

for 2¼ hrs. before the angle eased off and the summit of the Laquinhorn gave us a convenient halting-place for lunch at 12.30.

We ostentatiously opened our bouvier, and with exaggerated gestures partook of our remaining provisions, for the possible delectation of the observing friends at the further end of the Fée telescope. Then when in half an hour the wind blew cold we looked longingly towards the Laquinjoch at the magnificent S. ridge below us, and turned resolutely down the western face. To avoid the icy parts we zigzagged a good deal at first, making much of the small excrescences of rock in the steep face. The route became easy when in an hour we struck the W. ridge and kept it to its base. We halted an hour for tea at the hotel, and then scampered happily down to Grund by 4.30, and thence on to Fée by 5 o'clock.

Venez was appeased, and forgave me for my base desertion on the Portiengrat. On the whole I was well satisfied at having so far realised the hopes that had been first entertained five years earlier on the Rossboden.

THE EXPEDITION OF H.R.H. THE PRINCE LOUIS OF SAVOY,
DUKE OF THE ABRUZZI, TO MOUNT ST. ELIAS (ALASKA).

BY DR. FILIPPO DE FILIPPI.

(Read before the Alpine Club, March 29, 1898.)

EARLY in February 1897 H.R.H. the Duke of the Abruzzi decided to attempt the ascent of Mount St. Elias in the following summer. The expedition under his direction consisted of Lieut. Umberto Cagni, his A.D.C., of Francesco Gonella, president of the business section of the Italian Alpine Club, of Vittorio Sella, and myself. There were also four guides of the Val d'Aosta—Giuseppe Petigax and Antonio Croux, of Courmayeur, Antonio Maquignaz and Andrea Pelissier, of Valtournanche, besides Erminio Botta, formerly porter of Mr. Sella in the Caucasus.

We left Turin on May 17, and arrived at Seattle, in Puget Sound, on June 11. On the 13th we started for Sitka on the steamship 'City of Topeka.' There is no need for me to describe once again the passage through the wonderful canals of the Archipelago of Alexander.

Sitka is the northern limit of the regular shipping service. The archipelago comes to an end between the 58th and 59th degrees latitude. Beyond this the coast runs N.W. for about

300 miles, with no break of any importance except the Bay of Yakutat, everywhere exposed to the fury of the surf, which renders landing dangerous and often impossible. This coast is dominated by the great chain of the Fairweather Mountains, from which the Pacific Glacier flows down to the ocean. About 50 miles N. of Sitka the great isolated Peak of St. Elias makes its appearance on the horizon, rising little by little out of the sea. Further eastwards the peaks of Logan, Augusta, Cook, and Vancouver begin to show themselves clearly.

The steamship of the Alaskan Commercial Co., which brought us from Sitka, had in tow the 'Aggie,' a schooner hired by the Prince, conveying the American porters, with Mr. Ingraham at their head, as well as our equipment and provisions.

We reached Port Mulgrave, in the Bay of Yakutat, on the evening of the 22nd. Leaving two barometers for the purpose of control observations with Mr. Hendricksen, the missionary residing in the little Indian village, we proceeded to cross the bay and land on the shore at the foot of the Malaspina Glacier.

This glacier covers a vast tableland extending from the foot of the chain, southward to the Pacific Ocean, eastward to the Bay of Yakutat. The average height above the sea level is 900 ft., the width about 30 miles by 50, giving an approximate area of 1,500 square miles. The frontal moraine extends for a distance of some 80 miles along the shore, from which it is separated by a strip of forest, which here and there covers the moraine itself with a luxuriant vegetation. Only for short spaces is the coast barren, and at one point the glacier reaches the water. From this vast frontage of ice issue innumerable streams, which deposit huge accumulations of glacial detritus.

