISGANA PASS.—Mr. Ball sends a narrative, which will appear in our next number, of this very interesting pass from Val di Genova to Val Camonica.

ANTELAO: *Sept. 8.*—Lord Francis Douglas and Mr. Latham, with Matteo Orsi of Borca, left the inn at St. Vito at 4.45 A.M. In 1hr. 45m. they reached the top of the Forcella Piccola, then turned into the rock basin on the right, and in 55m. reached the arête at the top of these very steep rocks. Following this to the foot of the last peak they reached the summit after 3hrs. 15m. more climbing at 11.15 A.M. The descent, which occupied almost as long as the ascent, was made from the arête upon the apex of the slopes of *geröll* in the basin before mentioned, Orsi saying that the rocks up which the ascent had been made were too dangerous to descend. Time, without halts, 11½ hrs. The Antelao was ascended in 1863 by Herr Grohmann, but never before by Englishmen. Orsi is the only man who knows the mountain: he is a good guide (firstrate on rocks), and very good-tempered and civil.

We are informed also that in September Herr Specht of Vienna, with Pöll of Ischgl in the Paznaun Thal as guide, gained the summit of the Königsspitze, though not without considerable difficulty, by the glacier on its NW. flank (mentioned by Mr. Tuckett as a possible mode of access), and descended by that gentleman's route. Herr Grohmann has also at length succeeded in vanquishing the highest peak of the Marmolata.

\* \* Several of the new expeditions briefly mentioned above will be described in future numbers of the *Alpine Journal* among the series of *Alpine Byways*. Among these may be specially mentioned the following:—

- Col des Planards, from St. Pierre to the Ferrex châteaux.
- Faldum Pass, from Leukerbad to Kippel.
- Geschenen Limmi, from Stein to the Geschenen Thal.
- Bocca dei Camuzzi, from Val Brenta to Val d'Agnola.

## NOTES AND QUERIES.

ACCIDENT ON THE PIZ MORTERATSCH.—We reproduce the remarkable narrative of this occurrence from the pen of Professor Tyndall, which appeared in *The Times* shortly after the event, with a short letter, giving one or two additional facts, from another of the travellers.

'Towards the end of last July (Saturday, July 30), while staying at Pontresina, in Ober Engadin, I was invited by two friends to join in an expedition up the Piz Morteratsch. This I willingly did, for I wished to look at the configuration of the Alps from some commanding point

in the Bernina mountains, and also to learn something of the capabilities of the Pontresina guides. We took two of them with us—Jenni, who is the man of greatest repute among them, and Walter, who is the head of the bureau of guides. We proposed to ascend by the Roseg, and to return by the Morteratsch glacier, thus making a circuit, instead of retracing our steps. About eight hours of pleasant healthful exertion placed us on the Morteratsch Spitze, where we remained for an hour, and where the conviction forced on my mind on many another summit was renewed—namely, that these mountains and valleys are not, as supposed by the renowned President of the Geographical Society, ridges and heaps tossed up by the earth's central fires, with great fissures between them, but that ice and water, acting through long ages, have been the real sculptors of the Alps.

‘Jenni is a heavy man, and marches rather slowly up a mountain, but he is a thoroughly competent mountaineer. We were particularly pleased with his performance in descending. He swept down the slopes and cleared the “schrunds” which cut the upper snows, with great courage and skill. We at length reached the point at which it was necessary to quit our morning's track, and immediately afterwards got upon some steep rocks, which were rendered slippery here and there by the water which trickled over them. To our right was a broad couloir, which was once filled with snow, but this had been melted and refrozen, so as to expose a sloping wall of ice. We were all tied together at this time in the following order:—Jenni led, I came next, then my friend H., an intrepid mountaineer, then his friend L., and last of all the guide Walter. L. had had but little experience of the higher Alps, and was placed in front of Walter, so that any false step on his part might be instantly checked. After descending the rocks for a time Jenni turned and asked me whether I thought it better to adhere to them or to try the ice-slope to our right. I pronounced in favour of the rocks, but he seemed to misunderstand me, and turned towards the couloir. I stopped him before he reached it, and said, “Jenni, you know where you are going; the slope is pure ice.” He replied, “I know it; but the ice is quite bare for a few yards only. Across this exposed portion I will cut steps, and then the snow which covers the ice will give us a footing.” He cut the steps, reached the snow, and descended carefully along it—all following him, apparently in good order. After a little time he stopped, turned, and looked upwards at the last three men. He said something about keeping carefully in the tracks, adding that a false step might detach an avalanche. The word was scarcely uttered when I heard the sound of a fall behind me, then a rush, and in the twinkling of an eye my two friends and their guide, all apparently entangled together, whirred past me. I suddenly planted myself to resist their shock, but in an instant I was in their wake, for their impetus was irresistible. A moment afterwards Jenni was whirled away, and thus all five of us found ourselves riding downwards with uncontrollable speed on the back of an avalanche which a single slip had originated.

