The Canadian Alpine Journal

PUBLISHED BY
THE ALPINE CLUB OF CANADA

1908

HEADQUARTERS
BANFF, ALBERTA

VOLUME I, No. 2

CANADIAN ALPINE JOURNAL
PUBLISHED BY THE
ALPINE CLUB OF CANADA
1908

Printed by the Herald Printing Co., Limited, Calgary, Alberta.

COLONEL AIME LAUSSEDAT

Figure 1 Colonel Aimé Laussedat

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MOUNTAINEERING SECTION.

THREE ATTEMPTS ON PINNACLE.

McTavish, P. D..

Pinnacle Mountain is bold and precipitous with somewhat of a castellated appearance. It is situated between Paradise Valley and the Valley of the Ten Peaks and behind or southwest of Mt. Temple, which overshadows it by upwards of 1,500 feet. Its altitude is only 10,062 ft., but the steepness of its walls on all sides, and the rottenness of its rock combine to make it extremely difficult of ascent. In fact it has so far defied the efforts of all who have attempted to reach its summit.

During the summer of 1907, the year in which the Alpine Club of Canada met in Paradise Valley, three attempts were made to conquer it. On June 24 Mr. Forde of Revelstoke with Guide Peter Kaufmann made the first attempt, the Alpine Club sent a party composed of the Reverends J. C. Herdman, J. R. Robertson and Geo. B. Kinney and P. D. McTavish in charge of the guide Edouard Feuz Jr. on July 9; and on August 22 Dr. Hickson of Montreal with both Peter and Edouard made the third unsuccessful attempt.

The Alpine Club's party left camp at six o'clock, and, after the usual tramp through the woods and over the 2,500 feet of loose rock and snow forming the mountain’s lower slopes, we encountered the first real work. This consisted in the ascent of a long, steep couloir filled with much loose rock on which rested, most insecurely, from six to twelve inches of snow and ice. In spite of the greatest precaution we dislodged some boulders and a considerable amount of finer debris, snow and ice. As we approached the top of the chimney the snow increased in quantity and steepness, becoming almost perpendicular, so our ice-axes were called into use.

Regarding this particular part of the mountain Mr. Forde writes in his account of the climb: "About seven o'clock the first work began at an elevation of about 9,000 feet, up a small couloir, and, as the rocks were icy and covered with from six to twelve inches of snow, the rope was brought into use. Here one of the pleasures so often experienced by mountain climbers fell to the lot of the writer, that of hanging on to the face of the rock wall while the man above sent a steady stream of snow and lumps of ice on the top of his head and down his neck, while his fingers were getting numb and stiff and he was beginning to doubt the existence of such things as toes. Surely one is justified in asking at such times the question: Is life worth living? After about two hours of this work, during which the two climbers 'spelled' each other in cutting steps and finger-holds, about 125 feet had been gained, and they reached a small shoulder of the mountain, projecting into the Wastash Pass. Up this shoulder the travelling was comparatively good for 200 feet more, and then they were brought to a stop by a perpendicular rock wall, the face of which was composed of loose, shaly rock, affording no secure foothold or hand-hold."

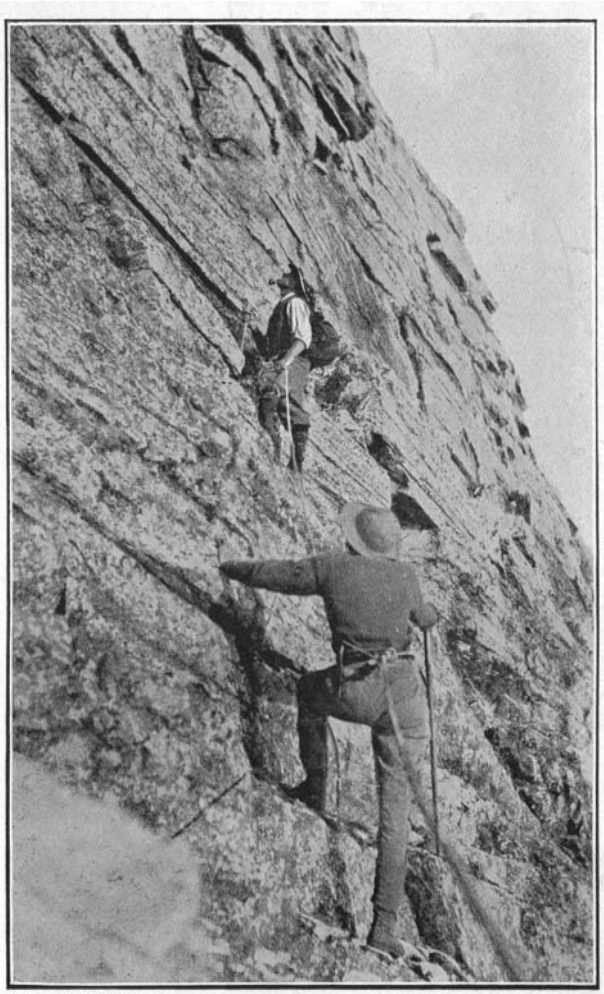
Having finally reached the top of the couloir we found ourselves on a narrow ridge which connected a gendarme to the body of the mountain. This ridge was so narrow that there was barely room for our party to sit down, while the rock was so disintegrated that we wondered why col and gendarme did not go crashing to the depths below. We had been climbing five hours, and now halted for a breathing spell and a sandwich. Resuming the climb, we found ourselves confronted by a perpendicular wall several hundred feet in height, therefore turned south towards Eiffel Peak. Our first work was a very difficult descent of about fifty feet which landed us in a sort of funnel-shaped amphitheatre. Its walls were very steep and its outlet led to a perpendicular drop of 500 feet. We crossed safely by a narrow ledge and soon found ourselves on the col joining

Pinnacle Mountain and Eiffel Tower.

Looking upwards (northerly) Pinnacle Mountain presented the appearance of a succession of cascades of honeycombed rock which seemed ready to crumble were any extra weight put upon them or the rain to saturate them. For an hour we scaled this succession of perpendicular faces and had little trouble except that the rottenness of the rock made more or less hazardous our every movement.

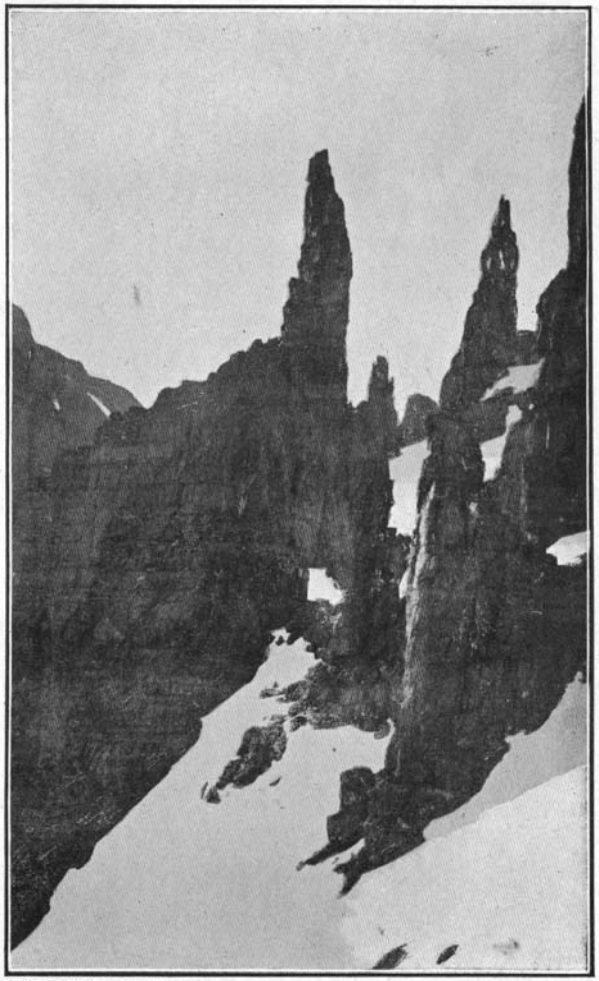
Finally about one o'clock we reached the base of the precipice-walled crown which surmounted the rest of the mountain, the "keep" as it were of the fortress. Its walls rose in a perpendicular face and seemed to defy us. We went to right and to left only to find that the same perpendicular face extended completely around the mountain, guarding jealously its summit. There seemed but one chance: A huge crack cleft the face of the crown, reaching apparently to the summit, and it looked as though we might be able to work our way up. For about forty or fifty feet we had little difficulty, but beyond that the way was absolutely blocked by the steepness of the rock and its utter lack of hand-holds and foot-holds. For fully an hour the guide struggled at this point. Finally one of the party braced himself and allowed Edouard to climb upon his shoulders in the hope that the advantage thus gained would reveal new possibilities. But the effort was useless and we were reluctantly forced to retreat.

It was now suggested that we try to work our way up the walls of the huge crack at a point farther in where it was not as wide, but upon examination we found these walls covered with ice and the hope of getting up here was quickly dispelled. Then began a more careful examination; but, after reconnoitering to right and left we found no place where there was the slightest possibility of ascending, so returned to the fissure once more. For upwards of an hour we redoubled our efforts at this point, but all to no effect, and finally decided unanimously that we were defeated. Mr. Forde's experience at this point follows: "The foot of the wall was traversed on a small ledge for several hundred feet easterly, along the side of the mountain, above the Valley of the Ten Peaks, but further progress was barred by the ledge ending suddenly. As no place was found at which it was possible to attempt to get higher, the climbers retraced their steps to the shoulder mentioned before and continued around the face of the wall towards Paradise Valley. Here again no practicable route to the top was found, the only place that seemed at all likely to be feasible being a narrow crevice in the face of the wall. This crevice looked anything but promising, but as it was the only chance left, it was attempted and some progress made by pressing the elbows and knees against the sides and working up a few inches at a move. About fifty feet from the bottom of the crevice it widened out to six or eight feet. As the walls were smooth and perpendicular, and the former mode of progression of no further service, the only course left was to retreat to the shoulder. Here a council was held and the easterly ledge again traversed in the hope that some possible chance had been overlooked, but the hope proved to be a vain one. At about one o'clock, therefore, it was decided to abandon the attempt."



P. D. McTavish, Photo

SCALING CLIFFS OF PINNACLE MOUNTAIN



P. D. McTavish, Photo

ROCK TOWERS OF PINNACLE MOUNTAIN

McTavish, P.D.

Figure 2 Scaling Cliffes of pinnacle Mountain Figure 3 Rock Towers of Pinnacle Mountatain

It was now four o'clock. If loose and rotten rock was dangerous on the ascent, it would be doubly so descending, and it was imperative to commence the descent. With the chagrin of defeat in our minds, we did not particularly relish the anticipation of descending faces of weathered and disintegrating rock, skirting fearsome ledges with foot-holds of questionable security and yawning depths below and, worst of all, lowering ourselves down couloirs treacherous with snow, ice and debris.

Proceeding carefully we reached the top of the last and longest couloir about seven o'clock. To its base the depth was fully 200 feet, and we dreaded this more than any part of the whole descent. The sun was approaching the mountain peaks to the west, the air had become noticeably cool, speed was necessary. Eight hundred feet below was the snow-field; unless we reached it before dark we might have the uncomfortable experience of spending a night above snow-line, an experience which none of us desired. Just as we had nicely entered the chimney the guide, Edouard, called a halt until he should examine another route apparently more feasible. It was; but the first thirty or forty feet seemed quite hazardous, so one member of the party was lowered by a rope to examine the rock carefully. It seemed better than the couloir and soon all had descended and we were approaching the snow-field, which we eventually reached about eight o'clock, feeling much relieved that the dangers were over before darkness set in. We arrived at the camp about nine o'clock, just as the evening shadows were creeping over Paradise Valley, and the warm glow and pleasant crackle of the camp fire were making many merry hearts merrier.

The third attempt of Pinnacle Mountain was made on the 22nd of August last by Dr. J. W. A. Hickson, of McGill College, Montreal. The account of it is given in his own words:

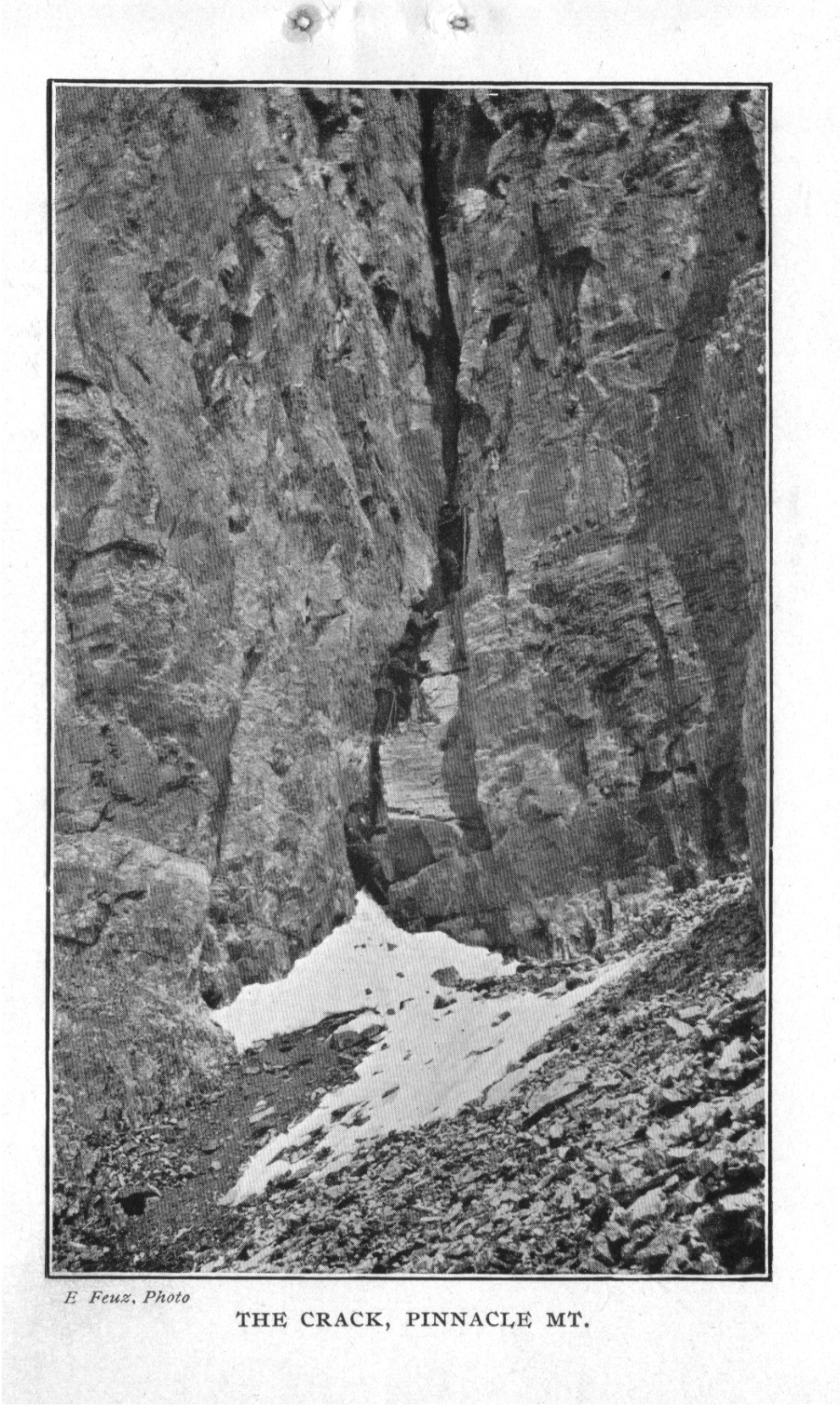
"I started in the afternoon of August 2ist from Lake Louise with Peter Kaufman and Edouard Feuz, Jr., and camped one night on the site of the Canadian Alpine Club camp in 1907. We had camped here a week before, but had been driven back from our proposed attempt on Pinnacle by heavy rain and snow. When we were taking supper, in full view of the mountain, it seemed to me that the guides were by no means so hopeful of attaining the summit as they had been previously. Feuz even remarked in no genuinely joking tone: 'Perhaps we won't get to the top.' Needle-like in appearance, its summit covered with fresh snow looked cold and forbidding, and very diminutive alongside of the massive Temple.

“We set out next morning about 5 o'clock, in fine weather. After following the stream which flowed past the camp, we ascended a grassy slope and over some boulders along the left shoulder of the mountain. In about three hours we reached the snow, which was fresh and powdery, and the rope was brought into requisition. Proceeding carefully up the snow-slope, we crossed to the right and following the ridge, which one of the guides had traversed some weeks before, had some good rock climbing. In some place the foot-holds were rendered easier by the hard snow, particularly on a narrow ledge skirting the right shoulder of the mountain near the top; but elsewhere the rocks were unpleasantly slippery through melting snow. We had reached a ledge within what seemed to be about 300 feet below the summit, when further advance was stopped by a precipitous wall of smooth rock, about 60 feet high, which apparently could be ascended only through a perpendicular chimney affording no hand-holds except at its base, and having an overhanging rock near its top. Feuz Jr. had already been this far in July 1907

with a small party; and had been obliged to turn back.

"It was now about 10.15 o'clock. The weather though fairly clear, had turned unpleasantly cold, and there were heavy clouds moving from the west with a high wind. After taking some refreshment the guides suggested that they should first try the chimney, in regard to the feasibility of which I was not at all hopeful. As the result of half an hour's work Feuz managed to ascend some 15 or 20 feet, but there was no prospect of getting further in this direction. We then explored both sides of the ledge to discover whether there was any way of working round the wall of rock and ascending to the summit from another side. We came to the conclusion, however, that what seemed to offer a possible means of circumvention was, on account of the fresh snow on the loose rocks, too dangerous to be worth the risk. The guides were strongly opposed to undertaking it. So we left the ridge very reluctantly about 12.30 o'clock with the intention of seeing something more of the mountain by descending on the opposite side to that along which we had come up. But, after getting down about a thousand feet, we were obliged, again owing to the condition of the snow, to ascend in order to resume our previous path. We reached camp at 4.40 p.m. It seems to me that it would be worth while trying this peak again only when it is completely dry, i.e., free of snow for 1,000 feet below the summit. Last summer was notoriously unfavorable for mountaineering, as fresh snow fell almost continuously after the beginning of August on all peaks over 8000 feet."

Defeat does not always mean lack of pleasure, for in mountain climbing (as in most other things) the very striving itself is enjoyable. "Strive, nor hold cheap the strain." When a party of mountaineers, protected from danger by a careful guide, spends a day on a mountain that tries all their skill and constantly taxes their ingenuity, every moment is replete with pleasure. So our fifteen hours spent on Pinnacle Mountain was a decided success even though we failed to reach the summit. All honor to the man who finally performs the feat.



E Feuz, Photo

THE CRACK, PINNACLE MT.

Feuz, E

Figure 4 The Crack, Pinnacle Mt.

THE FIRST ASCENT OF MT. GARIBALDI.

Dalton, A. T

On the extreme west of the Rocky Mountains system, hard by the waters of the North Pacific, is a mountain range little known beyond its own horizon. Its highest peaks do not compare in altitude with the giants of the Selkirks and Rockies, rising above valleys already at a considerable elevation, but they have the same alpine features of rock and glacier and snow, while their ascent involves climbing almost from the level of the sea. Moreover, they possess an added feature of beauty impossible to the ranges lying further east, their seaward slopes being indented with numerous fiords which find their way often into the very heart of the range.

The peak of greatest height is Mt. Garibaldi— known locally as "Old Baldi"— which stands at the head of Howe Sound, some thirty miles in from the Gulf of Georgia. Every dweller in the lovely Valley of the Squamish, which this mountain overlooks, is as proud of him as he is proud of his country; yet, except to these good people, he is all but a myth. Years ago a party attempted the ascent, but failed; and it looked, as time went on, as if Old Baldi were to crumble away in peace. But in that party were some who were "baffled to fight better," and this is why one stormy night, early in August, 1907, an adventurous group found themselves about a roaring fire in an old log house in the Squamish Valley, forty miles by water from Vancouver.

At six o'clock the next morning under a clear sky, we set out for the coveted summit, following the Tsee-Ki whose source is in Garibaldi's glaciers. At first the travelling was easy, for the rise was gradual and the country open; and in a few hours we were in the foothills, with the Tsee-Ki's milky waters boiling through canyons, and our mountain looming ever higher and more forbidding. By noon we reached a place where the way by the stream was barred and we were obliged to begin the ascent by a ridge on the left. And now our toils commenced. For 1,000 feet we had some very awkward rock-work made risky by loose fragments; and beyond this, a laborious grind of 5,000 feet up a wooded slope at an angle of 45 degrees. For hours we toiled up that interminable mountain-side with never a glimpse of a view to encourage us; until at last, when quite near the summit of the ridge, we "played out." We had been travelling for twelve hours. Camp was made in an open glade carpeted with heather, and with plenty of wood and pure water, we were soon comfortable for the night.

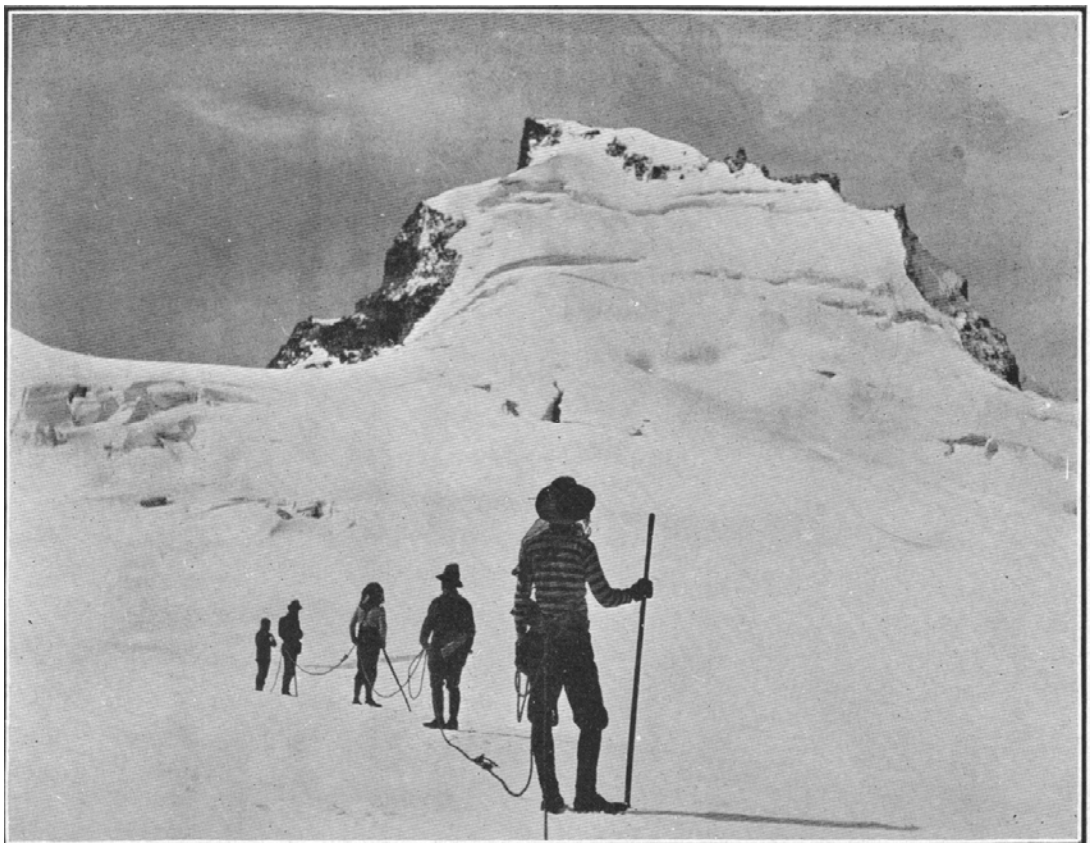
Early next morning we broke camp and continued the work of the previous day with keen anticipation. In a short while we were rewarded by our first panorama, for all at once we stepped on open ground and, looking back, beheld the whole Squamish Valley lying six thousand feet beneath us with its roads, rivers and farms showing as depicted upon a living map. Beyond lay Howe Sound stretching away to the open sea, and in the far distance Vancouver Island. We were feasting upon this scene when a shout from our amateur guides hurried us on. Almost before we knew what had happened, we found ourselves on the first crest with Garibaldi beyond in full view, and quite close. Towering heavenwards in one magnificent mass of rock, his precipices crowned with hanging glaciers, and all his upper heights wrapt in a mantle of fresh snow, he seemed some terrible monarch of the skies not to be approached by man. A rising ridge in the form of a crescent connected our present point with the glaciers behind the mountain. A steep descent of some three hundred feet brought us to its crest and along it we took our way. The whole ridge was clothed with fresh green grasses and blossoming heather, through

which flowed here and there silvery streamlets of purest crystal. Clusters of trees were scattered about in reckless order, and gorgeous flowers in wild profusion made fragrant the air. In Indian file we moved along, ever on our right the mountain, and far below on the left the Squamish Valley and the ice-clad range beyond. Once a deer went bounding past with swift graceful motion, and then some fleecy, clouds floated by. A few hours brought us to a commanding knoll, and here at timber-line we pitched camp in a group of dwarfed balsams. We now had a view behind Garibaldi of a vast sea of unknown mountains, glaciers and lakes.

After a somewhat uncanny night we awoke to find ourselves enveloped in clouds, so dense that our knoll seemed a little island in mid-ocean. All morning was spent in camp in that heavy, silent fog, but in the afternoon two of us set off with one of our guides for the base of the peak. It took two hours to get to it, steadily tramping up slopes of shale and snow in the thick fog. And then we reached a point where there was no sign of vegetation, and from whence we beheld the wildest scene of the trip. We stood on the top of a huge mass of rock, on one side was a precipice vanishing below in clouds, and on the other a very steep slope of trap rock, up which the clouds were surging from out the Tsee-Ki canyons. Within a stone's throw on the left darkly loomed the red walls of the dome of Garibaldi, and from a glacier at its base rushed a noisy little streamlet, the very head of the Tsee-Ki, which we had followed for twenty-five miles.

Early next morning the whole party set out to make an attempt at the ascent; but when we reached the snow-field below the peak, silent, desolate and trackless, the party would go no further. The fog gathered thickly and it was snowing; so, dejected, we returned to camp. Now happened what nearly ruined the whole expedition. Four of the party wanted to go home, and one of the leaders was willing, but the other bitterly opposed to it. The fate of that virgin peak hung in the balance. It was settled by the "youngster" of the party stepping alongside the "foolish" guide, as he was rated, and with him swearing to retreat not one step till more than mere ‘clouds and snow flurries barred the way to the summit. It had been "do or die" sitting before a cosy hearth in town, so now the only way home was the Spartan one: with your shield or on it!

At sundown the wind veered to the north and in a few hours there was not a vestige of a cloud in the sky. Now we had cold to contend with, for an icy wind blew from the glaciers behind Garibaldi, and our supply of wood was ended. The break of dawn on the twelfth was the scene of a lifetime. All hands were up early and, just as the sun was tipping the surrounding peaks and tinting glacier after glacier, we set off for the third time up that mountain ridge. The peak showed clear but was clad with new snow and looked anything but easy. In a couple of hours we reached the base and here roped, with the two men of the former expedition as guides. Then we stepped out upon the glacier at an altitude of about eight thousand feet, and began to circle the peak—a pyramid rising two thousand feet—by the north. For an hour we walked steadily over new frozen snow of dazzling whiteness, constantly encountering ugly crevasses, the peak on our right, a wall of unscaleable precipices overhung by a glacier. For another hour we hurried on, gradually rising, the silence of those dismal wastes broken only by the sound of an alpenstock biting the frozen snow. Once the whole place was shaken by an avalanche which came thundering down the precipice on our flank. At eleven o'clock we reached the nine-thousand foot level where began the final struggle.



Dalton, A.T.

Figure 5 The Summit of Mt. Garibaldi

Peach

Figure 6 Looking East from the Summit

Soon we were on one of the frozen faces of the pyramid, a slope of 45°, rounding off abruptly to where, far below, we had passed early in the morning. We made a horizontal traverse of this, negotiated two crevasses, and then began to climb the steep face of iced snow leading to an arête above, which would take us to the summit. Every step had to be cut, and the higher we climbed the steeper it grew. Then someone murmured, for the slope became nearly vertical and a merciless wind was whistling across it. Close above, however, was rock, so we worked to this haven. Decidedly unnerved we reached it at last, and clambering up its steep face, gazed over the saw-like edge. What we saw there sickened the bravest of us. We were on the edge of a thin toppling precipice of rotten lava, overhanging a horrible green glacier a thousand feet below, with empty space beneath it again. A cry was raised to return, but our guides were firmer now, and we had to go on. The arête was about a hundred yards long, all cracked and crumbling, with its north face, on which we were, a mass of loose slabs of lava, coated with snow and ice. Under this was a bank of snow too steep to use, with two yawning crevasses stretching across it. To the south was the paralyzing "overhang." It took an hour and a half to make that course. Every piece of dislodged rock went either silently flying into dizzy space on one side, or whirring down the other to vanish with an almost human howl in the hungry throat of one of those crevasses.

In a kind of trance we at last crawled up a ridge of soft clean snow, and found ourselves standing on a flat, bare rock, with only the four winds about us and the heavens above us. One of our young guides planted a Union Jack; and we realized that a virgin peak was conquered—Garibaldi.

The view from that point ten thousand feet above the sea must be left to the imagination of those who have been in like places. A cairn was built, and then we hurriedly roped, for there were only four hours till nightfall and it had taken eight to make the ascent. Clouds were whirling about us now, and a storm was evidently coming on.

How we made the nerve-racking descent of that arête, and how once the front of our line went into one of those crevasses and was rescued, cannot be related here. Let it suffice that after a mad race with night and fog over the glaciers, we returned to camp, exhausted. One more night, and the worst, was spent in that desert spot, for all the elements seemed running riot, and our firewood was used up. In the morning we bade farewell to our never-to-be-forgotten camp, and set off home by the route we had come. Observation Point was reached, (and then began the long tedious descent to the Tsee-Ki canyons. It rained in torrents, we lost our way and got entangled in a maze of cliffs. Several of these we overcame by sliding down our ropes, finally reaching the Tsee-Ki; and at 5 o'clock we stood on the Squamish road and were soon safe in our log house again.

Wednesday, the eighth day out, broke as clear and bright as ever a day seen by man, and we set off early down the country road on a farm wagon. Quietly we drove through that lovely valley, among its farms with their peaceful green lands and happy faces; above, the blue sky with a fringe of snow peaks.

Ten miles brought us to the sea where the little steamer "Britannia" waited. Then we bade farewell to Squamish and her "White-headed Baldi," and were homeward-bound.

The next four hours were spent steaming down that grand old fiord, Howe Sound,

and at sunset we entered Vancouver harbor.

A DAY ON SIR DONALD.

Freeborn, Frank W..

Sir Donald, one of the most conspicuous of the Selkirks by its height and position, rises at the side of the little valley in which stands the Glacier House. On its left it is buttressed by four noble peaks, and on its right the big Illecillewaet Glacier comes tumbling down four thousand feet, a mighty cataract of ice, a mile wide. Its sharp pyramid, rising to the height of 10,808 feet, is so steep that little snow can rest on its surface, but in its lap it holds a living glacier. In actual height it is overtopped by some mountains that are oftener climbed, but in elevation above any convenient starting point it considerably surpasses them. Add to this fact its excessive steepness, the difficulty of crossing its bergschrund, and the danger from falling rock, and you have the explanation of the infrequency of its ascent. Only two ascents were made, I think, in 1905, and after the first in 1906 the guides were very loath to try it again that season. So when I reached Glacier House near the end of July, 1907, after a week in Paradise Valley with the Alpine Club of Canada, I had little hope of realizing my ambition to climb it. But when I hailed the elder Feuz on the subject he at once consented to try it with me. At the same time Miss Jean Parker, of Winnipeg, one of the practiced climbers of the Canadian Alpine Club, engaged the younger Feuz to go with her. So we fixed an early day for the climb, July 26th. The day before was an ideal one for the task, and we wished we had chosen it. But when at 3.30 o'clock the next morning we four met for an early breakfast, the clouds hid all the mountain tops, and the prospect was gloomy. But at 4 o'clock we set out, hoping the adverse weather might change with the rising sun.

It was a silent, wet, chilly tramp that we four had by the early light up the Illecillewaet path for a half hour then we branched off into a narrow trail to the left through dripping weeds and bushes, across two streams, uncomfortably wide and full even at that hour, and up a wooded ridge that led us to the terminal moraine of the Vaux Glacier. Here we found conditions of ascent better than usual. The crevasses were safely filled with hardened snow, and when the glacier became much steeper, the snow gave us a fine footing to kick our steps in it and make it our stairway. With this advantage we came at 7.45 to the bergschrund. This had always been one of the most serious obstacles to the ascent; but, thanks to the enormous masses of snow that had fallen the previous season and until early summer, the dreaded chasm was, when we happened to reach it, no chasm at all, and we could walk directly up to the cliff that forms the head wall of the glacier basin. Up this we swarmed with much use of our arms. The foot-holds and hand-holds were small, but generally more secure than in the Rockies. Two hundred feet up we came to a series of horizontal ledges none too wide, but wide enough for our purpose. These we followed straight across the face of the wall to the left until we reached the main mass of the mountain. Along this part of the way we had some encouraging weather promises; patches of blue sky appeared, and once for a few minutes the whole pinnacle of Sir Donald was free from clouds. How huge it towered in that sudden nearer exhibition!

