ascended by Major Bruce and his party. The thick mist refused to lift, and we had to find another way down as our line of ascent was now practically impossible.

With much difficulty we found our way down, having many awkward bits of rock climbing. Amongst other troublesome places were two waterfalls which we descended. At about 8 P.M. we reached a steep snow slope and our difficulties were at an end. After a long standing glissade we reached a river which turned out to be the Shikara. The main difficulty had been that, owing to the thick mist, it was impossible to locate our position, and you can easily imagine our joy when we found that we were in the Shikara nullah, where we wished to be, and which led us directly down to our camp.

OSWALD ERIK TODD.

THE MOUNTAINS OF THE YELLOWHEAD PASS.

BY A. O. WHEELER.

THE Expedition of the Alpine Club of Canada, made during the months of July, August, and September 1911, was for the purpose of ascertaining the character of the mountain areas opened up by the Grand Trunk Pacific Railway in the region of the Yellowhead Pass.

Mt. Robson was the keynote of the expedition, and an eighty-five-mile circuit was made around it, mapping the country by photographic methods as the party proceeded.

Mountaineering was not the primary object, and no very arduous ascents were made, the time at our disposal in this climatically uncertain district being preferably devoted to obtaining material for mapping purposes. Notwithstanding, thirty peaks were climbed, ranging in altitude from 7000 to 11,000 ft. above sea level.

The general line of travel was as follows: From the site of Henry House, up the valleys of the Athabaska and Miette Rivers to the Continental Divide at the Yellowhead Pass; thence, down the valley of Yellowhead Lake and Fraser River, seventeen miles to the junction of Moose River with the Fraser. At this point the actual circuit of the great massif began. Following the Moose River to the summit of Moose Pass, the Continental Divide was again crossed and the valley of the stream on the opposite side of the pass

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Byron Harmon, photo. *Swan Electric Engraving Co., Ltd.*

MR. A. O. WHEELER'S 1911 EXPEDITION.

Reading from left to right: No. 2, Rev. G. B. Kinney; No. 4, Curley Phillips (the conquerors of Mt. Robson); No. 6, Konrad Kain (guide from the Rax Alpe, near Vienna); No. 7, Mr. Riley, of the Smithsonian Institute, Washington; No. 9 Mr. A. O. Wheeler, the leader of the Expedition.

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descended to the Smoky River Valley. This valley was now ascended to the Robson Pass, where the Continental Divide was crossed for the third time, and the valley of the Grand Fork of the Fraser River, or Grand Fork River, as it is frequently called, followed to the Fraser Valley, which was ascended to the junction of Moose River Valley.

Again starting from the site of Henry House, the survey was carried up the Athabaska River Valley and through a pass (Bighorn Pass) in the hills on the E. side to the valley of Maligne Lake, of which, with the enclosing mountains, a survey was made.

A relative idea of the height to which the mountains rise above the respective valleys may be obtained from the following altitudes: Site of Henry House, approx. 3330 ft.; Yellowhead Pass, 3727 ft.; Fraser Valley, at junction of Moose River, 3420 ft.; Moose Pass, 6700 ft.; Robson Pass, 5550 ft.; Fraser Valley at junction of Grand Fork River, 3000 ft.; Bighorn Pass, 7300 ft.; Maligne Lake, 5525 ft..

The altitudes here given are in feet above sea level and are based on the levels of the Grand Trunk Pacific Railway survey. They are carried from bench-marks along the line of the survey, and are the means of a series of trigonometrical levels obtained from transit readings back and forth between the stations established. In all cases, where possible, reciprocal readings have been taken, but in some cases, such as Mts. Robson, Bighorn Resplendent, etc., this could not be done, and the altitudes given for these are the mean results of a series of readings on their highest points. They are, therefore, not definitely established, but cannot be far from the truth. The base for the triangulation was obtained from land-survey corners established by the Dominion Government and the Provincial Government of British Columbia.

The expedition was made possible for the Alpine Club of Canada through the co-operation of the Grand Trunk Pacific Railway and of the Provincial Governments of British Columbia and Alberta and of the Dominion Government. The party originally consisted of the writer in charge, Konrad Kain, the Club's professional mountain guide, Byron Harmon, of Banff, the well-known mountain photographer, a cook and two packers. Later George B. Kinney was added as an assistant. The transport was in charge of Donald Phillips, the plucky young Canadian who made his initial mountain climb on Mt. Robson at the time the first, and as yet only, ascent of Mt. Robson was made.

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Correspondence with Dr. Charles Walcott, Secretary of the Smithsonian Institution of Washington, enabled the scope of the expedition to be enlarged, and a party of four was sent out by that Institution to collaborate with the Alpine Club of Canada and deal with the zoology and botany of the region surveyed. The party was in charge of Mr. Ned Hollister, Assistant Curator of Mammals of the United States National Museum. Mr. Hollister looked after the mammals, and Mr. J. H. Riley, also of the Museum, collected birds. To Charles Walcott, jun., and H. H. Blagden was assigned the collection of big-game specimens. A most satisfactory collection was made, over 900 specimens being obtained. In addition to their other duties, Messrs. Hollister and Riley made a fine collection of plants, comprising some 200 species. Several species and sub-species of mammals, birds, and plants, new to the United States National Museum, were collected. Full reports of the above work will appear in the 1912 issue of the 'Canadian Alpine Journal.'

The party left Edmonton on July 1, and followed the line of travel of the early fur traders to the junction of the Athabaska and Miette Rivers. Details of the old travelled trails from Edmonton to the Athabaska, up the Athabaska and down the Fraser, will be found in the records of the fur traders, David Thompson, Alexander Henry, Gabriel Franchère, John McLeod, Sir George Simpson, and others. A delightful description is given in an article written by Sir Sandford Fleming for the 'Canadian Alpine Journal' (Vol. i. No. 1). The same publication in later numbers also contains accounts of the several expeditions to this region by Dr. A. P. Coleman and by Messrs. Mumm, Hastings, Amery, and Dr. Norman Collie of the Alpine Club, England. Last of all, 'The New Garden of Canada,' by F. A. Talbot, gives a minute and amusing, as well as instructive, account of the tribulations of a tenderfoot who travelled over a part of the trail in 1910.

In our case the old landmark of the trail had ceased to exist, and the iron horse carried us to Fiddle Creek near the gap through which the mountains are entered. Here we were joined by our packers, and the balance of the journey to the Yellowhead Pass was over the newly constructed waggon road, made to carry the supplies necessary to build the railway.

At Fiddle Creek, the Rivière de Violon of the voyageurs, about one and a half mile S. from the railway, on the E. side of the stream, the Grand Trunk Pacific Railway Company is about to build a magnificent hotel to accommodate visitors

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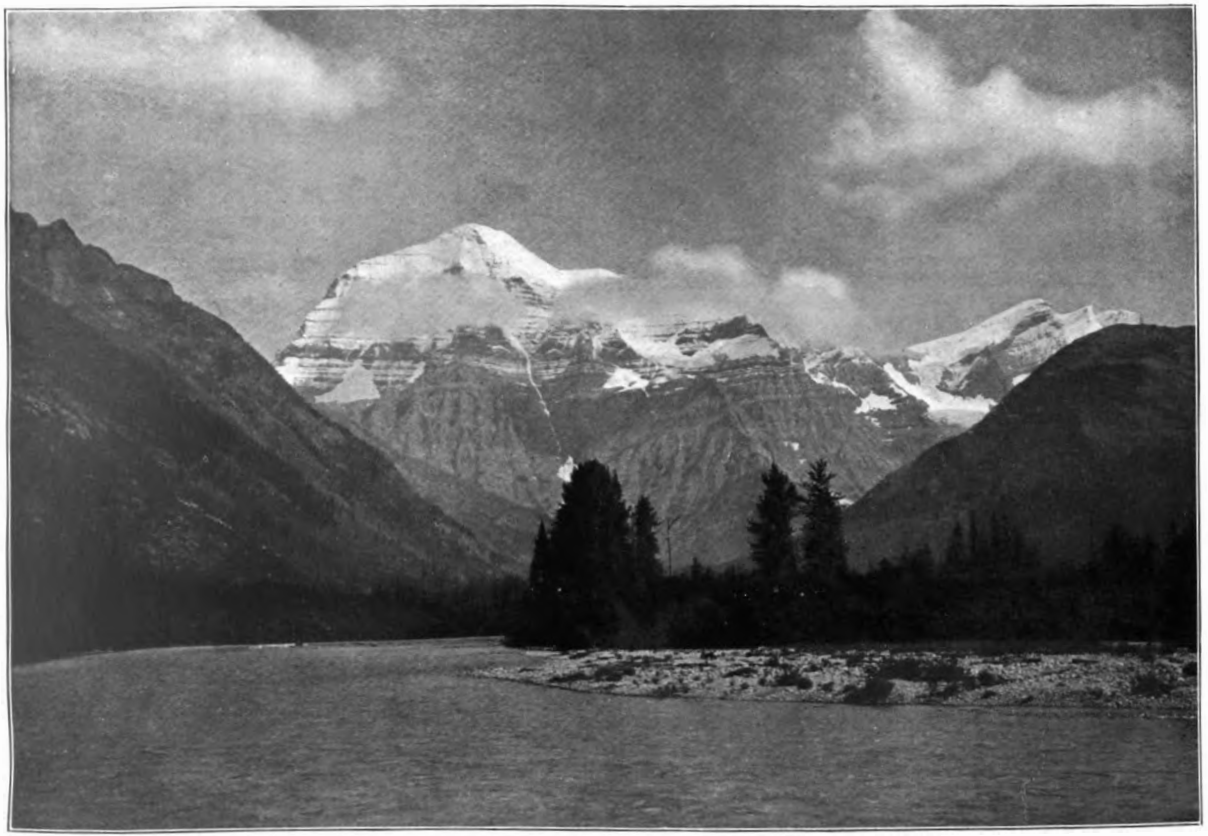

Byron Harmon, photo *Swan Electric Engraving Co., Ltd.*

MT. ROBSON FROM THE FRASER VALLEY.