‘When thrown down by the jerk of the rope, I turned promptly on my face and drove my baton through the moving snow, seeking to anchor it in the ice underneath. I had held it firmly thus for a few

seconds, when I came into collision with some obstacle and was rudely tossed through the air, Jenni at the same time being shot down upon me. Both of us here lost our batons. We had, in fact, been carried over a crevasse, had hit its lower edge, our great velocity causing us to be pitched beyond it. I was quite bewildered for a moment, but immediately righted myself, and could see those in front of me half-buried in the snow, and jolted from side to side by the ruts among which they were passing. Suddenly I saw them tumbled over by a lurch of the avalanche, and immediately afterwards found myself imitating their motion. This was caused by a second crevasse. Jenni knew of its existence and plunged right into it—a brave and manful act, but for the time unavailing. He is over thirteen stone in weight, and he thought that by jumping into the chasm a strain might be put upon the rope sufficient to check the motion. He was, however, violently jerked out of the fissure and almost squeezed to death by the pressure of the rope.

‘A long slope was below us, which led directly downwards to a brow where the glacier suddenly fell in a declivity of ice. At the base of this declivity the glacier was cut by a series of profound chasms, and towards these we were now rapidly borne. The three foremost men rode upon the forehead of the avalanche, and were at times almost wholly immersed in the snow; but the moving layer was thinner behind, and Jenni rose incessantly and with desperate energy drove his feet into the firmer substance underneath. His voice shouting, “Halt! Herr Jesus, halt!” was the only one heard during the descent. A kind of condensed memory, such as that described by people who have narrowly escaped drowning, took possession of me; and I thought and reasoned with preternatural clearness as I rushed along. Our start, moreover, was too sudden and the excitement too great to permit of the developement of terror. The slope at one place became less steep, the speed visibly slackened, and we thought we were coming to rest; the avalanche, however, crossed the brow which terminated this gentler slope, and regained its motion. Here H. threw his arm round his friend, all hope for the time being extinguished, while I grasped my belt and struggled for an instant to detach myself. Finding this difficult I resumed the pull upon the rope. My share in the work was, I fear, infinitesimal, but Jenni’s powerful strain made itself felt at last. Aided probably by a slight change of inclination, he brought the whole to rest within a distance of the chasms over which, had we preserved our speed, a few seconds would have carried us. None of us suffered serious damage. H. emerged from the snow with his forehead bleeding, but the wound was superficial. Jenni had a bit of flesh removed from his hand by collision against a stone; the pressure of the rope had left black welts on my arms; and we all experienced a tingling sensation over the hands, like that produced by incipient frostbite, which continued for several days. I found a portion of my watch-chain hanging round my neck, another portion in my pocket; the watch itself was gone.

‘This happened on the 30th of July. Two days afterwards I went to Italy, and remained there for ten or twelve days. On the 16th of August I was again at Pontresina, and on that day made an expedition in search of the lost watch. Both the guides and myself thought the

sun's heat might melt the snow above it, and I inferred that if its back should happen to be uppermost the slight absorbent power of gold for the solar rays would prevent the watch from sinking as a stone sinks under like circumstances. The watch would thus be brought quite to the surface; and, although a small object, it might possibly be seen from some distance. I was accompanied up the Morteratsch glacier by five friends, of whose conduct I cannot speak too highly. One of them in particular, a member of the British Legislature, sixty-four years of age, exhibited a courage and collectedness in places of real difficulty which were perfectly admirable.

