

***JOHN
TYNDALL***

***HOURS
OF EXERCISE
IN THE ALPS***

John Tyndall

Hours of Exercise in the Alps

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PREFACE.

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A short time ago I published a book of 'Fragments,' which might have been called 'Hours of Exercise in the Attic and the Laboratory'; while this one bears the title of 'Hours of Exercise in the Alps.' The two volumes supplement each other, and, taken together, illustrate the mode in which a lover of natural knowledge and of natural scenery chooses to spend his life.

Much as I enjoy the work, I do not think that I could have filled my days and hours in the Alps with clambering alone. The climbing in many cases was the peg on which a thousand other 'exercises' were hung. The present volume, however, is for the most part a record of bodily action, written partly to preserve to myself the memory of strong and joyous hours, and partly for the pleasure of those who find exhilaration in descriptions associated with mountain life.

The papers, written during the last ten years, are printed in the order of the incidents to which they relate; and, to render the history more complete, I have, with the permission of their authors, introduced nearly the whole of two articles by Mr. Vaughan Hawkins and Mr. Philip Gossett. The former describes the first assault ever made upon the Matterhorn, the latter an expedition which ended in the death of a renowned and beloved guide.

The 'Glaciers of the Alps' being out of print, I can no longer refer to it. Towards the end of the volume, therefore, I have thrown together a few 'Notes and Comments' which

may be useful to those who desire to possess some knowledge of the phenomena of the ice-world, and of the properties of ice itself. To these are added one or two minor articles, which relate more or less to our British hills and lakes: the volume is closed by an account of a recent voyage to Oran.

I refrain from giving advice, further than to say that the perils of wandering in the High Alps are terribly real, and are only to be met by knowledge, caution, skill, and strength. 'For rashness, ignorance, or carelessness the mountains leave no margin; and to rashness, ignorance, or carelessness three-fourths of the catastrophes which shock us are to be traced.' Those who wish to know something of the precautions to be taken upon the peaks and glaciers cannot do better than consult the excellent little volume lately published by Leslie Stephen, where, under the head of 'Dangers of Mountaineering,' this question is discussed.

I would willingly have published this volume without illustrations, and should the reader like those here introduced—two of which were published ten years ago, and the remainder recently executed under the able superintendence of Mr. Whympers—he will have to ascribe his gratification to the initiative of Mr. William Longman, not to me.

I have sometimes tried to trace the genesis of the interest which I take in fine scenery. It cannot be wholly due to my own early associations; for as a boy I loved nature, and hence, to account for that love, I must fall back upon something earlier than my own birth. The forgotten associations of a far-gone ancestry are probably the most

potent elements in the feeling. With characteristic penetration, Mr. Herbert Spencer has written of the growth of our appreciation of natural scenery with growing years. But to the associations of the individual himself he adds 'certain deeper, but now vague, combinations of states, that were organised in the race during barbarous times, when its pleasurable activities were among the mountains, woods, and waters. Out of these excitations,' he adds, 'some of them actual, but most of them nascent, is composed the emotion which a fine landscape produces in us.' I think this an exceedingly likely proximate hypothesis, and hence infer that those 'vague and deep combinations organised in barbarous times,' not to go further back, have come down with considerable force to me. Adding to these inherited feelings the pleasurable present exercise of Mr. Bain's 'muscular sense,' I obtain a somewhat intelligible, though, doubtless, still secondary theory of my delight in the mountains.

The name of a friend whom I taught in his boyhood to handle a theodolite and lay a chain, and who afterwards turned his knowledge to account on the glaciers of the Alps, occurs frequently in the following pages. Of the firmness of a friendship, uninterrupted for an hour, and only strengthened by the weathering of six-and-twenty years, he needs no assurance. Still, for the pleasure it gives myself, I connect this volume with the name of THOMAS ARCHER HIRST.

J. TYNDALL.

May 1871.

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Nature, thou earliest gospel of the wise,
Thou never-silent hymner unto God;
Thou angel-ladder lost amidst the skies,
Though at the foot we dream upon the sod;
To thee the priesthood of the lyre belong—
They hear religion and reply in song.