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to the fine alpine region of the Yellowhead Pass. It is the first of a number of similar hotels through the mountain section of the railway. Situated on a high terrace surrounded by grey limestone peaks of strata twisted and contorted in every conceivable manner—so much so that one has been named Folding Mountain—the hotel will command a glorious view of snow-clad peaks, grassy hills, dark green forest, rushing torrent and shining lake. Beautiful park lands, brilliant with alpine bloom, are at its front, and eight miles up the creek are sulphur hot springs, said to rival those of Banff, from which the water can be piped to the hotel for public use.

'Swift's' prior to the advent of the railway was known to the men of the trail as a landmark and a stopping-place where one must bivouac, if only to gather the past history and latest news of the country. Swift is an old prospector and miner who settled at this spot fifteen or twenty years ago, married a half-breed, and has a well-grown family. He is a genius and has been a fairy godfather to all parties such as ours.

Directly across the river, on the S. side, rises the Colin range, to over 9000 ft. in altitude. It is a very striking-looking pile owing to its sharp pointed peaks and the knife-like edges presented by the limestone ridges. A peculiar feature is noticed in the rock fractures. Whole masses seem to have slipped away, leaving steeply sloping smooth surfaces. These surfaces are traversed horizontally by cracks in which large-sized spruce trees have grown, presenting the appearance of isolated trees of considerable size, clinging to the face of the almost precipitous bare rock. Here also is seen a very fine example of a triple hanging valley.

A little S. of W. lies Pyramid Peak (9104 ft.). It had been in full view the whole of our last day's march, and its N. face showed a pure white pyramid, rising supreme from among its fellows. It was the first ascent made by the party. The summit was reached by Konrad and Kinney, who built a cairn that was subsequently useful for the purposes of the survey. The view from the summit is superb, covering the Athabaska valley for many miles, both up and down, and showing, as on a map, the network of channels in which the winding river flows, creating numerous islands clad with dark spruce timber. Of particular interest was the view to the S. and S.W., where numerous fine snow-capped peaks could be seen, appearing and disappearing among the drifting masses of clouds.

Seven miles from Swift's the Miette River flows from the

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W. into the Athabaska. The course of the river is here nearly due N., and, looking southward up its broad valley, groups of magnificent peaks were seen. One fine wedge-shaped peak in particular rose supreme. I have called this peak Mt. Fitzhugh, as it is in full view from what will some day be a large and thriving city of that name. Mt. Fitzhugh is snow-clad the year round and rises to a height of 11,188 ft. above the sea. Around its base can be seen the snowfield supplying a fine glacier, which was, however, hidden at our low altitude by intervening hills. Another peak, rising conspicuously on the opposite side of the Athabaska, a little farther up, I named Mt. Mostyn as a tribute to Lady Rivers-Wilson, wife of the popular president of the Grand Trunk Railway. It is a huge rock mass, snow-crowned and bearing a large glacier on its eastern flank. The view up the valley of the Athabaska from Fitzhugh is very imposing and opened up vistas of deep gorge-like tributary valleys, leading westward to ragged peaks and towers of rock, capped by snow. They suggested great possibilities and looked very fascinating to the mountaineer. We knew from McEvoy's map that Mt. Geikie lay somewhere within the group, and Mumm had said that the N. face of Mt. Geikie was composed of the most tremendous precipices he had ever seen, so we looked keenly for a glimpse, but the peak cannot be seen from the waggon road. Moreover, the clouds were down low, and kept swirling around and about these big fellows in a most tantalising manner.

The Grand Trunk Pacific Railway follows the Miette River to the Yellowhead Pass. As the pass is approached the Yellowhead Mountain stands out conspicuously. It is of striking structure and, although not similar in form, rises like, and reminds one of, Castle Mountain in the approach from Banff up the Bow River Valley to the Main Divide.

Directly S. of Yellowhead Pass summit and four miles distant is a blunt cone-shaped peak with castellated sides. The height is 9742 ft., and it carries snow on its crest all the year round. For some reason it seems to have acquired the name of Mt. Pelée, although I can find no authority for it. On the map of their route accompanying their book, 'The Northwest Passage by Land,' Viscount Milton and Dr. Cheadle have shown the mountain as 'Mt. Fitzwilliam' after Lord Milton's family name. Together with Yellowhead Mountain it produces an excellent and very striking effect as the pass is approached from the E.

The altitude of the railway bed at the summit of the Yellowhead Pass is 3720 ft. above sea level. Here the Miette River

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furnishes one of those examples seen occasionally in the Canadian Rockies—viz. a mountain torrent breaking in on a height of land, travelling along it for some distance, and then sending its waters both ways. The old channel beds that carried the water westerly to the Pacific are still to be seen. The Railway Company has found it necessary to protect its property by building a line of cribwork that will for all time confine the stream to the Atlantic slope.

Yellowhead Lake lies two and a half miles from the summit on the western side. It is a very charming little sheet of water, four miles long, with a greatest width of half a mile. There are several narrows, and the irregularities of its form are by no means the least part of its charm. For the most part it is surrounded by green forest and is distinctly one of the most beautiful lakes in the district. In colour the waters are creamy sap green. A mile below Yellowhead Lake the Fraser River comes in from the S., and its valley forms a continuation of that in which the Yellowhead Pass and Lake are situated, with a general westerly direction.

Seventeen miles below the pass, the Moose River joins the Fraser from the N. Here was a camp known in railway parlance as 'Mile 17,' otherwise 'Moose City.' It proved to be for us a den of thieves. Some of our supplies and clothing were stolen while we were looking at them, and our camp cooking stove was extracted almost while the cook sat upon it. The thief staked it at a game of poker the same evening, but beyond that we were unable to trace it.

The canyon of Moose River opens directly on the railway and would be an interesting place to hold passenger trains for a few minutes to give the travelling public an opportunity to see the sight. The canyon is short, not more than two hundred yards in length. It is 150 ft. deep and the river drops that depth in the distance given. There are two falls, both near the head of the canyon; the upper drops 50 ft., and the lower 20 ft. There is a circular pocket below the upper fall which is filled with spray; there is also a V-shaped draw on the right side, into which the spray and mist from the falls eddy and circle. Here is the home of the rainbow on a sunny day. I saw not less than half a dozen spring into existence in this chamber at various points of view. 'Rainbow Falls and Canyon' would be an attractive and appropriate name; the more appropriate that the mountains directly W. of Moose River are known as the Rainbow Mountains. The Moose River flows from the heart of this range, of which Mt. Robson is the king pin. They are formed of rocks showing

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brilliant colours of crimson, red, and yellow, and these, mingled with the blues and greens of Nature's everyday garb, present from distant points a highly prismatic effect that has given rise to the name.

At the present time the quickest available route to Mt. Robson is by the valley of the Moose River. It can also be reached by way of the Stony River Valley; but the latter route, though possibly a better one, has not been travelled so frequently. Up the Moose Valley there is more of a track than a trail, and generally speaking the going is bad. It is, however, strikingly picturesque. At intervals the milky green torrent was seen rushing between walls of spruce, pine, and fir. Everything looked bright and fresh, for here, although July, it was little more than spring, and the early flowers were in bloom. On either hand the valley is bounded by low peaks more or less capped by snow, the dark grey of the rock, frequently broken by great bands of iron red, and the white snow they bear fitting into the picture most harmoniously. Often muskegs of stunted spruce and moss hummocks were met with through which the horses floundered as best they could.