'Two only of the party, both competent mountaineers, accompanied me to the scene of the accident, and none of us ventured on the ice where it originated. Just before stepping upon the remains of the avalanche, a stone some tons in weight, detached by the sun from the snow-slope above us, came rushing down the line of our glissade. Its leaps became more and more impetuous, and on reaching the brow near which we had been brought to rest it bounded through the air, and with a single spring reached the lower glacier, raising a cloud of ice-dust in the air. Some fragments of rope found upon the snow assured us that we were upon the exact track of the avalanche, and then the search commenced. It had not continued for twenty minutes when a cheer from one of the guides—Christian Michel of Grindelwald—announced the discovery of the watch. It had been brought to the surface in the manner surmised, and on examination seemed to be dry and uninjured. I noticed, moreover, that the position of the hands indicated that it had only run down beneath the snow. I wound it up, hardly hoping, however, to find it capable of responding. But the little creature showed instant signs of animation. It had remained eighteen days in the avalanche, but the application of its key at once restored it to life, and it has gone with unvarying regularity ever since.'

'JOHN TYNDALL.'

*To the Editor of the Alpine Journal.* DEAR SIR,—As one of the party concerned in the accident on the Piz Morteratsch last July, I trust I shall not be thought presumptuous in bearing my testimony to the entire accuracy of Professor Tyndall's account. I can add no facts of any importance to those there mentioned, unless it be that we estimated the distance down which we were carried at fully 1,000 feet—a conclusion which, Mr. Tyndall tells me, was confirmed by his subsequent visit to the spot. The angle of the slope we did not measure, nor can I give the time of our descent with any accuracy; it seemed to me a lifetime. From the moment that the snow cracked, Jenni behaved with the greatest coolness and courage. But he ought not to have taken us down the ice-slope so late in the day—it was then nearly half-past two o'clock—and that after a warning word from Professor Tyndall and myself. Of Walter's conduct the less said the better; our opinion of his courage was not raised by this trial of it. Mr. Tyndall speaks of his own share in the work as 'infinitesimal.' I must say that both Lee-Warner and I thought very differently, and feel that the safety of the party was in no small degree owing to his efforts.—Yours truly,

C. B. HUTCHINSON.

ON THE COMPARISON BETWEEN THE METRICAL AND ENGLISH READINGS IN DOUBLE SCALE BAROMETERS.—In the June number of the *Alpine Journal* is a paper by my friend Mr. Packe, in which he attributes the larger part of the discrepancy between the barometric pressures corresponding to the French and English boiling-points to the difference between the standard temperatures of the French and English units of length.

I believe this conclusion to be erroneous, and I propose to state as briefly as possible my reasons for dissenting from it.

'First,' writes Mr. Packe, 'as to the discrepance arising from the standard temperatures. That of the English barometer being 30° F. higher than that of the French scale, when the mercurial column is reduced to the freezing point, the scale of the French barometer is also reduced to the freezing point, but the scale of the English one is only reduced to the temperature of 62° F.'

*'The consequence is that the French barometer, when reduced, will always read higher than the English barometer.'*

The unsoundness of this inference will appear from the following considerations.

By reducing the French barometer we obtain the length of a column of mercury at 0° C, estimated in millimetres at the standard temperature of 0° C.

By reducing the English barometer we obtain the length of the same column of mercury, at the same temperature, estimated in English inches at the standard temperature of 62° F.

From Guyot's tables for the conversion of millimetres into English inches, and vice versa, we express millimetres at the standard temperature of 0° C in terms of English inches at the standard temperature of 62° F.

*The consequence is that the reading of the French barometer, when reduced and converted into English inches by Guyot's tables, ought always to coincide exactly with the reading of the English barometer.*

From the following further quotation from Mr. Packe's paper, it is easy to show how he has arrived at a different conclusion.

'For exact observation, therefore, it is useless to have a barometer marked with a double scale—the French and English; they cannot be made to coincide, e. g. :

'Let the barometer read 29 inches = 736.59 millimetres (temperature 62° F = 16.67 C). In the English scale at 62° (the temperature of the standard) no correction is made for the brass scale. The only correction is for the expansion of the mercury—·087.

$$\begin{array}{r} 29 \text{ inches} \\ - \quad \cdot 087 \\ \hline \text{reduced } 28.913 = 734.38 \text{ mm.} \end{array}$$

'But in the French scale, the temperature of the standard being 32° F, the correction to be made is for the expansion of the mercury—the expansion of the scale.