If he hath held thy worship undefiled
Through all the sins and sorrows of his youth,
Let the man echo what he heard as child
From the far hill-tops of melodious Truth,
Leaving in troubled hearts some lingering tone
Sweet with the solace thou hast given his own.

LORD LYTTON'S *King Arthur*.

'The brain,
That forages all climes to hue its cells,
Will not distil the juices it has sucked
To the sweet substance of pellucid thought,
Except for him who hath the secret learned
To mix his blood with sunshine, and to take
The winds into his pulses.'

JAMES RUSSELL LOWELL.

HOURS OF EXERCISE
IN
THE ALPS.

I.
THE LAUWINEN-THOR.

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In June 1860 I completed 'The Glaciers of the Alps,' which constituted but a fraction of the work executed during the previous autumn and spring. These labours and other matters had wearied and weakened me beyond measure, and to gain a little strength I went to Killarney. The trip was beneficial, but not of permanent benefit. The air of those most lovely lakes was too moist and warm for my temperament, and I longed for that keener air which derives its tone from contact with the Alpine snows. In 1859 I had bidden the Alps farewell, purposing in future to steep my thoughts in the tranquillity of English valleys, and confine my mountain work to occasional excursions in the Scotch Highlands, or amid the Welsh and Cumbrian hills. But in my weariness the mere thought of the snow-peaks and glaciers was an exhilaration; and to the Alps, therefore, I resolved once more to go. I wrote to my former guide, Christian Lauener, desiring him to meet me at Thun on Saturday the 4th of August; and on my way thither I fortunately fell in with Mr. Vaughan Hawkins. He told me of his plans and wishes, which embraced an attack upon the Matterhorn. Infected by his ardour, I gladly closed with the proposition that we should climb together for a time.

Lauener was not to be found at Thun, but in driving from Neuhaus to Interlaken a chaise met us, and swiftly passed; within it I could discern the brown visage of my guide. We pulled up and shouted, the other vehicle stopped, Lauener leaped from it, and came bounding towards me with admirable energy, through the deep and splashing mud. 'Gott! wie der Kerl springt!' was the admiring exclamation of my coachman. Lauener is more than six feet high, and mainly a mass of bone; his legs are out of proportion, longer than his trunk; and he wears a short-tail coat, which augments the apparent discrepancy. Those massive levers were now plied with extraordinary vigour to project his body through space; and it was gratifying to be thus assured that the man was in first-rate condition, and fully up to the hardest work.

On Sunday the 5th of August, for the sake of a little training, I ascended the Faulhorn alone. The morning was splendid, but as the day advanced heavy cloud-wreaths swathed the heights. They attained a maximum about two P.M., and afterwards the overladen air cleared itself by intermittent jerks—revealing at times the blue of heaven and the peaks of the mountains; then closing up again, and hiding in their dismal folds the very posts which stood at a distance of ten paces from the hotel door. The effects soon became exceedingly striking, the mutations were so quick and so forcibly antithetical. I lay down upon a seat, and watched the intermittent extinction and generation of the clouds, and the alternate appearance and disappearance of the mountains. More and more the sun swept off the sweltering haze, and the blue sky bent over me in domes of

ampler span. At four P.M. no trace of cloud was visible, and a panorama of the Oberland, such I had no idea that the Faulhorn could command, unfolded itself. There was the grand barrier which separated us from the Valais; there were the Jungfrau, Monk and Eiger, the Finsteraarhorn, the Schreckhorn, and the Wetterhorn, lifting their snowy and cloudless crests to heaven, and all so sharp and wildly precipitous that the bare thought of standing on any one of them made me shudder. London was still in my brain, and the vice of Primrose Hill in my muscles.