The W. branch of Moose River joins the main stream some eight miles from the mouth. The trail follows this branch and soon comes to fine twin falls, of which the roar is heard for a considerable distance. Almost in sight from the trail, the stream drops over a ledge for forty feet, being divided into two falls by a great boss of rock in the centre that has withstood the ceaseless wash of the rushing water. The fall is a grand one, and sends up a dense cloud of mist. We camped three miles from the falls, on the S.W. bank, directly opposite a low ridge across which the route lies to the main branch of the Moose Pass. The valley of W. Moose River has a more westerly trend, its erosion being due to the glaciers lying at its head below Mt. Resplendent and the Lynx Mountains. In full view, a few miles away, was seen a splendid icefall with a far-reaching névé above it, which appeared to be divided into several component parts by narrow rock ridges.

The business of the expedition now began in earnest. The mammal man, Ned Hollister, went off to set his traps; the bird man, J. H. Riley, was already popping away with his gun, and the hunters were getting ready to tramp the numerous side valleys up near the crags in search of game. The topographic party got a flying camp outfit together and started up the W. branch to explore the valley at its head and the big glacier and snowfield that could be seen so clearly and

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A. O. Wheeler, photo.

Swan Electric Engraving Co., Ltd.

THE EAST FACE OF MT. ROBSON, WITH THE ROBSON GLACIER

(taken from Lynx Centre Station).

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looked so attractive. The glacier at the head of the W. branch was named Reef Glacier by Dr. A. P. Coleman on one of his expeditions to Mt. Robson. It is so called on account of the rock ridges, or *nunataks*, referred to, which appear like reefs rising from the snowfield. This is the glacier and snowfield described by A. L. Mumm in his delightful paper written for the 'Canadian Alpine Journal' (Vol. II. No. 2, pp. 6, 7) as having been visited by the British party on its 1909 expedition to Mt. Robson, the one from which they had the memorable midnight tramp to reach their camp. The icefall is much broken by crevasses and is enclosed by well defined lateral moraines, whose unoccupied terminal curves show clearly the very marked recession of the ice. It is not necessary to ascend the icefall, a snow-filled couloir on the W. side and a splendid ledge along the cliffs give easy access to the névé. Our objective point was a high conical peak at the S.W. corner of the névé from which a somewhat precipitous rock wall extended northerly and formed the boundary of the snowfield. The highest point of the snowfield is near its southern extremity, not far above the icefall, and without warning we found we had stepped from the Province of British Columbia to that of Alberta—we had crossed the Continental Divide.

The rock wall rose very steeply for 1500 ft. and gave some good climbing. An avalanche fell from above and poured from an overhanging ledge close by like a waterfall. As we topped the crest the whole wonderful panorama came into view. At our feet flowed the Robson Glacier, a great river of ice, every crevasse, every moraine, every icefall, clearly portrayed. Across, directly opposite, rose the massif, its outline clear from base to summit for fully 7000 ft. Up the sides was piled mass on mass of snow, falling in great waves to the glacier below—all of an intense whiteness. We easily recognised 'The Dome,' 'The Helmet,' 'Rearguard,' names familiar through Coleman. Above the snow masses rose almost perpendicular rock to the great S.E. ridge, and beyond the ridge the steep arête that leads to the extreme summit. It was a perfect day, the air so thin and clear that we could easily define the tremendous overhanging cornice with which the crest was lined. From where we stood the distance is four miles, but it seemed less than a mile away. The Helmet, 11,160 ft. in altitude, and Rearguard, 9000 ft., seemed quite insignificant beside this towering rock monolith. We tried to trace the route of Hastings, Mumm, Amery, and Inderbinen of two years ago, and thought we succeeded, but

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it looked so absolutely impossible from our point of view that we could not be sure.

To the S. rose Mt. Resplendent, named, and well named, by Coleman. Its altitude is 11,173 ft. On this side it is clad from top to bottom in pure white snow, and presents with the sun shining upon it a spectacle of such wonderful brilliance that the aptness of the name became immediately apparent. It rose in great snow masses and ice walls sheer to the summit, and showed several of the largest and widest bergschrunds I have seen in the Rockies. Enormous cornices overhung on the N. and E. sides. Later, the mountain was ascended by Konrad and Harmon. It proved to be altogether a snow and ice climb, and Konrad reported having seen some of the greatest ice cracks he had met with throughout the course of his professional experience. The crest of the mountain he described as an immense cornice reaching far out into space over the depths below.

To the S.E. the mighty precipices of Lynx Mountain frowned down upon us. It was the peak for which we had started, but its summit was more than 900 ft. above us and out of the question for the day. I may say with truth it was the most stupendous alpine scene I had ever gazed upon. To the right of Robson, in the N.W., stood a sharp conical peak. It has been referred to by Coleman as 'The White Horn' and by Kinney as 'Mt. Turner.' It looked a splendid and difficult climb, and from this point of view is of symmetrical and striking form, although it did not appear white at the time we saw it. I make the altitude of this mountain 11,100 ft.

Twenty miles northward could be seen, out-topping all else, a huge mass clad from summit to base in everlasting snow. With the sun shining on it, it showed a beautiful pure white, but most often looked a ghostly wraith appearing dimly through the mists. They said it rivalled Robson in height, but I find its altitude works out at 10,893 ft.; this, however, is not absolute. It is easily distinguished by its all-white appearance, and by a peculiar little horn that projects horizontally from its eastern highest corner. All round the immediate circle of vision were seen huge rocky peaks well set with snow and ice, that would afford excellent work for mountaineers. On one, in the centre of the circle looking northwards, a cairn was discovered by means of the transit telescope. I presume it had been set there by the English party two years ago, or the year before that. Our station was on the Continental Divide and its altitude 9542 ft. I named it 'Lynx Centre.' The line of the watershed crossing

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A. O. Wheeler, photo. *Swan Electric Engraving Co., Ltd.*

PEAKS ON THE SOUTH SIDE OF RESPLENDENT VALLEY

(from Roof Glacier Station)

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the Reef Névé ascends a low conical peak directly below Lynx Mountain, then climbs to the summit and, following the N. ridge on which we were, descends to the Robson Pass. The altitude of Lynx Mountain, the highest point of the Lynx range, is computed at 10,471 ft. Seen from our camp on the W. branch it showed a fine cone, but now stood out a huge black mass capped by snow. Especially striking is the great cornice with which it was surmounted.

It was on a low peak at the extremity of the E. ridge of Lynx Mountain, known to us as Reef Glacier Station (9162 ft.) that I had a most narrow escape of losing my life. Konrad and I were ascending to occupy the station with camera and transit. We had come to a slope of ice, covered by new snow; Konrad was leading and I was following in his footsteps. Suddenly the footsteps broke away and I slid down the slope to where it ended abruptly. I could hear the adze part of the ice axe grate as it scraped swiftly down the ice, and I had made up my mind that it was the end, when I suddenly stopped. The ice axe had caught. There was not, however, much to spare, for the lower half of my body was over the edge and the visible rocks lay far below. I suppose there was an exclamation, for Konrad, with a look of horror in his eyes, came bounding down the slope as though it had been level, and grasping me by the shoulder said 'I've got you'; and then he began to go himself. Fortunately the ice axe held, and we were soon on our feet, but it took some little time to pull oneself together after so close a call.

While at Reef Glacier Station we saw to the S. across Resplendent Valley one particular peak that rose from the centre of a snow massif like a huge rock-finger pointing heavenward. On seeing it Konrad exclaimed 'Ach! That is my peak,' and thereafter we knew it as 'The Finger of Kain.'

The source of the W. branch of the Moose River is found in glaciers lining the side of a magnificent valley. Directly at its head stand the S.E. faces of Mt. Resplendent and Lynx Mountain, together with two intervening peaks which, though of low stature in the snow-filled basin of the Robson amphitheatre, now stood out boldly, showing tremendous black precipices. The valley is exceptionally fine in every way, and particularly the amphitheatre at its head. It contains wonderful stretches of green rolling alplands, high up above timber line. From a vantage spot on these I counted a circle of twenty-five peaks, all good climbs, and that did not include a number of minor ones. From a station we occupied at the S.E. corner of the circle named 'Resplendent Valley South,'

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I also counted seven icefalls descending into the amphitheatre. It is without doubt one of the finest cirques I have ever seen. Owing to its exceptional alpine qualities and the fact that it is dominated at its head by Mt. Resplendent, rising on this side in almost sheer black precipices to 6000 ft. above the valley floor, I named it 'Resplendent Valley,' and feel sure that subsequent and more detailed investigation will well justify the term. From the alplands to the shingle flats below the steep sides are clad with a fine growth of forest, giving a delightfully picturesque setting to the whole scene. The valley is of wide extent, and the numerous icefalls, moraines, alps, and névés will require much exploration before their interesting features become fully known. The floor sweeps outward in broad shingle flats intersected by a tissue of glacial streams that shine like a silver network when seen from the heights above. Many timbered islands and points of spruce break the monotony of the flats and add to the fascination of the surroundings. Between the peaks deep pockets and recesses contain each its own little glacier and bit of alpland, and in some cases have fine waterfalls where their streams drop to the level of the main valley.