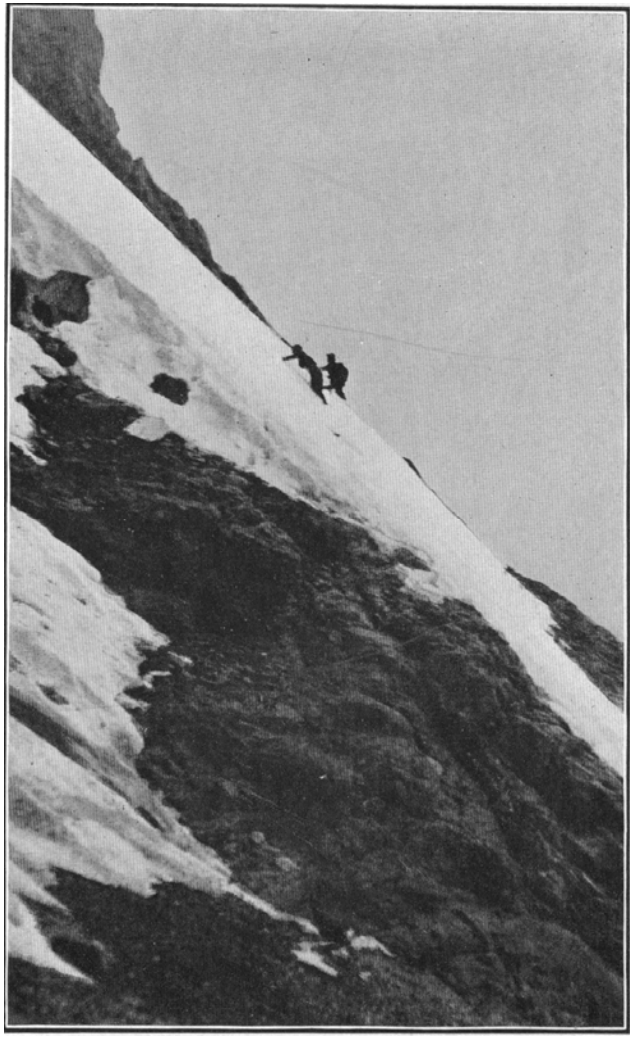


Figure 7 Mis Parker on Sir Donald

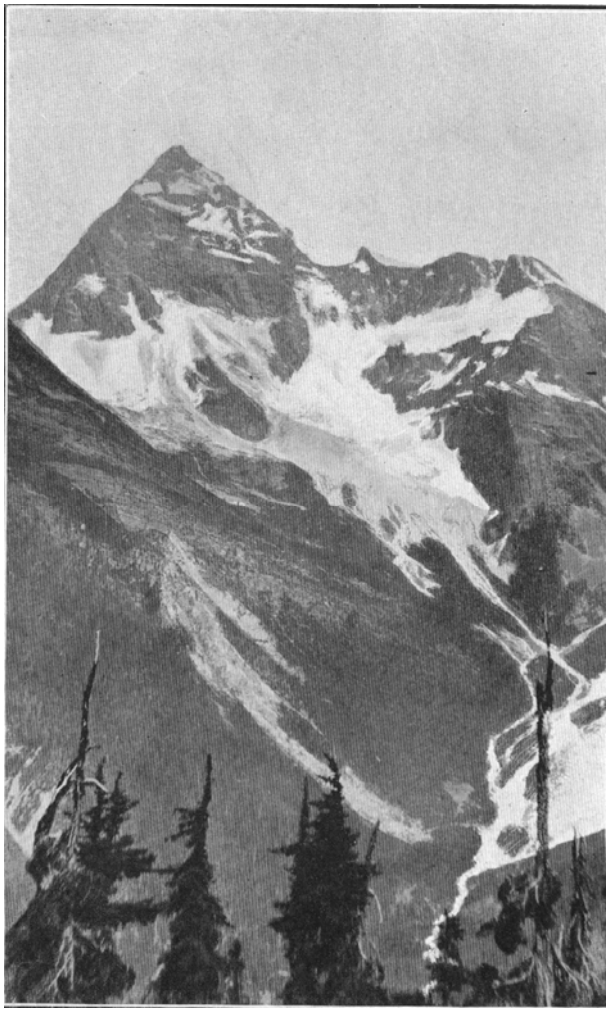


Figure 8 Mt. Sir Donald

Freeborn, F

Arrived at the end of this ledge, we stopped for twenty minutes for our breakfast. Then we tackled a narrow gully, one of the bugbears of the ascent, for it is the pathway of much falling rock. And so with anxious upward glances, and hurrying feet, we got through it as soon as we could, and halted for rest and breath, crouched at the foot of an overhanging cliff that rose vertically hundreds of feet above us, its face from top to bottom so jagged and loose-jointed, with such fresh-looking cleavage, that it threatened at any moment to drop tons of wreckage at our feet. The weather had grown thick again, streams of leakage were trickling down upon us, and so we kept our refuge no longer than we really had to.

Just beyond this halt we struck to the right and somewhat upwards over the face of the main peak; at first across a shallow couloir 200 feet wide, plainly in most of its curving width a pathway of rocky debris, where watchful eyes and active feet were needed. Beyond this a traverse was made of a rather steep, snow slope. We were still two parties, and so we took the couloir and the traverse separately, Miss Parker and young Feuz going first, and then when they had got well started on the snow, the elder Feuz and I followed rapidly. Luckily, neither in this couloir nor in the one below had we to dodge so much as a pebble. In this we fared much better than some of our predecessors.

Our course lay towards the conspicuous shoulder on the right of the mountain, and thence along the sky-line to the top. The climbing was steady and slow and always somewhat strenuous, but in two and a half hours from our refuge under the cliffs, we came suddenly and somewhat unexpectedly upon the summit.

Miss Parker was the first Canadian woman to tread that windy peak. Only four women had preceded her, Mrs. Berens, Miss Benham and Miss Tuzo of Old England, and Miss Raymond of New England, all four names well known to the mountain-climbing world.

We were almost exactly eight hours in going from the Glacier House to the summit. We had been shut in by clouds and snow squalls for some time, and in a continuance of such condition with no view beyond a few rods, we sat there and ate our lunch. It was a cold eating place; no sun to cheer us, no landscape to repay the toilsome climb, a cold wind blowing, our benumbed feet in a snow-bank, the flakes falling thickly over us. Then we came down.

The weather played us many tricks on the return, sunshine, rain, hail, sleet, fierce winds, snow squalls, in turn and sometimes in conjunction, gave us all the variety we needed to kill monotony. A little way below the summit the clouds blew away from about us and discovered a wide landscape to the east and south. Still farther down the whole mass of clouds would lift at times and we could look under them over the broad Illecillewaet Névé with its ten square miles of pure white, looking from that height as level as a floor. Now and then beyond appeared the mighty mass of Dawson, and further to the right the graceful curves of the Asulkan Pass and Glacier, with a wilderness of nameless ice-clad giants in the west beyond them as far as eye could see.

The most striking sight of all was a brief view that came to us when we were near the base of the main peak. We had just been pelted with a fierce squall of wind and rain and hail. It passed, and we stood in an oasis of sunlight. The lower clouds were gone. To the south a broad band of sunlight lay across the Illecillewaet Névé; the heavy blanket of the upper clouds threw its gloomy shadow on all the world in that quarter save the single

peak of Mt. Purity, its perfect cone a brilliant gleaming white in the bright sunlight that transfigured it alone. I tried to catch the scene with my camera, but the result is only a faint suggestion of the majesty and beauty of the original.

Our descent was made by practically the same route as the ascent, but greater caution was necessary for safety; and so we all four went upon one rope. So carefully had we to pick our way, that even with less stops than on the way up, we were more than an hour longer in descending from the summit to the glacier than in covering the same space in the ascent. But once on the glacier, we could avail ourselves of the same tactics that had served us so well on the peaks and passes about Paradise Valley; now rushing down in the yielding snow by leaps and bounds, now sitting and taking a long glissade. So with alternate sliding and striding we soon reached the moraine. Then, with a short but heavy shower, the cantankerous god of the weather gave us his parting blessing, and we plodded prosaically along until, in a trifle over seven hours after leaving the summit, we were back at the welcome shelter of the Glacier House. Tired? Of course. Exhausted? By no means. Happy? Only those who hold in memory the retrospect of such a day can know the feeling.

EXPEDITION TO LAKE O'HARA.

Glisan, R. L..

To a nature-lover, the invitation of the Alpine Club of Canada to the Mazamas to send a representative to the Annual Meet in the summer of 1907 was very alluring with its brief hints of the scenery one might expect in and around Paradise Valley. And especially attractive was its suggestion of a two-days' expedition among glaciers and over passes in the vicinity.

I had years before looked with longing eyes from the train as we caught fleeting glimpses of distant snow-peaks and deep glacier-cut valleys, and when the call came to me in Oregon to penetrate the mysteries of the Rockies I eagerly accepted.

Oregon and Washington have attractive snow scenery, but it is largely centred about individual volcanic peaks rising like sentinels above the densely wooded region around them. I had made the ascent of our more prominent peaks, and was anxious to make comparisons. Entering Paradise Valley a stranger, I left it with so many pleasant memories that, as I now mentally retrace my steps and glance again at the photographs before me, as I have so many times, I experience a keen pleasure that only Alpine enthusiasts can possibly appreciate.

Paradise Valley is well named, for it lies in the center of a wonderful scenic region and makes an ideal place for a club camp. From the summit of Mount Temple above the valley, I gazed over a bewildering sea of snow peaks and looked with envious eyes in the direction of Lake O'Hara, eager to make the circuit of the lakes. That evening I entered my name for the O'Hara Expedition, and the following morning, rising with the sun or shortly thereafter, made one of a small group around the fire, for the early air was sharp and biting.

Breakfast over, seven responded to the roll-call and the click of the alpenstock announced our departure from camp. We trailed along up the timbered valley on the left bank of the stream rushing madly down from Horseshoe Glacier. Crossing the stream about a mile from camp, just above the Giant's Stairway, over which the water glides in liquid sheets, we came close to the Mitre, a prominent peak overhanging the valley, and

so named from its resemblance to a bishop's mitre. Here we commenced our ascent towards the pass between the Mitre and Mt. Aberdeen, working up a rocky slide, of which the lower portion was covered with small brush. We were soon taking a breather on the first bench above, where the snow began. As a matter of practice and precaution the rope was uncoiled, and, while our leader was making the necessary loops, we turned and absorbed the view. Paradise Valley lay before us, a carpet of green, walled in by snow peaks reaching from the glacial amphitheatre at its head down its entire length.

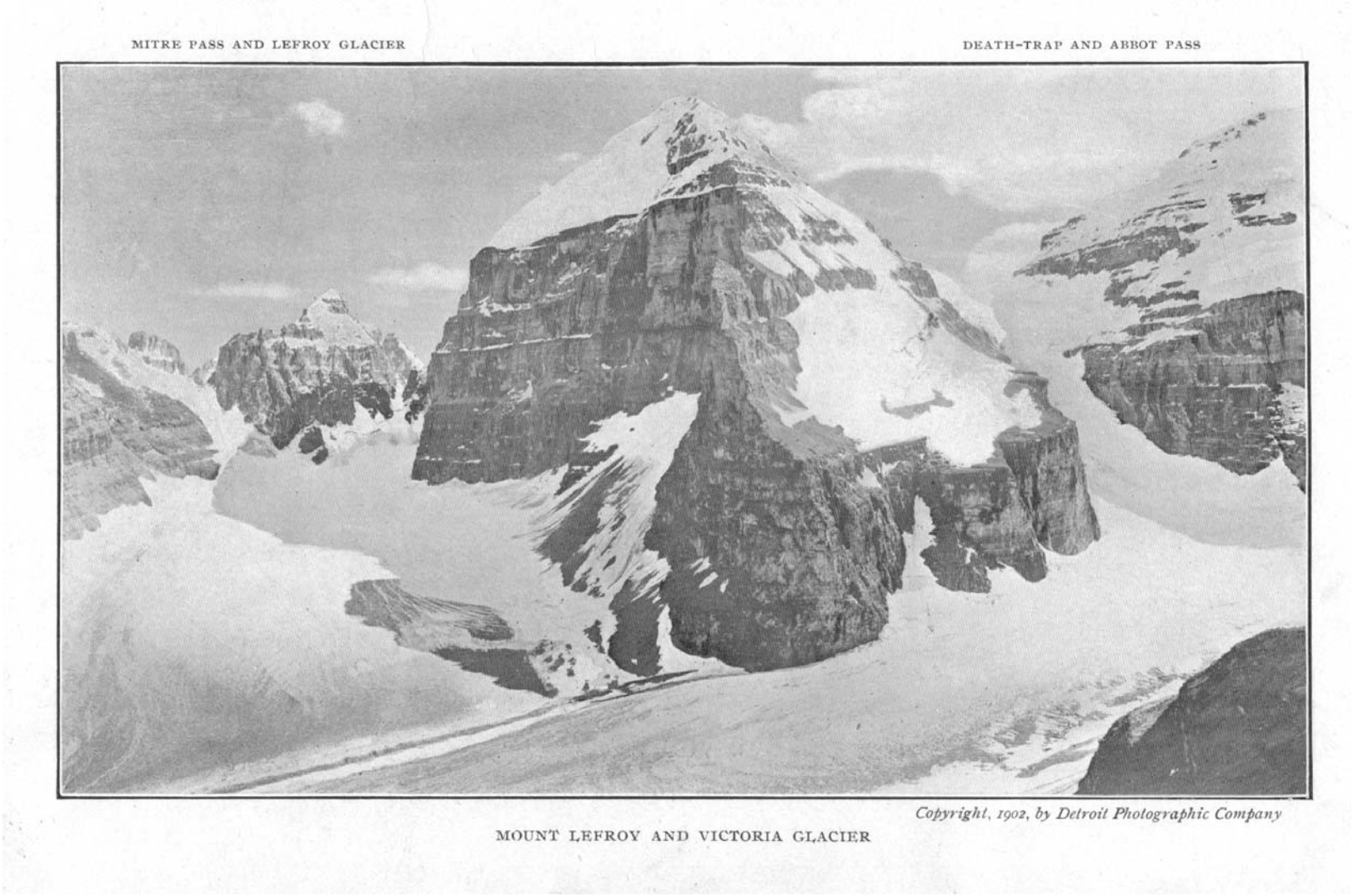
Mount Temple raised its snowy dome across the way, with Pinnacle, Eiffel and the other peaks forming a massive semi-circle curving towards where we stood.

The loops adjusted, we started the climb over the snow, and after a rather strenuous pull made the pass and looked down the other slope, which led to Lefroy Glacier and proved much steeper than the route up. Some difficulty had been experienced here on the previous expedition, as the snow then had a hard crust, necessitating a tedious process of step-cutting. We were fortunate, however, as we found the snow in good condition, and, going cautiously at the start, we soon broke rank and slid—first one ahead and then another—until what appeared like a forbidding descent was soon over and we were out on the glacier.

Where Lefroy and Victoria Glaciers meet we found the surface badly broken, necessitating rather cautious movement and obliging us in places to jump over partially concealed crevasses. Here we paused to take in the view. We were at the head of another valley, wilder and more interesting than Paradise. The Mitre and Lefroy looked down on us, as their other sides did on Paradise Valley. Victoria formed the centre of the circle, its huge mass of snow and ice overhanging high rocky walls suggesting something familiar. Turning, the eye swept down the valley of ice and there below us, a pure gem in a perfect setting, appeared a small lake of liquid blue. "Lake Louise!" someone exclaimed; and, like a flash, I then recalled gazing through powerful binoculars towards Lefroy and Victoria from the Chalet by the lake, wondering at the time if I would have the good fortune to stand where we now stood. The Chalet was plainly visible, and beyond we could see Laggan, the railroad and other signs of prosaic existence.

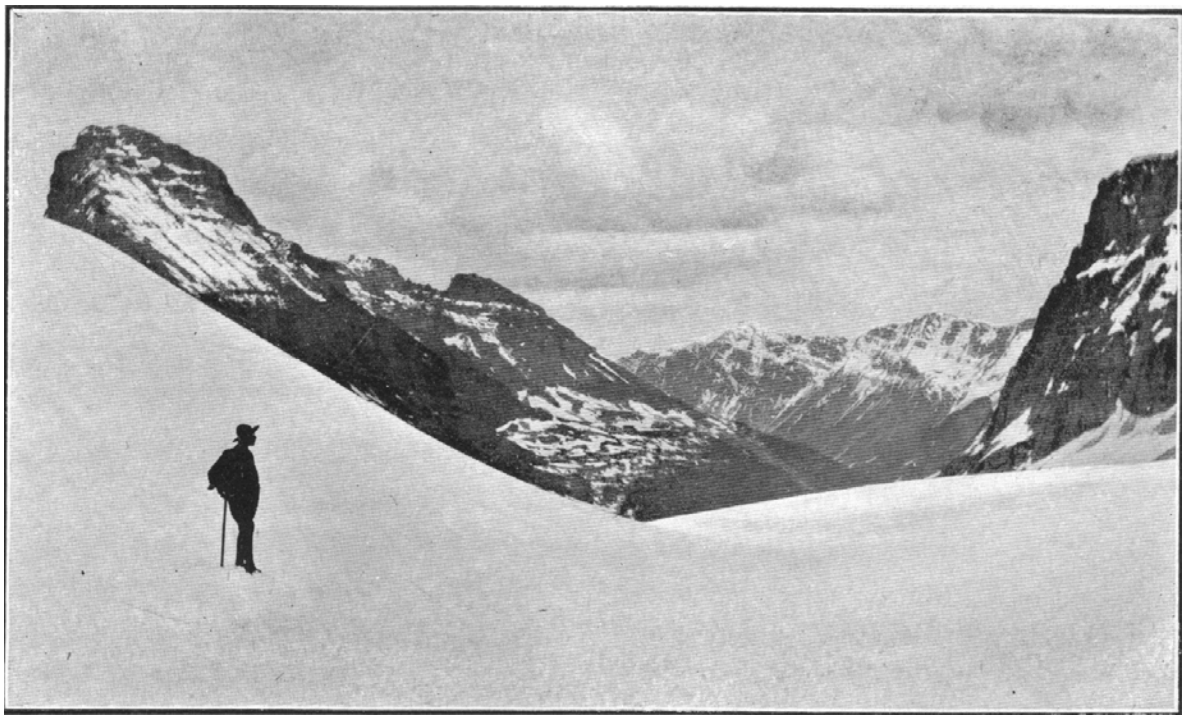
Awakened from a reverie by the warning that we must make Abbot Pass before the sun should loosen the dangerous snow masses by its piercing rays, we reluctantly turned, and taking our way around the bulwark of Lefroy, looked up the Victoria Glacier to Abbot Pass. The precipitous walls of Lefroy and Victoria on either side force snow into this narrow gap.

A clear blue canopy of sky brought out the vivid whiteness of the pass, and the incline of the vision following the upward slope belittled the intervening distance and made the pass seem almost insignificant. Why was it called the "Death Trap"? Why was it dangerous? Why the warning to take a long breath and no halt? The answers came as we pushed upward, the pass apparently receding as we advanced and yet near enough to lure us on. As we zigzagged up, huge masses of snow lay in loosely piled heaps, rising high above us, almost forbidding a whisper lest it start an avalanche; and the sun, as if just aware of our presence and indignant at our audacity, directed its rays against the gap. It did not start the snow, but it started beads of honest toil. A snow flurry in camp and the biting air on Temple had inspired me with the precaution of extra heavy clothing, and before we made the skyline, I was ready to halt and take my chances with an avalanche.



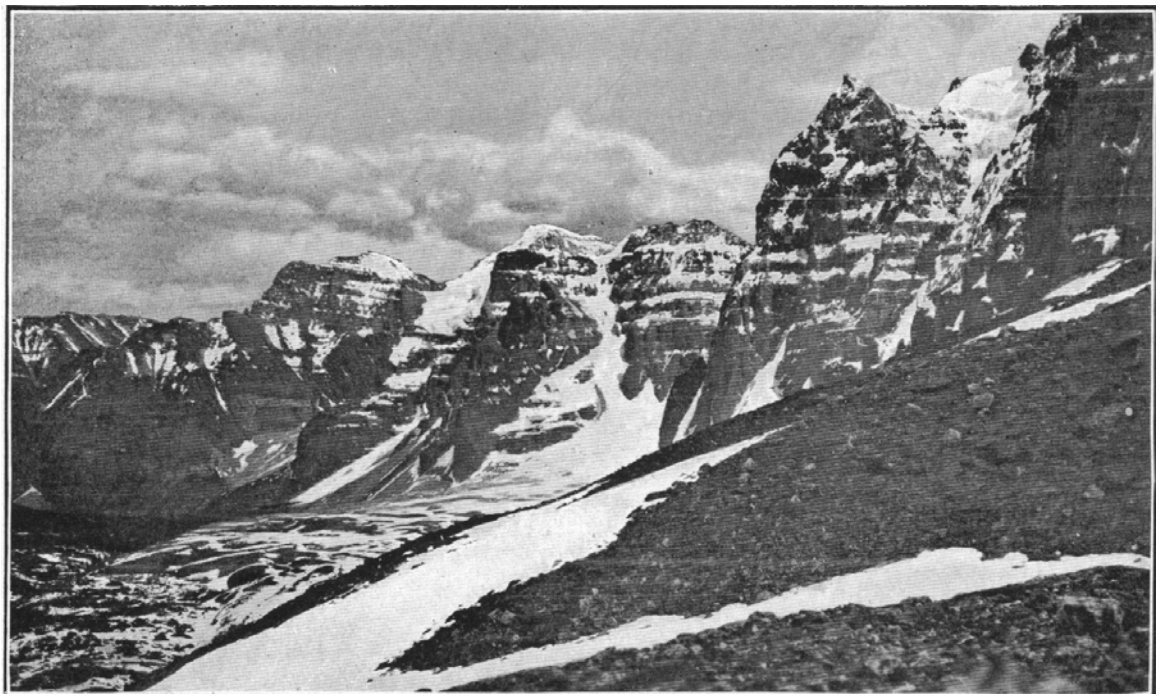
Detroit Photographic Company

Figure 9 Mt. Lefroy and Victoria Glacier



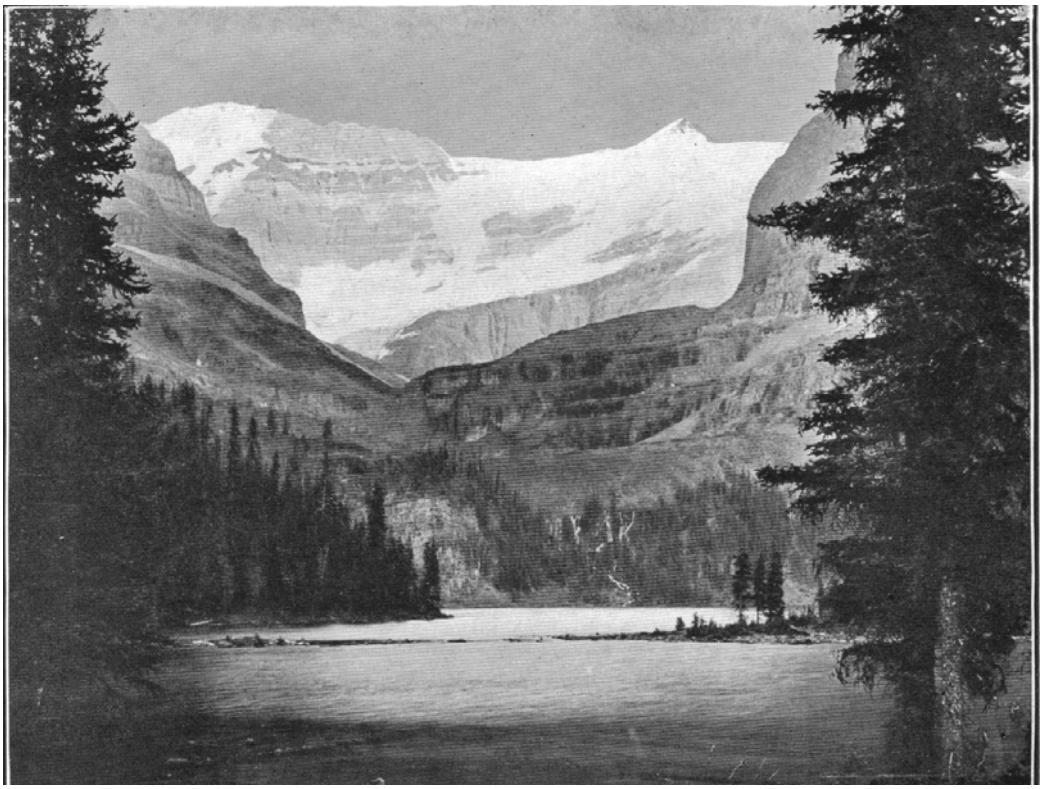
McTavish, P.D.

Figure 10 Opabin Pass - Looking South-East
Pass No. 3 of Two-Day Expedition



Glisan, R.C.

Figure 11 Wenkchemna Pass - Looking East
Pass No. 4 of Two –Day Expedition



Bridgland, M.P.

Figure 12 Lake O'Hara

Figure 13 The Eagles Eyrie

It seems a misnomer to call the gap between Lefroy and Victoria a pass. Higher than the average snow peak, a precipitous slope on either side, we stood on the knife-edge of the pass, caught our breath and lost it again as we gazed down the other slope. We looked into chaotic grandeur, snow and rock everywhere in an endless uplift. Reluctantly we commenced the descent, fortune again favoring us as the slope in places permitted cautious sliding, and before we realized it we were down the narrow funnel and on the ridge that jutted out from the main wall. Here someone suggested lunch, and the suggestion meeting with favor, we selected a place where we could take in the view and enjoy a sun-bath as well. The rocks, though a rather hard resting place, were a welcome relief from the snow, lack of water being the only drawback. Above us towered Lefroy, further to the left rose Mt. Yukness, and below, at the base of glaciers and snow-fields, we could see Lake Oeesa[1], its ice-covered surface making the water seem black by contrast. The lake is seldom free from ice on account of its elevation.

After a brief rest and the inner man appeased, we made our way down the ledges and then down a talus or rock-slide above Oeesa. Here we caught a glimpse of Lake O'Hara in the valley below. Following down the bed of the valley for several miles, we suddenly came out on the rim of a rock-wall and below us saw the lake, its mirror-like surface reflecting the snow peaks surrounding it.

The lake is about a mile long, of irregular shape, in places half a mile wide, the further shore broken in a series of inviting coves covered with evergreen trees reaching to the water's edge. To our right Wiwaxy Peaks, a huge buttress of oddly-shaped rock pinnacles, rose abruptly from the water, cutting off the further end from view, while across rose Mount Schäffer. It was then about three o'clock, and the afternoon light brought out the vivid blue of the water. Not a trace of human presence, not a trace of any disturbing element, the whole scene was the personification of majestic peace.

The Alpine Club had established a temporary camp on the shore of the lake to take care of parties making the circuit from the main camp, the tents and supplies being packed in over a trail from Hector. We looked for the camp but failed to locate it, as it was hidden in one of the distant coves. Hesitating to break the stillness, we finally hallooed, the call echoing and re-echoing from shore to shore, but no one answered. We

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were puzzled at first how to reach the lake as the descent was almost a sheer drop of several hundred feet, but after careful experimenting, a route was selected requiring caution, and we were soon at the water's edge.

Satisfying our thirst from a small torrent of pure water, we followed the left shore over a mossy bank, through a natural park, and came in sight of the camp about three-quarters of the way down the lake, a most welcome sight. A refreshing plunge in the water gave additional zest to our appetite for the evening meal, which soon followed. The air was cool enough to make the fire welcome, and the hard tramp, bath and supper had put us in a condition of blissful laziness. Lounging there we could see the evening glow and the deepening shadows on the lake, and on the mountains and glaciers beyond. Going up to a meadow about a mile distant, we secured the full effect of the afterglow on the snow peaks back of the camp. The twilight was gracious in its length, and only the thought of tomorrow persuaded us to turn in. A tent with double blanket on yielding, fragrant boughs seemed luxurious. We fastened the lower flap to keep out the porcupines who have a playful habit of chewing footgear and driving, the quill, to one's dismay, when interfered with.

After a restful sleep, which you often fail to get in city turmoil, we arose as Aurora, rosy-fingered dawn, was tinting the rocks and glaciers in soft morning light. Breakfast over, we continued our circuit. Above the timber-line we stopped at Crystal Cave to secure specimens and a farewell view of the lake. Like Lot's wife, we could not resist glancing back for just one more view to salt down in our memory. Opabin Pass was the first goal, and on our way up, on the benches above, we passed two small lakes covered with floating ice. In skirting them we sank repeatedly in the loose snow, making slow progress. From above the lakes, looking westward, a panorama of mountain scenery was presented, broader and more extensive than we had enjoyed at Lake O'Hara. In the distance we could see Mount Odaray prominent among many other peaks. Light clouds in the clear blue sky heightened the effect. Opabin Pass lacked the elements of danger and the strenuousness of Abbot Pass. A good long pull over the pass and a slide and coast on the other side brought us down the slope below the snow-field; and on a rocky, heather-covered knob, where we could shake the snow from our feet, and bask in the sunshine, we ate lunch, with plenty of sparkling water and a glorious view to feast on. Just below us stood the Rock Tower, a curious monolith rising above the bed of the valley. Keeping to the left, we worked along the side of the valley a short distance until we reached the rock-slide below Wenkchemna Pass. Struggling up over small loose rock and then stepping on larger boulders, we reached snow-line, the sun a blaze of glory at our backs, reflecting the heat from snow and rock into our faces. A gentle breeze on the summit of the pass proved very welcome. We were now looking down the Valley of the Ten Peaks, ten snow peaks forming the right side of the valley.

From the lofty mountains of Oregon and Washington, the view lies all below, no rival near. From these different passes peaks lifting everywhere fairly bewilder one; and it makes it all the more impressive to realize that you are not far from the Great Divide, the source or fountainhead from which streams branch out to flow eventually into three different oceans. The descent into the valley would have been easy had the snow been firmer. We broke through repeatedly, sometimes waist deep. Three of our party soon left us to keep on down to Moraine Lake, a few miles away, where another side camp had been established. We ascended the left slope of the valley, and after a rather steep rock

climb reached snow again and quickly made Wastash Pass, just west of Eiffel Peak, and looked into Paradise Valley.

We were now opposite the Mitre Pass, the first pass of the preceding day's tramp. We hurried down, enjoying several steep slides in the snow, and were soon retracing our way down the valley, making the main camp in time for supper; having seen more in two days than could be seen elsewhere in months, an expedition never to be forgotten.

NATURA BENIGNA.

(From "The Coming of Love.")

What power is this? What witchery wins my feet
To peaks so sheer they scorn the cloaking snow,
All silent as the emerald gulfs below,
Down whose ice-walls the wings of twilight beat?
What thrill of earth and heaven—most wild, most sweet
What answering pulse that all the senses know
Comes leaping from the ruddy eastern glow—
Where, far away, the skies and mountains meet?
Mother, 'tis I reborn:
I know thee well: That throb I know and all it prophesies,
O Mother and Queen, beneath the olden spell
Of silence, gazing from thy hills and skies!
Dumb Mother, struggling with thy years to tell
The secret at thy heart through helpless eyes.

—Theodore Watts-Dunton.

SCIENTIFIC SECTION.

THE CAUSES OF MOUNTAIN FORMS IN THE CANADIAN ROCKIES.

Coleman, A. P..

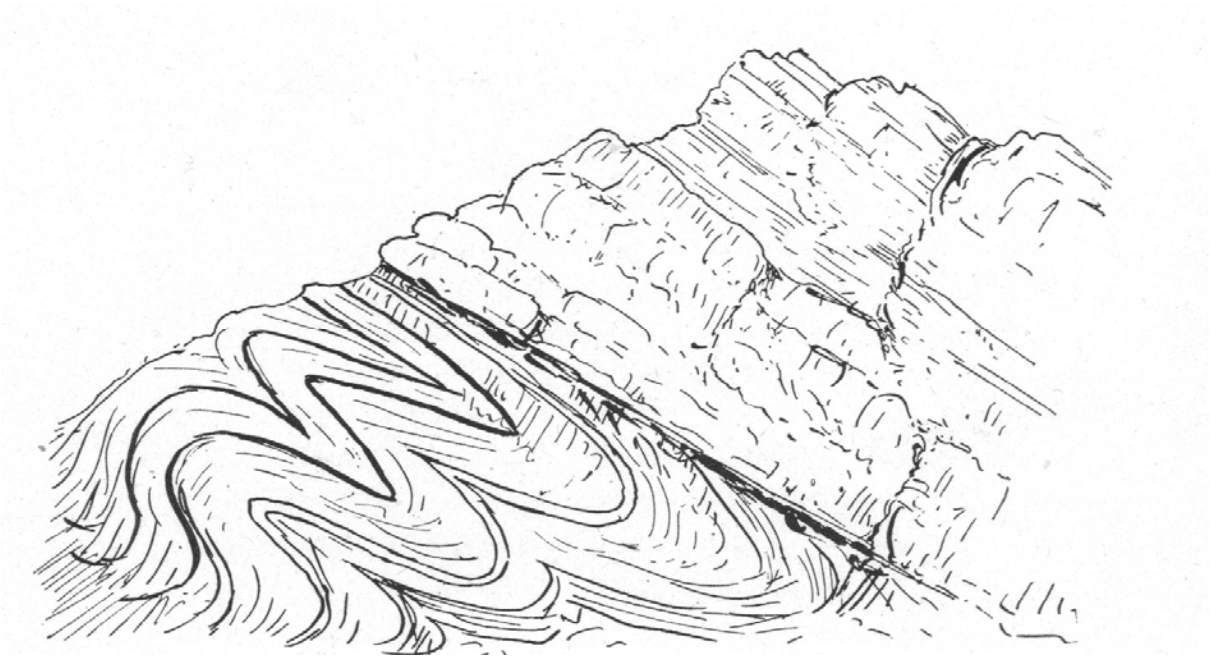
The "Everlasting Hills " have become proverbial, so that we are apt to think of mountains as the very emblems of stability and permanence, and very few except geologists ever inquire into their past to see how they were lifted up and sculptured to their present shape, or look into the future to forecast their ultimate fate. There is nothing more certain, however, than the fact that mountains, like every other creature of earth, have their birth, their youth, and middle age, and at last sink into decrepitude. The loftiest mountains must always be geologically young, for, once elevated, every century means wear and tear and loss, till finally only stumps remain, as in the most ancient ranges of America, the Laurentide Mountains of northeastern Canada.

The raising of mountains is a difficult bit of engineering to explain, and geologists are by no means agreed as to the causes that thrust one part of the earth's crust skyward and sink other parts into ocean depths. The most commonly accepted cause is the shrinkage of the earth's interior, by cooling, or by the loss of gases, or by condensation due to gravity. In this process the solid outer crust becomes too large for the interior and must be crushed and crumpled to adjust itself. This crushing and crumpling takes place along the lines of weakness, usually where sea and land meet, as in our Pacific coast region. There, from time to time, through the geologic ages the ocean floor has pushed itself inland, thrusting up the parallel ranges of British Columbia and Alberta, the Selkirks first and the Rocky Mountains last.

It was not until the end of Mesozoic times, when the dawn of the recent ages had begun, that the Rockies were elevated. No volcanic forces took part in the work. All the rocks that compose them were laid down as sediment on a sea bottom, mud and sand and gravel and the lime of shells accumulating until the beds were five miles or more in thickness and were slowly transformed into slate and quartzite and conglomerate and limestone, the building materials of the mountains that were to be.