I disliked the ascent of the Faulhorn exceedingly, and the monotonous pony track which led to the top of it. Once, indeed, I deviated from the road out of pure disgust, and, taking a jumping torrent for my guide and colloquist, was led astray. I now resolved to return to Grindelwald by another route. My host at first threw cold water on the notion, but he afterwards relaxed and admitted that the village might be attained by a more direct way than the ordinary one. He pointed to some rocks, eminences, and trees, which were to serve as landmarks; and stretching his arm in the direction of Grindelwald, I took the bearing of the place, and scampered over slopes of snow to the sunny Alp beyond them. To my left was a mountain stream making soft music by the explosion of its bubbles. I was once tempted aside to climb a rounded eminence, where I lay for an hour watching the augmenting glory of the mountains. The scene at hand was perfectly pastoral; green pastures, dotted with chalets, and covered with cows, which filled the air with the incessant tinkle of their bells. Beyond was the majestic

architecture of the Alps, with its capitals and western bastions flushed with the warm light of the lowering sun.

I mightily enjoyed the hour. There was health in the air and hope in the mountains, and with the consciousness of augmenting vigour I quitted my station, and galloped down the Alp. I was soon amid the pinewoods which overhang the valley of Grindelwald, with no guidance save the slope of the mountain, which, at times, was quite precipitous; but the roots of the pines grasping the rocks afforded hand and foot such hold as to render the steepest places the pleasantest of all. I often emerged from the gloom of the trees upon lovely bits of pasture—bright emerald gems set in the bosom of the woods. It appeared to me surprising that nobody had constructed a resting-place on this fine slope. With a fraction of the time necessary to reach the top of the Faulhorn, a position might be secured from which the prospect would vie in point of grandeur with almost any in the Alps; while the ascent from Grindelwald, amid the shade of the festooned trees, would itself be delightful.

Hawkins, who had halted for a day at Thun, had arrived; our guide had prepared a number of stakes, and on Monday morning we mounted our theodolite and proceeded to the Lower Glacier. With some difficulty we established the instrument upon a site whence the glacier could be seen from edge to edge; and across it was fixed in a straight line a series of twelve stakes. We afterwards ascended the glacier till we touched the avalanche-débris of the Heisse Platte. We wandered amid the moulins and crevasses until evening approached, and thus gradually prepared our muscles for more arduous work. On Tuesday a sleety rain

filled the entire air, and the glacier was so laden with fog that there was no possibility of our being able to see across it. On Wednesday, happily, the weather brightened, and we executed our measurements; finding, as in all other cases, that the glacier was retarded by its bounding walls, its motion varying from a minimum of thirteen and a half inches to a maximum of twenty-two inches a day. To Mr. Hawkins I am indebted both for the fixing of the stakes and the reduction of the measurements to their diurnal rate.

Previous to leaving England I had agreed to join a party of friends at the *Æggischhorn*, on Thursday the 9th of August. My plan was, first to measure the motion of the Grindelwald glacier, and afterwards to cross the mountain-wall which separates the canton of Berne from that of Valais, so as to pass from Lauterbrunnen to the *Æggischhorn* in a single day. How this formidable barrier was to be crossed was a problem, but I did not doubt being able to get over it somehow. On mentioning my wish to Lauener, he agreed to try, and proposed attacking it through the Roththal. In company with his brother Ulrich, he had already spent some time in the Roththal, seeking to scale the Jungfrau from that side. Hawkins had previously, I believe, entertained the thought of assailing the same barrier at the very same place. Having completed our measurements on the Wednesday, we descended to Grindelwald and discharged our bill. We desired to obtain the services of Christian Kaufmann, a guide well acquainted with both the Wetterhorn and the Jungfrau; but on learning our intentions he expressed fears regarding his lungs, and recommended to us his brother, a powerful young man, who

had also undergone the discipline of the Wetterhorn. Him we accordingly engaged. We arranged with the landlord of the Bear to have the main mass of our luggage sent to the *Æggischhorn* by a more easy route. I was loth to part with the theodolite, but Lauener at first grumbled hard against taking it. It was proposed, however, to confine his load to the head of the instrument, while Kaufmann should carry the legs, and I should bear my own knapsack. He yielded. Ulrich Lauener was at Grindelwald when we started for Lauterbrunnen, and on bidding us good-bye he remarked that we were going to attempt an impossibility. He had examined the place which we proposed to assail, and emphatically affirmed that it could not be surmounted. We were both a little chagrined by this gratuitous announcement, and answered him somewhat warmly; for we knew the moral, or rather immoral, effect of such an opinion upon the spirits of our men.