From a peak at the S.W. corner, between Resplendent Valley and that of Moose River, a magnificent view was had of nearly the entire structure of the two valleys, which lay before us in all the beauty of a perfect day. Southward, directly below, was a deep valley which rose by comparatively easy gradients to alpland and an excellent rock pass to the Fraser Valley, opening to it about two miles below Moose Lake. On the Fraser Valley side brilliant red rocks are seen near its crest, and for this reason it has been christened the Red Pass. Later, it was examined from the Fraser side, and there seems to be no reason why a good pony trail cannot be built over it to give access to Resplendent Valley in one day from the railway. Across the deep valley of Red Pass stood a ridge of rock, where the strata were very nearly vertical, and the snow-filled couloirs so peculiarly shaped as to give the intervening rock the appearance of razor-blades. The culminating crest of the ridge was on that account called 'Razor Peak.'

Camp was now moved some six miles, crossing over from the W. branch of the main stream of the Moose River, and pitched near a little spring lakelet, of which there seemed to be many scattered up and down the valley. Directly across from our camp rose a fine-looking peak, that reminded me on a smaller scale of one on the Blaeberry River, near its junction with the Columbia, named Mt. Laussedat. It is so called after Colonel

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Ami Laussedat, a French scientist who first brought to public notice the method of making topographic surveys by means of photography. I therefore named the peak 'The Colonel,' and it was arranged to climb it and make it a photographic station. To reach the peak it was necessary to cross the river and ascend a grassy couloir to the rocks. The ground here was literally covered with bloom: purple asters, wild geraniums, Indian paint brush of all shades from yellow to scarlet, yellow columbine, forget-me-not, heath and heather, pink and white, and numbers of other kinds of which I do not know the names. The Colonel is a very commanding peak and the view from its summit will repay the climb, which is nowhere difficult. The line of the Great Divide could be traced coming from the direction of Yellowhead Mountain; it passed close below us. Eastward about eight to ten miles could be seen a wide valley trending S.E. It is probably some tributary of the Snaring or Stony River. Mt. Robson was visible in the haze, swathed in clouds. To the N. showed the great snow mass previously referred to. To the S. another snow mass appeared, and far off on the Athabaska the black precipices of Mt. Geikie, Yellowhead Mountain, and Mt. Pelée could also be seen. It was a wondrous sight—seas of peaks does not express it—oceans of peaks rising high in every direction. The immensity of the view is astounding—the immeasurable chaos of it all! It will be years before it can be sorted out and set in order. Talk about lakes! We counted twenty-one of all sizes, and many of very beautiful colours: one directly below us to the N. is a glorious blue; another, westward across the Moose River, nestling in a hanging valley, is similar in colour to Emerald Lake seen from Burgess Pass. They are everywhere in this region—gems of turquoise, aquamarine, sapphire, cerulean blue, ultramarine, topaz—I cannot find names to fit all their colours. From the summit of the peaks they sparkle like rare jewels in a setting of deep green velvet, or are seen hemmed in by bold rocky steeps with snow and ice along their margins. The N. and E. faces of The Colonel are covered by snow, and the summit and W. ridges crested with wide overhanging cornices. It is a splendid landmark. The rock is in places broken into great slaty slabs, frequently many feet in length and resembling boards, they are so long and regular. In climbing over them much care is required owing to their slippery surfaces. The altitude of The Colonel is 9166 ft.

Camp was now moved ten miles farther up the valley to a beautiful park-like spot not far from the entrance to the Moose Pass. It is at the junction of three valleys, all of which are of

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very deep interest. The main valley turns N.E. and leads to the glaciers and snowfields forming the extreme source of Moose River. Directly N. is the valley of Moose Pass, and to the W. lies a very attractive one which is known to us as 'Terraced Glacier Valley,' owing to a fine glacier at its head which rises in three distinct terraces to the Reef Névé and forms one of its outlets on this side. All three will furnish splendid fields of exploration and many fine climbs of peaks that are as yet untouched, midst whose recesses are hidden wonderful alpine valleys. Camping expeditions may be made from such a centre to very great advantage. Directly E. is a high peak, which, owing to the rock strata of which it is composed having been tilted at an almost vertical angle, has been named 'Mt. Upright.' It is a long, ridge-shaped mass, and is prominently in view from The Colonel. Its altitude is probably 9600 ft., and it is one of the peaks of the Continental Divide. It was reached by a climb up the hill on the E. side of the river to an attractive-looking hanging valley directly opposite. The valley contained a gem of a lake of turquoise blue, surrounded by green alplands and a rock slide on one side. The water ran away from the lake in a fine cascading stream with some small falls. In the valley near by a caribou cow and calf were grazing, and a flock of ptarmigan flew screaming as we approached. Our station, though not the summit, afforded a splendid view of Terraced Glacier Valley and also of the Moose Pass.

The altitude of Moose Pass is 6700 ft. It is very nearly at timber line, and only a few clumps of stunted and scrubby spruce are seen scattered on the hill slopes. The approach is through thick timber, opening to vistas of grassy alps like avenues between the trees. On the W. rise bold rugged cliffs to over 2000 ft. and on the E. steep open grassy slopes. Passing two small blue lakes, the summit is found at the north extremity overlooking 'Pipestone Creek,' so called because the Indians who visit here are said to get a suitable stone to make into pipes along its borders. There is already a Pipestone Creek, a tributary of the Bow River, near Laggan, so I re-christened this one 'Calumet Creek.' It heads in an amphitheatre surrounded by glaciers; there are five or six of them.* The Moose Pass opens into Calumet Valley at the foot of the amphitheatre. There are a number of high tributary

* Over one of these glaciers is a pass with magnificent glacier scenery on the far side, leading to the head of the Stony River Valley. Mr. Mumm and Inderbinen reached this pass from the Stony River side in 1911. The Calumet Creek side appeared quite easy.

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A. O. Wheeler, photo. *Swan Electric Engraving Co., Ltd.*

THE HEAD OF RESPLENDENT VALLEY, AND EAST FACE OF MT. RESPLENDENT
(taken from Resplendent South Station).

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valleys coming into it. They all contain park-like alplands and are the home of the caribou and bear. Several herds were seen of the former, and our hunters secured a splendid grizzly and a number of caribou. The collectors were delighted at getting these fine specimens. They were, moreover, doing well among the smaller fry, and the returns from the traps and the guns kept both Hollister and Riley busy at skinning, curing, and packing away specimens from morning until night. At the opening of Moose Pass on the W. side is a conical rock peak, easy of ascent. It is very central and commands a glorious view, disclosing new glaciers, new peaks, and new valleys in every direction. It is recorded as 'Moose Pass Station,' altitude 8817 ft. After crossing the Pass, the Continental Divide climbs this peak and twists back S. again to cross the Reef Névé and climb Lynx Mountain. The course of the Divide here is very intricate and it zigzags back and forth in a truly wonderful manner; each fold contains a snowfield and glacier, sending their streams alternately flowing E. and W. Our Moose Pass camp was just below the line of big timber. It was one of the most fascinating spots I have ever been at. The trees are spruce, the kind that sends wide outspreading branches so satisfactorily on a wet day, when you sit under them with a jolly blazing fire in front and keep quite dry, and the carpet was pink and white heather.

Opposite our camp on the N. side of Calumet Creek is a most interesting snow-filled basin. It contains three distinct glaciers, separated by rock ridges of very peculiar and striking form. This amphitheatre as well as the one at the head of the Creek, will be of exceptional interest to explorers. On the opposite side of the valley, directly below Moose Pass Station, a large snowfield on the W. side of Moose Pass sends down a fine glacier terminating in a delightful alpine valley that encloses a clear bright green lakelet. The camp near the Moose Pass was about forty miles from the railway by the existing trail. It was next moved down Calumet Creek to a point a mile or more above the junction with Big Smoky River. The upper reaches of the Calumet Valley are open and park-like. Then comes a wide shingle flat with many streams glittering silver in the sunlight, and after that thick woods. There are two blazed tracks through the woods: one keeps low down on an easy grade for horses; the other, the Yates trail, leads high up to the crest of a large ridge which stretches far out into the valley from the S. side.