$$\begin{array}{r}
 \text{Expansion of the mercury for } 16\cdot67^{\circ} \text{ C.} \quad = \quad 2\cdot212 \text{ mm.} \\
 \text{Expansion of brass scale for ditto} \quad = \quad - \quad \cdot231 \\
 \hline
 \qquad \qquad \qquad 736\cdot59 \text{ mm.} \\
 \quad - \quad 1\cdot981 \\
 \hline
 \text{reduced } 734\cdot61 = 28\cdot9224 \text{ inches.}
 \end{array}$$

Mr. Packe evidently supposes that in a barometer with a double scale, when the attached thermometer is at  $62^{\circ} \text{ F} = 16\cdot67^{\circ} \text{ C}$ , and the English reading is 29 inches, the metrical reading will be 736·59 mm.

Now, if the metrical scale is properly graduated, this will not be the case. 736·59 mm. is what the reading would be, if the metrical scale were at its standard temperature of  $0^{\circ} \text{ C}$ . But by hypothesis it is at  $62^{\circ} \text{ F}$ ; it has therefore expanded through the space due to an increase of temperature of  $30^{\circ} \text{ F}$ , that is, through  $\cdot23$  mm.

If, then, the English reading be 29 inches, the corresponding metrical reading will be 736·36 mm.

$$\begin{array}{r}
 \qquad \qquad \qquad 736\cdot36 \text{ mm.} \\
 \text{Reduction for } 16\cdot67 \text{ C} \quad 1\cdot98 \\
 \text{Reduced reading} \quad \hline
 734\cdot38 = 28\cdot913 \text{ inches,}
 \end{array}$$

precisely the same result that is obtained by the direct reduction of the English reading.

I make the proviso, if the metrical scale is properly graduated, as there is reason to fear that this is not the case with many double-scale barometers made in this country.

WM. MATHEWS, Jun.

ALPINE BYWAYS. VIII.—*From Riva to Pinzolo by Molveno and the Bocca di Brenta.*—In the second volume of the Alpine Guide there is a short notice of the Bocca di Brenta Pass, derived from imperfect and partly incorrect information which I had received in a former visit to Val Rendena. On the 22nd July last I took this pass on my way from Riva to Pinzolo. Though not quite corresponding to the description given in the above-mentioned work, this is a singular and interesting pass, well deserving the notice of travellers who may visit this picturesque district. The most direct way to Molveno from Le Sarche, where the road to Tione joins the main line from Riva to Trento, is by Ragno; but, adopting the advice of the landlord of the little inn at Le Sarche, I followed the Tione road for about three miles through the fine defile of the Sarca, and then descended by a rough path to a bridge over the river. It is a very hot but picturesque walk from thence to Le Mulina. Then follows an ascent over a barren stony tract, apparently the remains of a great bergfall, till the tract reaches the W. shore of the pretty Lake of Molveno. This has no visible outlet, as the stream after making its way underground through the vast piles of rubbish above Le Mulina first comes to light near that hamlet. Molveno is in a charming situation on rising ground at the N. end of the lake, about 3,025 feet above the sea. I found a good bed and much civility at Giacomo's Osteria. Fresh meat is seldom to be had in such places, but on my way I secured a good-sized perch just fished from the lake, and obtained at the village inn an excellent salt tongue which served me for

dinner on the three following days. According to the concurrent testimony of all those whom I consulted, the highest summit of the group of pinnacles that bear in Val Rendena the collective name Brenta Alta, is called La Tosa on the Molveno side of the mountain. It is a dome of snow sustained on three sides by precipitous walls of rock, but it appears to me that it would be accessible with little difficulty from Molveno, provided it were possible to find a guide or companion in the least accustomed to ice work. The name Cima Tosa, given on the Austrian map to a much lower summit lying north of the Val delle Seghe, is not applied to any of the peaks in that part of the range by the country people at Molveno or in Val Rendena.