The weather became more serene as we approached Lauterbrunnen. We had a brief evening stroll, but retired to bed before day had quite forsaken the mountains. At two A.M. the candle of Lauener gleamed into our bedrooms, and he pronounced the weather fair. We got up at once, dressed, despatched our hasty breakfast, strapped our things into the smallest possible volume, and between three and four A.M. were on our way. The hidden sun crimsoned faintly the eastern sky, but the valleys were all in peaceful shadow. To our right the Staubbach dangled its hazy veil, while other *Bachs* of minor note also hung from the beetling rocks, but fell to earth too lightly to produce the faintest murmur. After

an hour's march we deviated to the left, and wound upward through the woods which here cover the slope of the hill.

The dawn cheerfully unlocked the recesses of the mountains, and we soon quitted the gloom of the woods for the bright green Alp. This we breasted, regardless of the path, until we reached the chalets of the Roththal. We did not yet see the particular staircase up which Lauener proposed to lead us, but we inspected minutely the battlements to our right, marking places for future attack in case our present attempt should not be successful. The elastic grass disappeared, and we passed over rough crag and shingle alternately. We reached the base of a ridge of *débris*, and mounted it. At our right was the glacier of the Roththal, along the lateral moraine of which our route lay.

Just as we touched the snow a spring bubbled from the rocks at our left, spurting its water over stalagmites of ice. We turned towards it, and had each a refreshing draught. Lauener pointed out to us the remains of the hut erected by him and his brother when they attempted the Jungfrau, and from which they were driven by adverse weather. We entered an amphitheatre, grand and beautiful this splendid morning, but doubtless in times of tempest a fit residence for the devils whom popular belief has banished to its crags. The snow for a space was as level as a prairie, but in front of us rose the mighty bulwarks which separated us from the neighbouring canton. To our right were the crags of the Breithorn, to our left the buttresses of the Jungfrau, while between both was an indentation in the mountain-wall, on which all eyes were fixed. From it downwards hung a thread of snow, which was to be our leading-string to the top.

Though very steep, the aspect of the place was by no means terrible: comparing with it my memory of other gulleys in the Chamouni mountains, I imagined that three hours would place us at the top. We not only expected an easy conquest of the barrier, but it was proposed that on reaching the top we should turn to the left, and walk straight to the summit of the Jungfrau. Lauener was hopeful, but not sanguine. We were soon at the foot of the barrier, clambering over mounds of snow. Huge consolidated lumps emerged from the general mass; the snow was evidently that of avalanches which had been shot down the couloir, kneading themselves into vast balls, and piling themselves in heaps upon the plain. The gradient steepened, the snow was hard, and the axe was invoked. Straight up the couloir seemed the most promising route, and we pursued it for an hour, the impression gradually gaining ground that the work would prove heavier than we had anticipated.

We then turned our eyes on the rocks to our right, which seemed practicable, though very steep; we swerved towards them, and worked laboriously upwards for three-quarters of an hour. Mr. Hawkins and the two guides then turned to the left, and regained the snow, leaving me among the crags. They had steps to cut, while I had none, and, consequently, I got rapidly above them. The work becomes ever harder, and rest is unattainable, for there is no resting-place. At every brow I pause; legs and breast are laid against the rough rock, so as to lessen by their friction the strain upon the arms, which are stretched to grasp some protuberance above. Thus I rest, and thus I learn that three days' training is not sufficient to dislodge London from one's