Four previous expeditions had attempted the ascent of Mount St. Elias. Messrs. Libbey, Schwatka, and Seton-Karr in 1886, and again the brothers Topham, George Broke, and W. Williams in 1888, made the attempt from the western and southern slopes. They explored the western part of the Malaspina Glacier, but found the face of the mountain so steep as to make the ascent impossible from that side. The two following expeditions, directed by Professor Russell in 1890 and 1891, yielded important geological and geographical results. Russell crossed the Malaspina from E. to W. and from N. to S., prospected the Seward, Agassiz, and Newton Glaciers, ascended the col between Mount St. Elias

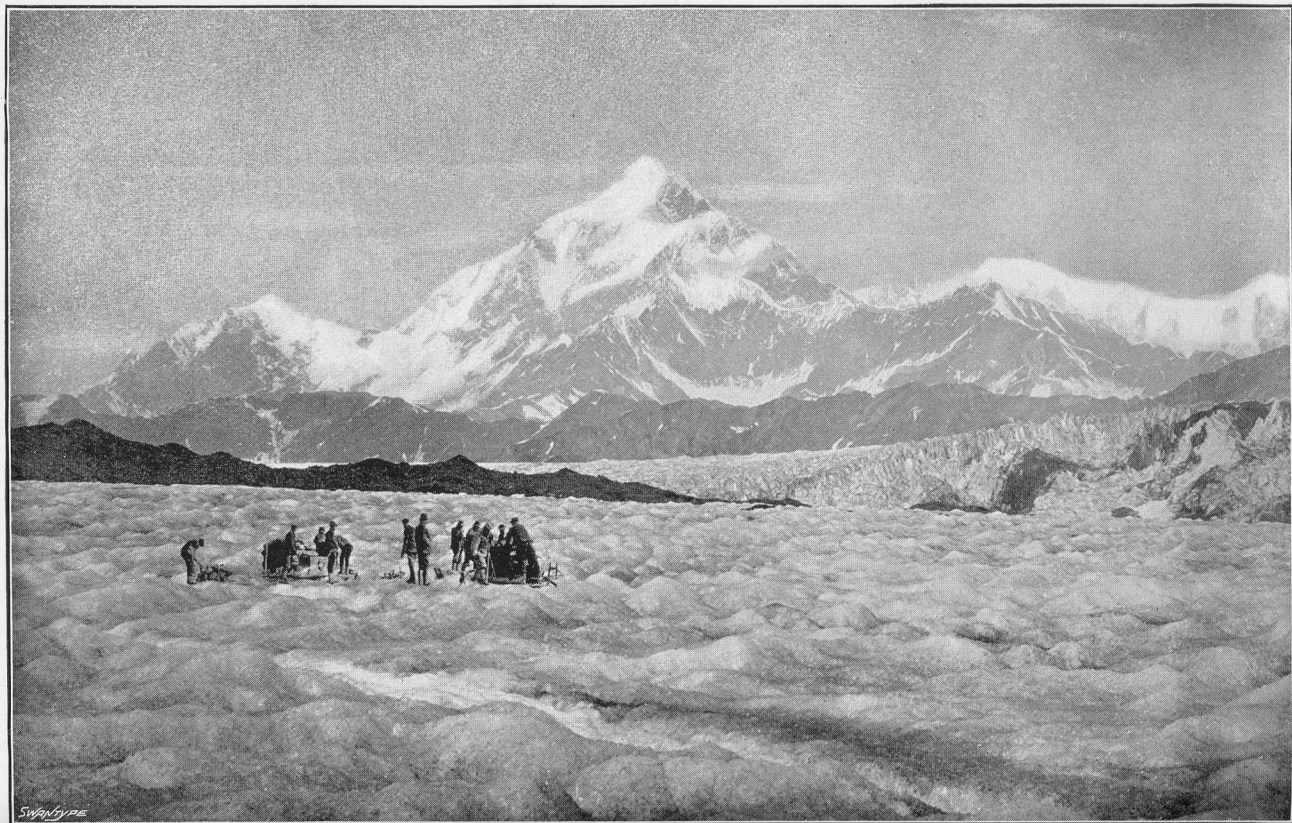
and Mount Newton, and reached a height of 14,500 ft. on the ridge which leads direct from this col to the summit. The sketch map constructed by him was a very valuable assistance to our expedition, and will long serve as the basis of the future exploration of that region. Following Professor Russell's advice, the Prince decided to land on the west side of the Bay of Yakutat, a few miles N. of Cape Manby, at the mouth of the Osar stream.

Our route, after crossing the belt of forest and the wide frontal moraine, traversed the Malaspina in an oblique direction; next skirted the foot of the spur formed by the Hitchcock Hills, followed up the east side of the Seward Glacier as far as the ridge which bounds the Pinnacle Glacier on the N.; from this point crossed over the Seward Glacier; thence by way of the Dome Pass, a depression in the Samovar Hills, reached the right bank of the Agassiz Glacier, and ascended the long valley of the Newton Glacier. This valley terminates in a snowy col, from which an ice ridge leads by a moderate slope to Mount St. Elias. By this ridge we reached the summit. Our return route was the same. The Prince gave the name of Russell to the col at the head of the Newton Valley, and of Columbus to a great glacier dividing the Mount Logan group from the Newton-Augusta chain.