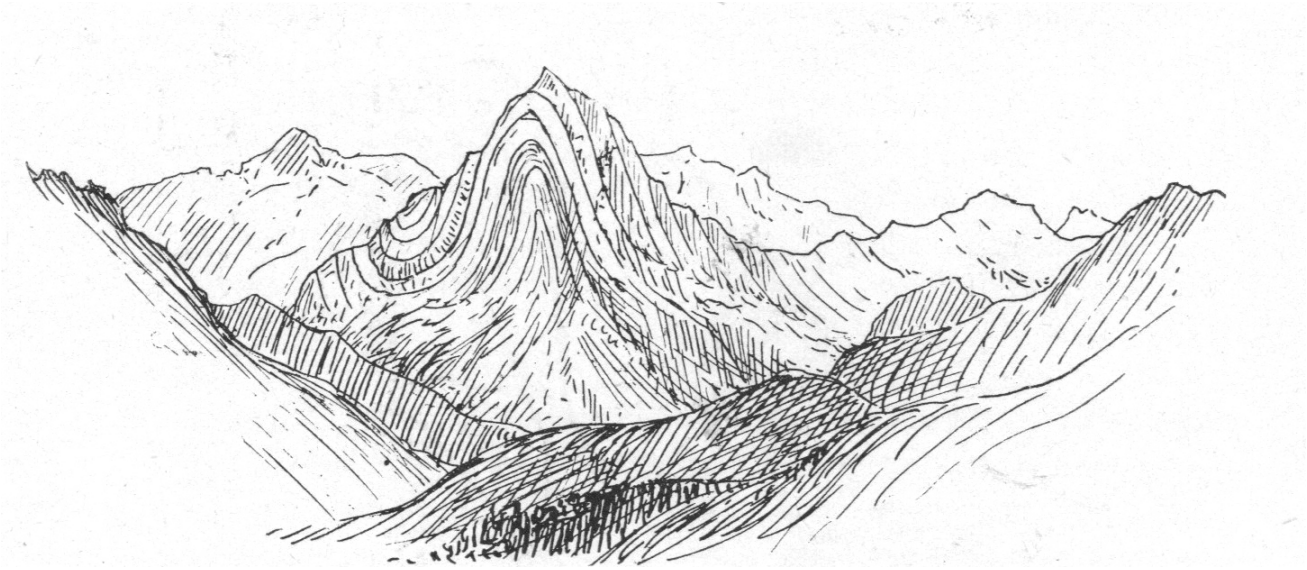
What gave the signal for the raising of the new range no one knows, but after the Cretaceous sediments forming the coal-bearing rocks of the prairie provinces had been deposited, the thrust from the Pacific became irresistible, the earth's crust yielded and step by step the thick layers of rock were pushed inwards, rising as folds or breaking off strip by strip, tilted up and riding upon one another like ice-cakes when a great floe is driven ashore. We must not think of this process as taking place suddenly in one mighty convulsion, but very deliberately, a small push with its earthquake shock, followed by a long quiescence before the next installment of elevation; so that age by age the mountains grew, perhaps are growing even yet.

During all this time of slow growth in height the destructive forces were at work, frost and weather and running water and ice, tearing down the structures just as they do now, though the constructive forces were more than a match for them, at least in the earlier history of the mountains. The present forms of the Rockies are due then to a balance between the upbuilding and the down-tearing influences which have been at work during the past millions of years since the end of Cretaceous times.



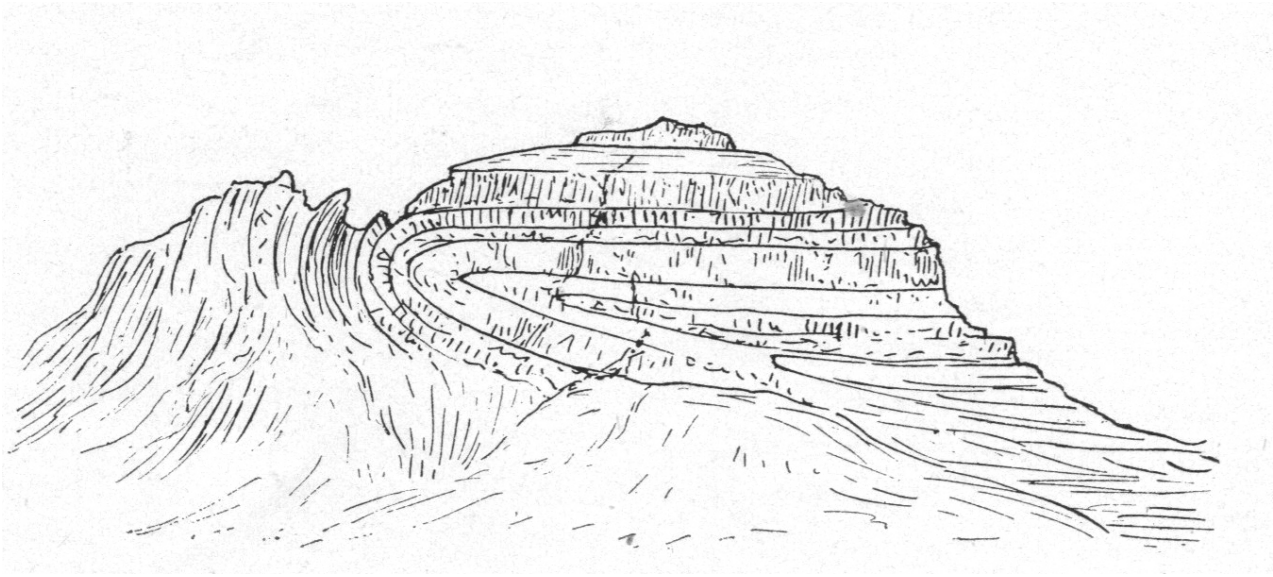
Coleman, A.P.

Figure 14 Folding Under Thrust Fault, Clearwater River



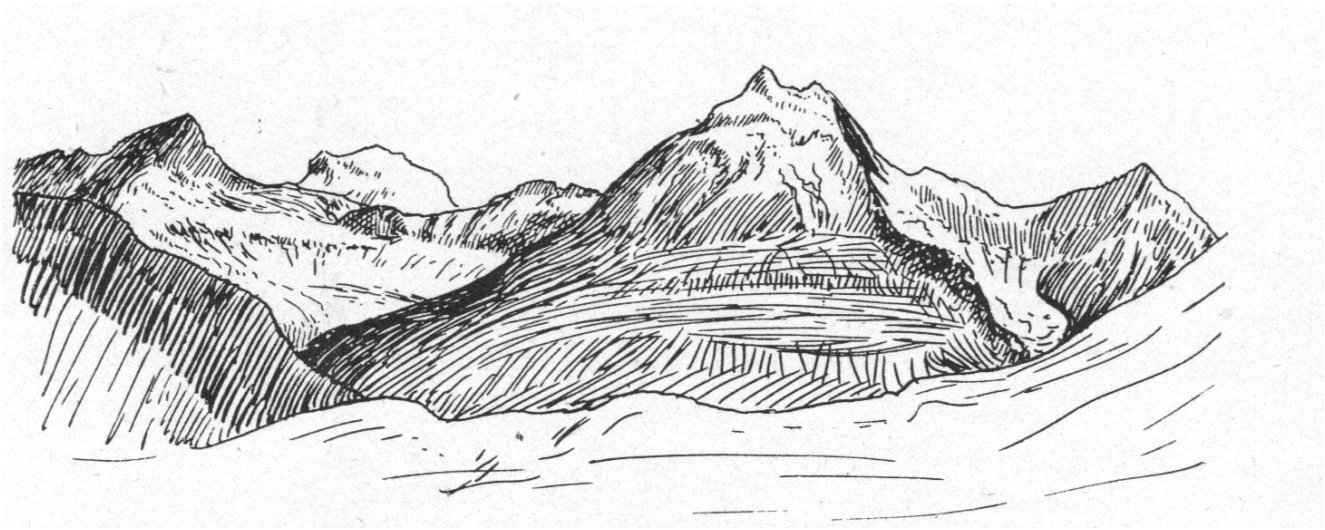
Coleman, A.P.

Figure 15 Anticlinet and Syncline, Sentinel Mt., Kootenay Plains



Coleman, A.P.

Figure 16 Overturned Fold, Clearwater River



Coleman, A.P.

Figure 17 Cirques, Head of South Fork, Brazeau River

Having discussed general causes shaping the mountains, let us turn now to some of the special features. The fundamental structure of the Rockies is simple when contrasted with the complex foldings and faultings in different directions shown by the Alps. The folds in our mountains are often rather broad and uncomplicated, especially toward the Pacific side of the range; while toward the northeast vast blocks of the sediments 25 to 40 miles long, from northwest to southeast, several miles wide and sometimes more than 15,000 feet thick, seem to have been split off from the earth's crust, the southwest side being tipped down, and the northeast side slid up over the next block toward the prairies, the last block riding seven miles out over the region of the foothills before the thrust from behind ceased. Mr. McConnell, of the Geological Survey, whose work I am following here, estimated that along Bow Pass this overriding or telescoping of range after range sums up to a shrinkage of 25 miles. If the blocks were set back in their place again and the strata ironed out flat Golden would be 25 miles farther from Calgary than now.

The blocks which build the eastern ranges have various tilts. In the Brazeau Valley I found the inclinations run from 28° to about 50°, blocks with the lower dip presenting a steep cliff of 3,000 or 4,000 feet toward the northeast, and a gentler slope following the surface of the strata, toward the southwest. These rather gently tilted blocks provide the "writing-desk" type of mountain so common in the eastern Rockies, e.g., near Banff, rather scorned by certain English mountain climbers. The steeper blocks, with a dip of 50° or more, make very rugged, striking mountains, however, often with two or three more resistant layers of quartzite standing out as sharp ridges, while the softer slates have been carved away by the weather.

The great faults that separate block from block sometimes run out into sharp folds at one end, as in Sentinel Mountain, near the Kootenay Plains on the Saskatchewan.

Towards the middle of the Rockies the tilted blocks of the eastern side give place to broad folds, more or less dome shaped at times, where there are wide anticlines; while at others the anticlines have been destroyed and shallow synclinal forms make the mountain tops. Here the carving of the rivers, perhaps helped by faults in some places, has cut the nearly flat-lying beds into castles, minsters and cathedrals, magnificent types of architecture, with towers and unscalable walls, supported here and there by mighty buttresses.

The folding is not always on broad lines with dome and gentle synclines, however; for sometimes, as on Kananaskis Pass, the folds have been pushed so far as to be overturned and lie flat on their side, to be carved up in various ways by frost and running water. Along with predominant folding, faulting occurred also in many places, splitting up the folded structures into large or small fragments. On the other hand when the great fault blocks of the eastern side of the range rode upon the next block to the east the softer strata beneath were often crumpled into small folds, as may be seen along the Clearwater Valley. In the eastern half of the Rockies we have then chiefly fault blocks with minor folds, and in the western half chiefly broad folds with faults of a less important kind.

All of the fundamental structures described are supposed to be due to thrusting from the direction of the Pacific, thus furnishing the rough and massive forms from which were to be carved the splendid variety on slopes and cliffs and ridges and pinnacles that give the mountains their present wild variety of surface. Above the snow-

line the sculptors which shaped them are chiefly frost, the avalanche and the glacier; on the lower slopes frost and rain and torrents have done most of the work; while the larger rivers have sawn their way down through the rocks, hollowing canyons and broad valleys, and sweeping downwards toward the plains or the sea all the debris, the rocks and pebbles, the sand and the clay, delivered to them by the agents working at higher levels. The main valleys have generally been cut right across the direction of the great ranges, as shown by the Bow, the Saskatchewan and the Brazeau on the east, and the Kicking Horse on the west.

Were the rivers there before the mountains, and did they carve their valleys downwards as fast as the upheaving forces pushed the mountains aloft; or did great lines of faulting provide channels that the rivers merely had to deepen? I am inclined to think that the main rivers at least were earlier than the mountain ranges and simply held their ground during the ages of uplift.

Passing through the Rockies by the lower valleys as in the Kicking Horse Pass, one sees mainly the work of running water. Where the river has a somewhat gentle slope, like the Bow, the valley which it has cut is broad and open, with terraces on each side sweeping with a curve up to the foot of the cliffs, which have their bases buried under vast heaps of talus blocks from above, mainly quarried by frost. The broad valleys seem peaceful enough, and it is hard to imagine the relentless war of the river and its tributary torrents upon the mountains until one works out the cross-section which they have cut from the summits on one side to those on the other, and figures the many cubic miles of rock which have been destroyed and carried down to the plains by the flow of water.

Where the slopes are steeper we have turbulent rivers, like the Kicking Horse, rapidly cutting down their V-shaped valleys into canyons, and our sense of the endless strife grows more vivid as we watch them leaping down thousands of feet in a few miles, dragging with them the rocks which have rolled from the sides and using them as powerful tools to cut the canyon still deeper.

As one climbs out of the main valleys, especially on the western side of the Rockies, when timber-line is passed, snow begins to show itself, and at length there are snow-fields draining into glaciers, which creep thousands of feet down into the valleys. Finally the warmth of the lower elevation balances their slow advance and from an ice cave at the end there flows a milky mountain torrent, loaded with the stones and gravel and rock flour ground from the rock floor of the glacier above. Here there is a splendid chance to study the carving power of ice in its downward motion urged by gravity. Where the mountain torrent cuts sharp-walled canyons or V-shaped gorges, the glacier carves broad U-shaped valleys with smoothly rounded surfaces; and one notices that these broad U valleys often run far below the present glacier and are crossed by crescent-shaped moraines, perhaps now tree-covered, monuments of former ice extension. In general our glaciers seem to be retreating as if the warming up of the climate after the Ice Age were still slowly going on.

In many cases the old ice-carved valleys have been hollowed into rock basins or have their outlet blocked by moraines; and this gives rise to some of our most delightful mountain scenery, where forest slopes and precipices and snow-fields are reflected in lakes of the most marvellous turquoise blue in deeper parts, running into clear green in the shallows. These ravishing colors appear to be due to the last remnants of glacial mud from the ice-fed streams flowing into the lakes, the finest possible particles settling

almost infinitely slowly, and reflecting the short blue rays of light, just as infinitesimal particles in the air give the paler blue to the sky. The intense blue or green of these mountain lakes contrasts strongly with the much paler blue of clear lakes like Superior or Ontario, unfed with glacial mud, and makes it certain that the minute remaining particles are the real cause of the color.

Rising out of the snow-fields and rock ridges and isolated peaks, nunataks, as they are called in Greenland, and as one ascends above the glaciers a new type of scenery shows itself, no longer smoothed and rounded surfaces of rock with here and there a moraine, but rugged forms where weathering and frost have rudely done the shaping. In this higher region the character of the rock has much to do with its forms. Hard quartzite or solid limestone resist best and stand out as cliffs and ridges, while softer slates and sandstones crumble and slide, giving long slopes of loose scree into which the foot sinks, the whole surface often slipping with the climber.

In these upper regions the jointage of the rocks plays a large part, those with numerous joints, into which the water from thawing snow may sink by day, only to freeze at night and pry asunder the blocks, are quickly shattered even if of hard materials; while rocks with few open fissures stand their ground far better and rise amidst the slopes of debris as walls or pinnacles.

From the higher levels one sees, too, how the glaciers eat back their U-shaped valleys into the solid rocks of the central mountain blocks, even little "cliff glaciers" carving for themselves nests shaped like a half kettle, cirques, as they are called in the Alps. When two of these cirques have been gnawed inwards toward each other very narrow ridges of rock with knife edges may result. From the lips of empty cirques or hanging valleys hollowed during the Ice Age bridal-veil falls now spring hundreds or thousands of feet over precipices into some deeply cut main valley carved by a glacier of the first rank.

The highest of our Rockies were probably never covered by the ice sheets of the glacial period, but rose above them, so that their rugged forms are due to the tilt of the strata, their relative resistance to weathering, and their lack of joints in which frost could work.

Every climber must have been impressed by the strangely uniform level reached by most of the peaks. Hundreds or even thousands of summits rise from ten to twelve thousand feet above the sea, but very few get above that limit. Some geologists account for this by supposing that a vast tableland has been elevated and then carved into the innumerable crests and valleys; but it is very doubtful if such a tableland ever existed. Certainly no important remnant of it can be recognized now. It seems more probable that the higher summits, rising with steep slopes much above the protecting snow-fields, have been more rapidly attacked by frost and storms, and so have paid the penalty of greatness. The higher the summit the more rapidly it is cut down, till it reaches a level where slopes are gentler and snow and ice give some protection from erosion; and so there is a tendency to uniformity of height.

One type of mountain scenery is lacking in our Rockies. No eruptive rocks have reached the surface in their elevation, so that none of the forms belonging to massive rocks can be seen.

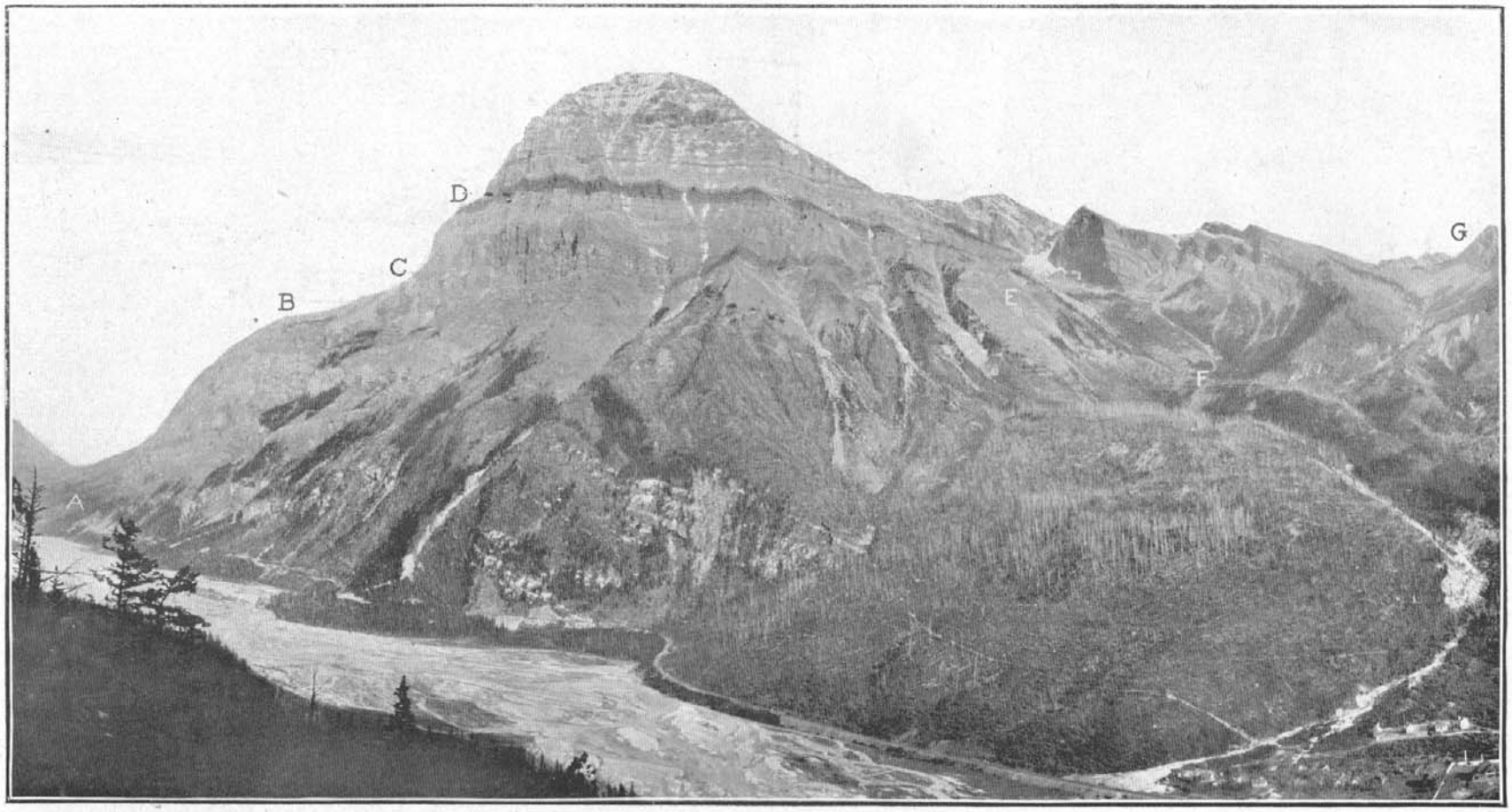
From the comparative simplicity of their structure our Rockies make a splendid school for the study of folds and faults on a large scale, and it is well worth while for the members of our Club to add this geological interest to the many other attractions of the mountains.

MOUNT STEPHEN ROCKS AND FOSSILS.

Walcott, Charles D..

The north face and slope of Mount Stephen presents a wonderfully interesting section of rocks in which many finely preserved fossils occur. At the base, where the railroad passes through the north shoulder of the mountain mass, fossils of the Lower Cambrian fauna occur in the hard, brown sandstones and in the bluish-gray limestones and shales above them for 315 feet. The characteristic fossil of this horizon is a large trilobite called Olenellus. No whole ones have been found on Mount Stephen, but an entire specimen found at about the same place in the section in Nevada is shown by Figure i, Plate II. Above the Lower Cambrian formations comes the massive Cathedral limestone, 1680 feet thick, which forms the summits of Cathedral Mountain. These limestones are sandy and impure and in Mount Stephen only worm borings have been seen in them. Above the Cathedral formation there is a series of thin layers of bluish limestone and shale, 525 feet thick, which is called the Stephen formation. In this may be found many fragments of fossils that belong to the Middle Cambrian fauna. We have now reached the level of the celebrated fossil bed of Mount Stephen. The rock is a gray, siliceous and sandy shale that, 2200 feet above the railroad station at Field, is 150 feet in thickness. A sharp fold in the shale and the rock below has bent the layers sharply down the slope in the direction of Field. The frost, rain and snow have gradually broken up the great layers of shale and scattered them down the slopes. Nature has done all that she could to open up and make accessible the great storehouse of fossils contained in the shales. Nearly every fragment of shale found on the slopes from 2000 to 2600 feet above Field has fossils upon it; not only fragments, but usually entire specimens of trilobites. The fossil bed thins out rapidly to the northeast and southwest. It is in fact a lens-shaped formation, thinning out from the center in all directions. The shales were originally a sandy mud that was slowly deposited as thin layers in quiet water. For some unknown reason, the trilobites died by thousands and were buried by the successive layers of mud. Small marine shells occur quite abundantly in some of the layers along with the trilobites and smaller fossils of various kinds. The largest and most abundant trilobite is called Ogygopsis klotzi, and from it the name Ogygopsis shale is given to the band or lens of siliceous shale in which the trilobite occurs.

The Stephen formation, with the Ogygopsis shale, forms the dark, bluish-gray band that extends across the north face of the mountain just above the shoulder, over the railroad tunnel. Another dark band of limestone, 150 feet thick, that shows in all photographs of Mount Stephen from the north, is 650 feet higher up, the interval being occupied by massive beds of gray siliceous limestone. A few fragments of Middle Cambrian fossils occur in the dark, bluish-gray limestone. Above the dark band, massive beds of gray, sandy limestone rise tier above tier for 2700 feet to the summit of the mountain. This great series is called the Eldon formation, from Eldon, north of which, in the slopes of Castle Mountain, it has a fine development.

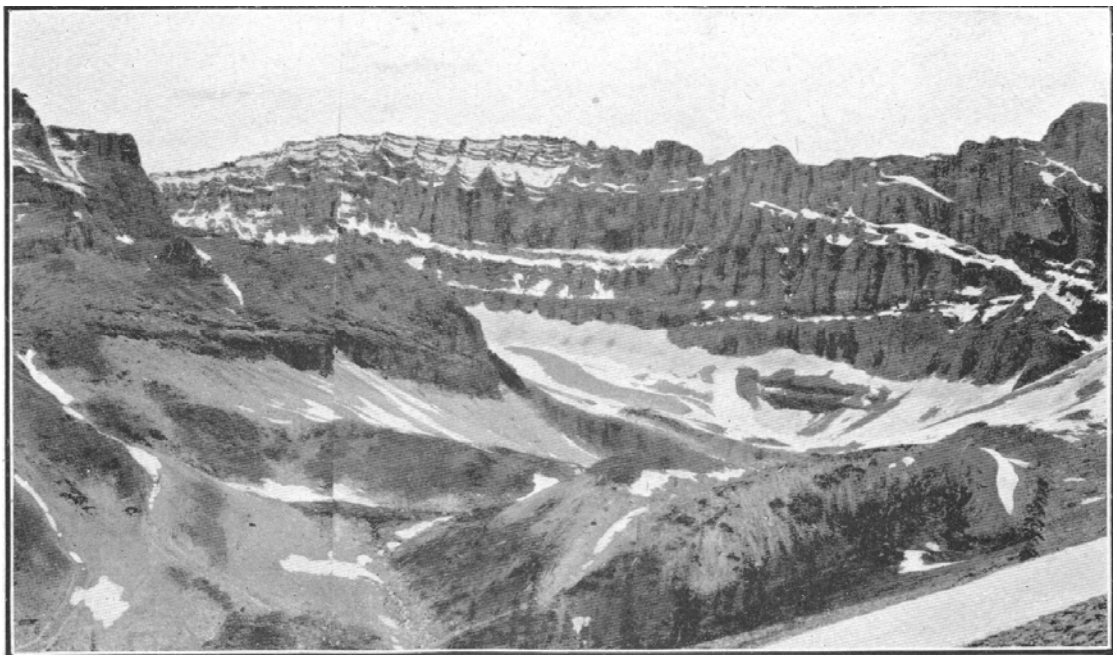


Chas. D. Walcott, Photo

THE NORTH-WEST FACE OF MT. STEPHEN—SHOWING THE KICKING-HORSE RIVER AT THE BASE

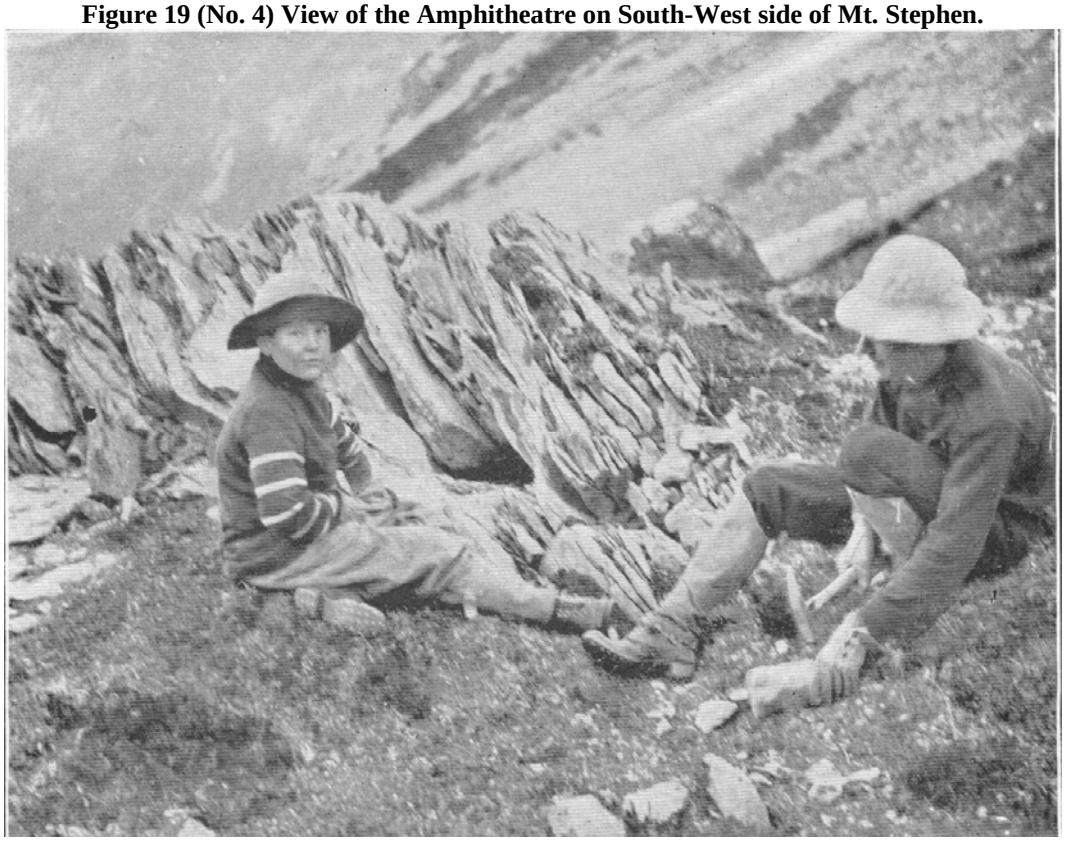
Walcott, Charles D.

Figure 18 (No. 1) The North-West Face of Mt. Stephen - Showing the Kicking-Horse River At the Base



Walcott, Charles D.

Figure 19 (No. 4) View of the Amphitheatre on South-West side of Mt. Stephen.



Walcott, Charles D.

Figure 20 Juvenile Geologists at the "fossil Bed," Mt. Stephen.

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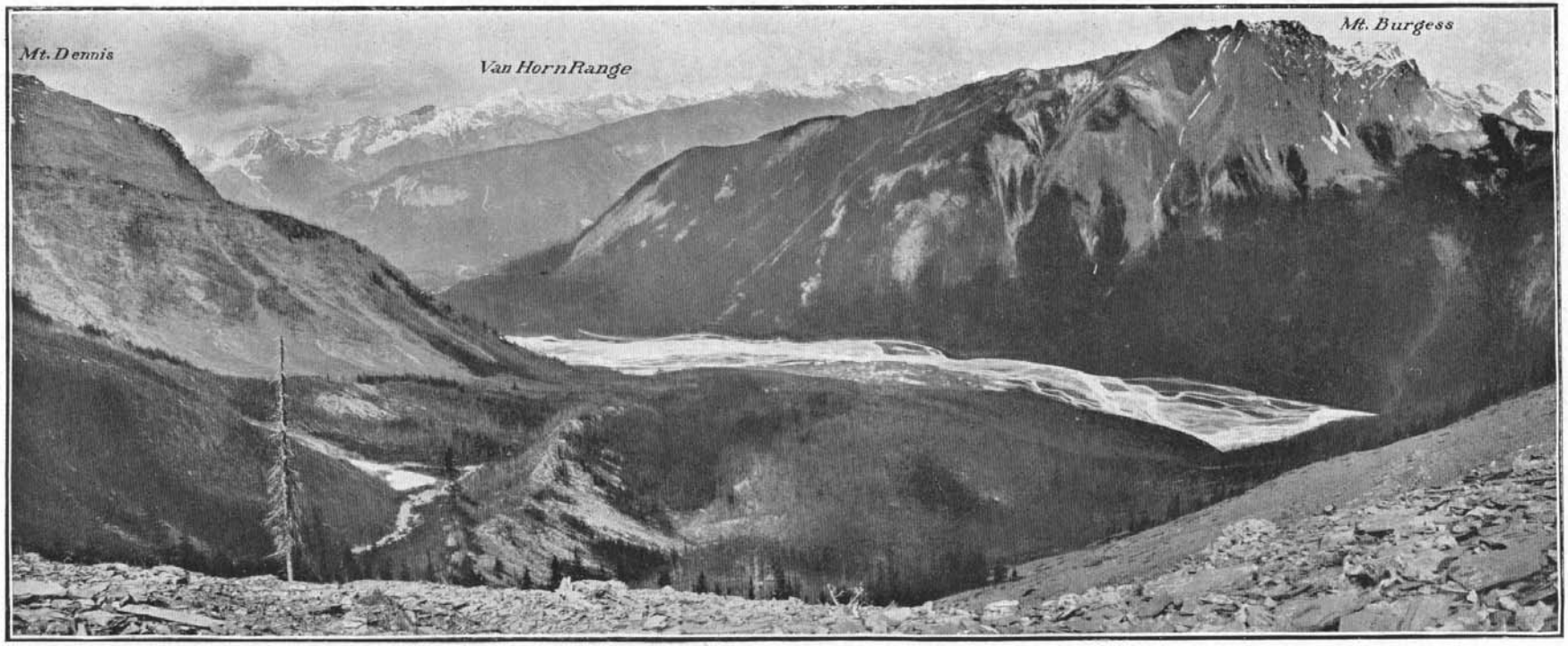


Walcott, Charles D.

Figure 21 (No.2) View Looking North-West From the "Fossil Bed," which is shown in the foreground..

Chas. D. Walcott, Photo

VIEW LOOKING WEST FROM THE "FOSSIL BED" TOWARD MT. DENNIS

Walcott, Charles D.

Figure 22 (No. 3) View Looking West from the "Fossil Bed" Toward Mt. Dennis

Southwest of Mount Stephen the layers of rock are broken and bent to the southwest and west until they pass beneath Mount Dennis. All belong to the Cambrian period. A few fossils occur in the amphitheatre east of Mount Dennis, but the best collecting ground for fossils above the great fossil bed, Ogygopsis shale, is in the Mount Bosworth section on the continental divide.

The principal locality from which good fossils can readily be obtained is on the slope of Mount Stephen, above Field. The best way to make a collection from the "fossil bed" is to ride up the trail on a pony to about 2000 feet above the railroad, collect specimens, securely wrap them in paper, place them in a bag, tie the bag to the saddle, and lead the pony down the mountain. A fine lot can be secured in a long day's trip, 6 a.m. to 6 p.m.

In order that the reader may understand the location of the "fossil bed" and the position of the various formations in the Mount Stephen section, four photographs taken in 1907 and a geological section are given in connection with this paper; also a list of the fossils from the "fossil bed" and illustrations of the more common species.

No. 1 Northwest face of Mount Stephen, showing the Kicking Horse River at the base.

A—The railroad tunnel.

B—The great north shoulder.

C—The lower bluish-black limestone belt.

D—The upper bluish limestone belt.

E—The celebrated "fossil bed."

F—Best locality to camp in working "fossil bed."

G—East slope of Mount Dennis.

No.2. View looking northwest from the "fossil bed," which is shown in the foreground. The trail from Field can be followed with a saddle animal to the large dead pine tree on the left. Just below this is the ridge upon which the trail is located. To the left of the ridge near the triangular patch of snow is the best place to camp when working at the "fossil bed." It is 1600 feet above Field.

This picture gives a beautiful view of the various channels of the Kicking Horse River, the mass of Mt. Burgess, and the Van Home range to the left of Mt. Burgess.

No. 3. View looking west from the "fossil bed" toward Mt. Dennis. The character of the "fossil bed" is beautifully shown, also the structural character of Mt. Dennis.

No. 4. View of the amphitheatre on the southwest side of the upper portion of Mt. Stephen. The "alcove" erosion of the cliff on the south side of the amphitheatre is beautifully shown. Middle Cambrian fossils occur in the rock shown in the lower right hand corner of the view.

GEOLOGICAL SECTION OF MOUNT STEPHEN.

Studied July, 1907.

The section is from the summit of the mountain down the northeast and north slopes to the Canadian Pacific Railroad track below the tunnel and through the basal quartzitic sandstones.