lungs. Meanwhile my companions are mounting monotonously along the snow. Lauener looks up at me at intervals, and I can clearly mark the expression of his countenance; it is quite spiritless, while that of his companion bears the print of absolute dismay. Three hours have passed and the summit is not sensibly nearer. The men halt and converse together. Lauener at length calls out to me, 'I think it is impossible.' The effect of Ulrich's prediction appears to be cropping out; we expostulate, however, and they move on. After some time they halt again, and reiterate their opinion that the thing cannot be done. They direct our attention to the top of the barrier; light clouds scud swiftly over it, and snow-dust is scattered in the air. There is storm on the heights, which our guides affirm has turned the day against us. I cast about in my mind to meet the difficulty, and enquire whether we might not send one of them back with the theodolite, and thus so lighten our burdens as to be able to proceed. Kaufmann volunteers to take back the theodolite; but this does not seem to please Lauener. There is a pause and hesitation. I remonstrate, while Hawkins calls out 'Forward!' Lauener once more doggedly strikes his axe into the snow, and resumes the ascent.

I continued among the rocks, though with less and less confidence in the wisdom of my choice. My knapsack annoyed me excessively; the straps frayed my shoulders, and tied up my muscles. Once or twice I had to get round a protruding face of rock, and then found my bonds very grievous. At length I came to a peculiar piece of cliff, near the base of which was a sharp ridge of snow, and at a

height of about five feet above it the rock bulged out, so that a stone dropped from its protuberance would fall beyond the ridge. I had to work along the snow cautiously, squatting down so as to prevent the rock from pushing me too far out. Had I a fair ledge underneath I should have felt perfectly at ease, but on the stability of the snow-wedge I dared not calculate. To retreat was dangerous, to advance useless; for right in front of me was a sheer smooth precipice, which completely extinguished the thought of further rock-work. I examined the place below me, and saw that a slip would be attended with the very worst consequences. To loose myself from the crag and attach myself to the snow was so perilous an operation that I did not attempt it; and at length I ignobly called to Lauener to lend me a hand. A gleam of satisfaction crossed his features as he eyed me on my perch. He manifestly enjoyed being called to the rescue, and exhorted me to keep quite still. He worked up towards me, and in less than half an hour had hold of one of my legs. 'The place is not so bad after all,' he remarked, evidently glad to take me down, in more senses than one. I descended in his steps, and rejoined Hawkins upon the snow. From that moment Lauener was a regenerate man; the despair of his visage vanished, and I firmly believe that the triumph he enjoyed, by augmenting his self-respect, was the proximate cause of our subsequent success.



ASCENT OF THE LAUWINEN THOR.

The couloir was a most singular one; it was excessively steep, and along it were two great scars, resembling the deep-cut channels of a mountain stream. They were, indeed, channels cut by the snow-torrents from the heights. We scanned those heights. The view was bounded by a massive cornice, from which the avalanches are periodically let loose.[1] The cornice seemed firm; still we cast about for some piece of rock which might shelter us from the destroyer should he leap from his lair. Apart from the labour of the ascent, which is great, the frequency of avalanches

will always render this pass a dangerous one. At 2 P.M. the air became intensely cold. My companion had wisely pocketed a pair of socks, which he drew over his gloves, and found very comforting. My leather gloves, being saturated with wet, were very much the reverse.

The wind was high, and as it passed the crest of the Breithorn its moisture was precipitated and afterwards carried away. The clouds thus generated shone for a time with the lustre of pearls; but as they approached the sun they became suddenly flooded with the most splendid iridescences.^[2] At our right now was a vertical wall of brown rock, along the base of which we advanced. At times we were sheltered by it, but not always; for the wind was as fitful as a maniac, and eddying round the corners sometimes shook us forcibly, chilled us to the marrow, and spit frozen dust in our faces. The snow, moreover, adjacent to the rock had been melted and refrozen to a steep slope of compact ice. The men were very weary, the hewing of the steps exhausting, and the footing, particularly on some glazed rocks over which we had to pass, exceedingly insecure. Once on trying to fix my alpenstock I found that it was coated with an enamel of ice, and slipped through my wet gloves. This startled me, for the staff is my sole trust under such circumstances. The crossing of those rocks was a most awkward piece of work; a slip was imminent, and the effects of the consequent glissade not to be calculated. We cleared them, however, and now observed the grey haze creeping down from the peak of the Breithorn to the point at which we were aiming. This, however, was visibly nearer; and, for the first time since we began to climb, Lauener

declared that he had good hopes—'Jetzt habe ich gute Hoffnung.' Another hour brought us to a place where the gradient slackened suddenly. The real work was done, and ten minutes further wading through the deep snow placed us fairly on the summit of the col.