We left Port Mulgrave on the morning of June 23, but owing to the dense fog, it was not until 5 in the evening that we succeeded at last in recognising, on the Malaspina coast, the point selected for our landing. We could just distinguish the fringe of forest ending abruptly at the foot of the steep moraine which terminates some 350 ft. above in the faint white line made by the margin of the vast glacier plain. The process of landing began at once, and by 8 o'clock all our cases were on shore safe and dry. We established our first camp on a small plain close to a branch of the Osar, and a few yards only from the forest. Not before midnight did we seek our tents, tired with our efforts to bring about order into the chaos of our things, and in a ceaseless struggle with the most ferocious mosquitoes.

The 'Aggie' left that night for Port Mulgrave, there to await our return. An expedition consisting of seven Americans, led by Mr. Bryant, had landed at the same point a fortnight previously, also with the object of ascending Mount St. Elias.

The belt of forest separating us from the moraine is about 3 m. wide. On the morning of the 24th the Prince set out with a few men to look for a practicable route. We crossed the branch of the Osar on an improvised bridge of trunks



SWAN TYPE

Signor V. Sella, photo.

MOUNT ST. ELIAS, FROM MALASPINA GLACIER.

Swan Electric Engraving Co.

of trees, and followed up the right bank on the sand and fine gravel of the bed, or among the fallen trunks, the brushwood, and the luxuriant growth of ferns and of mosses which cover even the trunks and boughs of the firs. Animal life abounds. We saw hawks, crows, gulls, ducks, and wild geese, and numerous trails of bears. The forest ends abruptly at the foot of the moraine, which slopes upward, barren and undulating, a waste of shingle, mud, and stray boulders of granite, intersected by streams and dotted with pools which disappear into crevasses, leaving beds of fine sand in their place. The moraine is about 4 m. wide, and ends abruptly at a height of 450 ft. at the brink of the glacier, which was still covered with deep snow. By the evening of the 25th we had got our equipment to the top of the moraine.

All our subsequent camps were on snow. On July 1 we started on the Malaspina Glacier at about 3 in the morning. The air was mild, the temperature being about 36° F. Before us extended the vast white plain as far as the eye could reach. To our right, stretched the long spurs of the Mount Cook chain enclosing great glaciers in their valleys. Before us, some 25 m. away, under Mount Augusta, is the great icefall formed by the Seward Glacier flowing into the Malaspina from its huge bed between the Hitchcock and the Samovar Hills. Far behind looms up the towering crest of Mount St. Elias.

It took us three days to cross the Malaspina Glacier. The heavily-laden sledges, in the bad condition of the snow, required the united and unremitting exertions of the whole party. The snow was deep and furrowed, no crevasses being anywhere visible. The inclines, though gentle, were distinctly perceptible in dragging the sledges, and the hollows were often full of water or melting snow. Luckily the streams were few and not wide, and we succeeded in getting the sledges across them on bridges made with the ice axes.

The scenery is grand but monotonous; all element of contrast is lacking, while the abundant snow destroys any boldness of outline in the peaks and ridges. The sunshine and dazzling glare of the first day were succeeded by fogs and mists. The Prince took the lead, and occupied himself with the dull and ungrateful task of steering our route by the compass.

We reached the Hitchcock Hills at half-past 3 P.M., July 3, tired and wet through, after a ten-hours' march in dense fog. We had at last crossed the Malaspina, and proceeded to pitch our tents in the hollow between the glacier and the hills, at an altitude of 1,670 ft.

July 4 was spent in prospecting for a route to get on to the Seward Glacier. Crossing its left moraine we reached the foot of the icefall which flows into the Malaspina.

Between the spur of the Hitchcock Hills and the séracs is a narrow couloir full of snow, about 300 ft. high. Up this the guides cut a track in short zigzags, and before midday of the 5th our loads were on the Seward Glacier, in front of a vast amphitheatre dominated by the peaks of Mount Augusta, Mount Matasona, and Mount St. Elias.