The massive, siliceous, dolomitic limestone (Eldon formation) forming the upper portion of the mountain was not measured above the bluish-gray limestone and shaly band. Its thickness is estimated at 2,700 + feet. It is 2728 feet thick on Mount Bosworth. An attempt was made to measure the Cathedral formation, but owing to step-faulting, the result is not satisfactory. This formation has a thickness of 1595 feet on Mount Bosworth, so the measured and estimated thickness of 1680 feet on Mount Stephen is given in the section. No attempt was made to carry the section from Mount Stephen across to Mount Dennis through the Bosworth formation owing to local displacement and the alteration of the strata in Mount Dennis.

MIDDLE CAMBRIAN. (Summit of Mountain) Eldon Formation—

1a. Massive bedded, gray, siliceous and dolomitic limestone, estimate ..... 2700 + ft.

1b. Bluish-gray limestone with bands of dark siliceous shale in lower portion ..... 190 ft.

Fauna—Middle Cambrian.

The fossils are very poorly preserved but the following have been recognized:

Protospongia (spicules)
Lingulella, species undetermined.
Hyolithes, species undetermined.
Agnostus, cf. montis Matthew.
Zacanthoides spinosus (Walcott)
Ptychoparia, species undetermined.
Bathyuriscus (pygidium)
Ogygopsis (pygidium)

1c. Gray arenaceous and dolomitic limestone ..... 650 ft.

Stephen Formation—

1 Calcareous and siliceous shales 150 ft.

This shale is given the name of Ogygopsis shale from the predominating trilobite contained in it, Ogygopsis klotsi. A detailed description of this shale and its contained Middle Cambrian fauna may be found on page . In a siliceous shale about one-half mile east of the great fossil bed the following species were found:

Obolus mcconnelli (Walcott)
Nisusia (Jamesella) cf. nautes Walcott.
Hyolithes carinatus Matthew
Orthotheca, species undetermined.
Scenella varians Walcott.

Ptychoparia, species undetermined.

2. Thin bedded, bluish-black limestone forming dark broken cliff in many sections……..325 ft.

Fauna—Middle Cambrian.

In the upper portion of this formation just beneath the Ogygopsis shale in a bluish-black shaly limestone in the amphitheatre between Mount Stephen and Mount Dennis the following species of fossils were found:

Obolus mcconnelli (Walcott)
Acrotreta depressa Walcott.
Hyolithellus annulata (Matthew)
Ptychoparia, species undetermined.
Neolenus serratus (Rominger)
Ogygopsis klotsi (Rominger)

At another locality just east of the great "fossil bed" there were found in the limestone beneath the Ogygopsis shale the following species of fossils:

Micromitra, species undetermined.
Nisusia alberta Walcott.
Hyolithes, species undetermined.
Bathyuriscus rotundatus (Rominger)
Neolenus serratus (Rominger)

Near the base of this thin-bedded limestone the following species of fossils were found:

Micromitra, species undetermined.
Obolus mcconnelli (Walcott)
Micromitra (Iphidella) pannula (White)
Aero tret a (large)
Hyolithes, species undetermined.
Agnostus mantis Matthew.
Agraulos, species undetermined.
Ptychoparia, species undetermined.
Zacanthoides, species undetermined.
Bathyuriscus, species undetermined.
Albertella, species undetermined.
2a. Massive bedded gray limestone, breaking down into thin layers on weathering ..... 37 ft.
3a. Gray and greenish siliceous shale 47 ft.
3b. Gray oolitic limestone in layers, 6 in. to 2 ft. thick..... 4 ft 6 in.

Fauna—Middle Cambrian.

Micromitra, species undetermined.
Nisusia alberta (?) Walcott.

Hyolithes, species undetermined.
Microdiscus, species undetermined.
Ptychoparia, species undetermined .
3c. Greenish siliceous shale..... 15 ft.
3d. Gray oolitic limestone..... 6 ft. 6 in.
3e. Gray, impure dolomitic limestone, compact, fine-grained and weathering buff and yellow.....38 ft.
3f. Greenish siliceous shale.....1 ft.
3g. Similar to 3e. ..... 52 ft.
3h. Gray oolitic limestone.....2 ft. 2 in.

3i. Similar to 3e.....3 ft.
3j. Gray oolitic limestone. .....4 ft. 2 in.
3k. Similar to 3e. .....5 ft. 8 in.
3l. Gray oolitic limestone.....2 ft. 3 in.
3m. Similar to 3e. .....5 ft.
3n. Gray oolitic limestone..... .....3 ft. 9 in.
3o. Thin-bedded, bluish-grey limestone,
weathering buff ..... 10 ft.

Total of 3 ..... …..200 ft.

Cathedral Formation—

1. Massive bedded, arenaceous, siliceous limestone ..... 60 ft.
2. Massive bedded, arenaceous, siliceous dolomitic limestone. At 495 feet from the base the beds are thinner and of a dark gray color for 30 to 40 feet. At 825 feet the massive layers are banded with light and dark grey colors. .1560 ft.

Owing to small step faults the thickness of this series of strata is uncertain. The entire thickness on the northeast side was measured and an allowance made for duplication by faulting.

This great limestone series forms bold, high cliffs on the east face of Mount Stephen and the west side of Cathedral Mountain.

Fauna — Annelid borings and trails at a few horizons.
Massive bedded arenaceous dolomitic limestone ..... 60 ft.

Total of Cathedral formation. .... 1680 ft.

LOWER CAMBRIAN—

Whyte Formation—

1. Thin-bedded bluish-black and gray
limestone .....3 ft.
Fauna (from1 and the interbedded limestones at the top of 2)
Nisusia (Jamesella) lowi, new species.
Stenotheca elongata Walcott var.
Platyceras, new species.

Scenella varians Walcott
Hyolithes billingsi Walcott
Ptychoparia, species a.
Crepicephalus, new species.
Protypus, new species.
Albertella, species undetermined.

2. Gray siliceous shale with inter-bedded gray fossiliferous limestone in layers 5 in. to 2 ft. thick in the upper portion ..... 108 ft.

Fauna (In the shale of the central portion)
Cystid plates.
Micromitra (Paterina), species undetermined
Acrotreta sagittalis taconica Walcott.
Nisusia (Jamesella) lowi, new species.
Hyolithes (fragment)
Hyolithellus cf. micans Billings
Scenella varians Walcott
Olenellus (fragments of thoracic segments)

3. Thin-bedded, compact, hard, dark, bluish-gray limestone, with a little interbedded gray, siliceous shale and a few beds of coarser gray limestone, 6 to 10 inches thick.....52 ft.

Fauna (near the top)
Acrothele colleni, new species.
Acrotreta sagittalis taconica Walcott
Scenella varians Walcott
Stenotheca elongata Walcott var.
Albertella, species undetermined.
Olenellus (fragments)
Bathyuriscus, species undetermined.

Fauna (near the base)

Micromitra (Paterina) labradorica (Billings) var.
Micromitra (Iphidella) pannula (White)
Acrotreta sagittalis taconica Walcott
Bornemannia prima, new genus and new species
Ptychoparia, 3 species.

4. Brownish-gray, quartzitic sandstone in layers 2 to 4 inches thick
…… 32 ft.

Fauna —
Microdiscus, species undetermined
Olenellus (fragments).
Ptychoparia, species undetermined.
Protypus, species undetermined.

5. Gray, siliceous shale. ..... 102 ft.

Fauna—

Hyolithes billingsi Walcott
Scenella varians Walcott
Ptychoparia, 2 species.
6. Bluish-black and gray limestone. …….. 18 ft.
Fauna—
Micromitra (Iphidella) pannula (White)
Acrotreta sagittalis taconica Walcott
Kutorgina cingulata Billings
Nisusia festinata Billings
Hyolithes billingsi Walcott.
Scenella varians Walcott
Protypus, new species.
Agraulos, species undetermined.
Ptychoparia, 3 species.
Olenellus canadensis, new species.

BOW RIVER TERRANE.

St. Piran Formation—

1. Massive bedded quartzitic sandstone ..... 300 + ft.

In the Lakes Agnes and Louise section the St. Piran formation has a thickness of 2640 feet.

Beneath the St. Piran the Lake Louise shale is 105 feet in thickness. In it occur a few fossils as follows:

Micromitra (Iphidella) louise, new species.

Crusiana (casts of tracks and burrows made in the mud by trilobites)

Beneath the Lake Louise shale there is a great thickness of quartzitic sandstone and siliceous shales of which about 600 feet of the upper portion is exposed at Lake Louise.

FAUNA OF THE GREAT FOSSIL BED.

(Ogygopsis Shale)

The fossils occur in a gray siliceous and arenaceo-calcareous shale, only a trace of calcareous matter showing. The shale usually rests on a thin-bedded limestone, but in one instance a lentile of quartzitic gray sandstone occurs between the lower limestone and the shale. This is at the upper northeast end of the exposure of the shales, and here several species of fossils occur that were not seen elsewhere, notably Burlingia hectori Walcott.

Fossils are very rare for 50 feet above the base of the shale and then only the more common species such as Ogygopsis klotsi, Bathyuriscus rotundatus and Ptychoparia cordillerae.

The list of named fossils from this shale is as follows:

1. Hyolithellus flagellum (Matthew)
2. Hyolithellus annulata (Matthew)
3. Orthotheca corntgata Matthew
4. Orthotheca major, new species.
5. Hyolithes sp.

6. Hyalites carinatus Matthew.
7. Stenotheca wheeleri, new species.
8. Platyceras romingeri Walcott
9. Platyceras bellianus, new species.
10. Acrotreta depressa (Walcott)
11. Micromitra (Iphidella) pannula (White)
12 Obolus mcconnelli (Walcott)
13 Nisusia alberta Walcott
14 Philhedra columbiana (Walcott)
15 Scenella varians Walcott
16 Anomolocaris canadensis Whiteaves
17 Anomolocaris whiteavesi, new species.
18 Anomolocaris (?) acutangulus, new species.
19 Agnostus mantis Matthew
20 Dorypyge (Kootenia) dawsoni (Walcott).
21 Bathyuriscus rotundatus (Rominger)
22 Bathyuriscus pupa Matthew. Probably 23.
Conocephalites cf. perseus Matthew—30.
Corynexochus romingeri Matthew—25.
23 Bathyuriscus occidentalis (Matthew)
24 Bathyuriscus ornatus Walcott
25 Karlia stephenensis Walcott
Neolenus granulata Matthew—26.
26 Neolenus serratus (Rominger)
27 Ogygopsis klotsi (Rominger)
28 Oryctocephalus reynoldsi Reed
29 Burlingia hectori Walcott
30 Ptychoparia cordillerae (Rominger)
31 Ptychoparia palliseri, new species.
32 Zacanthoides spinosus (Walcott)

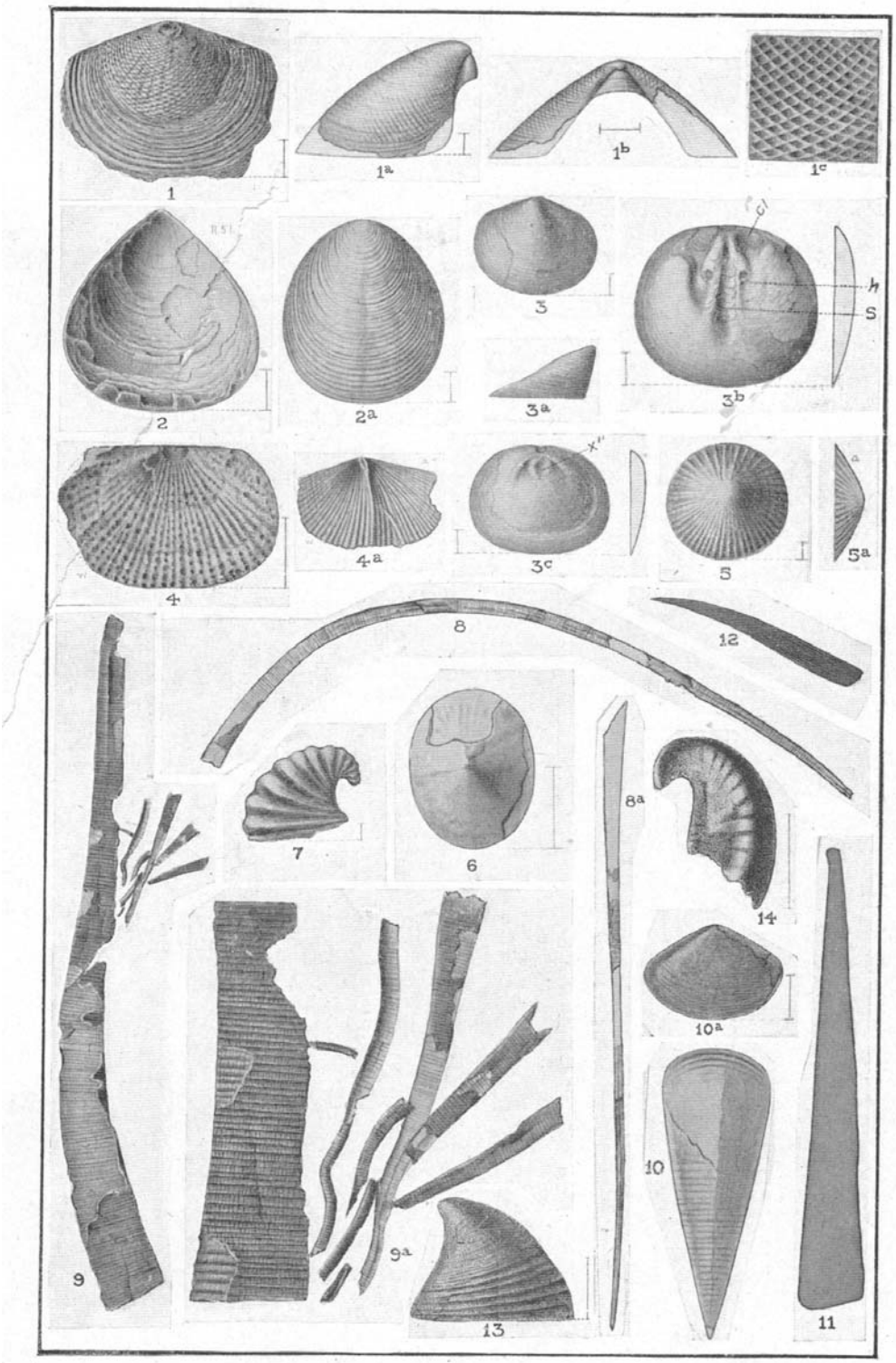


PLATE I.—MT. STEPHEN FOSSILS

Figure 23 Plate I. Mt. Stephen Fossils

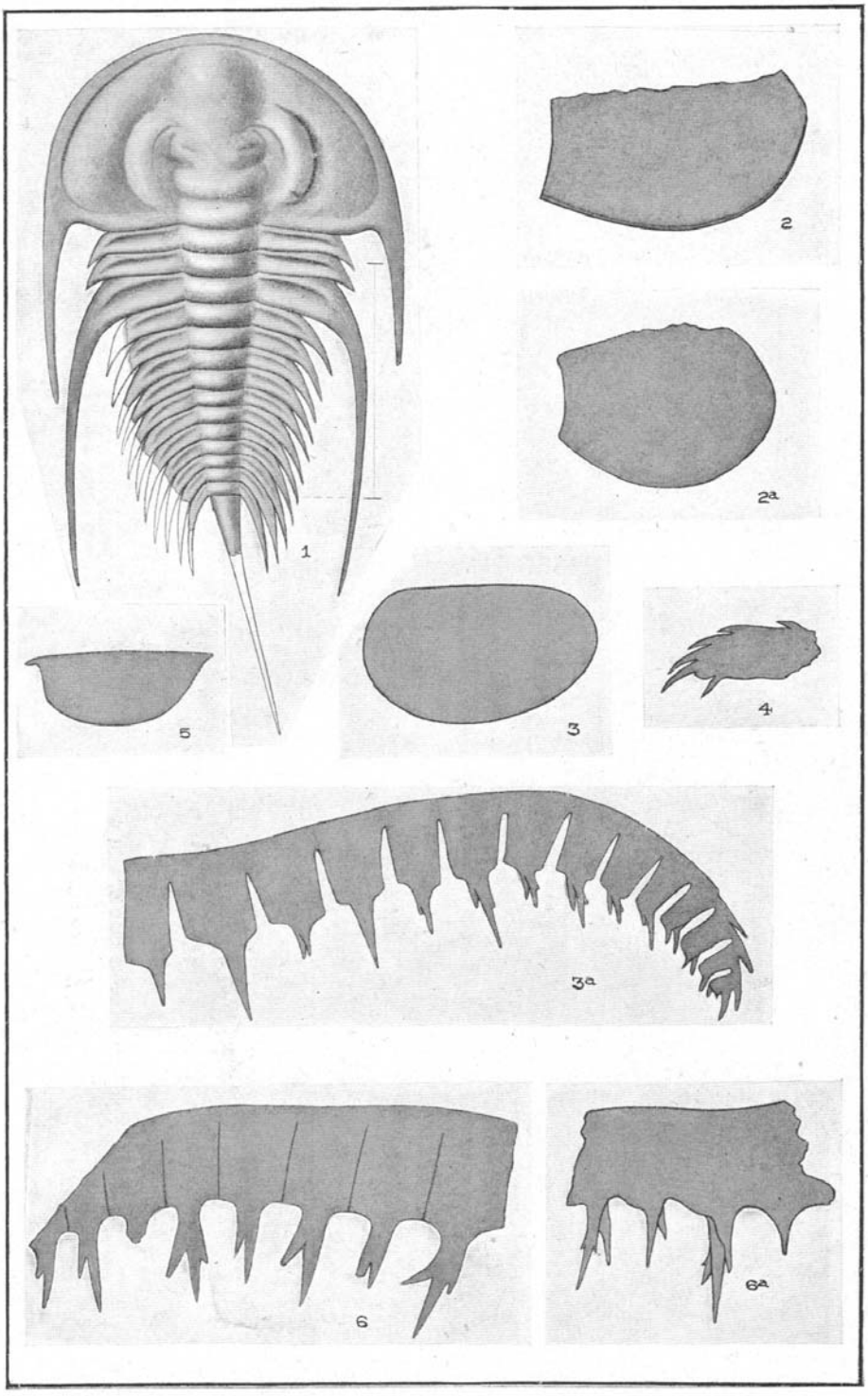


PLATE II —MT. STEPHEN FOSSILS

Figure 24 Plate II - Mt. Stephen Fossils

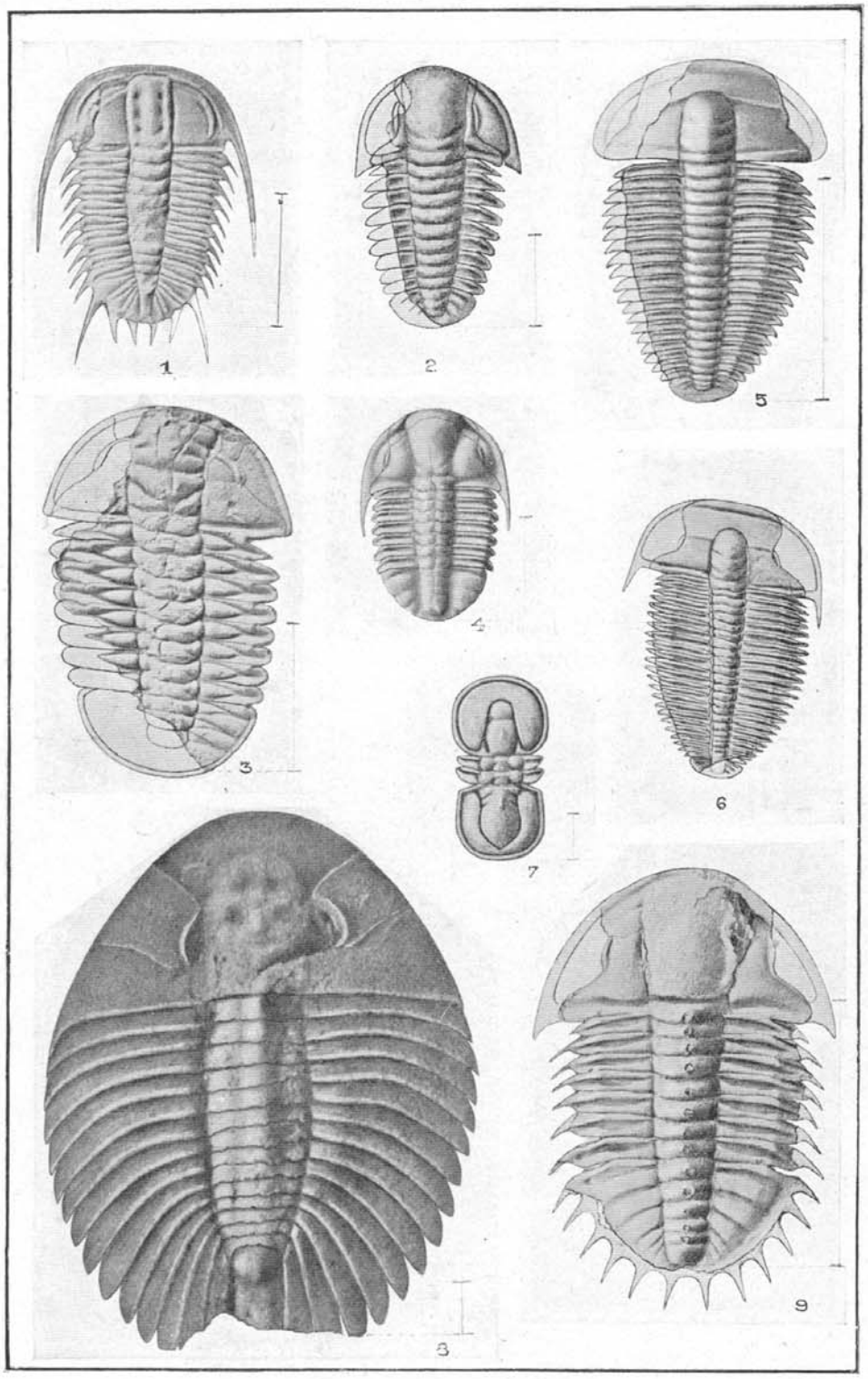


PLATE III.—MT. STEPHEN FOSSILS

Figure 25 Plate III - Mt. Stephen Fossils

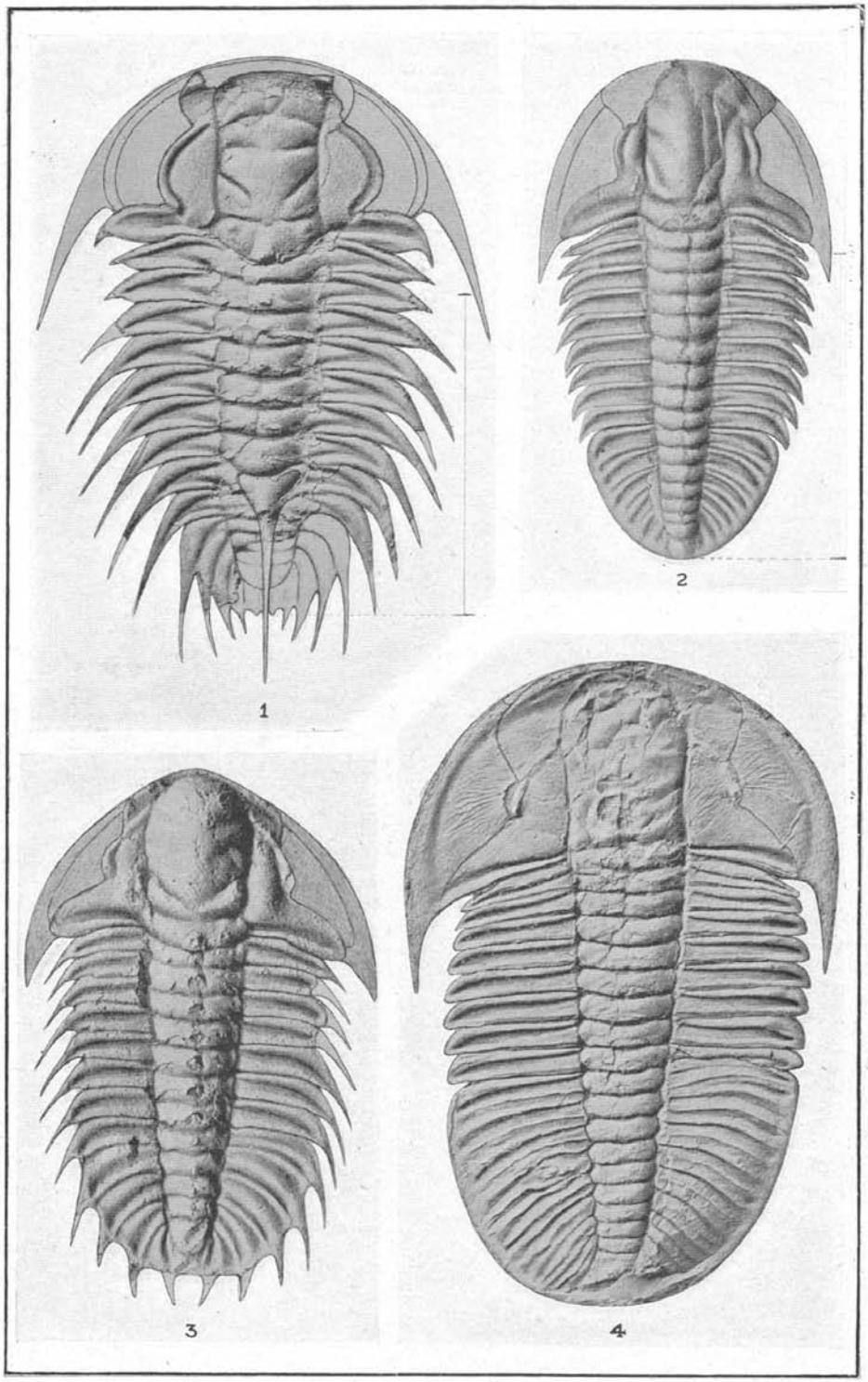


PLATE IV. —MT. STEPHEN FOSSILS

Figure 26 Plate IV - Mt. Stephen Fossils

DESCRIPTION OF PLATE I.

MICROMITRA (IPHIDELLA) PANNULA
(White)
Figs, 1, 1a, 1b. Top, side and back views of a ventral valve.
Fig 1c. Surface greatly enlarged.

OBOLUS MCCONNELLI (Walcott)
Fig. 2. An imperfect ventral valve, enlarged. Fig. 2a. A dorsal valve, enlarged.

ACROTRETA DEPRESSA (Walcott)
Figs. 3 and 33. Top and side views of an elevated ventral valve.
Fig. 3b. Cast of the interior of a dorsal valve.
Fig. 3c. Cast of the interior of a ventral valve.
NISUSIA ALBERTA (Walcott)
Fig. 4. A cast of the exterior surface showing bases of surface spines.
Fig. 4a. A compressed valve.
PHILHEDRA COLUMBIANA (Walcott)
Figs. 5 and 53. Top and side views, greatly enlarged. (Very rare).
SCENELLA VARIANS Walcott
Fig. 6. Top view of a specimen with the apex nearer the center than usual.
STENOTHECA WHEELERI, new species.
Fig. 7. Side view of the type specimen. (Comparatively rare).
HYOLITHELLUS FLAGELLUM (Matthew) Fig. 8. A long curved specimen. Fig. 8a. A slender nearly straight specimen.
HYOLITHELLUS ANNULATA (Matthew)
Fig. 9. A large specimen with a group of small
tubes adjoining it.
Fig. 9a. Enlargement of a portion of the specimen represented by figure 9. The small tubes are much like those of Hyolithellus flagellum.
HYOLITRES CARINATUS Matthew
Fig. 10. Shell as it appears flattened in the shale.
Fig. 10a. Operculum that covered the opening of the shell.
ORTPIOTHECA MAJOR, new species.
Fig. 11. This is a thin shell compressed in the shale.
ORTHOTHECA CORRUGATA Matthew
Fig. 12. Portion of a flattened tube.
PLATYCERAS (?) BELLI ANUS, new species.
Fig. 13. Side view of shell flattened in the shale. (Very rare).

DESCRIPTION OF PLATE II.

OLENELLUS GILBERTI Meek.
Fig. 1. Introduced to show the character of the trilobites which occur in fragments at the tunnel near the north base of Mount Stephen.
ANOMOLOCARIS (?) WHITEAVESI, new species.

Figs. 2 and 2a. Broken and compressed specimens of the carapace.
Figs. 6 and 6a. Abdominal segments tentatively referred to this species.
Fig. 4. A caudal segment, probably of this species.
ANOMOLOCARIS CANADENSIS Whiteaves
Fig. 3. Carapace referred to this species. This is the most abundant form of carapace.
Fig. 3a. Thirteen abdominal and one caudal segment.
ANOMOLOCARIS (?) ACUTANGULUS, new species
Fig. 5. A carapace, very rare.

DESCRIPTION OF PLATE III.

ORYCTOCEPHALUS REYNOLDSI Reed
Fig. 1. A nearly entire specimen twice enlarged. Not rare.
BATHYURISCUS OCCIDENTALS (Matthew)
Fig. 2. A very rare species.
BATHYURISCUS ORNATUS Walcott
Fig. 3. A comparatively rare species.
KARLIA STEPHENENSIS Walcott
Fig. 4. A small and rather rare species.
PTYCHOPARIA CORDILLERAE (Rominger)
Fig. 5. This is one of the common species. It is usually about one-half the size of this figure.
PTYCHOPARIA PALLISERI, new species.
Fig. 6. A large rare species.
AGNOSTUS MONTIS Matthew
Fig. 7. The fragments of this species are very abundant in some layers.
BURLINGIA HECTORI Walcott
Fig. 8. Greatly enlarged. This is a small, very rare species.
DORYPGE (KOOTENIA) DAWSONI Walcott
Fig. 9. A large specimen. Not very abundant, but often mistaken for Neolenus serratus.

DESCRIPTION OF PLATE IV.

ZACANTHOIDES SPINOSUS (Walcott)
Fig. 1. A large specimen partially crushed in the shale. A common species.
BATHYURISCUS ROTUNDATUS (Rominger)
Fig. 2. The average size of this species is about one-half that of this figure. It is quite abundant.
NEOLENUS SERRATUS (Rominger)
Fig. 3. A common species.
OGYGOPSIS KLOTZI (Rominger)
Fig. 4. This is the largest and most abundant trilobite in the fossil bed.

THE NATURE AND ACTIVITY OF CANADIAN GLACIERS.

Sherzer, William Hittell.

None the less attractive to the glacial student than to the mountain climber is that grand array of peaks and snow-fields which stretches poleward through the western part of the Dominion of Canada. Here upon a magnificent scale and in endless variety and profusion one may recognize the various types of glaciers, detect in them every feature known to science and about them every form of geological activity ascribed to these great engines of rock destruction and transportation. About the peaks and ridges and in the higher valleys there accumulates season after season layer upon layer of snow, which, by its own pressure, surface melting and occasional rain or cloud mist is gradually compacted into ice. Indefinite accumulation of this congealed moisture is prevented by one of those beneficent provisions of Nature by which, under the influence of its own weight, this ice in frozen streams, or shorter tongues, moves slowly to lower levels where complete melting may occur and this moisture again be put into general circulation. Were it not for this the Canadian Rockies and Selkirks would be encased in a great ice ridge, extending as high into the atmosphere as it is possible for moisture to be lifted, from the sides of which tremendous avalanches would hurl themselves to the adjacent plains, deeply covering regions now free from snow during a portion of the year.

Although the mechanics of glacial motion are not yet fully understood, these ice-streams appear to move much as would a similar mass of asphaltum, with which they have often been compared. They conform more or less perfectly to the shape of the valley and irregularities of the bed, move more rapidly towards the centre and upper surface than toward the sides and bottom, flow more rapidly down steep slopes than gentle ones, and are more active during the day than at night and in summer than in winter. Where compelled to change their course too suddenly, or when subjected to a certain degree of tensional stress, great cracks are slowly opened at right angles to the direction of such stress. When one portion of the mass begins to lag it may be thrust forward bodily by great pressure from behind, compelled to mount reverse slopes, to scour the bed, detach rock fragments and transport whatever material finds lodgment within or upon the mass.

I.—Conditions Requisite for Glacial Formation.

In order that a certain region may support glaciers four conditions must be fulfilled, no two or three of which alone will suffice, (a) There must first be a degree of cold that will cause some of the precipitation to fall as snow or hail without which a glacier would be impossible. (b) The amount of such precipitation must be sufficiently great so that, in spite of the seasonal melting and evaporation, there will be a remnant to add to the accumulation of previous years. The entire snowfall of any year, or any short series of years, may be destroyed by melting, but, upon the whole, there must be more or less steady increase in the amount of congealed moisture, (c) There must be a collecting area, which from its shape or slope is capable of retaining the requisite amount of snow and ice. If the slope is too steep the snow will be avalanched from the area before the glacier has time to come into existence, (d) Finally, the local conditions must be of such a nature as to permit of the inauguration of a movement in which there

is more or less of a horizontal component. The chief factors concerned are the configuration of the collecting area and the weight of the accumulated snow. If movement is not permitted the entire mass remains a snow bank, or heap of stagnant ice which does not possess the essential characteristics of a glacier.

Space does not permit the discussion here of the distribution of modern and ancient glaciers over the face of the earth by which the application of the above conditions might be more readily comprehended by the reader. In general it may be said that when a glacier exists today these four conditions have been satisfactorily met in the past, although one or more of them may be now lacking. If a given area does not support a glacier, one or more of these conditions has been wanting, just which ones being readily determined by an inspection of the region. In the Canadian Rockies and Selkirks we find ideal conditions for glacier formation: broad valleys, basins and gentle slopes; high altitude and latitude; moisture-laden winds from the Pacific, causing heavy snowfall upon the western slopes and about the crests of these great systems.

When exposed to the warm rays of the sun the snowflakes melt into small globules which are subsequently frozen into pellets resembling granular tapioca. The snow in this condition is known as firn or névé, and from its consolidation the glaciers take their origin. In some way not yet fully understood the granules of the névé gradually diminish in number and increase in size until they attain the size of hazelnuts or walnuts, or even the size of the fist in large glaciers like the Yoho and Illecillewaet. So long as the temperature of the ice is well beneath the freezing point these granules are not in evidence, the ice appearing compact and homogeneous. When, however, it begins to feel the effect of a higher temperature, there appears a delicate system of capillary tubes, outlining the granules and extending some distance into the ice mass. As melting proceeds these capillaries develop into narrow fissures separating the granules, and in the final stage a sharp blow will cause the ice to crumble into these component granules. It is in this granular structure that glacial ice is distinguished from that which results from the direct freezing of water, as in lakes, ponds and the pools and crevasses of the glaciers themselves. Such ice, commonly spoken of as "water-ice," consists of approximately parallel prisms, arranged with their axes perpendicular to the freezing surface. This structure is often strikingly shown in the case of lake and river ice when in the spring it is undergoing disintegration.