Looked at from the top the pass will seem very formidable to the best of climbers; to an ordinary eye it would appear simply terrific. We reached the base of the barrier at nine A.M.; we had surmounted it at four; seven hours consequently had been spent upon that tremendous wall. Our view was limited above; clouds were on all the mountains, and the Great Aletsch glacier was hidden by dense fog. With long swinging strides we went down the slope. Several times during our descent the snow coating was perforated, and hidden crevasses revealed. At length we reached the glacier, and plodded along it through the dreary fog. We cleared the ice just at nightfall, passed the Märjelin See, and soon found ourselves in utter darkness on the spurs of the Æggischhorn. We lost the track and wandered for a time bewildered. We sat down to rest, and then learned that Lauener was extremely ill. To quell the pangs of toothache he had chewed a cigar, which after his day's exertion was too much for him. He soon recovered, however, and we endeavoured to regain the track. In vain. The guides shouted, and after many repetitions we heard a shout in reply. A herdsman approached, and conducted us to some neighbouring chalets, whence he undertook the office of guide. After a time he also found himself in difficulty. We saw distant lights, and Lauener once more pierced the air with his tremendous whoop. We were heard. Lights were

sent towards us, and an additional half-hour placed us under the roof of Herr Wellig, the active and intelligent proprietor of the Jungfrau hotel.

After this day's journey, which was a very hard one, the tide of health set steadily in. I have no remembrance of any further exhibition of the symptoms which had driven me to Switzerland. Each day's subsequent exercise made both brain and muscles firmer. We remained at the *Æggischhorn* for several days, occupying ourselves principally with observations and measurements on the Aletsch glacier, and joining together afterwards in that day's excursion—unparalleled in my experience—which has found in my companion a narrator worthy of its glories. And as we stood upon the savage ledges of the Matterhorn, with the utmost penalty which the laws of falling bodies could inflict at hand, I felt that there were perils at home for intellectual men greater even than those which then surrounded us—foes, moreover, which inspire no manhood by their attacks, but shatter alike the architect and his house by the same slow process of disintegration.^[3] After the discipline of the Matterhorn, the fatal slope of the Col du Géant, which I visited a few days afterwards, looked less formidable than it otherwise might have done. From Courmayeur I worked round to Chamouni by Chapieu and the Col de Bonhomme. I attempted to get up Mont Blanc to visit the thermometers which I had planted on the summit a year previously; and succeeded during a brief interval of fair weather in reaching the Grands Mulets. But the gleam which tempted me thus far proved but a temporary truce to the war of elements, and, after remaining twenty hours at the Mulets, I was

obliged to beat an inglorious retreat.—*Vacation Tourists, 1860.*

II.

DISASTER ON THE COL DU GÉANT.

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On the 18th of August, while Mr. Hawkins and I were staying at Breuil, rumours reached us of a grievous disaster which had occurred on the Col du Géant. At first, however, the accounts were so contradictory as to inspire the hope that they might be grossly exaggerated or altogether false. But more definite intelligence soon arrived, and before we quitted Breuil it had been placed beyond a doubt that three Englishmen, with a guide named Tairraz, had perished on the col. On the 21st I saw the brother of Tairraz at Aosta, and learned from the saddened man all that he knew. What I then heard only strengthened my desire to visit the scene of the catastrophe, and obtain by actual contact with the facts truer information than could possibly be conveyed to me by description. On the afternoon of the 22nd I accordingly reached Courmayeur, and being informed that M. Curie, the resident French pastor, had visited the place and made an accurate sketch of it, I immediately called upon him. With the most obliging promptness he placed his sketches in my hands, gave me a written account of the occurrence, and volunteered to accompany me. I gladly accepted this offer, and early on the morning of Thursday the 21st of August we walked up to the pavilion which it had been the aim of the travellers to reach on the day of their death. Wishing to make myself acquainted with the entire line of the fatal