If the Malaspina Glacier resembles a placid lake the Seward is like a stormy sea. Enormous blocks of ice lie piled in the wildest confusion over a breadth of about six miles. The whole glacier rings with the tinkle of streams in the crevasses, with the sharp repercussion of falling stones off the séracs. You have the sensation of a mysterious energy, a force of disintegration, a slow but unceasing convulsion of Nature, while all looks calm and immovable in the huge coherent mass, and no sign betrays the enormous strain of the millions of tons of ice gliding slowly down.

On the precipitous flanks of Mount Augusta hang glaciers which look like torrents of frozen foam. Mount St. Elias, clearly in view, looks diminished by the vast proportions of everything around, and we can scarcely realise its true height. Fantastic clouds curl around the summits; the sky is wild and broken, flecked with red, and a mass of deep gold covers the western horizon.

The state of the ice obliged us to ascend the left bank of the glacier, sometimes dragging the sledges over the levels formed by the foot of the glaciers and névés that flow down from the Hitchcock chain, sometimes carrying our packs on our shoulders over steep ice slopes or around spurs of rock which project nearly to the séracs of the Seward. On July 8, by ascending couloirs full of snow and steep grassy inclines covered with violets, saxifrage, anemones, and lupins in full blossom, we surmounted a glacier-fall formed by the Pinnacle Glacier, flowing into the Seward. Crossing the great smooth plain of the Pinnacle, we pitched our tents, on the evening of the 9th, on a snowy hummock at the foot of the ridge which forms the northern side of the Pinnacle, at an altitude of 3,180 ft. This was our twelfth bivouac, and we had spent sixteen days in reaching this comparatively insignificant height, covering, however, a distance of 35 miles from the coast. In the neighbourhood of our bivouac we found traces of Russell's passage in 1890. We were now alone with the

guides, our American porters having gone back in relays to fetch supplies.

On the 10th we crossed the Seward by the route reconnoitred two days previously by the Prince. The sky was overcast, the temperature mild, and the condition of the snow extremely bad. Our route skirted enormous crevasses on narrow strips of ice, often scarcely wider than the sledges. Sometimes the track lay on mere isolated blocks connected by snow bridges, fortunately very solid. We passed the base of Mount Augusta, and now had before us the glacier valley which leads to the Dome Pass, a saddle at an altitude of 4,030 ft. between two symmetrical domes of snow. On the 12th we reached this saddle, and on the following day bivouacked on the left bank of the Agassiz Glacier, at an altitude of 3,480 ft. The Agassiz is covered with pools and watercourses. The water is wonderfully limpid, of a dark cobalt colour. The crevasses are very large, and the séracs assume the most fantastic shapes, sometimes forming bridges over the blue water, and here and there presenting a truly architectural appearance.

On the right bank of the glacier we made a halt. We now knew that we were at close quarters with the mountain itself. In front of us the Augusta chain forms the rampart of the Agassiz Glacier. Down every side of the vast amphitheatre stream pale blue icefalls. The Newton valley opens up behind the spur at the foot of which we camp. Here we leave behind us the last sledge (the American porters have taken the rest) and every thing which is not absolutely indispensable. From the Seward up we had had several hours of rain daily, and more fog than sunshine.

The Newton Glacier terminates in a steep ice wall leading to the col between Mount St. Elias and Mount Newton. It is 7 m. long, and rises from an altitude of 3,850 ft. to one of 8,960, forming three terraces divided by icefalls of gigantic séracs. The sides of the valley are precipitous, heavily laden with snow, and crowned with bold peaks of rock and dizzy pinnacles of ice, whose ridges are fantastically wreathed by huge overhanging snow cornices.

The ascent of this valley took us thirteen days. We made six bivouacs, and our stages averaged about 1 mile 500 yards. We had to contend almost incessantly with a heavy snowfall, which went on without interruption for days together. Enveloped in a blinding mist, we toiled laboriously through the powdery snow in which we often sunk to our waists, patiently seeking our route among a labyrinth of ice blocks,

over insecure ice bridges, amid the deafening roar of the avalanches and the crash of falling stones that resounded almost incessantly on the edges of the glacier.

Out of thirteen days only three were fine. But such are the resources of colour in that atmosphere that nearly every day presented new pictures of indescribable tints and hues. The glacier is almost uniformly of an indigo blue, not greenish, as in our Alps, and bluer in the mist than in the sun. I do not know whether this is a result of the enormous snowfall, which leaves no point of the ice bare, not even in the deepest crevasses, or of peculiar conditions of atmospheric transparency.