2.—Principal Types of Glaciers.

Without attempting to draw any sharp lines of distinction between them there may be recognized four types of glaciers, all but one of which have numerous representatives in the Canadian Rockies and Selkirks. This one, not now represented, occupied the region during the previous geological epoch and its work is much in evidence in and about the mountains. These types may best be described in the order of their simplicity, frequency and development.

(a) Alpine Glaciers. In its simplest from this type originates from the snow which accumulates about a mountain pass, or within an amphitheatre, combined with that precipitated directly into the valley, or avalanched from the adjacent slopes. Having much the appearance of a great frozen river, it slowly winds its way down the valley to a level determined by a number of factors; chief of which are the latitude, thickness of the ice, exposure to the sun, amount and distribution of rocky debris and the amount of snow and ice urging the glacier forward. Canadian examples are the Victoria, Yoho and the easternmost stream of the Asulkan glaciers. The snow line crossing

the glacier divides the upper surface into two regions which are designated as the névé, or region of perennial snow, and the dissipator, or that portion ordinarily free from snow during late summer and early autumn. Glaciers of the alpine type may receive tributaries from confluent valleys and these in turn receive tributary ice-streams. If we consider that the Mitre Glacier originates about the Mitre Pass, it receives a short, broad tributary from between Mitre Mountain and Mount Lefroy and together they join the Victoria, being compressed to about one-fifth of their breadth. Not infrequently it happens that the main glacial stream does not fill the valley and it is separated from its tributary streams by a precipice, or very steep slope over which the ice and snow are avalanched. The higher glacier is termed a hanging or cliff glacier, as seen upon the eastern shoulders of Mts. Victoria and Lefroy, and the glacier formed by the re-cementing of the ice fragments is spoken of as a reconstructed or regenerated. A very interesting example of such a regenerated glacier is formed from the hanging Lefroy, the fragments of which accumulate at the foot of the eastern wall of Mt. Lefroy, upon the upper western margin of the Mitre Glacier. There is piled up there, mainly in the summer, a mass of ice fragments, along with the ground-morainic material manufactured beneath the hanging glacier, which gives rise to a regenerated glacier resting upon the Mitre and which is more or less independent of it. The course of the regenerated Lefroy is across the Mitre, where it dumps upon the opposite side a great heap of ground moraine, while it is at the same time carried bodily toward the Victoria. Such a glacier, of which this is the best example known, has been more or less appropriately called parasitic.

(b) Piedmont Glaciers. When a well-nourished glacier of the alpine type flows from a valley out upon the adjacent plain it has a tendency to spread laterally as soon as the restraint of the rocky walls is removed. In the case of such glaciers derived from a series of neighboring valleys their expanded extremities may coalesce laterally and form a glacier of the piedmont type. The separate alpine glaciers retain their independence so far as nourishment, structure, rate of movement and geological work are concerned and may better be termed commensal streams than tributaries. In their form, size and direction of movement they are more or less affected by their neighbors, gaining in protection and power by the union, so that a piedmont glacier is able to maintain itself at a lower level than could its separate commensals. Such glaciers are peculiarly broad and short and present a relatively great amount of frontage, which is more or less irregular or lobed by the noses of the component streams, some of which may be advancing while others are stationary or in retreat. The Wenkchemna Glacier is an interesting example of this type, having a length of one-half to one mile, a breadth of about three miles and a frontage of over three miles. About a dozen commensal streams may be recognized which originate in the minor depressions upon the protected northern slopes of the Ten Peaks. The Horseshoe Glacier at the head of the neighboring Paradise Valley is of this same type, containing some sixteen alpine, component streams.

A similar although less characteristic type of piedmont glacier may originate upon an elevated mountain slope, which is crossed by a series of sub-parallel depressions, separated by rather low divides. Each depression may at first support a small alpine glacier, which, under favorable conditions for growth, may increase in thickness until it more than fills its bed and unites laterally with its neighbors. If the supply of snow is sufficiently reduced, the loss by wind action, melting and evaporation may uncover again the divides and the piedmont glacier shrinks into its original alpine

components; thus attaining its second childhood. Such a glacier would have the position of a hanging or cliff glacier and might nourish another of the alpine type or give rise to a regenerated glacier. Upon the high western slope of the Asulkan Valley there existed such a glacier in recent geological time, which avalanched its ice to the alpine glacier which occupied the valley itself. The Asulkan Glacier, with its three commensal streams, is all that is left to show the piedmont character of the original, the remainder of the glacier having been resolved into its alpine components, lying between the Dome and Mt. Abbott.

(c) Local Ice-Caps. These are extensive fields of stratified ice and snow which are represented in the Rockies by the Waputik and Columbia Ice-fields and in the Selkirks by the smaller Illecillewaet field. They must originate in a system of alpine and piedmont glaciers which have been unable to drain away the ice as fast as it was supplied, and, if the expression may be permitted, the entire region is flooded with snow and ice. Accumulation continues until the lobes of ice which come into existence about the margin of the cap are able to drain away the excess, when an approximate condition of equilibrium is established. These marginal lobes may reach neighboring valleys, or the adjacent plains, and give rise to alpine and piedmont glaciers. The surface of such ice-caps is generally sloping or undulating, strongly ripple-marked by wind action and free from rock debris. Owing to the thickness of the ice and its sluggish conditions, crevasses are not common. Occasionally rocky islands protrude through the frozen sea and are known as nunataks. If the supply of snow is sufficiently reduced the surface of the cap is slowly lowered, the marginal lobes are withdrawn and there may remain only the original piedmont and alpine glaciers from which the cap was developed. The field evidence is that all the existing group of glaciers in the Rockies and Selkirks were, in recent geological time, encased in such deposits of ice and snow, with only the higher peaks and ridges protruding.

(d) Continental Ice-sheets. During the so-called Pleistocene stage of the earth's history conditions were favorable for the formation of glaciers over the entire region between the Rockies and the Pacific and from the International Boundary to Alaska. These conditions resulted from an increased precipitation over the region and a reduction in the mean annual temperature. In the way above noted local ice-caps developed wherever favorable conditions existed and later were completely buried in snow and their outlines obliterated. With the submergence of the higher ridges the filling of the intervening valleys would go on slowly and at one stage the entire western portion of the Dominion was heavily encased in ice. The movement was mainly to the north, west and south, but piedmont glaciers of great magnitude developed along the eastern margin of the Rockies and reached out for many miles over the plains. In our imagination we may apply the same characteristics to this great ice-sheet, with its complex of submerged glaciers, that were noted for the local ice-cap. Climatic conditions finally changed and this continental type of glacier was slowly resolved into its components, only relatively few of which still remain to grace the landscape. Two similar ice-sheets developed further eastward, either simultaneously or subsequently, one centering to the west of Hudson's Bay and the other in Labrador. Existing glaciers of this type are found in Greenland and the Antarctic region.

3.—Geological Work of Glaciers.

Within the sphere of their activity glaciers may become powerful geological agents, destroying or modifying former physiographic features and producing others

anew. This phase of glacial study may be best presented under three headings.

(a) Glacial Erosion. The eroding action of pure ice upon firm rock, varying in hardness from that of limestone to quartzite, is apparently slight and limited to a smoothing and polishing effect. When the glacier is shod with rock fragments, as is frequently the case, and has considerable thickness, the erosive effect may be great if the action is prolonged. Hard rocks are gouged, scratched and planed and the fragments reduced to pebbles, sand and clay. The glacier's rock tools by which this action is accomplished are bruised, battered, planed and scratched and the edges and corners are more or less rounded in a manner entirely characteristic of glaciers. When a glacier of considerable thickness moves over a jointed, stratified rock, especially if the dip of the strata is in the direction of the movement, masses of rock may be detached bodily, giving rise to what is termed plucking. By this action a glacier may leave its bed rougher than it found it, and furnish the sites for lakelets, such as the exquisite lakes Agnes and Louise. An unusually fine example of this type of glacial erosion may be seen near the head of Paradise Valley, where blocks of quartzite as large as small houses have been disrupted from the parent bed and shifted but a short distance. Standing upon the undisturbed portion of the beautifully glaciated bed and looking down the valley it is difficult to escape the conviction that many feet of strata have been similarly removed. Many valleys in the Rockies and Selkirks appear to have been deepened and given their characteristic U-shape by alpine streams during the maximum period of glaciation. Their side walls, up to a certain height, have been smoothed and mountain spurs uniformly truncated, as well shown upon the Lake Louise side of Mt. Fairview. Glaciers exert this erosive power to their heads and excavate often a semi-circular amphitheatre, or cirque, which may eat its way into the heart of a mountain and assist the atmospheric agencies in its destruction. A good example of such work is seen in the elevated Lake Agnes Valley, the glacier having nearly or quite disappeared from the region.

(b) Transportation. The loose material which a glacier finds in its path, along with that which it is able to pluck from its bed, is urged forward by sliding and rolling, or it may be incorporated into the base of the ice and transported bodily. Aside from the wind-blown dust which may be more or less evenly distributed throughout the body of the ice, the bulk of the material transported by the local ice-caps and continental ice-sheets lies in the basal layers. In the case of alpine and piedmont glaciers, however, from overtowering cliffs the active atmospheric agents may detach rock fragments which find their way to the surface of the glacier. If they reach the névé they may be incorporated into the body of the glacier, to appear later either at the surface of the dissipator or its extremity. Material carried thus either upon or within the ice suffers little abrasion compared with that at the base, but by means of crevasses and moulins it may work its way down to the lower zone. The transporting power of a glacier differs very markedly from that of a river since it is in no wise dependant upon its velocity. Rocks as large as a city block may be handled quite as easily as a grain of sand.

Owing to its relation to the steep cliffs of the Ten Peaks the Wenkchemna receives rock fragments along its entire breadth. In the case of the Victoria the upper valley is sufficiently narrow so that avalanches from Lefroy and Victoria may reach entirely across the névé, thus distributing rocky debris throughout the glacier there in process of formation. When brought below the snow-line by the forward movement there is a concentration of this material over the entire surface of these two glaciers, forming a thin veneering by which further melting is much retarded. Ordinarily the rock

fragments accumulate in a relatively narrow zone along the margin of the glacier where they are moved very slowly forward, protecting from melting the ice upon which they rest until there is produced a sharp-crested ridge upon either side of the glacier—the lateral moraines. When such a moraine towers above the nose of the glacier more than a hundred feet, as is the case with the Illecillewaet, it is difficult for the ordinary observer to believe that it is essentially an ice-ridge with scarcely a foot of rock veneering. For the last few years the left lateral of the Asulkan has been shedding its cover near the lower end and this ice-core is well exposed and is being slowly destroyed.

When a glacier has a tributary, as in the case of the Victoria, the adjacent lateral moraines of the trunk and tributary streams unite and form a medial moraine, which has much the same appearance as the laterals. Under ideal conditions there will be one such medial for each tributary stream. Owing to the more rapid movement of the ice upon which they rest there is not the opportunity for the development found in the laterals. The material which rests upon the surface of the glacier has suffered but little abrasion and is thus readily distinguished from that which has occupied a basal position. Whenever a glacier is nourished, however, by a hanging glacier, as is the Lefroy. Victoria and Yoho, there occurs a mixture of the two types of material in the lateral moraine.

(c) Deposition. While the glacier is still in possession of a region there is being deposited in certain protected places beneath the ice the clay, sand and glaciated boulders, firmly pressed together and typically unassorted. Bluish-gray in color, until it is oxidized, this constitutes the ground-moraine. Owing to the action of sub-glacial streams patches of stratified sand and gravel may occur locally, the clay being carried away by the drainage. On account of the relatively slight grinding action of the present Canadian glaciers and lack of opportunity for lodgment, no extensive deposits of this ground-moraine or till are now forming. In connection with the great continental ice-sheets, however, deposits were formed several hundreds of feet in thickness.

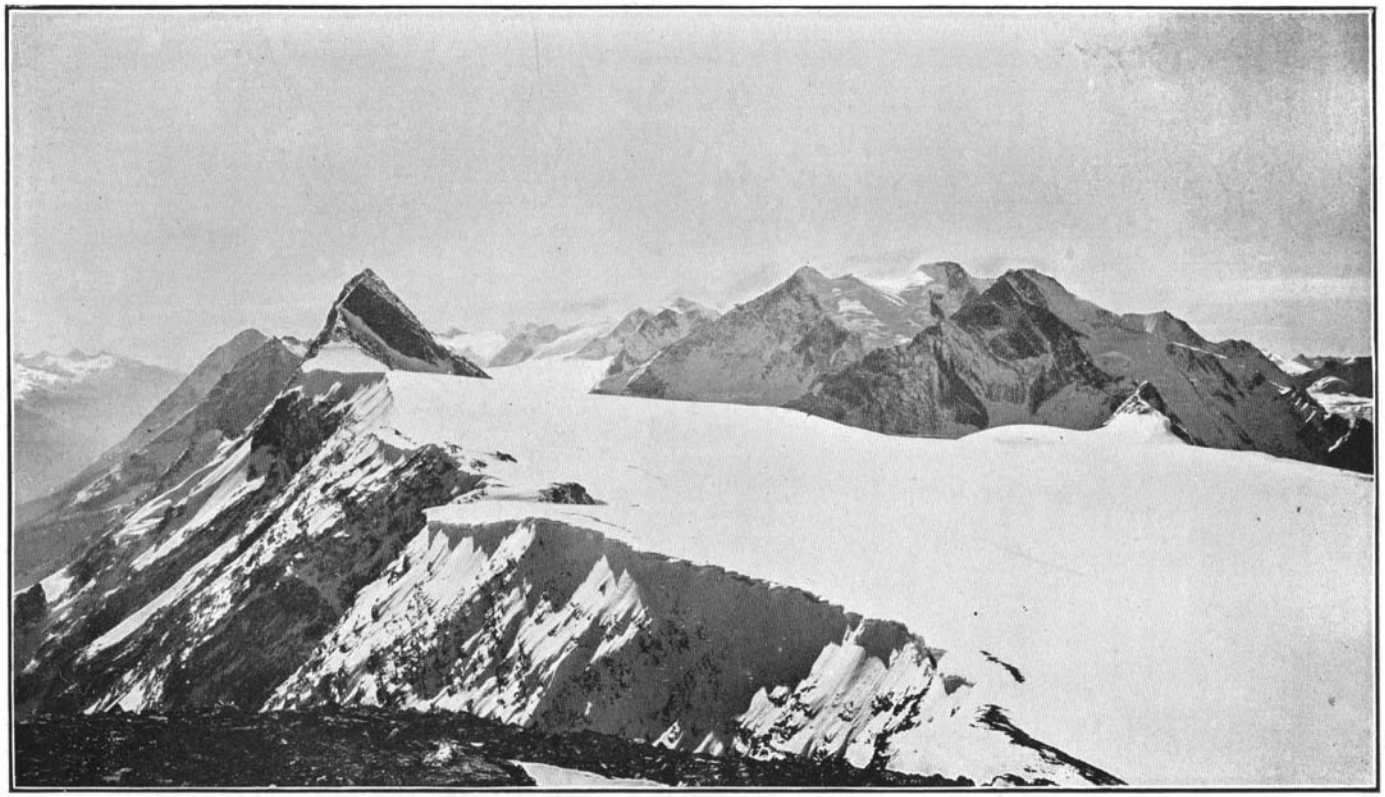
During the process of retreat all the material carried in or upon the ice must be deposited as fast as complete melting proceeds. The rock debris of the lateral and medial moraines will be set down in corresponding lines or ridges, but of surprisingly insignificant proportions when contrasted with the original moraines. Rock fragments distributed over the general surface of the glacier will be somewhat evenly distributed over the bed as it is uncovered, so long as the retreat is fairly uniform. In case the melting at the lower extremity, however, just equals the forward movement, the end of the glacier comes to a halt and its load is dumped in a ridge, forming a terminal moraine, providing we have a glacier of the alpine type, which alone can be considered to have an end. In the case of the three other types of glaciers such moraines, testifying to the stages of halt of the front, but not of the ice itself, are known as frontal moraines. A good example is seen in connection with the Wenkchemna, previously referred to.

A noteworthy type of ancient moraine is found in connection with the five most accessible glaciers along the Canadian Pacific Railway, viz., the Victoria, Horseshoe, Wenkchemna, Illecillewaet and Asulkan Glaciers. In each case its double character can be made out, either through its disposition in separate ridges, or differences in age where heaped together. The moraines consist of massive blocks of quartzite and sandstone heaped tumultuously together without the usual filling of gravel, sand and clay, differing strikingly from the moraines formed previously and subsequently. Between the great blocks, many of enormous size, spaces permit the entrance of man and other animals, so that Professor Tarr's name of “bear-den moraine" seems appropriate.

Space will not permit a detailed description here of these moraines, nor a full discussion of their probable origin. There is no reason for thinking that the ordinary filling material was originally present and removed by running water, or other agency. The blocks were not pushed along ahead of the ice, nor carried subglacially, but were carried either upon or within the ice. The ordinary process of weathering would produce as much fine as coarse material and give rise to a terminal moraine of the ordinary type. An inspection of the cliffs from which the blocks were apparently derived shows that in all the five cases the general trend is northwest to southeast and that the bulk of the material was dropped to the eastward. The only plausible explanation which the writer has been able to frame is that these glaciers became loaded with these coarse blocks as the result of a double earthquake disturbance, which probably crossed the Rockies and Selkirks in a northeast-southwest direction. The two shocks were separated by two or three centuries and the first was either the most severe, or else it found more loose material awaiting its arrival. The mountains of the region appear to have served as a gigantic seismograph to record the time, number, relative intensity and direction of the shocks. A very rough estimate based upon the rings of growth of trees, indicates that these disturbances happened from 700 to 1000 years ago, or from the l0th to the 13th centuries. Glaciers like the Geikie, whose bounding cliffs extend in a northeast-southwest direction, i.e., in the direction of wave transmission, would be able to secure but a slight load and might reasonably be expected to show no such moraines. Similarly the Yoho glacier, which is not bounded by steep cliffs capable of supplying such blocks no matter how severe the disturbance. Upon the eastern shoulder of Mt. Burgess there lies a mass of coarse blocks, very suggestive of these moraine blocks, which may have been shaken loose at the same time. The members of the Canadian Alpine Club can be of service in extending these observations to the north and south of the railway and in the collection of evidence which might verify or disprove the above hypothesis.

In describing their observations in the Sun Wapta Valley, Stutfield and Collie (Climbs and Exploration in the Canadian Rockies, 1903, page 126) note the occurrence of a similar type of moraine which may date back to the time of those above noted, or may have been due to a purely local rock-slide. In referring to the peaks Woolley and Stutfield, they say: "These two last mountains appeared to have been conducting themselves in a most erratic manner in bygone ages. A tremendous rock-fall had evidently taken place from their ugly, bare, limestone cliffs and the whole valley, nearly half a mile wide, was covered to a depth of some hundreds of feet with boulders and debris. What had happened, apparently, was this. The immense amount of rock that had fallen on the glacier below Peak Stutfield had prevented the ice from melting. Consequently the glacier, filling up the valley to a depth of at least two hundred feet, had moved bodily down; and its snout, a couple of hundred feet high, covered with blocks of stone the size of small houses, was playing havoc with the pine woods before it on either side. In our united experiences, extending over the Alps, the Caucasus, the Himalayas, and other mountain ranges, we had never seen indications of a landslide on so colossal a scale."

It is interesting to note that the Woolley-Stutfield range of cliffs has a northwest-southeast trend and that this rock debris was thrown to the eastward. It will be of much interest to ascertain whether other glaciers, lying between the headwaters of the Athabasca and the railway, which are favorably situated with reference to their cliffs, show such moraines.



A. O. Wheeler, Photo

EASTERN MARGIN OF THE ILLECILLEWAET LOCAL ICE-CAP, SELKIRKS, B.C.
Note the relatively even character of the surface of the cap and its freedom from crevasses and rock débris.

Wheeler, A.O.

Figure 27 Eastern Margin of the Illecillewaet, Local Ice-Cap,Selkerks, B.C.
Note the relatively even character of the surface of the cap and its freedom from crevasses and rock debris

GENERAL VIEW OF VICTORIA GLACIER AND ITS TRIBUTARIES

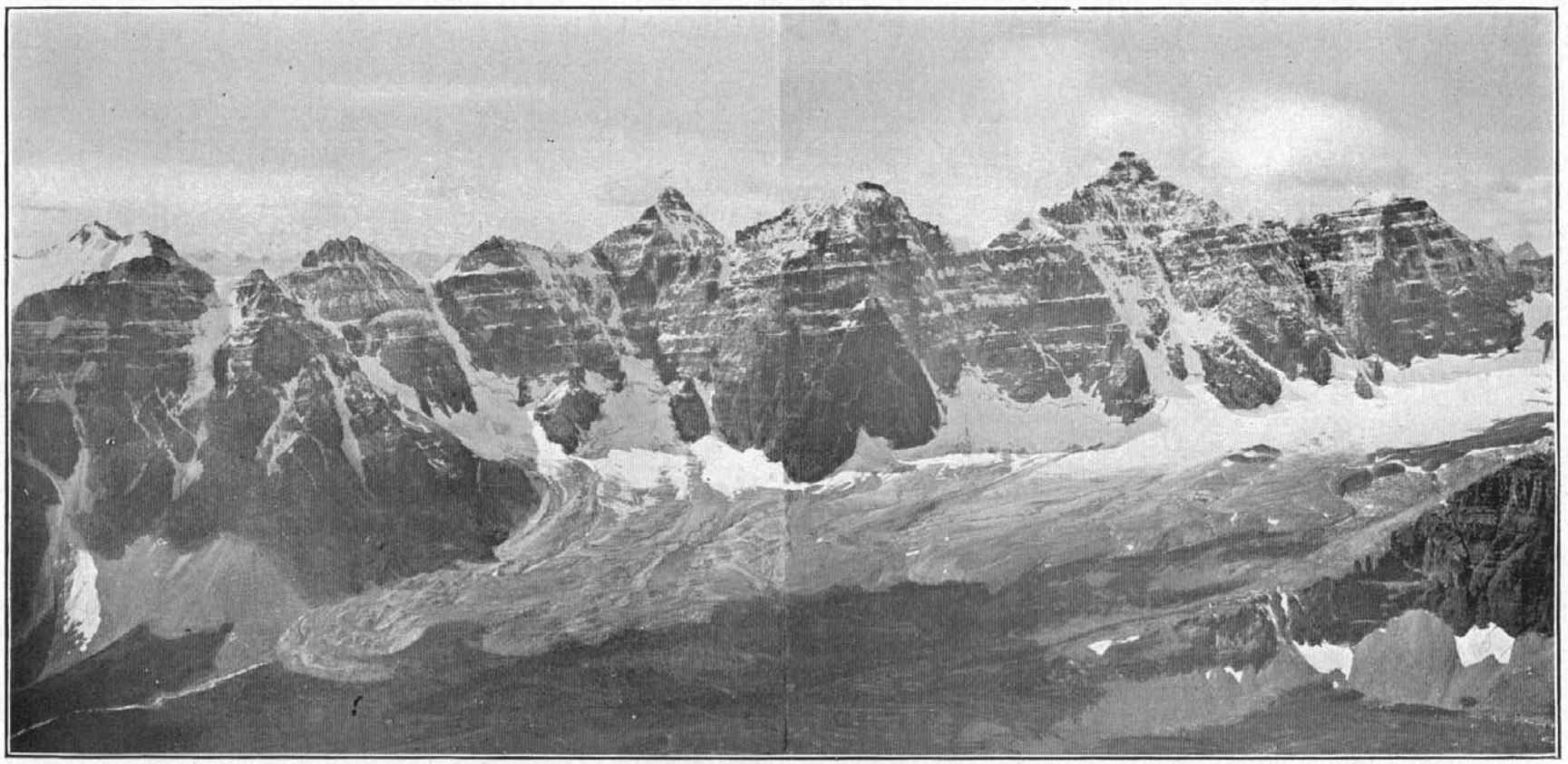
Detroit Photographic Co.

Figure 28 General View of Victoria Glacier and its Tributaries

THE ASULKAN GLACIER FROM MT. AVALANCHE

The entire series represents a hanging Piedmont glacier in a state of decadence, the four right-hand components having separated into small Alpine glaciers. The three left-hand components are still united, forming the Asulkan Glacier, but have started to separate.

Figure 29 The Asulkan Glacier from Mt. Avalanche



A. O. Wheeler Photo

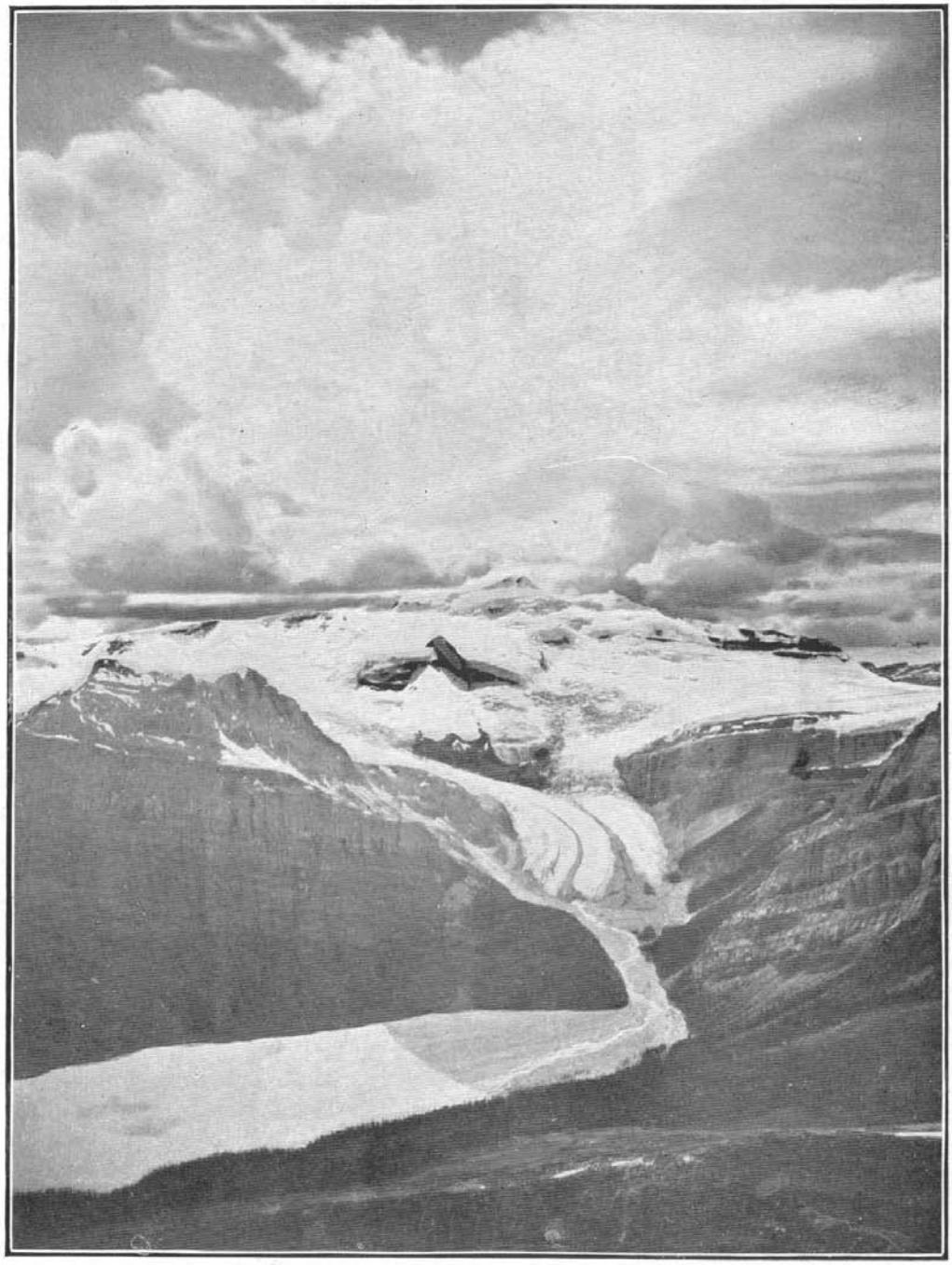
GENERAL VIEW OF THE WENKCHEMNA GLACIER

A PIEDMONT TYPE

Note the peculiar form of the glacier, the very general débris covering and the scanty snow supply of the component streams.

Wheeler, A.O.

Figure 30 General View of the Wenkchemna Glacier



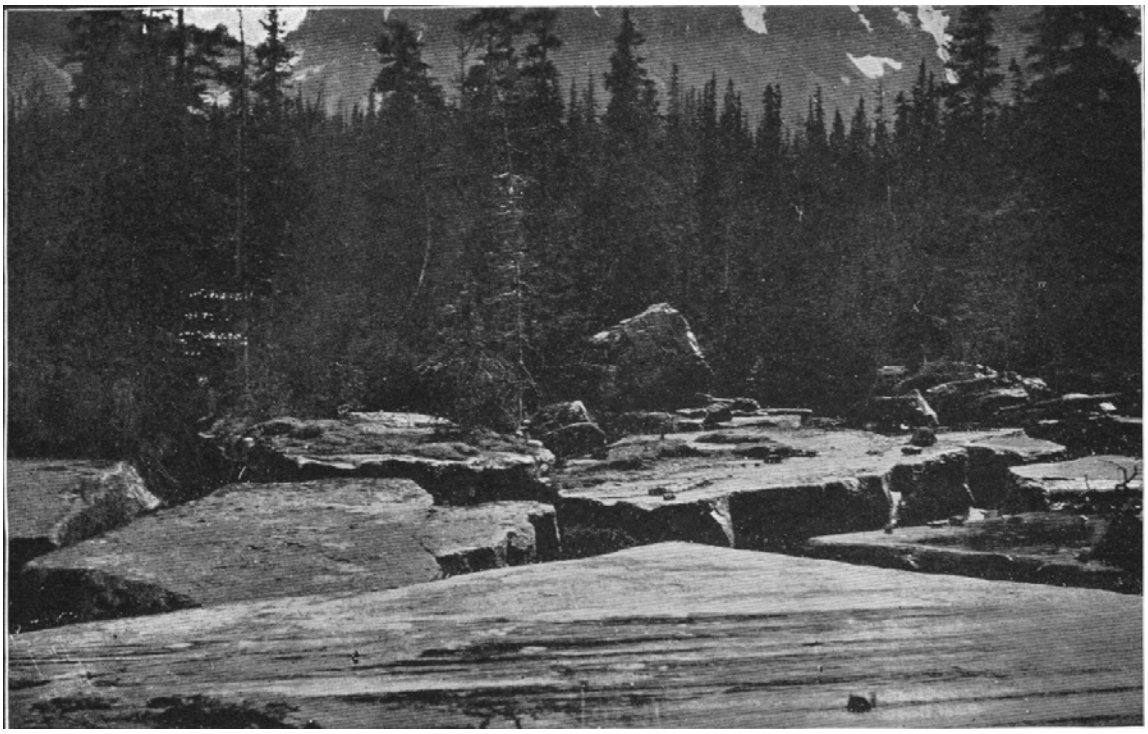
A. O. Wheeler, Photo

MT. BALFOUR AND BALFOUR GLACIER FROM BOW PEAK

The view is of unusual geological interest, showing the relation of the névé-field to the short, Alpine glacier, the work of the drainage stream in covering the valley floor with gravel, and the formation of an extensive delta at the head of the lake. The left lateral and two medial moraines are well shown, as well as the transverse and marginal crevasses.

Wheeler, A.O.

Figure 31 Mt. Balfour and Balfour Glacier From Bow Peak

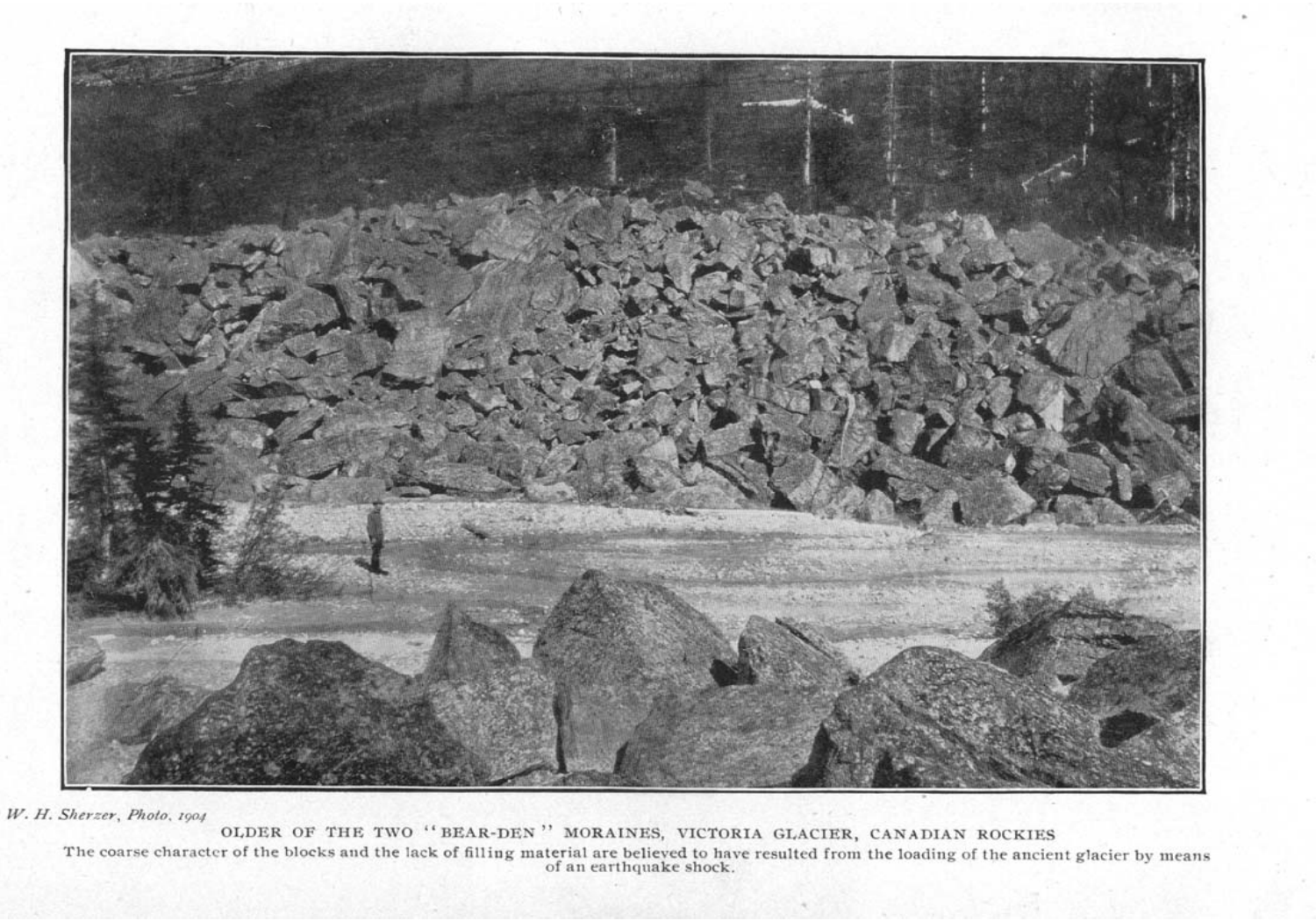


Sherzer, W.H.