glissade, I walked directly from the pavilion to the base of the rocky couloir along which the travellers had been precipitated, and which had been described to me as so dangerous that a chamois-hunter had declined ascending it some days before. At Courmayeur, however, I secured the services of a most intrepid man, who had once made the ascent, and who now expressed his willingness to be my guide. We began our climb at the very bottom of the couloir, while M. Curie, after making a circuit, joined us on the spot where the body of the guide Tairraz had been arrested, and where we found sad evidences of his fate. From this point onward M. Curie shared the dangers of the ascent, until we reached the place where the rocks ended and the fatal snow-slope began. Among the rocks we had frequent and melancholy occasion to assure ourselves that we were on the exact track. We found there a penknife, a small magnetic compass, and many other remnants of the fall.

At the bottom of the snow-slope M. Curie quitted me, urging me not to enter upon the slope, but to take to a stony ridge on the right. No mere inspection, however, could have given me the desired information. I asked my guide whether he feared the snow, and, his reply being negative, we entered upon it together, and ascended it along the furrow which still marked the line of fall. Under the snow, at some distance up the slope, we found a fine new ice-axe, the property of one of the guides. We held on to the track up to the very summit of the col, and as I stood there and scanned the line of my ascent a feeling of augmented sadness took possession of me. There seemed no sufficient reason for this terrible catastrophe. With ordinary care the

slip might in the first instance have been avoided, and with a moderate amount of skill and vigour the motion, I am persuaded, might have been arrested soon after it had begun.

Bounding the snow-slope to the left was the ridge along which travellers to Courmayeur usually descend. It is rough, but absolutely without danger. The party were, however, tired when they reached this place, and to avoid the roughness of the ridge they took to the snow. The inclination of the slope above was moderate; it steepened considerably lower down, but its steepest portion did not much exceed forty-five degrees of inclination. At all events, a skilful mountaineer might throw himself prostrate on the slope with perfect reliance on his power to arrest his downward motion.

It is alleged that when the party entered the summit of the col on the Chamouni side the guides proposed to return, but the Englishmen persisted in going forward. One thing alone could justify the proposition thus ascribed to the guides by their friends—a fog so thick as to prevent them from striking the summit of the col at the proper point, and to compel them to pursue their own traces backwards. The only part of the col hitherto regarded as dangerous had been passed, and, unless for the reason assumed, it would have been simply absurd to recross this portion instead of proceeding to Courmayeur. It is alleged that a fog existed; but the summit had been reached, and the weather cleared afterwards. Whether, therefore, the Englishmen refused to return or not on the Montanvert side, it ought in no way to influence our judgment of what occurred on the Courmayeur

side, where the weather which prompted the proposal to go back ceased to be blameable.

A statement is also current to the effect that the travellers were carried down by an avalanche. In connection with this point M. Curie writes to me thus: 'Il paraît qu'à Chamounix on répand le bruit que c'est une *avalanche* qui a fait périr les voyageurs. C'est là une fausseté que le premier vous saurez démentir sur les lieux.' I subscribe without hesitation to this opinion of M. Curie. That a considerable quantity of snow was brought down by the rush was probable, but an avalanche properly so called there was not, and it simply leads to misconception to introduce the term at all.

We are now prepared to discuss the accident. The travellers, it is alleged, reached the summit of the col in a state of great exhaustion, and it is certain that such a state would deprive them of the caution and firmness of tread necessary in perilous places. But a knowledge of this ought to have prevented the guides from entering upon the snow-slope at all. We are, moreover, informed that even on the gentler portion of the slope one of the travellers slipped repeatedly. On being thus warned of danger, why did not the guides quit the snow and resort to the ridge? They must have had full confidence in their power to stop the glissade which seemed so imminent, or else they were reckless of the lives they had in charge. At length the fatal slip occurred, where the fallen man, before he could be arrested, gathered sufficient momentum to jerk the man behind him off his feet, the other men were carried away in succession, and in a moment the whole of them were rushing

downwards. What efforts were made to check this fearful rush, at what point of the descent the two guides relinquished the rope, which of them gave way first, the public do not know, though this ought to be known. All that is known to the public is that the two men who led and followed the party let go the rope and escaped, while the three Englishmen and Tairraz went to destruction. Tairraz screamed, but, like Englishmen, the others met their doom without a word of exclamation.