Across the Big Smoky, nearly opposite the opening of Calumet Valley, is another valley that leads to a fine snow-filled

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amphitheatre, at the head of which rises a prominent peak. It was occupied as a station and named 'Mt. Gendarme' owing to a peculiar isolated rock pillar that rises from its eastern arête. From the crest could be seen, apparently not far away, but in reality twenty miles, the absolutely pure white face of the big mountain referred to—the one that seems to poke an inquiring nose eastward. I have computed the height of the mountain as 10,893 ft. Directly in front of it rose a black rock mass that looked as though it might have been a cone, but had the top sawed off. This is the peak climbed during the last summer by Dr. Norman Collie and A. L. Mumm, and named by them 'Mt. Bess.' On the crest or sawed-off portion is a snow plateau which Mumm says is nearly level, and must be fully a quarter of a mile across. The altitude of the peak is computed at 10,468 ft.*

Immediately below Mt. Gendarme lay a delightful-looking valley with a semicircle of tremendous glaciers at its head. They rose in great icefalls, mounds, and snow-slopes, sheer to the summits of the peaks, even climbing in almost perpendicular façades to the very summit of the peak named 'Whitehorn' by Coleman. Snow arms reached out in every direction and presented a scene of dazzling whiteness, reminding me forcibly of the Selkirks, looking southward from the summit of Mt. Dawson. The mass culminated in a distant high peak of which the side towards us was wrapped in snow. I named it Mt. Longstaff after the well-known mountaineer and explorer, Dr. T. G. Longstaff. The altitude is 10,530 ft. The amphitheatre, on the N. side of which lies Mt. Gendarme, contains a snowfield about two miles long by one and a-half broad, with a most interesting glacier flowing down the valley by which it is approached. The lower levels are covered by a veneer of stones, so thickly as completely to hide the ice. It is strewn with glacier tables in many positions of uprightness. Huge blocks of rock weighing as much as twenty tons and more are set all over it on ice pedestals. Sand cones are very frequent and perfect in their pyramidal form. The most striking feature, however, is a vertical ice wall or cliff, where the dry glacier leaves its névé, rising to a height of 400 ft. Great chunks keep breaking off

* There is a great snow *cap*, 2–300 ft. deep, on Mount Bess, which may have been lost to Mr. Wheeler's view against the big white mountain behind it. The difference in height between the two peaks is probably less than 200 ft.—A. L. M.

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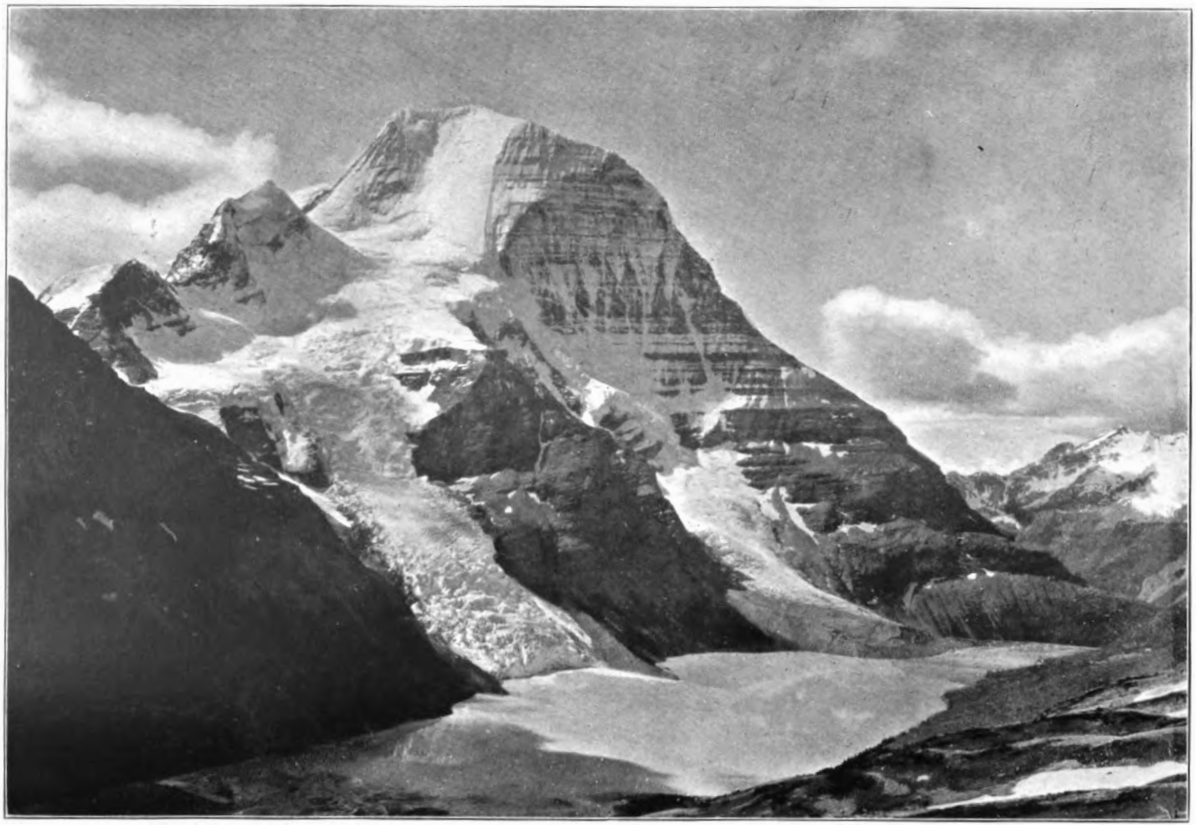

Byron Harmon, photo. *Swan Electric Engraving Co., Ltd.*

THE ~~N.W.~~ N.E. FACE OF MT. ROBSON, WITH BERG LAKE
(from the shoulder of Mumm's Peak).

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at the edge of the cliff and sprinkle the ice floor below with thousands of pieces, giving it a most bizarre effect. Over this ice wall, towards the S. side, two much broken ice-falls sweep from top to bottom in very striking cascades. I named it 'The Mural Glacier.' Above is the gently sloping snowfield bounded by towering precipitous cliffs, rising thousands of feet to the serrated ridge that forms the backbone of Canada, for along the ridge lies the Continental Divide. A gap in the rock circle, 300 ft. above the snow-field, permits of a mountaineer's pass to the valley of the Grand Fork, almost opposite Berg Lake.

Meanwhile camp had been moved up the Smoky Valley, across Robson Pass, and down the Grand Fork Valley to about a mile below Berg Lake. Some days later we climbed the peak on which the cairn stood. It had been placed there in 1910 by Dr. J. N. Collie and A. L. Mumm, accompanied by the well-known Swiss guide, Moritz Inderbinen. The peak is 9740 ft. in altitude and has been christened 'Mumm's Peak.' From the summit the scene beggars description. We looked at the N.E. face of the Mt. Robson massif. It rose supreme in the centre of the view. If one is lucky the hoary crest is free from clouds, which is not often the case. On this side tremendous rock walls seem to fall sheer thousands of feet to the valley—far too steep for snow to lie. On the N. shoulder rests a mighty ice-field, crevassed and broken in every direction. From its centre a rugged ridge protrudes, of which the culminating apex has been named by Coleman 'The Helmet,' from the resemblance to the old Roman headpiece when seen from the valley below. The altitude is 11,160 ft. The ridge ends in a semi-detached rock mass, aptly named by Coleman 'Rearguard' (altitude 9000 ft.). From the elevated ice-field, fed by avalanching snows from the sides of Robson, a gigantic ice cascade tumbles down rock precipices and buries its nose in the waters of Berg Lake. At frequent intervals great chunks of ice break off with a report like cannon, and, bounding and rattling down the steep incline, plunge into the clear water of the lake. I have seen one of these enormous ice blocks send a spout of water fully twenty feet into the air, while the waves caused by the upheaval wash to the farther shore. The incessant ice-falls soon fill the lake with floating blocks which drift hither and thither as the wind directs. Imagine a lake a mile and a-half long by three-quarters of a mile wide, of perfect turquoise-blue, filling the whole width of the valley floor, its

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surface dotted thickly with miniature icebergs, showing snow white against it. The altitude of the lake is 5506 ft. The ice cascade falls 5000 ft. from where it originates between the main massif of Mt. Robson and the Helmet. Two old, well-formed lateral moraines protrude into the lake and indicate a period when its bed was filled by ice. Dr. Coleman has named the overhanging ice-fall 'The Blue Glacier.' The term is not strong enough: 'Tumbling Glacier,' though not so euphonious, is a better name to express the activity of such a unique feature.

In line with the Helmet-Rearguard ridge, and a short distance from it, is a similar rock mass to Rearguard, of nearly the same elevation (9154 ft.). Between the two, leading from the wonderful snow-filled cirque, seen in its entirety from our station on the Lynx Range, flows the Robson Glacier. It describes a circular sweep around Rearguard, and, though much crevassed in its upper reaches, is generally easy to travel over. The total length is five miles, with a width of three-quarters of a mile, where the ice-flow is well defined. The mass on the E. side is named Ptarmigan Mountain by Coleman, from the fact that the alplands on the W. slopes are swarming with that species of grouse, a fact we fully verified. In the valley below its precipitous N. face lies Lake Adolphus, a blue gem of a lake three-quarters of a mile long and half a mile wide (5523 ft.). It is delightfully picturesque, nestling snugly in a setting of green spruce. Between the two lakes lies Robson Pass, altitude 5547 ft. The pass is a shingle flat, rising gently to the ice-fall of the Robson Glacier, by the outflow from which it has been formed. The western side is extensively covered by a growth of stunted spruce and scrub, and though the timber is small it represents hundreds of years of growth. The most advanced portion of the glacier is at the western side, and there are two main outflows, each a glacial torrent, the largest part of which goes to Berg Lake. Between the two a low eminence of hard rock, which has so far resisted the action of the ice resting on it, and has been piled up with morainal débris, rises a hundred feet above the pass. The western stream carries most of the volume of the run off, but when the hot sun causes the melting of the ice to be great the eastern stream also carries a considerable quantity of water, and it is this eastern stream that is of particular interest.