Often we awoke in the morning to find our camp half buried in snow, and the tent walls bent in with the weight, whereupon we would all set to work and dig out a ditch, shake off the snow, and stretch the cords. Luckily bad weather in Alaska is very calm. Neither storm nor wind accompanies the rain and snow, nor did we once see a flash of lightning.

The surface of the glacier is extremely unequal, and dotted with blue lakes; the crevasses are numerous, and the routes between them and the great séracs so tortuous and narrow that we could scarcely get through with the loads. The snow bridges were very heavy and insecure, and at every stage one or more gave way. The guides at last found a field for their skill; they worked perseveringly, advancing little by little through the treacherous fog, treading down the track through the loose snow; sometimes it took a couple of hours to cross a distance of 400 yards.

On the Newton Glacier we first heard news of Mr. Bryant. He had reached the foot of the Agassiz Glacier, had ascended it, and at the upper end, at the foot of the Newton, met our guides, and sent back word by them to the Prince that he was obliged to abandon his undertaking, owing to the illness of one of his party.

On the evening of July 28, in settled weather, we pitched the last of our camps on the Newton, not far from the ice wall leading to the col. Overhead rose the great peak of Mount St. Elias, which looks low, owing to foreshortening. The steep wall of rock is thickly clothed with small glaciers, from which at intervals volleys of ice blocks crash down into the valley 6,000 ft. below. The north ridge rises in an almost straight line from the col, at a moderate slope, broken at two or three points into séracs, which do not look formidable. About the middle and lower three dark projecting rocks break the white line. Above, the arête extends without interruption



Signor V. Sella, photo.

Swan Electric Engraving Co.

MOUNT ST. ELIAS, FROM THE 2ND PLATFORM OF THE NEWTON GLACIER.

'Route to Russell's Pass.

as far as a gigantic 'gendarme' of ice, beyond which rises the smooth dome of the summit.

On the day following three guides set out to cut steps on the *paroi* of the col; the Prince, with a few men, descended to the lower camp to fetch supplies. The evening was very clear. Though outwardly calm we all felt the excitement of our nearness to our goal.

On July 30 we set out at 4 A.M., divided into three caravans. The morning was bright and cloudless: the snow on the actual track was tolerably good; outside it powdery, with a thin crust that would not bear. We crossed the last stretch of the glacier swept by the avalanches of Mount St. Elias, and after $1\frac{1}{2}$ hour's march we reached the foot of the wall. Here we began the ascent up a series of snow slopes, rather steep, broken at the base by crevasses, three of which, in the upper part of the wall, are distinctly visible from below. Into the first Sella took a header. Next one of the guides dropped his coat, and we wasted $\frac{1}{4}$ hr. in recovering it. We skirted to the left a rocky island which projects from the centre of the wall, crossed without accident the second bergschrund (whose upper lip we reached over the shoulders of a guide), then the third, and by 10 o'clock we all met on the col, and pitched the two tents we had brought with us directly under the crest on the slope facing the Newton, at an altitude of 12,287 ft.

Southward the col leads direct to the broad ridge of St. Elias; northward to a snowy arête, edged with a great cornice, leading to Mount Newton. At our feet stretched the majestic expanse of the Newton Glacier. For the first time we caught sight of the sea, and recognised all the peaks around us. Westward, beyond a great level glacier, covered with snow, lay an endless series of mountain chains and seas of ice as far as the horizon—a chaos of peaks, an intricate labyrinth of broad domes and soaring pinnacles of rock and ice. From St. Elias and Mount Newton fell incessant and prolonged avalanches of snow, rock, and ice. The sunset was bright and long. Temperature, $17\cdot5^{\circ}$ F. A cold N.W. wind drove us into the shelter of our tents. The nights had begun to give a few hours of darkness now, and were lengthening rapidly. We lay down crowded into the tents. But the thought of the coming day allowed few of us to sleep on this last night.

By midnight we were all up, and, after a bowl of hot coffee, proceeded to form the loads—provisions for one day, the meteorological instruments, and the camera. The night

was absolutely calm and clear. Venus shone brightly over the summit of Newton. We roped ourselves in three parties; first the Prince and Cagni with Petigax and Maquignaz, next Gonella with Croux and Botta, last Sella with me and Pélissier.