Figure 32 Erosive Action of Glacier shown upon Quartzite near head of Paradise Valley

Wheeler, A.O.

Figure 33 The Deville Glacier, Selkirks, B.C. From summit of Mt. Fox



W. H. Sherzer, Photo, 1904

OLDER OF THE TWO "BEAR-DEN" MORAINES, VICTORIA GLACIER, CANADIAN ROCKIES

The coarse character of the blocks and the lack of filling material are believed to have resulted from the loading of the ancient glacier by means of an earthquake shock.

Sherzer, W.H.

Figure 34 Older of the Two "Bear-Den" Moraines, Victoria Glacier, Canadian Rockies

BOTANICAL NOTES.

THE ORCHIDACEAE OF THE ROCKY AND SELKIRK MOUNTAINS.

Henshaw, Julia W

Orchid-hunting has an irresistible attraction for every lover of Nature. Whether the secret of this fascination lies in the difficulties which beset the search for the rarer species, or whether it is the strange forms, sweet perfumes and tropical appearances of many of the flowers belonging to this eccentric family that inspire so vivid a delight in the breast of man it is hard to determine, but assuredly the traveller does experience a keen thrill of ecstacy on finding one of these uncanny plants closely hidden in some shady swamp, or deep-set amid the tall rank herbage of the hills.

So far I have found twenty-three different species of orchidaceae in the Rocky and Selkirk Mountains. They are as follows:

Calypso borealis	Calypso.
Corallorhiza innata	Early Coral-root.
Corallorhiza multiflora	Large Coral-root.
Corallorhiza striata	Alpine Coral-root.
Listera cordata	Heart-leaved Tway Blade.
Listera confallarioides	Broad-lipped Tway Blade.
Listera borealis	Northern Tway Blade.
Spiranthes Romansoffiana	Ladies' Tresses.
Goodyera Menziesii	Rattlesnake Plantain.
Goodyera repens	Small Rattlesnake Plantain.
Habenaria bracteata	Long-bracted Orchis.
Habenaria obtusafa	Small Orchis.
Habenaria hyperborea	Leafy Orchis.
Habenaria orbiculata.	Round-leaved Orchis.
Habenaria stricta	Green Orchis.
Habenaria dilatata.	White Bog Orchis.
Habenaria leucostachys.	Giant Orchis.
Orchis rotundifolia.	Fly-spotted Orchis.
Cypripedium passerinum	White Lady's Slipper.
Cypripedium montanum	Mountain Lady's Slipper.
Cypripedium acaule.	Pink Lady’s Slipper
Cypripedium pubescens.	Large Yellow Lady's Slipper
Cypripedium parviflorum	Small Yellow Lady's Slipper

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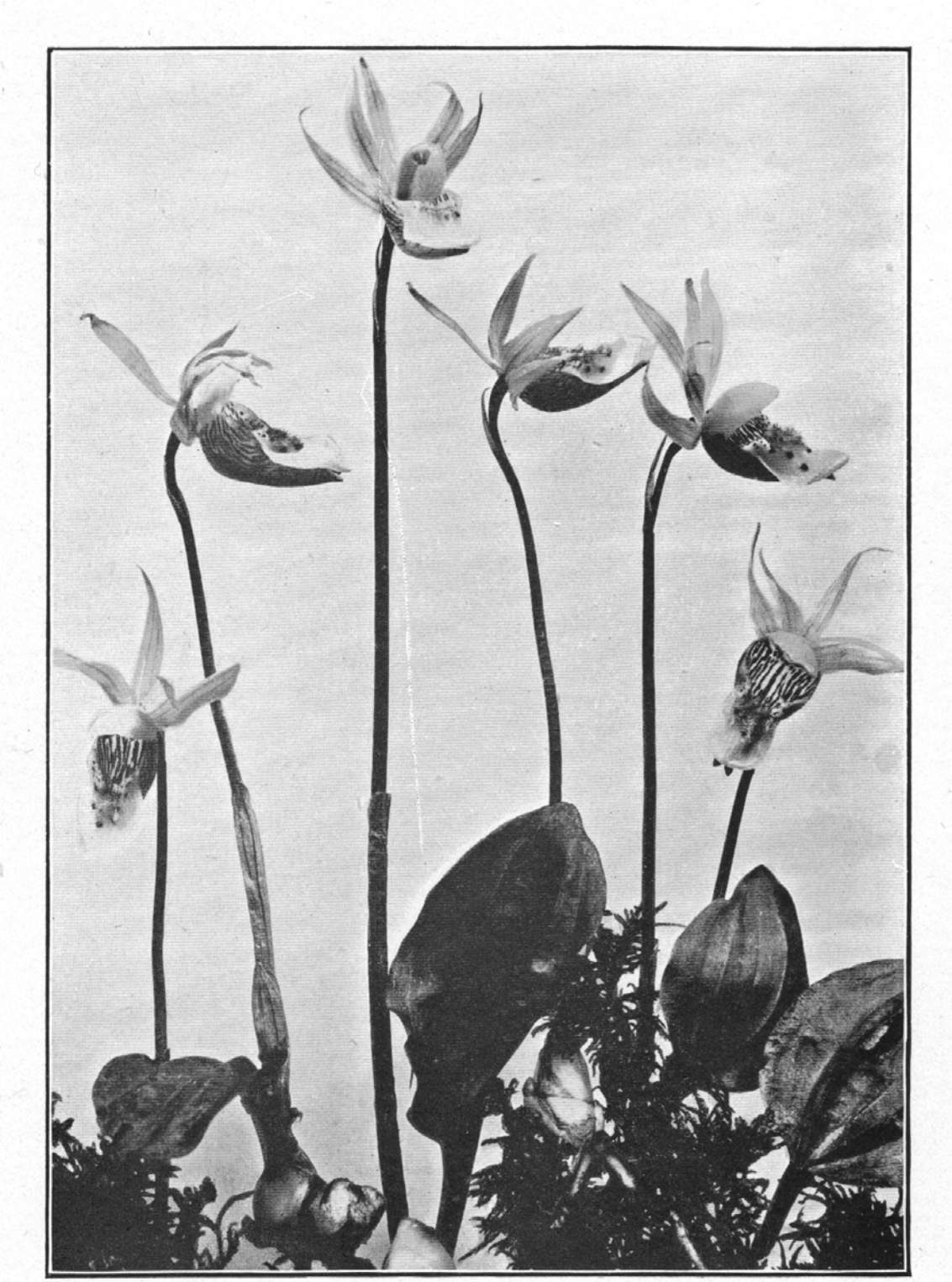
Some of the orchids are quite common in the Rocky Mountains, such, for instance, as the lovely Calypso (Calypso borealis) whose large rose-pink sacs, striped with a deeper hue and variegated by yellow spots, form clumps of exquisite color in the deep green forests.

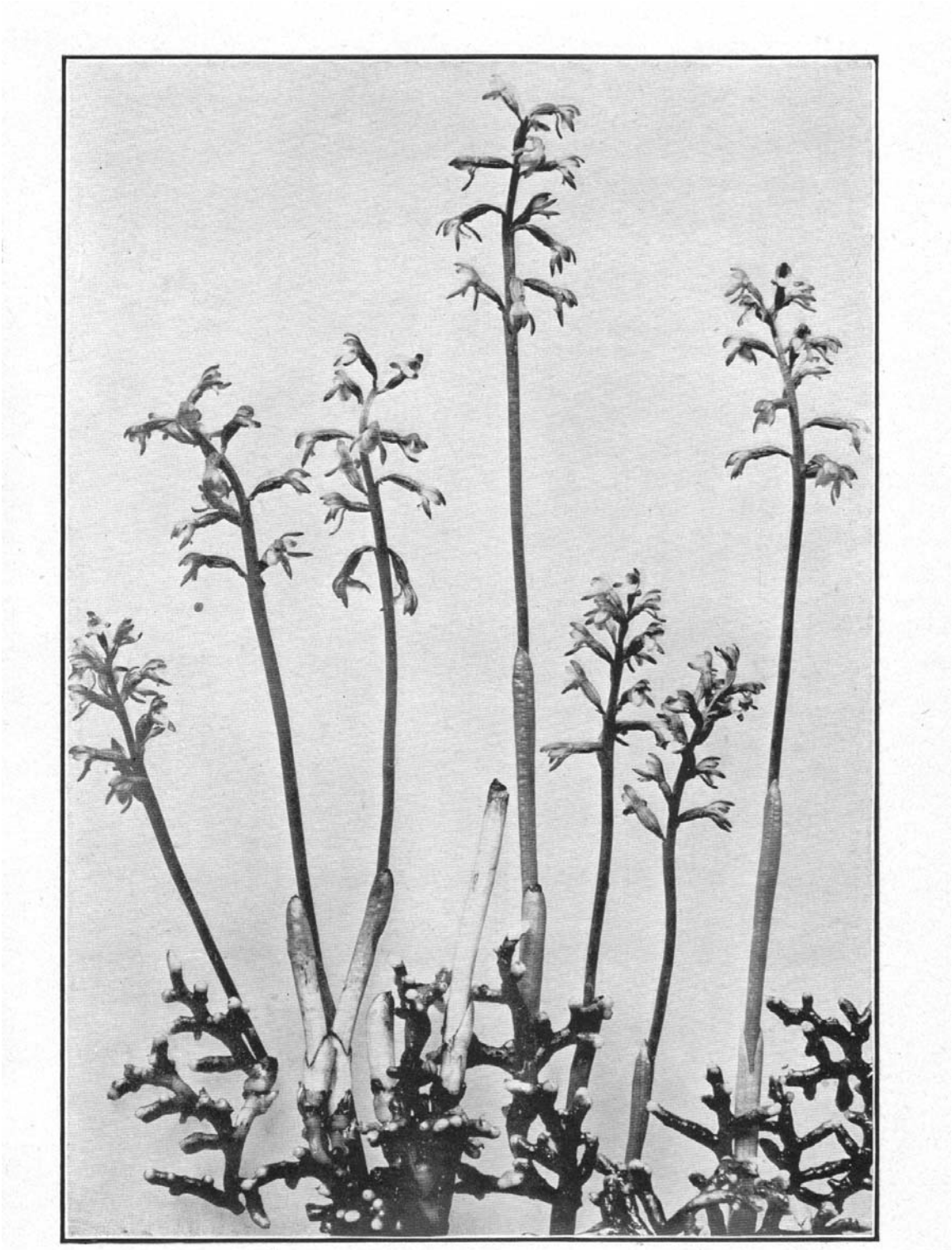


J. W. Henshaw. Photo

CALYPSO
(CALYPSO BOREALIS)

Henshaw, J.W.

Figure 35 Calypso (Calypso Borealis)



J. W Henshaw, Photo

EARLY CORAL-ROOT
CORALLORHIZA INNATA)

Henshaw, J.W.

Figure 36 Early Coral Root (Corallorhiza Innata)

A very interesting and leafless plant is the Early Coral-root (Corallorhiza innata)

found in quantities in the vicinity of Banff, where numbers of its queer, purplish-green flowers spring on succulent stems from the coralloid roots. Other species found in the Selkirk Mountains are: Large Coral-root (Corallorhiza multiflora) and Alpine Coral-root (Corallorhisa stricta) the latter being a very rare plant.

The healthy green Tway Blades (Listera cordata, Listera convallarioidcs, and Listera borealis together with the Rattlesnake Plantains (Goodyera menziesii and Goodyera repens) the two latter having peculiar white-veined leaves, are all found in the mountain regions, but are comparatively unattractive plants.

Ladies' Tresses (Spiranthes Romanzofiana) is a lovely member of the Orchid family found blooming towards the close of the summer in marshy localities, where its dense snowy flower-spikes exhale a fragrant perfume. The Habenarias are very numerous in the mountains. Some of them, such as the White Bog Orchis (Habenaria dilatata) and Giant Orchis (Habenaria leucostachys) have exquisite large spikes of white sweet-scented flowers and are a perfect prize to the Nature-lover; while others, such as the Long-bracted Orchis (Habenaria bracteata), Small Orchis (Habenaria obtusata), Leafy Orchis (Habenaria hyperborca), Round-leaved Orchis (Habenaria orbiculata) and Green Orchis (Habenaria stricta) are small plants and have greenish, yellowish or purplish blossoms that are almost scentless. These lesser orchids grow in the woods and beside the trails, and are easily recognized, as each species possesses its own marked individual peculiarities.

On wet, sandy flats and by the margin of the alpine streams grow the pale pink clusters of the Fly-spotted Orchis (Orchis rotundifolia), its dainty blossoms splashed with rose color and a single rounded green leaf growing at the base of the plant.

And so we come at last to the most exquisite of all the wild mountain orchids—the Lady's Slipper. To find these wonderful treasures growing in swamp or dell, their curious inflated sacs expanding with tropical luxuriance amid northern alpine surroundings, is a thrilling experience unequalled in the history of flower-hunting; and so completely does the sight of their mysterious beauty enthral the beholder that it is with rapture akin to awe he stoops to gather one of the " Golden slippers meet for fairies' feet" of the Large Yellow Lady's Slipper (Cypripedium pubescens) or the Small Yellow Lady's Slipper (Cypripedium parviflorum). The great moraine at Emerald Lake, gilt with these conspicuous orchids, is a marvellous sight in July, for, curiously enough, the Large Yellow Lady's Slipper grows both on exposed arid flats and in the deepest seclusion of the woods, while the fragrant Small Lady's Slipper has its haunts close beside the streams.

The two white Lady's Slippers (Cypripedium passerinum and Cypripedium montanum) are less gorgeous than the yellow species, but are more rare and charmingly dainty in appearance. Their shell-like velvety sacs, spotted inside with carmine, are very lovely.

But the Pink Lady's Slipper (Cypripedium acaule), the most rare and the most bewitching of all the orchids —how shall I describe its exotic beauty! A flower carven in coral of rose, it springs like a living flame from the soft green of its setting, exhaling a perfume sweet as the breath of Araby. Lance-shaped purplish sepals spread out on either side to protect the single drooping blossom, and two large leaves spring up from the base to sentinel its majesty, while the great glowing sac is folded together to defy the attacks of depredating bees. The Pink Lady's Slipper is so extremely rare in the Rocky Mountains that I regard my discovery of it in the year 1903 as the crowning triumph of my botanical work in that region.

FLORA OF THE SASKATCHEWAN AND ATHABASCA RIVER TRIBUTARIES.

Schäffer, Mary T. S..

Another sketch appears in this magazine referring directly to the localities of whose florae I have been asked to write, so there is no need to duplicate a description of the ground covered.

As our stay was to be a long one, it was with dubious feelings that we asked permission to include among the necessities a plant-press and a limited supply of paper. Having collected plants from Banff to Glacier during a number of years, there were days on the earlier part of the journey when we would have been glad to get rid of the cumbersome, troublesome thing, and leave it hanging on some tree till we should return in the fall. But there came a day when a trained botanist went over the result of our perseverance, and we felt repaid for the annoyance and labor involved in gathering the unfamiliar blossoms by the wayside.

Mr. Stewardson Brown, of Philadelphia, has had them all thoroughly studied, and I herewith give a few notes, the result of his work upon them.

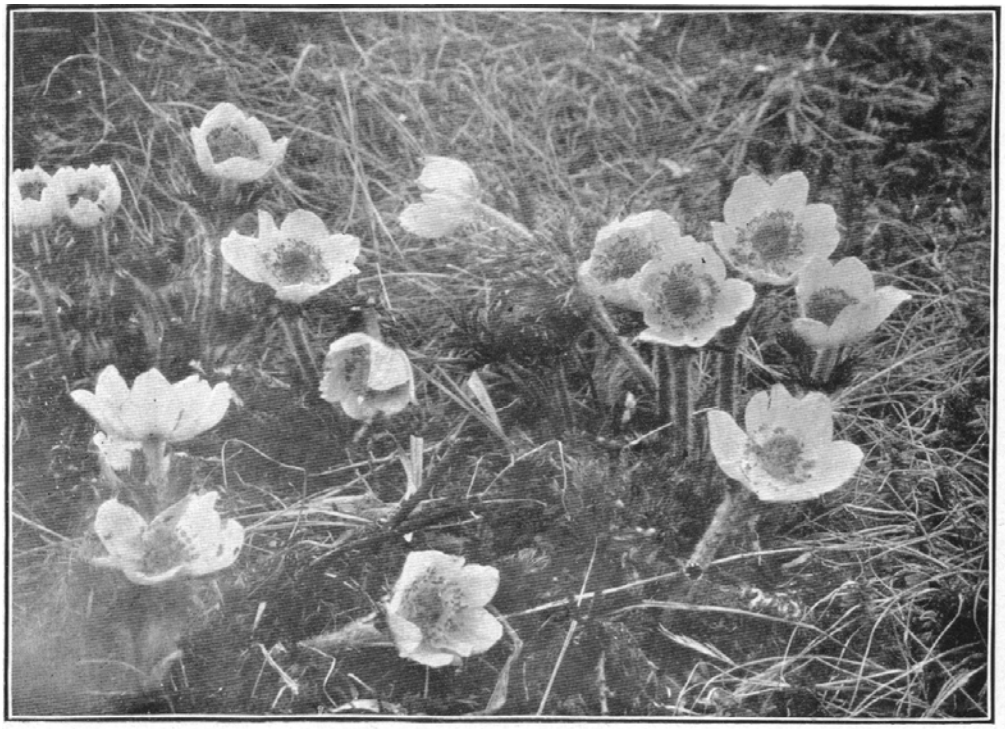
As far as the Wilcox Pass we found nothing particularly striking, until reaching a point at about 6000 feet we found the Pinus flexilus, its blue-green foliage betraying it quickly among the browner-green of the other trees. The cones, at that time a deep purple, vary from three to five inches in length. From there on we met many strangers (to us) of the plant world. The Picea Canadensis, not seen further south, was first noticed on the north shores of the Saskatchewan.

The Erigeron acris we found in August a few hundred feet below the Pinus flexilus, and, in the beginning of July, at 8500 feet, the Ranunculus pygmaeus, the tiniest butter-cup imaginable, struggling bravely to bloom in the icy winds of Wilcox Pass, and covering the ground like a golden moss wherever the winter snows had receded. Here, also, in full bloom, but or more exposed and barren sections of the pass, was the Aragallus inflatus. This was an especially interesting find as I had never seen anything more than the huge, inflated seed-pods before. The flower is a deep sky-blue, and, growing only upon higher elevations, not often seen. We gathered the beautiful crimsoning seed-vessels at the same place, the latter part of August.

From the north fork of the Saskatchewan to the headwaters of the Athabasca the Primula mistassinica and the Primula borealis grew by the river banks, frequently in beds together; they were as often found apart.

In the Sunwapta flats was growing the Pilosella Richardsonii, as also the Ardbis lyrata occidentals. The former plant, varying in general characteristics, but withal the same, made our entire journey to Fortress Lake bright, its clusters of white blossoms garnishing the sandy river-bars.

On the Wilcox Pass grew the Viola cognata, and in the Fortress Lake region, at about 7000 feet, the Viola Langsdorfii. This violet is an especially beautiful, rich, luscious-looking flower, with strong, rank foliage

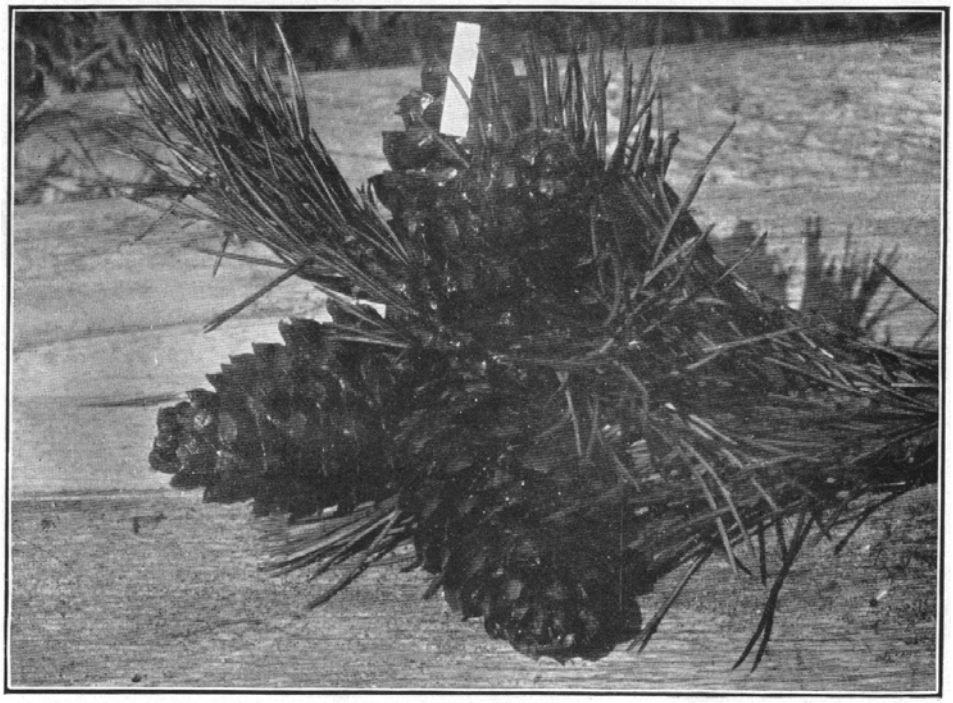


Mary T. S. Schaffer, Photo

PULSATILLA OCCIDENTALIS

Schaffer, Mary T.S.

Figure 37 Pulsatilla Occidentalis



Mary T. S. Schaffer, Photo

PINUS FLEXILUS

Schaffer, Mary T.S.

Figure 38 Pinus Flexilus.

Down in the swamps of the Su Wapta we found the Utricularia vulgaris, and though known generally throughout Canada, I have never come across it in the mountains further south. At the same time of year, and in the same section, but at 7000 feet, we found the purple-crimson blooms of the Telesonix heucheriformis. Wedged deep in the cracks of the rocks, it was impossible to get any of the specimens entire. One and two hundred feet above this point we found the strawberry (Fragaris bracteata): great luscious berries three-quarters to one inch long. Sweeter than many a cultivated variety, they were welcome company at a height where there was no water.

On September 9th, we climbed a bare, rocky point to look for Brazeau Lake. There was little of the floral life left, though fungi of many varieties were very numerous, even to tree-line, and we were surprised to come across the little Erigeron lanatus at 9000 feet. The plant was a new one to me, though Professor Macoun mentions finding it at high points further south. The rays are a deep rose-violet, and the rest of the plant covered with long white hairs. As it lay blooming in the scree close to the summit of the mountain, it had the appearance of a purple flower nestling in a bed of cotton.

By the latter part of August all the river banks were a continuous strawberry bed, a welcome addition to our limited larder, but we never saw a bush of the blueberry (Vaccinium ovaliform) which grows so profusely in the Selkirks. Occasionally we came across the Vaccinium erythrococcum, whose tiny red berries made very tiresome picking, but were very good and toothsome when once gathered.

We found very many plants familiar to us as growing near the railroad, but with limited space I have only jotted down the strangers. It will be seen by this list that they are largely the plants best known as having their habitation in the more northern mountains of the Pacific slope.

We had stolen a march into the meeting grounds of two distinct floral sections, an interesting ground for a botanist who has time in the future to go so far from the beaten way.

MOTION OF THE YOHO GLACIER.

Wheeler, A. O..

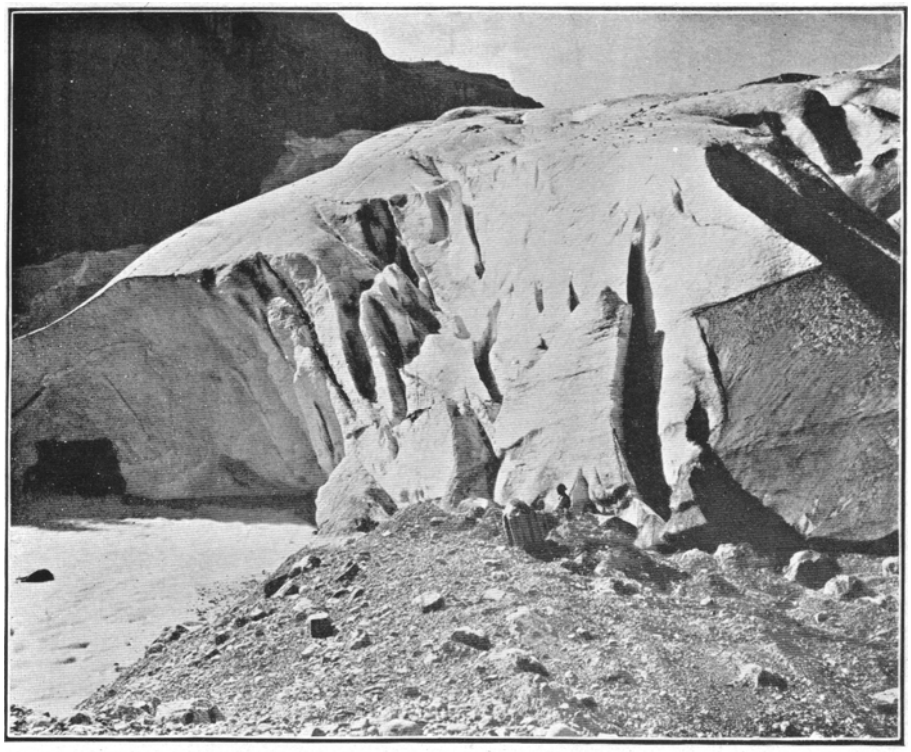
At the close of the Paradise Valley camp, on July 15th, 1907, the President with two assistants and a packer made a flying trip up the Yoho Valley, via Emerald Lake, to visit the Yoho Glacier and inspect the row of metal plates set out the year previous. It was intended to ascertain by trigonometric methods the extent of the movement of the ice-tongue down its bed.

The party camped for the night a short distance south of Lake Duchesney, and, early the next morning, July 16th, pushed on to a camp ground within a mile of the ice-tongue.

The glacier was at once visited, and, cutting steps in the ice forefoot, the party reached the comparatively level portion of the tongue where the plates had been set. The row of metal plates placed across the surface of the ice to mark the movement of the forefoot had been fixed in position on the 15th July, 1906, and their respective positions were now being checked, just one day later than the exact year. The method adopted in placing these plates will be found in the report given on pages 149-158, Vol. I., No. 1, of this Journal.

Of the six plates first set out, all were found, though No. 3 had fallen into a shallow crevasse. It was lifted from this and placed on the surface above at a point 10.5 feet farther to the south. As it is likely it received additional impetus from the fall one way or the other, its movement in relation to the original line of plates cannot be absolutely depended upon.

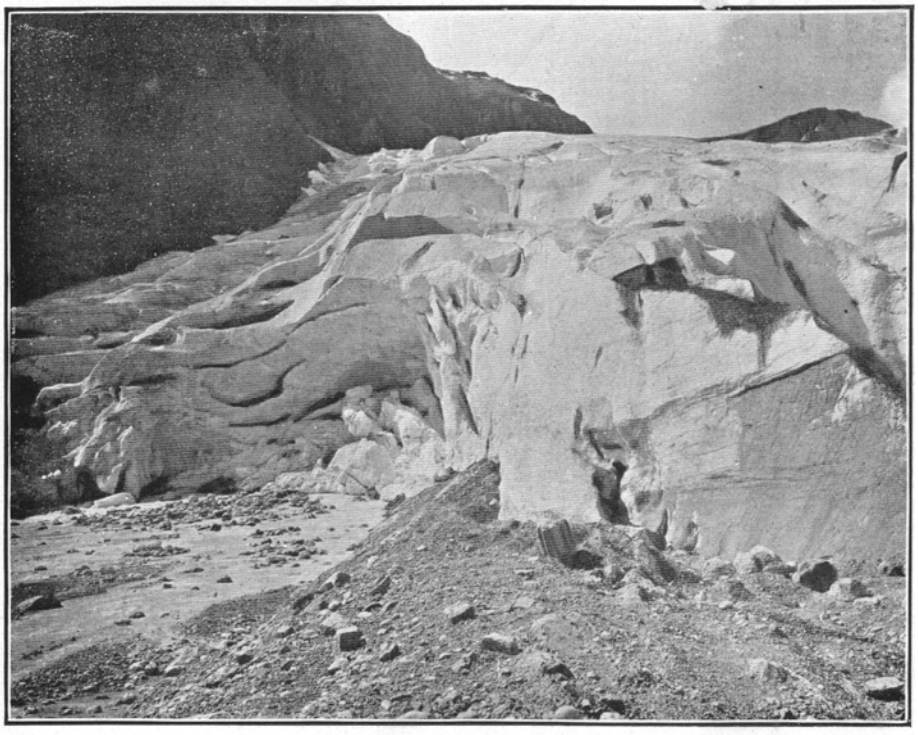
In 1906, three sets of observations were inaugurated: (1) to obtain rate of surface flow; (2) to ascertain retreat or advance; (3) to observe the annual change in the ice formation at the snout.



A. O. Wheeler, Photo
ILLUSTRATION No. 2.—FROM VIEW-POINT 79.3 FEET SOUTH OF ROCK No. 1—1906

Wheeler, A.O.

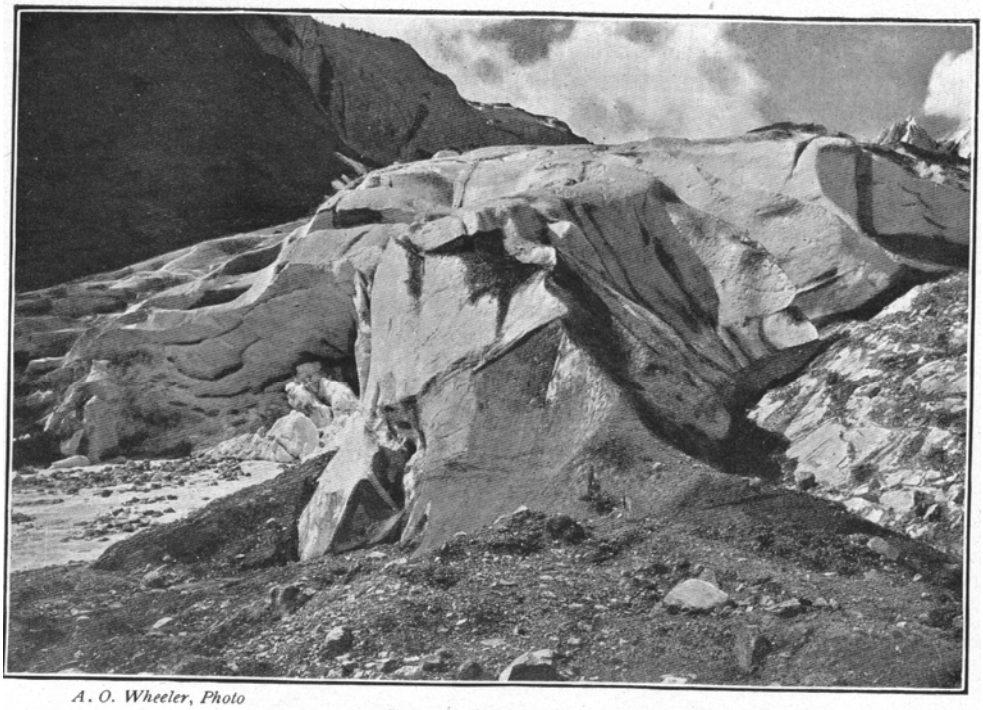
Figure 39 No.2 - From view-point 79.3 feet south of Rock No.1 – 1906



A. O. Wheeler, Photo
ILLUSTRATION No. 3.—FROM VIEW-POINT 79.3 FEET SOUTH OF ROCK No. 1—1907

Wheeler, A.O.

Figure 40 No.3 - From view-point 79.3 feet south of Rock no.1 – 1907



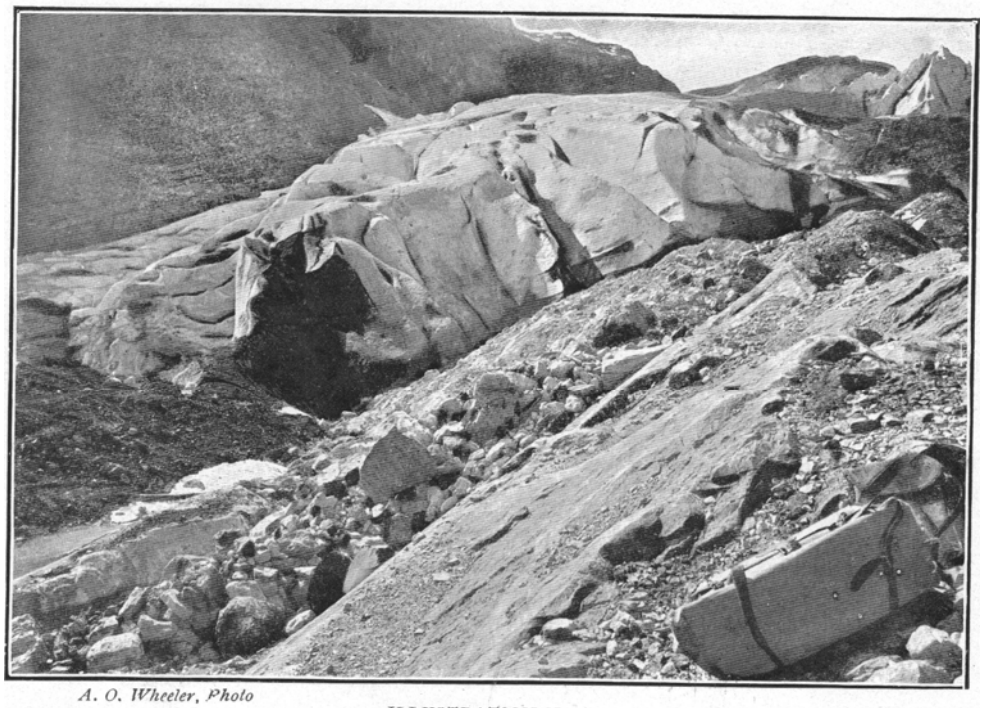
A. O. Wheeler, Photo

ILLUSTRATION No. 4

From Rock No. 2. Compare with plate opposite Page 158, Vol. 1, No. 1, Canadian Alpine Journal

Wheeler, A.O.

