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A ROUGH SURVEY OF THE CHAIN OF MONT BLANC. By
A. ADAMS-REILLY. Read before the Alpine Club, May 3,
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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 When the map was prepared for engraving, he sketched in some outlines from the unpublished sheet of the Sardinian Ordnance Survey, in order to take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° and in some places 60° (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° . 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 $\frac{1}{40000}$, 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 Armanettes 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