We marched in silence and deep excitement. Our minds were entirely taken up with the near attainment of the goal towards which we had been labouring for so many days in restless anxiety.

Where the col joined the arête we found an ice gap, which we skirted to the right. The snow was powdery and uneven, leaving bare spaces of hard old snow, in which the guides cut steps. Petigax and Maquignaz took turns of half an hour or an hour as leader. We ascended rapidly, at an even pace, soon crossing to the E. side of the arête, where the snow was better. As the light grew stronger the peaks around us shone like silver. We reached the first rocks, black broken masses of diorite, and, while we skirted about a crooked crevasse above them, sudden gusts of icy N. wind drove the fine snow against our faces. Overhead the white dome turned golden in the first rays of the sun, and soon the huge disc of gold itself appeared over the right shoulder of Mount Newton. Presently the summit of Newton was at our feet. We continued our ascent rapidly. The air was absolutely calm, and the temperature ideal, neither too hot nor too cold. We passed the second cluster of rocks, then the third. Here, at 8 o'clock, we set down the instruments, and Cagni took observations. The temperature was 17.5° F. We were now no higher than the summit of Augusta, which preserves the bold daring of its outline, and the view eastward was extraordinary.

We are the first to see the whole majestic mass of Mount Logan. From its rocky western peak an arête descends, and seems to join the Newton-Augusta chain, dividing from the upper basin of the Seward a vast glacier (perhaps the greatest in the region after the Malaspina), which reaches S.E. to St. Elias, and N.W. to a lower and very intricate chain, expanding far to the W. On the western horizon, beyond a chaos of low ridges, névés, and glaciers, at a distance of some 100 miles, tower up three great snowy groups, emulating in height Mount Logan and Mount St. Elias. The furthest W. of these is Mount Bear, seen by Mr. Russell in 1891; the other had not been viewed before.

About 9 o'clock the Prince ordered a halt for breakfast under a sérac, at an altitude of 16,400 ft. From this point onward the ascent became more and more trying; one after another

we felt the effects of the rarefied air, some complaining of headache, others being affected with difficulty of breathing and general lassitude. The Prince slackened the pace or stopped his party altogether to wait for those of us who followed more slowly. The ascent is monotonous, without the smallest difficulty, now on the wide crest of the arête, now on one or the other of its slopes. In our fatigue we began to take every point of ice we saw for the great 'gendarme' we distinguished so clearly from below. We were forced to halt five or six minutes every quarter of an hour. At last we sighted overhead a sharp pinnacle of ice, and a little beyond it to the right the great snowy dome of the summit.

We climbed the slope in zigzags, pausing for breath every ten minutes. At the top of the arête we halted again. The advance party started once more up the now gentle incline. We followed, tired out and unable to believe that we were close to the summit. Suddenly Petigax and Maquignaz stop and stand aside, and the Prince is the first to set foot on the summit of St. Elias. We hasten up, panting and exhausted, to join in his hurrah. I will not attempt to describe our sensations. Difficulty of breathing, throbbing at the temples, exhaustion, all disappeared instantaneously in the excitement of that moment. It was now a quarter to twelve. In another moment the Italian flag fluttered on an ice axe, and we crowded round our chief to join with all our might in his cheer for Italy and the King.

The thermometer recorded 10·5° F., and the barometer 15 inches, 15 lines. The height determined, after corrections, is 18,092 ft., in remarkably close agreement therefore with Russell's calculation of 18,100 ft., based upon triangulation. All previous calculations are widely divergent from each other and from this result. One only approaches accuracy, that made from the sea in 1792 by Malaspina, giving 17,847 ft. The ascent had taken 10½ hrs., and covered a height of 5,800 ft.

A few feet below the summit we halted to eat something. Before us stretched the marvellous panorama glittering in the intense noonday glare.