Figure 41 No.4 From Rock No.2



A. O. Wheeler, Photo

ILLUSTRATION No. 5

From View-Point 6½ feet nearer ice than the Vaux marks of 1902. Compare with Plate 2, opposite Page 158, Vol. 1, No. 1, Canadian Alpine Journal.

Wheeler, A.O.

Figure 42 No.5 From view-point 6 /12 feet nearer ice than the Vaux Mark of 1902

To Obtain Rate of Surface Flow.

Both ends of the base established in 1906 were now occupied with the transit, and readings taken upon the plates in the positions in which they had been found. Work was completed at the south end, but, while that at the north was still in progress, rain came on, stopping the work and driving the party back to camp.

Next morning, July I7th, work was resumed and the readings completed at the north end of the base. The plates were then set in line afresh and their positions fixed by angular readings from the south end. On the accompanying map the original line of plates is shown and the points at which they were found twelve months later. The table below shows the respective movements as measured from a plot of the several readings taken at the ends of the base.

Table Showing the Motion of Plates Set on the Yoho Glacier, between 15th July, 1906, and 17th July, 1907.

Plate	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Yearly Motion	29ft.	74ft.	89ft.	124 ft.	134 ft.	124 ft.
Daily Motion	0.95 in.	2. 43 in.	2.93 in.	4.08 in.	4.41 in.	4.08 in.

A glance at the map shows that the greatest movement has taken place in the locality of Plates IV., V. and VI. The reason is that the main body of ice is swung to the right against the cliffs seen in illustration No. 1.

This panorama shows the striation of these cliffs by the ice in past years, when the glacier filled up the trough as high as the upper line of dense forest. The grooving and fluting of the rock over which the ice grinds is well .shown by the uncovered portion where the fragments fallen from the séracs above are lying. On the extreme right may be seen the nunatak, which splits the icefall into two parts (Refer to map opp. page 152, Vol. I., No. 1, Can. Alpine Journal). The appearance of the lateral moraine that has been left standing around this nunatak and its position with regard to the timber growing thereon, suggest strongly an advance of the glacier subsequent to the growth of the timber on the nunatak.

For Advance or Retreat.

To obtain some idea of the movement of the ice forefoot with reference to its position in the valley, measurements were made from Rocks Nos. 1 and 2, marked in July, 1906; and, also, from the "Sherzer " rock marked in August, 1904. The measurements were to the nearest ice and the results are not very satisfactory, owing to a considerable change in the structure of the forefoot during the twelve months elapsed since July, 1906.

Table Showing Measurements to Nearest Ice.

Point Measured Prom	1904	1906	1907
Rock No. 1, left side		27.5 feet	35.8 feet
Bock No. 2, left side		33.6 "	43.8 "
Sherzer Bock, right side	79.4 feet	79.6 "	123.0 "

The above measurements would point to a slight retreat. The greatest shrinkage appears to have taken place on the right side, indicating the withdrawal of the ice to a distance of 43 feet further from the Sherzer Rock, although for the two years previous it appears to have been stationery at that point.

Annual Changes in Formation of Ice Forefoot.

A marked change had taken place. Comparison of photographs from view-point, 79.3 feet south of Rock No. 1 (illustrations Nos. 2 and 3) taken respectively on the 15th of July, 1906, and the 17th July, 1907, shows the change; and, very distinctly, the shrinkage of the forefoot.

It will be noticed that the two great cracks on the right of the 1906 picture are lacking in that of 1907; the further uncovering of the ground-floor may be seen in the centre of the 1907 picture; and the shattered and crevassed condition on the left where solid ice shows in the 1906 picture.

Comparison of the 1907 photographs, illustrations Nos. 4 and 5, with those taken in 1906 (opposite page 158, Vol. I., No. 1, Canadian Alpine Journal) from Rock No. 2 and from the view-point 6 1/2 feet nearer the ice that the Vaux marks of 1902 disclose the change to a greater degree. In the first picture the disappearance of the two great cracks, the uncovering of the floor, and the shattering of the ice on the left-hand side is still more marked. It will also be noticed that in 1906 the stream was higher than at the same time in 1907.

In the second picture the pointed nose of ice seen lifted above the ground moraine in the 1906 picture is lying broken off and nearly melted away.

Survey of Ice-Tongue.

Having completed the above observations, several camera stations were occupied at suitable points to enable, by means of the application of photogrammetry, a map of the tongue of the ice forefoot to be made. The map herewith, which is from the views taken at the several stations, shows the positions of these stations and of the rocks from which measurements were made to the ice; also, of the other view-points and the various features of the glacier in its bed. I now wish to acknowledge the assistance given me by Mr. M. P. Bridgland, who has plotted and computed the altitudes of all the points used in outlining the glacier and in drawing the contours here shown.

It may incidentally be mentioned that it is only by the means of the science of photogrammetry that in a single day—not taking into consideration the other work done when locating plates and making measurements, etc.—sufficient data could be obtained by two persons to map the tongue so completely and accurately, without making actual measurements, a process that would entail a considerable expenditure of time and labor. The process, combined with the views taken, enables, in this case, a large amount of additional information to be gathered, such as: thickness of the ice, previous thickness of the ice, slope of ground-floor, etc. It shows how valuable the method is for a survey of this nature.

From it we may gather that the approximate thickness of the ice on the right side is 170 ft., and on the left side 130 ft.; that the height of the cliffs from the ice to the lower edge of the upper growth of timber in illustration No. 1 varies from 300 to 400 ft., a depth of ice that once filled the valley; and that the slope of the portion of the bed

beneath the ice tongue is approximately 35 per cent.

The general conclusion that may be drawn from the above is that the glacier receded during the year, July 1906 to July 1907, an average distance of about 20 feet and that the shrinkage of the ice in thickness on the right side has been very considerable. These evident facts appear somewhat peculiar in view of the unusually large amount of snow that fell in that locality during the winter of 1906-07.

MISCELLANEOUS SECTION.

PARADISE VALLEY CAMP.

Walker, Francis C..

"Mr. Robinson! Is Mr. Robinson in this tent?" A very sleepy voice said something which might have been taken for a "yes." "Time for breakfast if you mean to make Mount Temple to-day. Party starts at 5.30 sharp." The sleepy voice gave a reply a trifle less like a grunt this time, and brisk steps were heard moving away from the tent. It was my first day in camp in the Paradise Valley, and I was just enough awake to rejoice that I was not in Robinson's shoes, while being still too much asleep to know whether it was my feet or Robinson's that were being pulled out of the pile about the tent-pole. I opened one eye and saw to my relief that a quite unfamiliar sock was being thrust into a stout hob-nailed boot. Evidently I had been left intact beneath the blankets, and could afford to take a spectator's view of any further preparations. I opened the other eye to see how he would manage the puttees, which he was now fishing out in suspicious newness from the dunnage bag. For the life of me I could not see that he knew any more about the things than I did. Possibly he knew less, for the right leg cost him three tries and the left leg two, while I flattered myself I could turn off the pair in an average of two attempts. Besides, the effect produced seemed all out of proportion to the cost of production in language, for the swathing was accompanied by a soliloquy whose depth of meaning made up for its lowness of tone. I intimated these views to Robinson, who took advantage of my waking to borrow a pair of warm gloves and to fish unsuccessfully for the loan of an ice-axe, an article evidently possessed by neither of us. There would be frosty weather on Temple—possibly flurries of snow; altogether Robinson at 5.30 a.m. seemed to look less cheerfully on the climb than he had done at 10.30 the night before. Finally he picked his way over the snoring mummies between him and the entrance, fumbled awhile at the fastenings, and crawled out, leaving a loose flap, past which the raw mountain air came sifting in.

Once Robinson's footsteps had died away I rolled my blankets tighter and tried to sleep. For a time I succeeded, but the open flap of the tent was in the end too much, and before a fair holiday rising hour I felt moved to get up and investigate the camp. My dim recollection of last night's arrival reminded me that I was a lodger in tent No. 5, Men's Quarters, south side of Paradise Creek. After wrestling with the puttees and crawling into the open, I found that tent No. 5 was almost the last from the bridge but at no great distance from the creek; and I soon washed and started out to find the main camp. All along as I made my way cheerfully over the stumps, guy-ropes and rocks that had treated me so scurvily the night before, I found other denizens of the men's quarters creeping out with soap and towel, or furbishing up their ice-axes and boots for the day's work. Crossing the substantial log bridge I reached the stopping place of the pack-train, where a number of the horses, just arrived from Laggan, were waiting to be unpacked. Before me now was the main encampment on the lowest slope of Aberdeen in a clearing hewn from the thick woods. Whatever it was hewn from I suspected it of holding a breakfast for me, and on I pushed through the tents. In another minute the breakfast was in view. Half way up what seemed to be the main street of the camp, and in the middle of the street, was a huge strip of canvas flung over a stout horizontal beam and guyed down at either side; beneath were six tables made on a simple rustic frame with oilcloth

"PLEASE SIR, MAY I GO WITH BILLY"?

Walker, F.C.

Figure 43 Please Sir, May I go with Billy?

MR. ROBINSON! IS MR. ROBINSON IN THIS TENT?

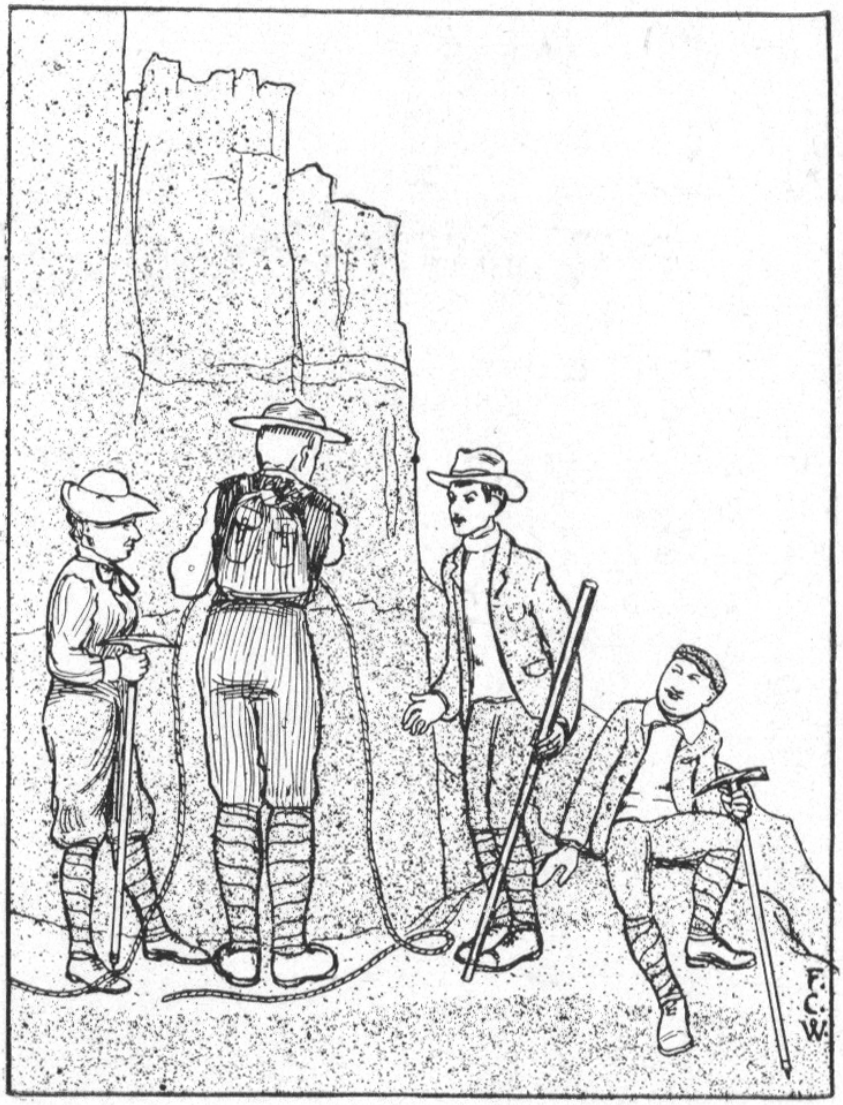
Walker, F.C.

Figure 44 Mr. Robinson! Is Mr. Roginson in this tent?

tops and furnished along either side with stout log perches on which the second relay of breakfasters were already balancing themselves. Opposite every place there was laid an outfit of eating implements, consisting of one tin plate, one tin cup, one knife, one fork and one spoon. These must serve the holder for his entire meal, and later, as we grew accustomed to the etiquette, it was astonishing how simple and natural it seemed to save from the influence of porridge a place large enough for bacon, and to keep an unbaconized surface for final prunes or pie. At that, my first breakfast, however, I was hard put to it, what with the simplicity of the service, and what with my struggles to preserve the equilibrium of the porridge dish on the curving surface of the oilcloth, as well as my own on the diner's perch.

From the mess-tent to the cook-tent below was a short distance, and the speed with which the various courses came on was only equalled by the rapidity with which the food disappeared. The chief cook was Mok-Hen, an old retainer of the President, and familiarly known as Mock Turtle, who had under him two China boys from the Lake Louise Chalet. Mok and his staff served only eatables, tea being handed out by more or less active volunteers, from a small tent sacred to the ladies, which stood just above the mess-tent.

The mess-tent practically divided the main camp in two. It stood almost spanning the main street, with the cook-tent below and official tents above. To the right and on the same level as the mess-tent were the living tents of the President and Secretary, and beyond these, scattered along the woody mountain side, were the ladies' quarters. The official tents of the President and Secretary stood at the upper end of an open space, the forum of the camp. Of this space the most important part was a big square of logs with the camp fire in the middle. Here every evening the campers gathered for song and jest, and here, during the day a succession of worried-looking ladies hammered nails, discussed sunburn cures, or fried out the interior of the boots they had used in climbing the day before. Not far from the camp-fire was a bulletin board fixed against a large tree and setting forth all the official announcements, especially the successive programmes for the following day. Altogether this year's camp to most of us, even the pioneers of 1906, seemed a model of good arrangement and comfort. The President, however, has in view for next year all sorts of improvements, among them a larger mess-tent and a more satisfactory tea-tent. The tea-tent is really sacred to the ladies, which means that they use it for drying their clothing, especially overflow boots from the camp fire. This system keeps out the mere males from the use of the tea-tent as such; but in future we may see a two-roomed tent with tea in the foreground, laundry at the back, and an entrance at each end. Why not go a step further and have bell tents with electric bells in them, buttless fir boughs, and porcupines furnished with hairpins as well as needles? I am at present working on a self-balancing, three-sided plate especially adapted to club use.



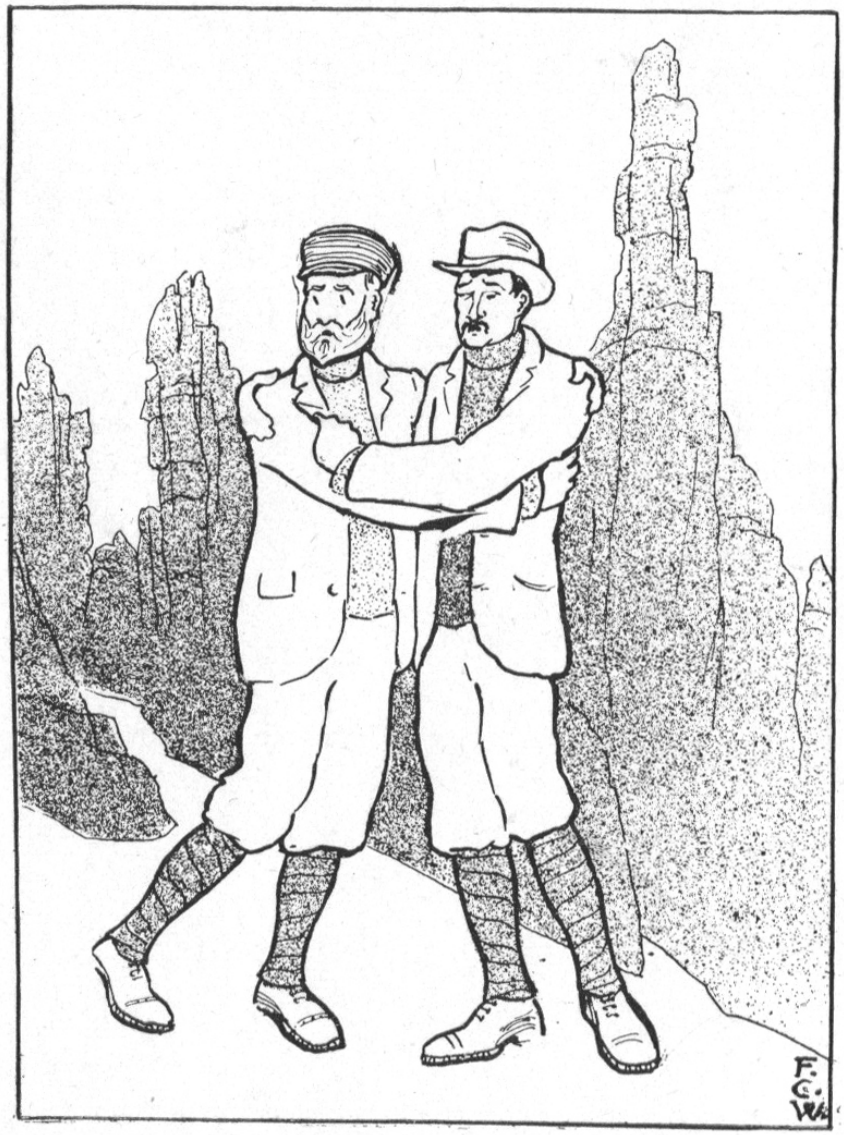
ROPING-UP ON ABERDEEN

Walker, F.C.

Figure 45 Roping-up on Aberdeen

The camp, as it stood, represented no small thought and toil. To begin with, the late-lingering snow had made it necessary to abandon the first site chosen and move lower down the valley. This second site had to be in the thick woods, and a clearing was made only by three days' work on the part of a gang of men loaned by the C.P.R. In addition to the work done by this gang in clearing the ground and bridging the creek, a number of members of the Club worked hard for the first four days of July in setting up tents, cutting boughs and firewood, and doing a hundred and one tiresome, necessary things. Those of us who came after and, like Kipling's "Sons of Mary" found the rough places smooth for our feet, owe a debt of gratitude to the hard-working officers of the Club who planned, and the unselfish volunteers who swung axes and stretched ropes for our comfort. The names of these, "The Sons of Martha," I could give—and would, were it not to save a blush in the cheek of the many lingerers. Even so I would venture

to make an exception of the man from Woodstock if he had not been already overpaid for those four days; it was then that he thought out the great device for the painless ironing of rough-dried collars on a tent roof. One of the McTavish twins, too, would certainly have been mentioned—if I were quite certain which twin it was that worked. The wrong one would assuredly claim the credit, and he, as it happened, appeared in camp when the work was all done, and just as supper was served. I ought to know, for I came with him.



THE PERILS OF SENTINEL PASS

Walker, F.C.

Figure 46 The perils of Sentinel Pass

Life in camp was, to some extent, guided by the official bulletin. Every evening we could read the programme for the following day, consisting of two official climbs (one starting about 5.30 for Mt. Temple, another at 6.30 for Mt. Aberdeen), two forty-eight hour excursions starting at 10 a.m. (one for Lake O'Hara and one for Moraine Lake), besides several less arduous trips about the valley itself. In spite of these notices, no member was compelled to do anything, arduous or otherwise, during the day. Three

meals were served for him at very elastic hours, and, beyond attendance at these, or not even including such attendance, he could spend his time as he pleased. I can at all events speak for there always being plenty of campers standing or lounging about to serve as artistic studies. There were always, too, plenty of people to welcome incoming campers or baggage when the saddle ponies or pack-horses reached us from Laggan. Such pastimes as porcupine hunting, wood chopping, patching "glissaded" clothes, mending tents, and drying out boots could but freely indulged; and only the most ardent mountaineer; spent the majority of their days in actual climbing. I hope that all of us, as we idled about in camp or took advantage of the daily expeditions through the valley or over the mountains, thought occasionally of those who oiled the smoothly running machinery. How would you, oh Robinson, have liked the fun of running the President's office, sending off scores of glorious expeditions and never sharing one, appointing guides you might not follow and replenishing rucksacks for other mouths to empty? Or with what grace would you, Miss Vere de Vere, have sweltered with the Official Chaperone in the tea-tent, catering to the insatiate thirst of the camp and leaning on bruised reeds of Ganymedes, who often went to pour and remained to eat?

Here's a health (and we would drink it in that same tea) to the President, the O.C, the Secretary, and all our noble officers. Here's to the governments too, at Ottawa and Edmonton, who have so practically endorsed our work! And here's to that octopus of a railway company who " hewed timber afore out the thick trees," loaned us their guides, and sent us (at one fare) on our way rejoicing!

Of the official climbs, i.e., the climbs by which graduating members were to qualify for active membership that up Mt. Aberdeen was taken by the greater number. Every day from twelve to thirty persons ascended this mountain, which was right behind the camp and has a height of 10,340 feet. The earlier expeditions from the camp up this mountain were attended with some difficulty owing partly to severe weather and partly to the dangerous course at first taken. Your blood would run cold if I could repeat to you the horrible adventures told in tent No. 5 by the different gentlemen who took part in those first ascents. The ledges along which they walked for hours were never wider than six inches, the precipices over which they hung suspended by a single rope were seldom less than 3,000 feet, and the general air of terror which enwrapt the whole performance almost robbed me of sleep on the night before my venture on the same mountain.

The next morning at seven o'clock a ropefull of us were lined up before the President's tent. Nine in all, we started off in charge of our guide without waiting for the sixteen others who were to make the ascent that morning. For the first half hour we tramped up a steep ravine. This seemed easy, though it was not long before it began to shorten our breath; the guide was ready for this, however, and made us sit down for a rest long before any of us would have considered it necessary. Once beyond the ravine and out on the rocks we began to do some real climbing. The easiest going was up the solid rock ledges; the most troublesome was over the great slides of shale, which, even when taken in zigzags, gave at every step. The greatest care was necessary in placing the foot so as not only to assure your own advance, but to safeguard from sliding fragments the brains of the following climbers. We kept on over rock and snow, for we had now reached the snow-line, till we arrived at the base of a sort of tower of rock with a narrow ledge running round it. Here our guide halted and began roping. There were, as I have said, nine in our party, and after half a dozen loops had been made in the rope and slipped over the shoulders of as many people, it was seen that at least two

would be left out in the cold. Some instinct seemed to tell me that I would be one of these heroes. Sure enough, it was to me that he first turned with a cheerful “I know that you won't mind going unroped." “N-no—it's not very dangerous, is it?" He reassured me and the other hero in such ambiguous terms that we followed the party with anything but heroic feelings. From the base of the tower we got into a snow-filled crevice easily negotiated by a series of steps made by the feet of the preceding parties. At the end of this crevice we found ourselves, as it were, on the roof of the mountain. We were, however, not on the summit, which we saw to the left at the end of a narrow snow-covered crest. Up this crest we worked for some time, keeping at a respectful distance from its precipitous sides, and before long-reached our goal, the cairn marking the top of the mountain. We were Active Members of the Alpine Club of Canada.

It was now almost twelve o'clock and the thoughtful guide took off his rucksack and brought out nine substantial lunches, the work of our friend Mock Turtle. The only drawback to our enjoyment was the lack of drinkables. Some of the party attempted sandwiches of snow and bread and jam, but with doubtful success. After lunch and a short rest we began the descent, not along the snow ridge, but straight over the mountain side, down the back stairs, as it were, the stairs consisting of a peculiarly long and irritating slope of shale. Besides the usual irresponsibility of this loose rock, it occasionally overlay smooth slopes of the firm variety, and several exciting slides added interest to the descent. Finally to our relief we arrived at an oasis of firm rock. Stopping here for a rest we were soon joined by the second party, and then prepared for the most exciting and most enjoyable part of the whole trip.

Below us was a long, smooth slope of snow extending, as our guide said, for nearly 3,000 feet. This we were to travel by the simple process of glissading. Glissading is, roughly speaking, tobogganing without a toboggan. The glissader simply sits down, put his feet firmly together in front of him, draws a long breath, and starts, guiding his way with alpenstock held firmly under the arm. As one who knows, I should like to say, that the only safe form of glissading is "independent firing." On this occasion we were beguiled into forming a combination toboggan of sixteen persons linked together by interlocked arms and feet. At a signal we pushed off and began to whiz down the snow slope. For a time all went well. Suddenly some projecting foot caught in the snow, the human toboggan split in two, and the part in front of me continued on its own responsibility. My section, however, came on with terrific impetus, and in their efforts to pass me while still holding on to me, forced my head and shoulders into the snow, and described over me a parabola which must have filled with joy the hearts of the onlookers. After we had gathered up our limbs, alpenstocks and ice-axes we continued our way in strictly independent fashion, and really enjoyed the long slide to the bottom of the snow-field.

The rest of the journey to camp was an easy scramble down the ravine, and we soon arrived rather wet and weary and quite ready for the usual afternoon tea.

For my part, when I have climbed a mountain, I like to sit down for a while and think about it. Yet you will see people coming back into camp with half the nails gone from their soaking boots and with a considerable gap in the garment that bears the brunt of a glissade, who will at once rush to the bulletin board hunting for more trouble. What are you to do with people like that? Mild cases are often satisfied with an enrollment for an ascent of Mt. Temple (11,626 ft.) on the opposite side of the valley, but for others this is as nothing; and for these the President unfalteringly prescribes a two-day trip. To grasp the psychic value of a two-day trip you must understand that the Paradise

Valley is a narrow playground running for some six miles north-east and south-west, fenced on the south-west by a wall of rock one mile in height, and on the south-east and north-west by similar walls of from half a mile to one mile in height. Unfortunately no

gate has ever been built at the front, and there are besides four places where you can climb over the walls. Now your two-day trippers are a sort of restless youngsters who want to see what the outside of the walls looks like. So the President says: "Certainly, my boys. I can put you over, Jimmy, by that gap on the north-west and you can walk along to the corner and down the south-west side and come back into the yard again by a gap you will find on the south-east. And you, Billy, if you like, may go out by the gap at which Jimmy is to come in and inspect the outside of the southeast fence till you come to the front, where you can easily come in by the gateway." Then he looks down and sees a very small boy. "Please, sir, may I go with Billy?" "Oh, no, my little man, that would make you too tired, and besides, Freddy, you might tear your clothes getting through the fence. But here's Mr. Holmes starting out through the gateway to take Billy's blankets to the place where he must stop tonight. How would you like to go along with him? He will take your blankets, too, if you ask him, and when you are tired he will let you ride on one of those nice ponies. Then tomorrow you can come back with Billy?"

All the boys jump at the chance. Jimmy climbs up from the valley, into the Mitre Pass, slides down that to the Lefroy Glacier, picks his way round the corner of Lefroy to the Victoria Glacier, and pushes upward to the Abbot Pass. If he escapes an avalanche in the Death Trap he passes Lake Oeesa, and at the end of the day staggers down to Lake O'Hara at his first fence corner, wondering if the supply of' beans and bedding in the rest-house will meet his needs. However, the rest-house, conducted by a gem of cooks and with a base of supplies at Hector on the C.P.R., makes a new boy of him and sends him the next morning through Opabin Pass into Prospector's Valley, then round his second corner by way of Wenkchemna Pass and Wenkchemna Glacier till he sights the two gaps in the south-eastern wall—Wastach and Sentinel Passes. Through one of these he scrambles into our Happy Valley. Meanwhile Billy has made his way over Sentinel Pass to Larch Valley, and thence down to the camp at Moraine Lake in the Valley of the Ten Peaks. Here he finds Freddy and the blankets, brought round by Mr. Holmes. Next morning they take a side trip up Consolation Valley and later in the day push along the south-eastern wall till they can come round the end into the Valley.

That many campers should look with favor on two-day trips is no surprise to me, for my own feelings in the matter may be partly hereditary prejudice. An ancestor of mine, many thousand years back, lived with his wife in a Paradise Valley of their own. One day they allowed themselves to be assisted through the gateway—presumably on a two-day trip—and none of the family have got back into that valley since.

In the modern Paradise Valley, at any rate, there was plenty of enjoyment for the one-day tripper, the man who liked to start off, not too soon after breakfast, in the wake of a well-filled rucksack, to reach at noon some remote part of the valley appropriate to the emptying of rucksacks, and to stroll back into camp with unexhausted frame in good time for the evening meal. To begin with, he could push up to the head of the valley as far as the Horseshoe Glacier, to feast his eyes on the towering snow-decked masses of Hungabee, Lefroy, and the Mitre. Or he could stay half way where the ice-fed waters of Paradise Creek come tumbling down the rock structure named not inaptly the " Giant's Stairway." Or he could follow the Larch

Valley between Temple and Pinnacle to the summit of Sentinel Pass and after "rucksacitating" the wants of the inner man, could glissade homeward down the slope that so nearly finished our friends the Physician and the Habitant. Or he could wander down the valley and climb up to where little Lake Annette lies a blinking emerald eye under the shadow of Mt. Temple.

Sad that none of us can stay in our Paradise Valley forever. Is it our battered boots and our glissaded nether garments that clamor for repair? And, now that I bethink me, it was some question of clothing— that and fresh fruit—that took my ancestor from his Paradise Valley. Look as long as the daylight lasts at the beautiful mountains, sit as late as you can about the camp fire, there must come an end. Already one roll of blankets has gone from tent No. 5, and more are to go. You have sat at the Annual Meeting in the firelight, you have heard the wit and wisdom of the " Alpine Herald " recited in the same magic light, you have taken your last mouthful of Mok Hen's bacon. Pack your dunnage bag, man! Roll your blankets! Hit the trail! As you mount the rise at the valley's mouth and turn for one last look before striding off for Lake Louise and the Outside, you seem to see across the entrance a flaming sword turning every way—or is it only the sunlight glancing from the snows of Hungabee?

A FEW DENIZENS OF THE CAMP

Walker, F.C.

Figure 47 A few denizens of the camp

UNTRODDEN WAYS.

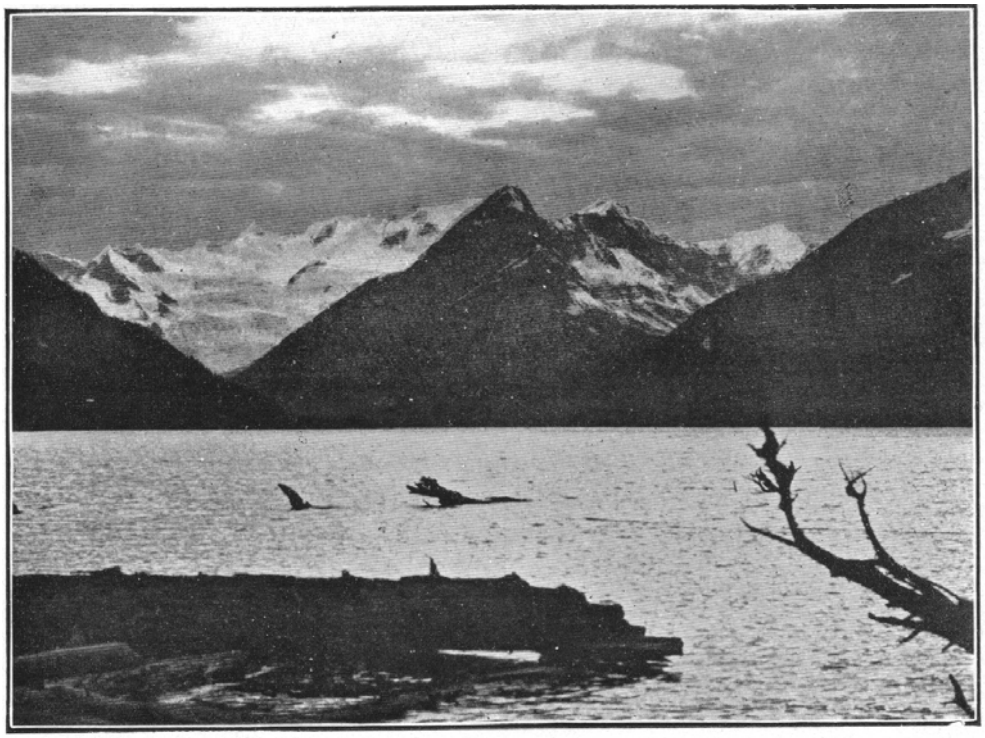
Schäffer, Mary T. S..

In the summer of 1907, on June 2Oth, two women and two guides left the little station of Laggan, Alberta, and started for the vast wilderness to the north. It was cold and raw, snow flew in our not over-jubilant faces, the way was one of grind over fallen timbers and through the most discouraging muskegs. For our trail lay up the Bow Valley, across the summit of the same name, down Mistaya Creek to its junction with the Saskatchewan River, and from thence on by the various branches of the Saskatchewan and Athabasca Rivers.

Not as the crow flies, but as the trail winds, we reached in our wanderings a point about 200 miles from Laggan, not far from the junction of the Whirlpool and Athabasca Rivers. In this section there are four distinct streams: the Chaba, which flows up from the south and joins the West Branch of the Athabasca about twelve miles from its own source; a branch which flows from the south-east and joins the Chaba about three miles from the latter's source; the West Branch mentioned above, and the Sun Wapta, which joins the main stream several miles below. About half way up the Chaba, and to the west of it, lies beautiful Fortress Lake, discovered in 1893 by Dr. A. P. Coleman. It is a wild and strikingly picturesque valley, though probably not more so than many similarly situated on the Saskatchewan River. Yet the West Branch appealed to us more; there was a sense of loneliness, of freedom from all touch of human life, a purity, a bloom, which the white man's hand so quickly brushes aside. I say “white” for the red man defiles it no more than does the passing caribou or the wandering bear. His standing teepee-poles but give the touch the artist loves, while the centuries-old hunting trails are filled with soundless stories which interested eyes may easily read as they follow in the wake of the feet that have gone by and will never return.

As far as I can learn, only one white man has ever penetrated to the end of the West Branch, and this was Jean Habel, a German explorer, who visited it in the summer of 1901. He did not then recognize the superb pyramid of faultless outline which stands guard at the extreme southern limit of the valley as Mt. Columbia, and called it "Gamma." He afterwards published a short article in " Appalachia " with a fine reproduction of Mt. Columbia, but before he could do more, or his work be better known, the pen was laid aside forever; and it was with a feeling of sincere sadness that we passed his long-deserted camps, and realized so vividly the feelings which must have thrilled him as he saw the rich scenic treasures the mountains were unfolding for the first time to human eyes.