Bonifazio Nicolosi, an active young chamois hunter, was my guide from Molveno to the pass. The way lies through the Val delle Seghe amid rock scenery of the highest order. The regular track mounts for some distance along the right bank of the stream, but there is a shorter way very faintly marked by the opposite bank. It lies chiefly through a forest of pine and beech, beneath whose shade the botanist may gather some rare plants. At a point where the main glen is formed by the confluence of several steep ravines descending between the noble limestone pinnacles that rise on every side, the way lies up a slope of barren débris, and then bears to the left. A very rough cattle track which might be easily missed facilitates the ascent, and leads past the highest beeches which here attain the very unusual altitude of 5,500 feet. These were reached in two hours from Molveno. Another hour and a half of very easy walking, interrupted by rare plants, led us to the Malga dei Vitelli, apparently the highest station of the herdsmen on this side. By the bank of the torrent a long halt was made for a second breakfast and botanising on the neighbouring rocks. The ascent from the Malga to the pass is over rough ground, but quite free from difficulty. The best way is to keep to the *thalweg*, and not to mount the débris lying on the right hand. The pass might be supposed to lie straight ahead, but after ascending for nearly an hour the true pass is seen to the right, and when once seen is quite unmistakable; but, should clouds come on, as happened to us a few minutes after it came in view, a stranger might easily miss the way, as there is no trace of path. The pass is a true gateway, about fifteen feet in width, between two bold limestone peaks or pinnacles; but it is less remarkable than another opening which was once pointed out to me from Val Agnolo as the Bocca di Brenta, and which I have ventured in the Alpine Guide to compare to the well-known Brèche de Roland. At the summit, which is 8,455 feet above the sea by my observations, the clouds partially cleared; but, except towards the north-east, there appears to be little distant view. In the ascent little snow was encountered, but on the opposite side the way lay down a long slope of soft snow, which would be tedious in ascending from the Val Brenta, as the wild rocky glen is called that leads from the pass down to Val Nambino. The snow came to an end about at the level attained by the highest creeping pines (*P. mughus*) which here rise to 7,200 feet. Soon after occasional traces of cattle were seen, but there remained a long descent before we found the highest *malga*, which lies in a hollow

amidst rocks and trees on the left bank of the torrent. It is easily overlooked as the beaten cattle-track descends on the right bank. Lovers of milk who turn aside to reach the *malga* must continue the descent by bearing well to the left, or they will be arrested by a lofty barrier of cliffs that divide the middle from the lower portion of Val Brenta. A rough and steep path will lead them down to a plank bridge, and, crossing to the right bank, they will rejoin the main track. After awhile, this traverses some extensive meadows where there are three or four houses or *sheda*. Here keep well to the left to reach a bridge, and then follow a cart-track on the left bank, which leads through very pleasant scenery to some extensive saw-mills lying on both banks of the Nambino torrent, where the timber which is being felled in the neighbouring glens is converted into planks, and carried by a very rough road down to Pinzolo. Bonapace's inn at that village is reached in one hour and three-quarters from the saw-mills, or in about nine hours, exclusive of halts, from Molveno. A guide is not required for the descent; but in ascending from Val Nambino, as well as from Molveno, it is quite possible to go astray. In the former case, after passing the highest *malga*, there is a choice between two narrow rocky gorges into which the glen divides. The true course is by that which lies to the left in ascending through Val Brenta.

J. BALL.

ASCENT OF LA ROSSE.—A note of an ascent of this, 'the most southernly of the three secondary peaks of the Grivola,' arrived too late for insertion in the summary of new expeditions. It was ascended by Messrs. Sedley, Taylor, and Montgomery, with the guide Johann Tannler, in about 4hrs. from Cogne. Being thus short and easy, this expedition may be safely recommended, as commanding a near view of both the Grivola and the Grand Parades.

METEOROLOGICAL NOTE.—I crossed the Col d'Argentière from La Folie on August 3rd, and found the thermometer planted there by F. F. Tuckett (marked Casella, London, Alpine Club, 314) suspended all right, but the bulb burst off beside the tube, the instrument being suspended in position as first placed. The index showed 30° C below zero, but a bubble still remaining at 16°, makes the above indication, perhaps, hardly trustworthy.

T. WHITWELL.

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\* \* \* Readers of this Journal who may be willing to communicate information for the Third Part of the 'Alpine Guide,' including all the Alps East of the Adige, are requested to do so at their earliest convenience. Information as to new and unfrequented routes, and notes as to inns, new roads, or horse-paths, and the distances from one place to another even on frequented routes, will be thankfully received by the Editor, whose address is: Care of Messrs. Longman & Co., 39 Paternoster Row, E.C.



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