At 1.15 we started on our descent. We came down rapidly by long glissades over the slopes we had just ascended with so much toil. Between four and five o'clock we were back again on the col. On the following day, August 1, we reached our bivouac on the Newton. On the 3rd we found our excellent American porters, as pleased as ourselves at our success. The descent was rapid, in spite of the bad

state of the snow, in which we sunk to the thigh at every few steps. The bridges, too, had grown more insecure, and we were often obliged to modify our course in consequence. On August 5 we took our last leave of the Newton Glacier, which saluted us with a parting volley of avalanches. We now resumed the tedious labour of dragging the sledges across the Agassiz and the Dome Pass, forcing them over open crevasses which had been hidden under the snow during our ascent. On August 6 and 7 we recrossed the Seward Glacier, and skirted its left side in alternately rainy, foggy, and sunny weather. The guides contrived to drag the sledges down the steep slopes without unloading them, winning the admiration and wonder of the American porters by their skill and strength. The Seward was still covered with a heavy coat of snow at an altitude of 8,000 ft., thus giving Mount St. Elias a height of over 15,000 ft. above the snow line, a state of things unknown in any other part of the world. The winter snow, which still covered the mountains on our way up, had now totally disappeared; the névés of the Hitchcock Hills had melted, giving place to a profuse mass of blossoming plants reaching to our knees. The rocky spurs which project into the Malaspina were bare and black, and the imposing aspect of the great peaks gained greatly by contrast with the dark foreground.

On the morning of the 9th we found ourselves once more on the Malaspina, now for the most part bare, seamed with long, narrow crevasses, and traversed by innumerable rivulets and streams. Wherever the snow still lingered were numerous pools and patches of melting snow, covered with a thin crust of ice, through which we broke one after another, to find ourselves up to the waist in freezing water. The tracks of our sledges were no longer visible, and the Prince was obliged to resume the direction of the expedition by the compass in order to reach the coast at the point where we had landed. About noon on the 10th we at last came in sight of the moraine and the Bay of Yakutat, where the 'Aggie' was awaiting us. It took us six more hours to cross the rest of the Malaspina, over which the sledges glided swiftly, crossing the inequalities of the ice with shocks and jerks which seemed calculated to shatter them to bits at every moment. We halted to rest among the rocks and mud of the terminal moraine, near the remains of the last bivouac of Mr. Bryant's expedition.

For the first time, after forty days on snow, we slept on rocks and ice. It took us ten days to descend the glaciers we had ascended in thirty. On the morning of the 12th we

were all on board of the 'Aggie,' the Prince being the last to leave the shore.

We spent the afternoon at Port Mulgrave, and on August 13 set sail from the bay which we had entered fifty-three days before, bidding adieu to the great peaks glittering in the sunlight.

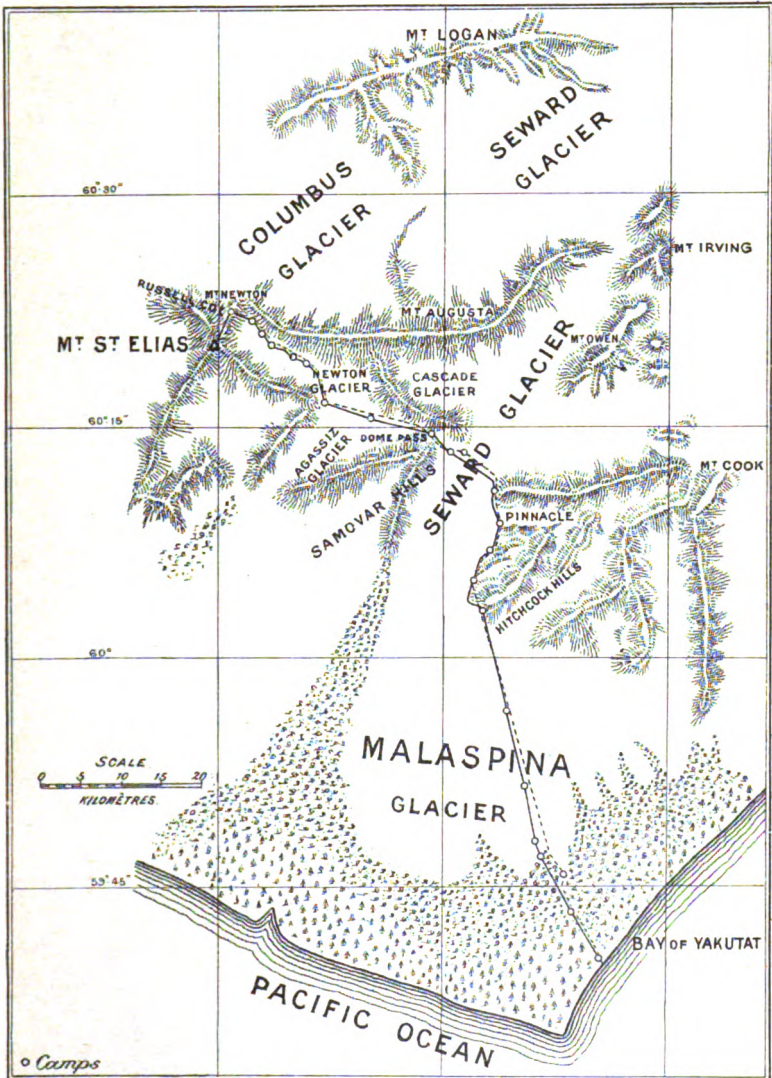
I will close with some general considerations that reflect our common opinion upon the undertaking.