It has been said that the line of the Continental watershed passes down the ice and divides the glacier between the E. and W. slopes of the Rockies. I did not find this to be the

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case. The Divide, after leaving Lynx Mountain, follows the ridge over Ptarmigan Mountain and descends its N.W. spur to within a few hundred feet of the low rock eminence referred to. It now crosses the shingle flat and climbs Mumm's Peak; thence following the line of the ridge surrounding the Mural Glacier and Snowfield. The eastern stream from the Robson Glacier passes through the narrow gap between the low rock eminence and the spur of Ptarmigan Mountain, and the rush of water has cut in on the height of land, following along its crest for a little and sending several channels flowing to Lake Adolphus. These channels vary in volume and number according to the stage of flow from the Glacier.

It was a glorious day when we made the ascent of Ptarmigan Mountain. The altitude of the highest peak is 9320 ft. The entire amphitheatre of Robson Glacier lay before us. The massif was clear from base to summit, and the scene was a creation of pure crystal white. Konrad picked out what he claimed to be the proper route of ascent and made the prophecy that the time would come when Robson would be climbed in eight hours from a camp at the summit of the pass. Not going quite so far as this, it is not unlikely that it will be done in one day from the farthest-up point of the alps below Ptarmigan Mountain. Midway between the Helmet ridge and the head of the amphitheatre is a great rounded shoulder, jutting out from the east wall of the mountain. It is completely covered by snow, and presents great yawning crevasses, ice cliffs, and steep slopes leading up to the bergschrund at the base of the S.E. precipices. This snow-covered mound has been named 'The Dome.' The route selected by Konrad lay up the glacier to the foot of it; then up a steep rock rib protruding from the superincumbent snow on the N. face of the Dome to the slopes leading to the bergschrund. This crossed, he asserts that climbable ledges will be found to the long horizontal arête, extending S.E. from the mountain. The arête reached, the ascent will be up the long snow slope leading directly to the summit. This is, practically, the route attempted by Hastings, Mumm, and Amery in 1909 under the guidance of Moritz Inderbinen, which would likely have proved successful but for the delay caused through starting from a base camp at the pass. (For an account of this attempt, see 'Canadian Alpine Journal,' Vol. II. No. 2, pp. 1–20.) I should like to have made an attempt to verify Konrad's statement, and my assistants would have been nothing loth; but previous experiments had shown that the uncertainty of weather conditions might have

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resulted in loss of valuable time for mapping topography, and we had none to spare.

A word about Mt. Robson. The massif, including its glaciers and glacial lakes, covers an area of more than thirty square miles. Of recent years an altitude of 13,700 ft. above sea level has been assigned to it. I regret to say that I am compelled from my trigonometrical observations to lower the height. I compute its elevation at 13,068 ft. This altitude is deduced from transit readings of the angles of elevation at three widely separated bench-marks established by the engineers of the Grand Trunk Pacific Railway along the road bed, and is carried from summit to summit to the crest of Mt. Robson. In the case of one bench-mark the reading is directly on the summit. This deduction is not absolute. It is impossible to arrive at an absolute deduction where no distinct signal, such as the top of a rock cairn, has been sighted upon, and there is none such on Robson. The result obtained is the mean of four readings on the summit from various other summits around it, of which the altitude has been established through sighting on rock cairns erected on them. In all, six such sights were obtained, but I have discarded two as uncertain, and the tendency being to still lower the altitude. I think the figures given will eventually be found to be not very far from the truth.

Before leaving the Robson Pass I must mention that while camped there Konrad and Harmon started off one cloudy morning to get some pictures of the crevasses and snow formation in the Robson amphitheatre, while Kinney and I made some investigations of the glacier forefoot and marked some rocks at measured distances from the ice for future reference as to advance or retreat. A memorandum of the measurements is here given. Harmon got some fine crevasse and sérac pictures, and, to crown all, they made the ascent of Mt. Resplendent (11,173 ft.). They report this snow-crowned mountain as wonderfully crevassed. The piled-up snow on the N. and N.W. faces is traversed by gaping chasms, set with icy teeth. Near the summit is a great crack, then filled with snow, which might be a very dangerous obstacle. The crest itself is hung with enormous cornices reaching out a great distance. The views, particularly of Resplendent and the Fraser Valleys, were superb. Konrad from this point of vantage confirmed his previous selection of a route up Robson. He states that the horizontal S.E. arête is quite possible, and that, once it is reached, there would be little

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further difficulty, as the slope to the summit does not exceed 45°, and the obvious route is along the edge of a great snow mass clinging to the S.E. face of the mountain. He again says it can be done from a camp below Mumm's Peak in eight hours, once the route has been established. But then Konrad is a wonder.

The Grand Fork River, having left Berg Lake, and cut through the boulder wash from the glaciers referred to, flows quietly in many channels over a shingle flat for a mile below the lake. It then enters a narrow rock canyon, and soon becomes a cascade, careering wildly down its bed and showing a great swirl of white water. In half a mile there are five leaps of from 10 to 50 ft., and the stream drops 200 ft. Then comes a line of cliffs extending part way across the valley. Over this the river makes a grand and spectacular leap to a rock floor below, where it turns sharply to the left and pours madly through an extremely narrow box canyon which it has carved in the bed rock. The fall is magnificent and I know no other of quite the same type. The total drop is 145 ft. by aneroid barometer measurement. At a distance of 60 ft. from the crest, the full volume of the water strikes a ledge and bounds outwards for 30 ft., creating a splendid rocket which gives the idea of a giant leap. There is such a feeling of majesty and power inspired by the spectacle that I christened it 'The Emperor Falls' and the rocket 'The Emperor's Leap.' The river now races through a narrow rip in the rock, 6 to 10 ft. wide, churning and swirling and leaping in the wildest manner. This is a distinctly new channel as geological time counts. Close alongside is a deep gorge where the river formerly flowed. There was then no big fall, for the gorge opens from the shingle flats, and descends by a steady grade. It is deep and trees hundreds of years old are growing at the bottom. The present bed and the old one come together about a mile below the falls, where there is another line of cliffs across the valley. Here is a second big fall of 150 ft. It suggests the name of the 'Fall of the Pool.' Two-thirds of the way down is a tiny pool in the rock into which the water leaps; the lower part is more broken. The river then proceeds on its way still in a deep rock canyon, to the last line of cliffs, down which it leaps in a great curve of white foam. 'The White Fall' would be an appropriate name.

Directly E. of the 'White Horn' is an exceptionally fine icefall descending very steeply from a wide snowfield. Its forefoot

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is of peculiar formation, is much broken and crevassed, and comes to a sharp point between the walls of a deep rock canyon. Its stream has formed a shingle flat which barometer measurements showed to be 1600 ft. below the level of Berg Lake. The shingle flat and the gorge beyond which it lies are at the head of 'The Valley of a Thousand Falls,' a name given by Kinney in one of his explorations. From a height the valley has an austere look. It is bounded by bare cliffs surrounded by flowing and hanging glaciers from which water streams on a hot day creating falls in every direction. Beyond the canyon rise tier on tier the awe-inspiring precipices of Whitehorn, and over against them to the W. a tumbling glacier which showed a fine bunch of séracs, and was continually avalanching fragments from them to the valley below. From the shingle flat at the head of the Valley of a Thousand Falls the drop to the morainal delta of the glacial lake in Grand Fork Valley is 450 ft. by aneroid, or altogether 2060 ft. from the western end of Berg Lake flat, and the stream again cascades down the incline, though in a milder manner. The scene from the delta is grandly picturesque. The valley on all sides except the S. is walled in by rock cliffs and extremely steep slopes. To the W. a fine waterfall comes down the mountain side in a number of white leaps. All around smaller falls from the melting snows are seen on a sunny day breaking over the cliffs of Mts. Robson and the 'White Horn' and falling like long white streamers down their sides. The lake is one of those beautiful glacier-fed lakes of glorious blue, surrounded on the E. by a splendid fringe of dark green spruce, and hemmed in on the W. by nearly sheer rock cliffs. The eastern shore line is delightfully irregular. A prominent point protrudes in the centre, and there are several small bays. It is four-fifths of a mile long by two-fifths wide, and lies at an altitude of 3260 ft.