At the bottom of the slope a rocky ridge, forming the summit of a precipice, rose slightly above the level of the snow, and over it they were tilted. I do not think a single second's suffering could have been endured. During the wild rush downwards the bewilderment was too great to permit even of fear, and at the base of the precipice life and feeling ended suddenly together. A steep slope of rocks connected the base of this precipice with the brow of a second one, at the bottom of which the first body was found. Another slope ran from this point to the summit of another ledge, where the second body was arrested, while attached to it by a rope, and quite overhanging the ledge, was the body of the third traveller. The body of the guide Tairraz was precipitated much further, and was much more broken.

The question has been raised whether it was right under the circumstances to tie the men together. I believe it was perfectly right, if only properly done. But the actual arrangement was this: The three Englishmen were connected by a rope tied firmly round the waist of each of them; one end of the rope was held in the hand of the guide who led the party; the other end was similarly held by the

hindmost guide, while Tairraz grasped the rope near its middle. Against this mode of attachment I would enter an emphatic protest. It, in all probability, caused the destruction of the unfortunate Russian traveller on the Findelen Glacier last year, and to it I believe is to be ascribed the disastrous issue of the slip on the Col du Géant. Let me show cause for this protest. At a little depth below the surface the snow upon the fatal slope was firm and consolidated, but upon it rested a superficial layer, about ten inches or a foot in depth, partly fresh, and partly disintegrated by the weather. By the proper action of the feet upon such loose snow, its granules are made to unite so as to afford a secure footing; but when a man's body, presenting a large surface, is thrown prostrate upon a slope covered with such snow, the granules act like friction wheels, offering hardly any resistance to the downward motion.

A homely illustration will render intelligible the course of action necessary under such conditions. Suppose a boy placed upon an oilcloth which covers a polished table, and the table tilted to an angle of forty-five degrees. The oilcloth would evidently slide down, carrying the boy along with it, as the loose snow slid over the firm snow on the Col du Géant. But suppose the boy provided with a stick spiked with iron, what ought he to do to check his motion? Evidently drive his spike through the oilcloth and anchor it firmly in the wood underneath. A precisely similar action ought to have been resorted to on the Col du Géant. Each man as he fell ought to have turned promptly on his face, pierced with his armed staff the superficial layer of soft

snow, and pressed with both hands the spike into the consolidated mass underneath. He would thus have applied a break, sufficient not only to bring himself to rest, but, if well done, sufficient, I believe, to stop a second person. I do not lightly express this opinion: it is founded on varied experience upon slopes at least as steep as that under consideration.

Consider now the bearing of the mode of attachment above described upon the question of rescue. When the rope is fastened round the guide's waist, both his arms are free, to drive, in case of necessity, his spiked staff into the snow. But in the case before us, one arm of each guide was virtually powerless; on it was thrown the strain of the falling man in advance, by which it was effectually fettered. But this was not all. When the attached arm receives the jerk, the guide instinctively grasps the rope with the other hand; in doing so, he relinquishes his staff, and thus loses the sheet-anchor of salvation. Such was the case with the two guides who escaped on the day now in question. The one lost his bâton, the other his axe, and they probably had to make an expert use of their legs to save even themselves from destruction. Tairraz was in the midst of the party. Whether it was in his power to rescue himself or not, whether he was caught in the coil of the rope or laid hold of by one of his companions, we can never know. Let us believe that he clung to them loyally, and went with them to death sooner than desert the post of duty.

III.

THE MATTERHORN—FIRST ASSAULT.