The ascent of St. Elias is easy. In no part of it did we find ourselves confronted by real mountaineering difficulties. Upon the Newton Glacier the chief difficulty was caused by the fog, which rendered it difficult to find our way among the numerous crevasses in the labyrinth of séracs, and from the abundance of fresh snow which does not harden even after several days of fine weather, because the temperature is almost always under the freezing point.

We were obliged to make continual use of the rope. Even crossing the Malaspina in our ascent we were roped. Enveloped by fog, with a thick layer of snow upon the ice, it was not prudent to trust to the unknown glacier. And again in crossing the Seward and the Agassiz glaciers, a roped caravan preceded the sledges, trying the snow bridges. On the Newton Glacier no caravan went forward without making use of the rope.

We never suffered from cold; on the Newton the temperature always remained between 35° and 25°-21°, with a few degrees between the maximum and the minimum in the twenty-four hours. The dampness of the climate is the chief source of trouble in an expedition to Alaska, and renders necessary very great care in the choice of the equipment. The weather is rarely fine; I believe that we had not more than ten fine days out of the fifty we passed on land. Fortunately, as I said, the weather, though bad, is not stormy, and in Alaska, as in the Alps, abundant snowfalls only take place in the low districts. If we had found on the ridge the enormous quantity of snow that rendered the Newton Glacier so laborious we should not certainly have been able to terminate the ascent in one day, and perhaps not even in two.

The real difficulty is that of preparing the equipment and organising the expedition. On this preliminary work, more than anything else, success depends. It is necessary to foresee everything in a campaign where we found ourselves completely isolated for a couple of months. And when once started it is essential to have an accurate and well-studied system of bringing up provisions by means of caravans of porters, who



THE ROUTE TAKEN IN THE FIRST ASCENT OF MT ST ELIAS.

keep up a line of communication, whilst the caravan at the head is occupied in seeking out and preparing the way. The base of the mountain is more than sixty miles from where we landed—sixty miles of ice, where thick fogs, snowfalls that conceal the track, or a fallen bridge, may delay the porters considerably.

The commissariat must be so organised that the foot of the mountain can be reached with food for several days in hand. The caravan of his Royal Highness had the fortune of being able to make the ascent immediately, but it could have waited from eight to ten days if the weather had proved bad.

From what we were able to observe from the summit of the St. Elias perhaps the best way of reaching the Col Russell would be to ascend to the upper part of the Seward Glacier, round the Corwin cliffs, thence to the foot of the west slope of the col on the Columbus Glacier to the foot of the col. Sledges could probably be taken; an advantage which, bearing in mind the difficulty found in carrying our things up the Newton Glacier, would more than compensate for the longer road.

During the ascent we were able to see perfectly well the great west ridge of St. Elias, which is broken down, and in part rocky. This ridge seems to separate the Columbus Glacier from the ice streams that descend on the S.W. side of the St. Elias, and flow down on the south toward the Pacific.

The south side of the Logan, being probably more than 12,000 ft. high, rocky, very steep, and apparently swept by avalanches of ice and stones, is not likely to be practicable.

Besides the photographic illustrations of the group we have explored we brought back a series of meteorological observations, continued for two months, and a mineralogical collection now under study.

THREE NEW WAYS IN THE CORTINA DOLOMITES.

BY J. S. PHILLIMORE.

MR. BROOME, in his interesting paper 'A Dolomite Holiday,' in 'Alpine Journal' for February last, concludes with a doubt whether Dolomites are real climbing at all; and I am afraid it is hopeless to contend that scaling the wrong sides of Dolomites is anything but a decadent perversion of taste. However, Dolomites have the effect of making other climbing appear quite insipid; and the comparatively insig-