We climbed a peak to the west, directly behind the big fall. The station is recorded as 'Little Grizzly' (8953 ft.). From it you get a comprehensive bird's-eye view and can see how things really are. Directly opposite, across the valley, could be seen the W. and S.W. faces of Mt. Robson. It rose very steeply on this side. Three distinct lines of cliff could be counted, traversing the lower half, with a slight inclination from the vertical, and between were slopes of varying steepness, some of the lower ones bearing quite large patches of spruce forest. When it is remembered that a line drawn through the centre of Mt. Robson at its base would extend

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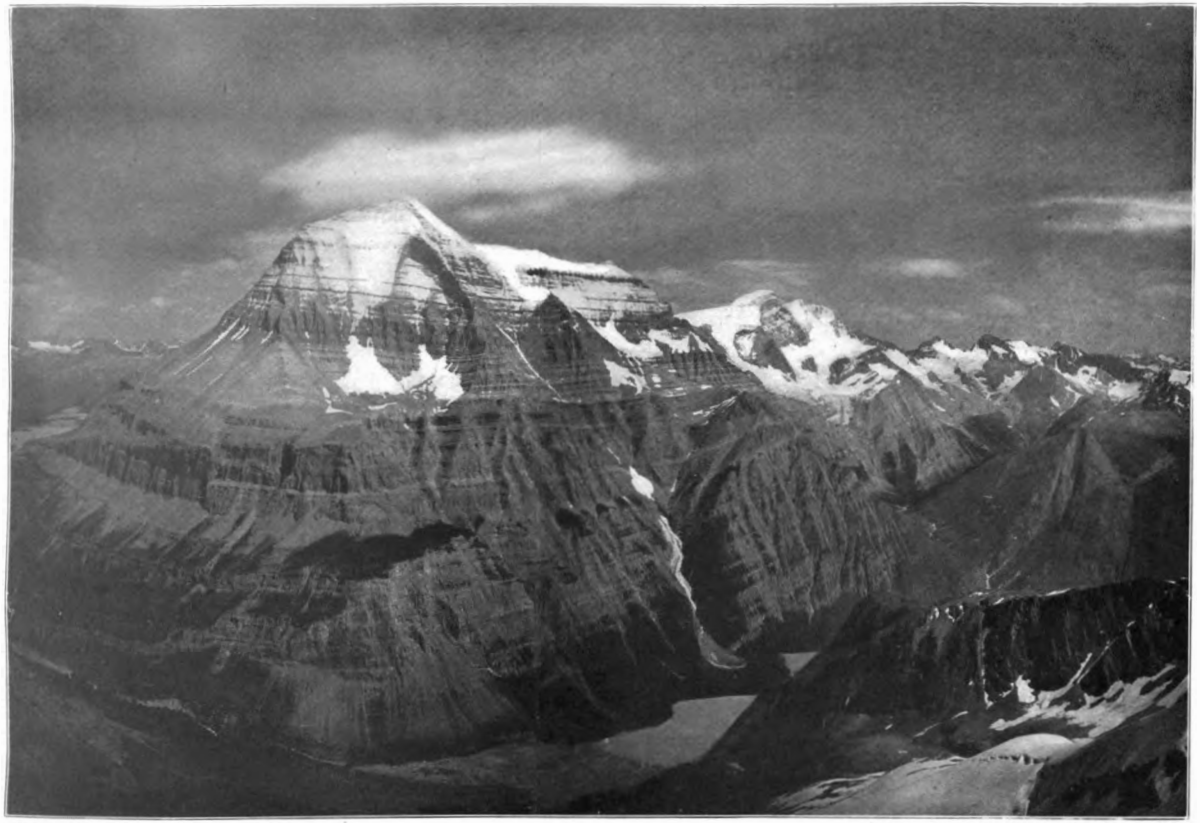

A. O. Wheeler, photo. *Swan Electric Engraving Co., Ltd.*

WEST AND SOUTH FACES OF MT. ROBSON, AND SOUTH FACE OF MT. RESPLENDENT
(from Little Grizzly Station).

The lake on extreme left is Berg Lake, at the N. foot of Mt. Robson The lake in centre of foreground is Lake Kinney. The first and only ascent of Mt. Robson, by Messrs. Kinney and Phillips, was made by gaining the upper scree slopes of the W. face and then, from somewhere near the big snowfield, striking straight up towards the summit, over good but steep snow

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for more than three miles, and that in this distance it only rises a little over one and three-quarter miles, it will be seen that there is plenty of room on the ledges between the lines of cliffs. Above the uppermost line is the great shale slope frequently referred to by Kinney and Phillips in their accounts of the ascent made by them in 1909. (See 'Canadian Alpine Journal,' Vol. II. No. 2, pp. 21–44.) From bottom to top the this tremendous shale slope measures 1870 ft. Above, rock face becomes very steep, but not too steep to prevent snow lying most of the year. Near the crest could be seen through our field glasses a remarkable feature, a series of snow séracs, fantastically shaped snow pillars, formed through the alternating action of fierce winds and hot sun. Even in the great distance it could be seen that these massive and very striking creations owed their peculiar and eerie shapes to the storms of driving snow that had swept over the mountain. Along the crest appeared enormous cornices reaching far out over the depths below on the N. side. Kinney and Phillips's route of ascent was pointed out, and it was more than ever borne in upon us, not the wonder of their having made the ascent, but the wonder of their ever having made the descent without accident. The route is certainly not one that would be adopted by any experienced mountaineer, and will never become a favourite, if, indeed, it is ever tried again. A careful inspection of it brought home the fact that the first route attempted by Dr. Coleman, the route of the English party of 1909, and that selected by Konrad through his knowledge of mountain conditions, is the proper one for a safe and rapid ascent.

On the opposite side of the Valley, directly across from Mt. Robson, rose the fine peak which on his sketch map Dr. Coleman shows as the 'White Horn'; Mumm speaks of it as 'The Horn,' while Kinney refers to it as 'Mt. Turner.' It does not convey the impression of a horn, and it is not very white except on the N. side. The massif is surrounded on all sides except that of the Grand Fork Valley by glaciers, and rises in steep precipices broken by ledges. Cliff glaciers line the sides and the peak is crested with snow. The whole N. face is clad with snow and from that side it shows a pure white peak. Behind, to the S.W., lay another long and splendid valley, that of Swift Current Creek. It showed a long array of peaks with glaciers filling the hanging valleys that lined both sides and led back farther than could be seen from our point of view. These beautiful valleys!

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Their name is 'Legion,' and each new discovery is more beautiful than the one before. All around were peaks, snow fields and icefalls, many easy to reach by a one-day climb from the delta basin of Lake Kinney. Directly across lay the valley of the Little Fork, a tributary of the Grand Fork. It looked intensely attractive for mountaineers and Nature lovers, and showed an easy pass at its head, where lay some fine rolling alplands, leading to the Fraser Valley. On the N. side, straight from its floor, rose in tremendous precipices and unscalable cliffs the walls of Mt. Robson. They were, however, intersected by deep narrow gorges whose sides jutted out in towering shoulders like buttresses. High up above the cliffs, the face of the massif was hung with wide beds of snow, hundreds of feet thick, which were constantly sending down avalanches to the Little Fork Valley. There would be a crack, a roar like near-by thunder, and an immense mass would break away, pouring from ledge to ledge like a giant waterfall, and so come down the gorges. Their paths could be followed from near the top to the very base of the mountain. It was a wondrous sight. To the E. lay Mt. Resplendent, on this side, as on the Resplendent Valley side, showing great precipices. At the base was a most interesting looking glacier with a fine icefall. Between Robson and Resplendent showed an apparently climbable pass to the snow-filled basin of Robson Glacier. The height of this pass is 9700 ft. It would give a rock climb on the Little Fork side, and then all snow and ice to the Robson Pass. It could not, however, be undertaken without professional mountain guides except by skilled mountaineers. Above the pass rises the square-cut vertical end of the long arête extending S.E. from Mt. Robson. The valley was prospected by Dr. Coleman with a view to making an ascent of the mountain from this direction. The idea was rejected, but, even so, I do not think it is impossible, and I look to see the day when a popular route of ascent will be from the Little Fork Valley.

The Grand Fork River flows for a distance of some six or seven miles after leaving the lake, before it joins the Fraser. Its valley is enclosed by high rounded hills (6850 ft.) on the E. side and a rock ridge (7300 ft.) on the W. A pony trail up the Grand Fork Valley to Berg Lake should be constructed as soon as possible. From the hills and ridge before mentioned, magnificent views are had of the broad Fraser Valley, sweeping westward to Tête Jaune Cache, situated at the junction of the McLennan River with the Fraser. The

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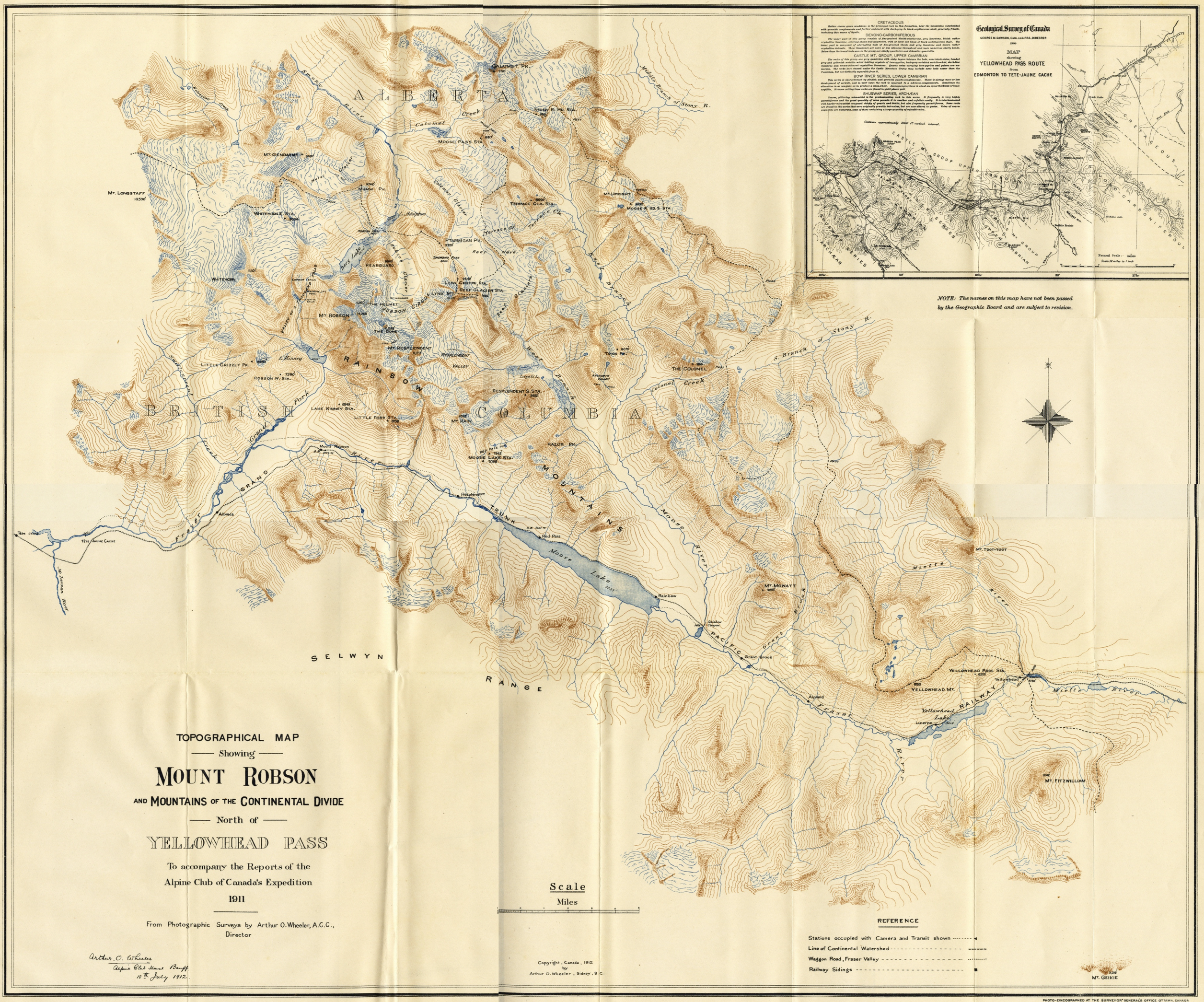

TOPOGRAPHICAL MAP

Showing

MOUNT ROBSON

AND MOUNTAINS OF THE CONTINENTAL DIVIDE

North of

YELLOWHEAD PASS

To accompany the Reports of the
Alpine Club of Canada's Expedition
1911

From Photographic Surveys by Arthur O. Wheeler, A.C.C.,
Director

latter could be seen winding in silver folds, and not far below it was joined by the Grand Fork, which spread itself out in many channels at the point of confluence. But what interested us most was a range of high mountains which lay W. beyond the McLennan River and was probably thirty to fifty miles distant. The range showed some bold, striking peaks and some very fascinating snowfields. These mountains were assumed to be of a goodly altitude, for the reason that the tops of the higher ones were continually in the clouds. It seemed to be one of the groups of high peaks scattered over the district, of which there may be said to be five principal ones. This particular group must be adjacent to the Caribou mountains, and as far as any report of it goes it is unbroken ground. The Canoe River, a tributary of the Columbia and the North Thompson River, a tributary of the Fraser, which it joins many hundred miles distant, both main highways of the Indians and early fur-traders, head in the range.

We had thus made the first complete circuit of Mt. Robson. Travel was by the Moose River and Pass, Calumet Creek, Smoky River, Robson Pass, Grand Fork, and main Fraser Rivers. The total distance is eighty-five miles. A pack train had been taken all the way except over the part between the shingle flats below Berg Lake and the S. end of Kinney Lake—a distance of three miles. It was necessary to send the pack train round by the Moose River route, a matter of five days travel, in order to make the connection again. So it will readily be seen how important it is that this broken link in the chain be taken up. We now proceeded to the crossing of the Athabaska near the site of Henry House, and the remainder of the season during which it was possible to work was spent in carrying on surveys in the Maligne Lake district.

Of the region as a whole, from the entrance to the high mountains at the gap at Brulé Lake to the exit below Tête Jaune Cache, it may briefly be said that it is one of tremendous possibilities to all who may be interested in the various phases of recreation and study presented by snow-clad mountain ranges: to the mountaineer, the artist, the Nature lover, the hunter, the scientist and the every-day tourist who travels to such parts to enjoy their unusual scenic splendours and to derive rest, health and pleasure while doing so; also to the still large number who select such routes to obtain a glimpse while passing from continent to continent. Although there are no great peaks to climb immediately along the line of railway, and the low altitude of the pass and railway bed

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necessitates a laborious and irritating climb to timber line over slopes covered by fallen tree trunks, yet there are five distinct groups of great peaks within easy reach: the Robson Group, the group lying W. of Tête Jaune Cache which has yet to be explored, the group of which Mt. Geikie is a centre, lying W. of the Athabaska and S. of the Whirlpool River, the group surrounding the Athabaska Pass, and the group which focusses around Maligne Lake. There are already a number of excellent outfitters and guides in the district, and as soon as the Transcontinental road is in operation from coast to coast trails to the various centres named will give ready access.

MEASUREMENTS TO FOREFOOT OF ROBSON GLACIER.

In front of the forefoot of the Robson Glacier is an isolated point of rock covered to a large extent by the terminal moraine. It rises from 90 to 100 ft. above the shingle flat of the Pass and appears to have been at one time a continuation of the rocky timbered ridge down which the Continental Divide descends from Ptarmigan Mountain. The outflow from the eastern lobe of the glacier seems to have cut through and isolated the point from the main ridge, piling morainal débris all over it, and depositing boulders on both sides. At the N. base is a small grove of spruce, probably part of the timber on the main ridge when joined. The trees here are several hundred years old.

Measurements E. of Isolated Point of Rock.

E. edge of white crystalline rock over which water flows is distant from end of ice . .	86 ft.
W. edge of white crystalline rock over which water flows is distant from end of ice . .	137 ft.
From nearest ice to arrow on rock marked . .	338·6 ft.

Rock is 14½ ft. by 7 ft., by 7 ft. high, of dark blue crystalline limestone.

Rock marked:

A. C. C.
AUG. 10
1911

TO ICE
338·6 ft.

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Main stream from ice flows just to east of and immediately below it.

The rock is in line with a square block of rock on the E. moraine of a whitish crystalline formation (size, 16½ ft. face by 13·7 ft. high by 13·4 ft. thick) and the first high point of the old moraine to W. where a pile of stones has been put together.

MEASUREMENTS W. OF ISOLATED POINT OF ROCK.

Marked a vertical slab of blue slaty limestone which forms the W. wall of the isolated point of rock. Slab shows striation and is quite smooth.

It was marked:

A. C. C.	TO ICE
AUG. 10	175 ft.
1911	ALONG WALL

In both markings an arrowhead was put at the point of measurement. The measurement in this case was made along the wall to where the ice of the glacier overhangs it. Here there was an irregular ice cave and the torrent poured from below it, immediately beside the rock wall—a whitish crystalline rock.

Magnetic bearing from this arrow to the most advanced ice is S. 30° W.

Just beyond where the rock slab was marked is a dry bed of the main torrent which sweeps outward around the old moraine farthest from the ice. This bed is not now in use, and the main stream, after leaving the cave, flowed to Berg Lake directly along the foot of the ice, in a position more westerly and much nearer the glacier. Three years ago the first-mentioned bed was in use.

THE ASCENT OF MT. KOLAHOI.

BY DR. ERNEST F. NEVE.

IT was a brilliant June morning when we left our camp on the Kolahoi névé, at an altitude of 15,300 ft., and with twelve porters lightly laden we crossed the mile of snowfield intervening between us and our climb. Facing us was the pyramidal peak, rising very steeply 2500 ft. Following

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