Next to being asked if we were not “afraid” in that lonely wilderness, the most common question is: “Did you go where no person had ever been before?" An Indian after all is a “person,” and to find a spot where an Indian has not been in that great hunting ground, which has doubtless been hunted over from time immemorial by the plains tribes, would seem an absolute impossibility. The caribou, goat and sheep yet wander in these lonely fastnesses, and a few Indians still come to the haunts of their forefathers; but in the further valleys the teepee-poles are fallen and decayed, and thus the story of the passing of the red man is simply and sadly told. So to that question I can only reply: We found one section, and but one, where it seemed as if not even an

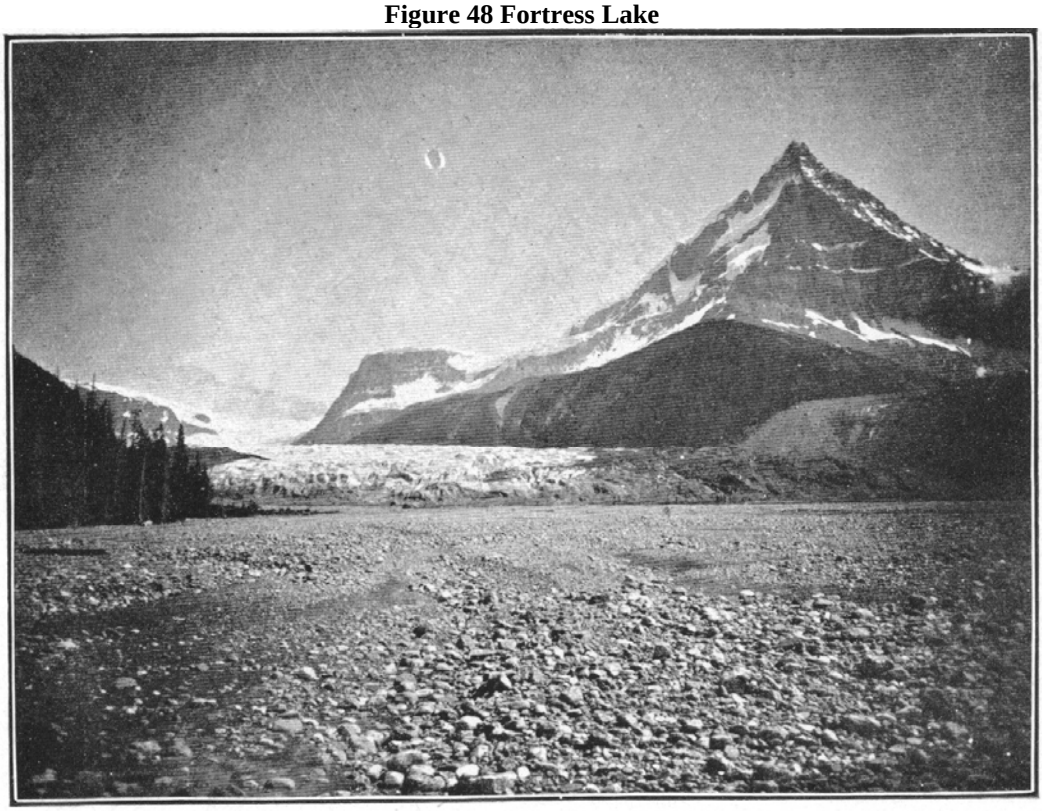


Mary T. S, Schaffer, Photo

FORTRESS LAKE

Schaffer, Mary T.S.

Figure 48 Fortress Lake



Mary T. S. Schaffer, Photo

MOUNT COLUMBIA

Schaffer, Mary. T.S.

Figure 49 Mount Columbia

Indian's foot had trodden. This was on the north shore of the Athabasca River after the four streams had united. The original explorer had chosen the south and more “muskeggy " ground, where we ourselves were forced to travel to avoid the arduous labor of chopping a trail. This was the only section of the eight or nine hundred miles we travelled where there was a doubt that Indians had gone; at least, it had never been a highway.

From the Athabasca we turned our attention to the sources of the Saskatchewan and Brazeau Rivers, to the “Valley of the Lakes," a branch of the North Fork of the former stream, and to the West Branch, a tributary of the Saskatchewan flowing from the Lyell group. This valley alone is worth a trip, an article to itself, and a more ready pen. It is a valley of gorges and glaciers, magnificent peaks and tumbling waterfalls, and holds a charming lake which we have named “Nashanesen."2 The climax is reached at the Thompson Pass, where the traveller who has stuck to it through pretty rough “going" is at last rewarded by his first glimpse of Mt. Bryce, and from a shoulder of the mountain the vast ice-fields of Mt. Columbia.

From the West Branch we crossed by Nigel Pass to the Brazeau country lying to the north-east of the Wilcox Pass. Roughly speaking, Brazeau Lake lies in latitude 53° and longitude 117°. It is about six miles long, is wooded round its shores, and at its head stands a fine peak—Mt. Brazeau. Low mountains hem it in on all sides, and, on a calm morning, before the sun has risen or the wind has cast a ripple on its blue-green surface, the sight is one of exquisite beauty.

We no sooner reached the southern shore of the lake than a whole volume was opened for us to read. In a perfect grove among the spruces stood comparatively fresh teepee-poles, while tossed here and there, in every stage of decay, were those which had served their purpose many, many years before. An old trail was beaten deep within the forest, and from this path sprang ancient trees which held their proud boughs to the blue sky above, their lower bark scarred and gashed by hands long laid beneath the sod.

That it was and yet is a magnificent sheep country, there is little doubt. Its long distance from the now small band of Stony Indians at Morley and the nearly exhausted

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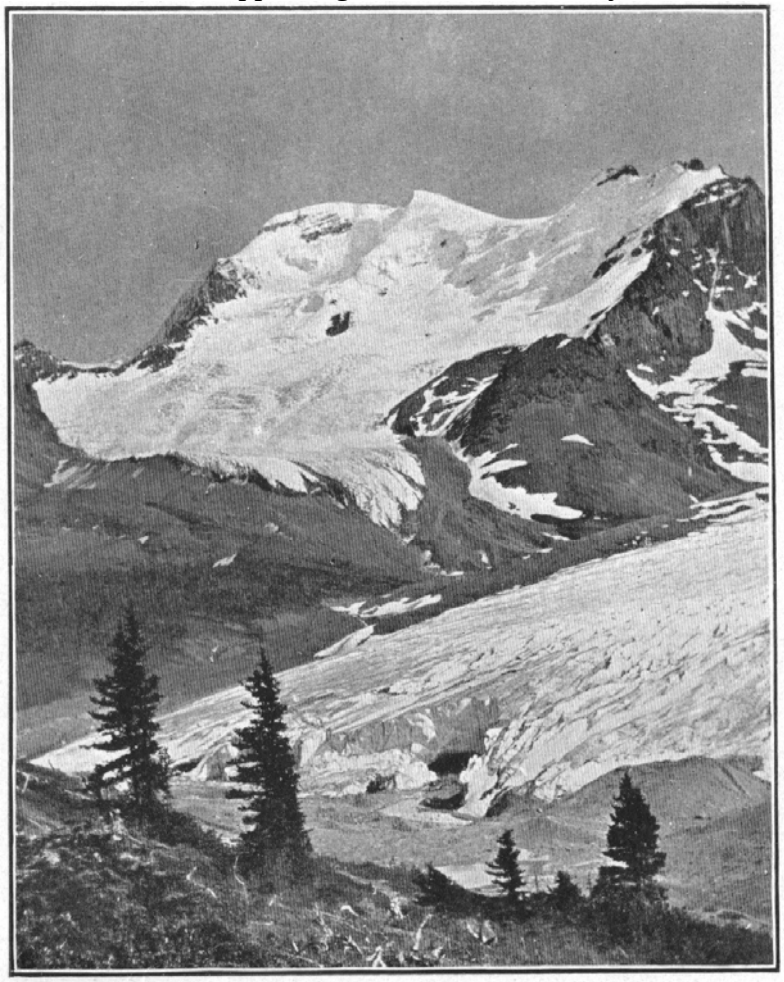
[2] Names given in Canada are subject to approval by the Geographical Board.—Editor.

game country intervening is probably a sufficient reason for the greater abundance of animal life which we saw there. We had followed a most marvellous Indian trail over the worst bed of boulders I ever met for horses to travel, had climbed on and on, lured by the old trail, until well toward 9,000 feet, when we suddenly surprised a band of sheep. They had probably never seen a human being before. On the defensive at once, they were off like a flash before our astonished gaze, along a bare rock-face and up an almost perpendicular wall covered with ice that the most fearless Swiss guide would not have dared attempt, and over which they bounded as though it were but a meadow of upland grass. Reaching the high and inaccessible crags, they paused, and for a moment gazed upon us far below; then a magnificent ram appeared to take the lead. The others disappeared, but the massive head of the leader, with its great horns, stood motionless against the grey sky, his attitude alert, his body immovable. Only, as we moved back and down the valley, we could discern that he turned to keep us in view. Such a picture! The dreary wastes of naked rock, the cold glistening glaciers all about us, the early snows in the unexposed niches, the dying alpine flowers at our feet, then, high above, clinging to the superb crags outlined against an angry sky, stood that emblem of a noble and fast-disappearing creature—the Rocky Mountain sheep.

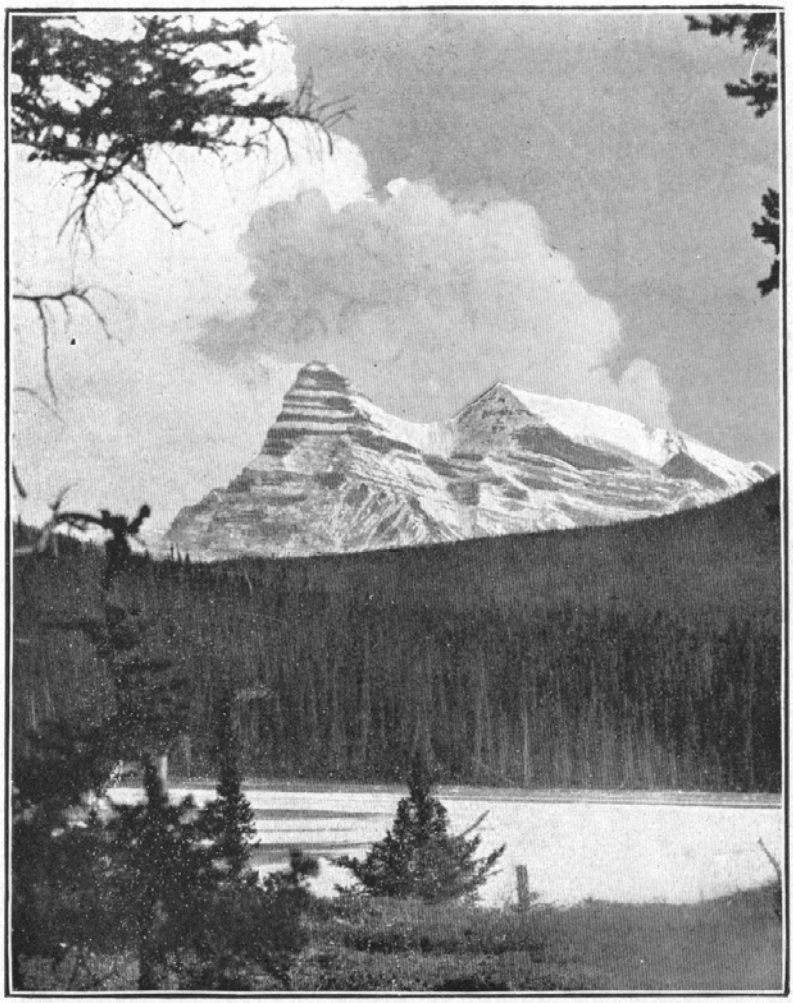


Mary T. S. Schaffer. Photo

MOUNT ATHABASCA
From Wilcox Pass

Schaffer, Mary T.S.

Figure 50 Mount Athabasca



Mary T. S. Schaffer, Photo

PYRAMID PEAK
From Junction of North Fork and Main Saskatchewan

Schaffer, Mary T.S.

Figure 51 Pyramid Peak

From the Brazeau country we made our way back toward Nigel Pass, crossed Cataract Pass and descended Cataract Creek to the Kootenai Plains. Here we rested and revelled in those golden valleys, visited the Indians, and found life a very pleasant matter in that peaceful sunshine after the snows and storms among the more northern valleys.

Yet even here the late September days were stealing. They were coming with the yellowing poplars, and with the laggard dawn. We knew the winter's snows must soon sweep across the higher passes, but begged a few days' respite to visit one spot which beckoned us with its beguiling name. This was the “Valley of the Lakes." James Outram speaks of seeing it from the summit of Mt. Lyell, and says in his book (In the Heart of the Canadian Rockies): “It appeared as a deep enshadowed trough, jewelled with a host of little lakes." The description fascinated us, appealed to our imagination, and we were to have the pleasure of stealing the first secrets of a primeval wilderness. From the camp at the junction of the North Fork and the main Saskatchewan River, we travelled up the east bank of the North Fork for about 13 miles; here, being low water, we easily found a crossing, and followed the west shore for a mile more, when an old

Indian trail led directly to the unknown valley. As far as the red man is concerned, it is many years since his moccasined foot has trodden that moss-covered way. The trail remains beaten and worn, but overgrown and impeded with huge fallen trees, and only the blaze of a white man's axe seven or eight feet above the ground showed that a hunter had gone that way in the dead of winter to test his fortune with traps and rifle.

No sooner had we left the river than we plunged into a thick growth of spruce, climbing constantly for two hours. Reaching comparatively level ground, we plodded on amidst closely grown and exasperating pines, so thick and so nearly impregnable that even our now depleted packs could not be forced through until the axe rang and woke the silence which seemed to lie like a pall on every surrounding object. So muffled and dark and still was this bit of primeval forest that no sign of life met us on the way; it seemed that with the passing of the Indian had passed the need for the little people of the wood; and yet, no doubt, bright, terror-stricken eyes were in every direction, watching the movements of the terrible and unaccountable enemy.

After long windings and turnings in the shadows, with no sign of the grass so necessary to our horses, we made our way to the banks of a tumbling torrent which seemed to come from the Lyell ice-fields. From the deathly silence of the forest, our serenade all that night was the rushing, pounding stream as it hurled itself along among the boulders of the river-bed scarce ten feet away. On each side of the very narrow valley avalanches had torn and ripped the trees from their roots in every direction, and amidst this havoc and desolation was the only feed our hungry horses could find, and very poor picking at that. As yet we had seen nothing of the lakes to which Outram had given the lovely name, the name which had .lured us through those long, silent, weary hours in the deep, lonely forest.

In a rainy, misty sort of sunshine the next morning, we essayed a climb to look for the lakes. How hot it was when the sun beat down! How steep and tough the avalanche-scarred hillside! How bitter cold the wind from the ice-fields! And our reward, “the lakes like jewels," where were they? Toiling stubbornly onward to the bare cliffs above, we reached the loose unstable scree just beneath them, paused and looked eagerly to the valley below upon a chain of sloughs. Beautiful they were, too, lying in peaceful silence far below, like giant emeralds tossed there by mountain gnomes. From his height of several thousand feet above us the enthusiastic climber had beheld “lakes." The home stretch lay over Howse and Baker Passes, the latter very beautiful but difficult to travel. It is hard, at best, to leave behind the days of freedom, the constantly shifting panorama of mountains, lakes and rivers, the balsam-laden air; to return to the beaten track, to four walls, and all the cares which know so well how to creep within them. It was a summer of almost continuous cold and storm, but with no accidents to ourselves or the horses. It was a happy sixteen weeks amidst as fine a cyclorama of changing scenery as the dear old world can offer, and there was always the sunshine of contentment and goodwill within the tent and at the camp-fire.

THE ALPINE CLUB'S JUBILEE.

Wheeler, Arthur O..

What was the Jubilee of the Alpine Club? It was the celebration of the fiftieth birthday of the oldest of such organizations — the Alpine Club of England. Founded in 1857, this Club has become famous the world over for its thrilling feats in mountain conquest, its records of scientific exploration among the high places of the earth and its introduction of art into the regions of snow and ice.

While the second Annual Camp of the Alpine Club of Canada was in progress, during July of 1907, an invitation was received by the President to attend the Jubilee Celebration. It was accepted, and thus the honor of representing our youthful Alpine Club, the Canadian Rocky Mountains and Canada at this gathering of the clans from all lands, far and near, devolved upon the writer.

The celebration may be summed in a sentence: It was a gathering of the foremost men of the world interested in mountain regions from all except the mercenary aspect, and a review of the foundation and past history of the Club.

For the information of our members, a few words as to its origin and early life may not be amiss. In an address to the Club by its President, the Right Rev. the Bishop of Bristol, delivered at the Winter Meeting, December 16th, 1907, he makes the statement that "the University of Cambridge had the predominant share in the formation of the Club and its earliest activities in literature and art as well as in the world of ice, rocks and snow." The President had for thirty-four years been a "devoted son" of that University. Whatever rival claims there may have been to predominance, it is a fact that the first proposal for the formation of an Alpine Club emanated from William Mathews to F. J. A. Hort, both high up in the highest honors of Cambridge, the 'latter during the years 1850 and 1851 carrying off three out of the four Honour Triposes and coming out as Third Classic. In the formation and detail, F. Vaughan Hawkins and Dr. Lightfoot took an active part. Both were Senior Classics and Wranglers.

According to an article devoted to the Jubilee Celebration, appearing in the Graphic of December I4th, the Club was founded at a meeting at Ashley's Hotel on 22nd December, 1857. The articles goes on to say: "It was greeted with a storm of ridicule. The press pronounced it to be an association of suicidal monomaniacs, and Ruskin uttered a wild protest in which he declared that 'the Alps themselves, which your own poets used to love so reverently, you look upon as soaped poles in a bear garden, which you set yourselves to climb and slide down again with shrieks of delight.' But the storm soon blew over. Ruskin himself found that men might climb mountains without vulgarising them, and gave practical effect to his recantations by himself joining the Club."

From an original membership of thirty-one, it has gradually advanced in the fifty years of its life to some seven hundred. The membership is small compared to that of other clubs since formed, whose members are in the thousands, one of them, the German-Austrian, boasting of more than seventy thousand members. The reason for the comparatively small membership is due to the very high standard set and maintained by the Club, and the great care with which applicants for membership have been selected. This fact is well illustrated by the names of now famous men which appear in the first list of members, published in 1859, when the dimensions of the Club had swelled from the original thirty-one to one hundred and thirty members.

In glancing over this publication, a copy of which has been presented to the

writer by Mr. Edward Whymper, such names as Matthew Arnold, John Ball, E. F. Blackstone, Rev. T. G. Bonney, Joseph Chamberlain, Rev. J. L. Davies, Rev. F. J. Hort, William Mathews, John Murray, Rev. Leslie Stephen, Prof. J. Tyndall, Alfred Wills and Horace Walker appear, names of young men who have since risen in their various departments to the highest fame and greatest responsibilities that can be acquired. With mental power and physical energy of a calibre such as these names indicate, it is not difficult to understand why the Mother Club stands to-day on a pinnacle whose heights have been climbed by her alone. It shows most conclusively that of all noble sports, that of mountaineering is most noble, in that it appeals to all classes and professions and brings forth the lofty traits of patience, perseverence, courage and skill. It has, moreover, much to do with the formation of a nation's character, in the development of the intellectual and religious senses, the former through scientific inquiry and artistic representation, and the latter through the unseen but much felt force of an Almighty Power behind an apparent chaos, evolving a scientific scheme of order and an artistic blending of color. An alpine club built on lines similar to the Mother Club is a national asset of which a country may well feel proud.

From the parent club has sprung a large family, one hundred and sixty-six in number. While many of these are, properly speaking, tourist associations rather than actual alpine clubs, yet the same keen activity, the same spirit of emulation and the same desire to come in touch with the cruder forms of nature is the mainspring of each organization. The constitution of the Alpine Club does not admit of women members, and, though the climbing record of many is on a par, if not superior to that of the average member, they are without the pale. It was, therefore, somewhat of a satire that, on the very night of the great dinner to celebrate the fiftieth anniversary of organization, a women's club should have been formed in London; thus putting the nose of the Alpine Club of Canada "out of joint," previously the baby and flower of the flock.

The most attractive and important features of the Jubilee Celebration were an exhibition of alpine paintings and drawings by past and present members at the club rooms, from December l0th to 28th, and the now historic dinner of the 17th December, 1907.

The former comprised a very fine and, to a stranger, instructive collection of mountain paintings. The representations were chiefly from the European Alps, the Himalayas, the Caucasus and the Andes. Of the first, Mont Blanc, the Matterhorn, the Wetterhorn and the Breithorn stood out conspicuously. Among others, striking pictures were shown of Mt. Everest and Aconcagua. There was also a representation of Fujiama; and even of Mt. Ararat.

Among the member-artists whose works were contributed figured the names of Ruskin, Watts, Loppe, Alfred Williams, McCormick, Sir J. Collier, Franz Schrader, Elijah Walton, and Willink. There were besides numerous pen and ink sketches, both humorous and descriptive. Taken as a whole, the several hundreds of paintings and drawings presented a collection of incalculable value; not only that it was a rare exhibition of art, but also from its association with members who had "done things"; and as an important series of links in the history of the Club, showing not alone the evolution of art in mountaineering, but the evolution of mountaineering itself.

The dinner was held in the historic hall of Lincoln's Inn, loaned by the Benchers for the occasion. Although a room of vast proportions, the three hundred and fifty-odd guests did not seem to fill it, and in the gloom beyond the brilliantly-lighted tables there was plenty of space. The walls were hung with portraits of by-gone Chief Justices

whose names are famous in the pages of England's history, and at the President's left hand, among the honored guests, sat the present Lord Chief Justice.

The gathering was a most remarkable one in that it represented the Church, the State, the Navy, the Army, Science, and all the learned professions in a very high degree. Numerous stars, orders and ribbons scattered through the assembly showed that many of those there had made their mark in their respective callings.

The dinner was the best London could provide, and was served in a style for which the Alpine Club is famous; but the supreme charm of the entertainment lay in the speeches, which were terse, brilliant and witty, and full of a pleasing reference to the history of the Club* A few extracts from them will serve to give point to our own existence, the objects and aims we have in view and the trials of infancy.

In proposing the toast of "The Alpine Club" the President said: " I find an extract which I should like to read to you, dating from the year 1854; it was an early time in the history of climbing, but I am privileged to say that this was not written by Sir Alfred Wills. This is the extract: 'It is a somewhat remarkable fact that a large proportion of those who have made the ascent of Mt. Blanc have been persons of unsound mind.' (Laughter). That, my lords and gentlemen, was no passing jest; it was in the sixth edition of Murray's 'Guide to Switzerland.' I take it that the fact was this—the writer himself had done it—(Laughter)—and he generalized from the one to the many, hence this remark. Having himself the curious mental twist he has described, he took a well-known proverb, transposed the word in, and changed the construction into mens insana, corpore sano. (Laughter). Of course he was speaking about the danger of the ascent as it was then."

Speaking of the care taken by the Alpine Club to obviate danger in climbing, he remarked: "I have had sent me reproachful cuttings from newspapers month after month in the season, with 'What do you think of this, President of the Alpine Club?' written upon them. (Laughter). I find this sort of thing: a party of three has been lost; one was a shoemaker, another a waiter, and another a student of the age of sixteen; that is the sort of thing with which we are reproached. With regard to the Club itself we are in this position: People talk about the danger of going without guides. Now, in the list of qualifications for entrance to the Club applicants frequently state that certain of their ascents were made guideless. We found that to be of very little real use as evidence, because so many members of the Alpine Club are at least as good as guides. We are now obliged to ask, 'Who was your companion when you ascended guideless?' (Laughter). The committee has had to make that change in very recent times. That, I think, may be a useful hint to those who are not exactly of us this evening, how very much the Alpine Club has succeeded in eliminating the element of danger. There are, of course, heaps of places where if you do slip there is probably an end of you; but the Alpine Club knows so well how to negotiate these places that in the last three years, and for some time before that, I am glad to say there has not been a single accident to any one of the six or seven hundred members of the Club." (Hear, hear).

During the course of his speech the Bishop of Bristol read a note of congratulation from President Roosevelt which concluded as follows: " I have always peculiarly prized my honorary membership in the Club, for not only has the Club itself done a great work, but it has set the standard for all similar organizations in all other countries, and its example has counted much in many fields other than those of strict mountaineering."

Continuing the Bishop said: “Now, my lords and gentlemen, I should like to

take as the text for a sermon as short as I can make it Theodore Roosevelt's remark that this club has set an example in many fields other than those of strict mountaineering. I should like to read to you—many of you may have forgotten this— an extract from the form of application for membership in the club; ' The applicant must send a list of his mountaineering expeditions or a statement of the amount of contribution to Alpine literature, science, or art, upon which he founds the claim for membership'— not strict mountaineering, you see, but a good deal that is outside that."

Again speaking of the contributions of Alpine men to the letters of the day: "With regard to literature, is it surprising that Alpine literature should be of a very striking kind? I think it is not. Beginning with Sir Alfred Wills, and even some before him, and going on to the list of other delightful writers—we can never forget 'Peaks, Passes and Glaciers'—they have been men of observation in many scenes of quite unrivalled beauty; not only of unrivalled beauty, but of mystery— a solitariness—a mystery that always makes an impression upon the sensitive mind. But more than that, anything that the skilled Alpine climber does must be virile and strenuous. Therefore you have thoughtful, imaginative, strenuous, virile literature as the natural literature which comes from the Alpine Club. (Hear, hear). It has been—I was going to say my duty—my pleasure to look once more at some of the literature which Alpine Club men have put forth to the world, apart from descriptions of mountaineering efforts. I have been very much struck indeed with one of the earliest of the important works to which I refer; I mean Mr. Whymper's great book on the Andes. (Hear, hear). That book is a marvellous collection of archaeology, history and science of all kinds—geology, petrology, entomology, and all sorts of things; excellently put as literature, and accompanied by abundant evidence of, I suppose, about the most skilled power of illustrating man ever had. (Hear, hear). There is nothing like Whymper's illustrating, I think, done by the mere hand. He makes noxious insects much more real than life. There is one standing prominent in the middle of a page, the most dangerous, poisonous, mischevious beast that is to be found in the whole of the Andes. I regret to say that the natives call it the 'Bishop.' (Laughter). A few pages on he describes another formidable stinging beast, evidently only less bad than the 'Bishop.' This the people call the 'Devil.' (Laughter). The libel stands in the latest edition."

Again: “Here is Conway, going wherever there is anything to be seen that other people have not seen, describing it in a wonderful way, taking about with him men who can produce those marvellous photographs of mountain scenery accessible and inaccessible. The Alpine Club has done at least as much as any to bring about that development to the very height of perfection which has now been reached by photography in mountain scenery. Here is Conway, conquering unconquered mountains, and describing it all in so fascinating a way; and the mystery of it is that he makes it all seem so easy, though he confesses now and then that it is not always pleasant. He, too, is everywhere, not in literature only, but emphatically in art, very much more than a mere mountaineer."

Passing on to science: “What a chance the Alpine Club men have always had in the direction of science.

They have had to examine the effects of rain and rivers, frost and fire, ice and snow. All the elements that have produced the present configuration of the earth's surface are familiar to them, and in fact to all of us who have climbed the Alps with our eyes open—a normal condition of the Club's eyes, whether its members arc scientific or not scientific men. By no means all of our best climbers have cared much for the

science of the Alps. Leslie Stephen once made a scientific report on the state of the atmosphere at a certain time earlyish in the morning. An early morning start, after a night on some hard material, was not his best time. I remember once moving up to him, about half-past two in the morning, and saying something genial. He responded with: 'If you think I am such a fool as to be in a good temper at half-past two in the morning, you're very much mistaken.' (Laughter). Well, Leslie Stephen once made a scientific report on the state of things he found at the top of a peak. It took this form: ' If there was any ozone in the atmosphere, ozone is a greater fool than I take it to be.' (Laughter) That sort of thing is not confined to Alpine Club men. For example, we have with us here tonight Sir George Darwin. Sir George Darwin had a father. This was a remark made by the first lieutenant of the ship 'Beagle' to Darwin, who was engaged in dredging, and no doubt was making a great mess on the decks: ' If the captain would leave me in charge of this ship for one day I would have you and your filth overboard in five minutes.' (Laughter). The latest instance of the scientific nature of the Club is very interesting. It is this: The University of Oxford has given the degree of Doctor in Medicine to a member of this club, than whom none has a bolder record as a mountaineer, for a highly scientific treatise on mountain sickness. (Applause). Some of our visitors who have not seen Dr. Longstaff's treatise may not know, perhaps, that the compound word 'mountain-sickness' is not formed on the same plan as that very nice word 'home-sickness.' (Laughter).

With regard to art: "Is it possible that Alpine Club men can climb as they do without breaking out into art, if they can use their fingers at all ? Why, our club rooms are at this moment crowded and overcrowded with examples of the art of members. Nothing but the work of a member has been admitted there at all."

Finally: “What about Alpine work as an old man's memory? Well, just this: It is clean and wholesome, pure and unselfish, from one end to the other; there is nothing like it. Just think of the recollections of companionship. You have a jovial, genial companion for a week; you give him chaff and he probably gives you more in return; and so you go on as if the whole thing was just a happy lark. Suddenly there comes a crisis. In a moment your companion is like a steel spring, instinct with keenness of mind. He knows exactly the right thing to do, and exactly the right way to do it. Many and many a time that steel spring, instinct with keenness’ of mind, has saved a valuable life. And at the end when the time comes to shake hands and say ' Auf wiedersehen,' not one word, not one glance, throughout the whole of the week that either has reason to regret. (Applause). That is the sort of thing we old men have, recollections of things like that. You younger men, not perhaps of the club, get this, that and the other in your course through life, but with all your getting get clean memories for your older age. (Applause).

“We have heard a good deal of late of Honours Classes. I am not going to put the Alpine Club in the first class of clubs, or of sports. There is one word that has only once been used in all the centuries of honours of the University of Cambridge. Far above all

First Classes I place our club; with this one word written over it, the word that has only once been used in all the centuries of honours of the University of Cambridge—incomparabilis. (Applause)."

I have quoted largely from this speech because from beginning to end it is a masterly pronounciation. It is a sermon worth the hearing, and compresses into a few terse sentences the objects, aims and possibilities of an Alpine Club, as a mold in which

to form a nation's character and comprise within it all the high moral, scientific, artistic and literary attributes that go to make the life of a nation or of a man beautiful.

Mr. Hermann Woolley, the President-elect—who, by the way, has spent a summer exploring and climbing in the Canadian Rockies—in replying to the toast of "The Alpine Club" said among other remarks: "Brilliant work has been done by those members who delight only in guideless climbing. Some of these gentlemen even disdain the services of the harmless, necessary porter, so successfully have they adjusted the weight of their equipment to the fewness of their wants. Whatever may be the disadvantages of guideless climbing, one thing may be said in its favor. When two or three men have climbed habitually together the safety of each one constantly depending upon the skill, judgment and watchfulness of his companion or companions, I believe that a feeling of confidence, sympathy and friendship must spring up between them strong enough to outlast all the wear and tear of later life. Last night's meeting impressed upon me the great development that has taken place within recent years in the Club, and also the value of the possession it has become to us. There is, I think, in one of Thackeray's books something to this effect: that we ought to cherish with gratitude and reverence a wine of noble vintage carefully laid down by our wise forefathers at a time when we were intent on childish things. In the same spirit we ought to cherish, and do cherish, the heritage that has been handed down to us by the climbers of the fifties and sixties in the records, traditions and literature of the Alpine Club." These are words of wisdom, and are good to meditate upon.

Mr. Clinton Dent, replying to the same toast, traced the history of the Club from its first home in Hinchliff's chambers in Stone Buildings, Lincoln's Inn, to its present comfortable and suitable quarters at 23 Savile Row. He said: "The club has often changed its home; it has never, thank Heaven! changed its character. (Hear, hear). From our rooms and from our present habitation we may have to pass elsewhere. Much water has flowed under the bridges since the days of our first President, John Ball, and much has' been done since Wills ascended the Wetterhorn and crossed the Fenêtre de Saleinaz; since Llewelyn Davies—happily with us tonight—(Hear, hear) made his famous ascent of the Dom or joined with his old friend Vaughan Hawkins in an expedition on the west side of Mont Blanc and the Col de Miage. The members have gone farther and higher since then. They have found the right way up peaks in the Andes, in the Himalaya, in the Caucasus, in the Rockies; while in the English Lake District and Scotland they have found the wrong way up nearly every conceivable ascent. (Laughter). The club has expanded, developed and increased its membership. But, notwithstanding all this, the essential old bond of union—the love of the mountains—remains as it always has been, and the club has been constantly true to its traditions on the lines which you, the founders, laid down, and which you, the early members, so successfully developed. (Hear, hear). It has been said often that it is with a feeling of regret that one finds one's mountaineering is coming to an end. I cannot quite myself take that view, for it is not till towards the time when we are approaching the end of our more active career that we realize to the full all that the mountains have done for us—(hear, hear)—and indeed, the consciousness may come quite suddenly upon us that we have perhaps, after we have climbed our very last mountain, gained a great possession of valued friendships and of happy memories— (hear, hear)—memories of which the recollection can fade away only with life itself. In the first volume of ' Peaks, Passes and Glaciers ' John Ball wrote: ' The community of taste and feeling amongst those who in the life of the High Alps have shared the same enjoyments, the same

labors and the same dangers constitutes a bond of sympathy stronger than many of those by which men are drawn into association.' Is not this true? Could any prediction have been more amply verified? Of a truth we were brought up not only in the law but amongst the prophets. You, the founders, revealed a new and wholesome pleasure which the early members so successfully developed. You discovered and made known the most unselfish and the grandest sport in this world. But in founding the Alpine Club you did a great deal more than that. You were the means of linking together, fascinated by one common pursuit, men of every taste, pursuit and occupation in life; and much more, and more important, men of every age—the young, those more mature in years, and those who have arrived at the period which the young are pleased to consider old, but which as a matter of fact is nothing of the kind. (Laughter and applause). This you, the founders, and you, the early members, have done for us, and for it we the rest shall ever be grateful to you.

"It is impossible, as I look round these tables, not to miss many faces once familiar and constantly seen at our Winter Dinners. It is hard indeed to believe that we must search in vain for Leslie Stephen or for the keen, alert face of Charles Mathews. Let that pass. I would not on the present occasion touch, however faintly, a note of sadness. Let us be content with McCormick's happy suggestion that our old friends are with us in spirit this evening. Gaps there may be, but our ranks are still close. Among our founders—those who have written after their names those mystic letters 'O.M.,' signifying alternatively ' Original Member,' or to us the rare ' Order of Merit'—(hear, hear)—those who are still with us are both present to-night in the persons of Walters and Wills."

In the following remarks Mr. Douglas Freshfield struck a keynote: "And now they, and we, are called on to a more arduous task—to preserve our conquest. The Alps are threatened with invasion by a horde of Goths and Vandals: the company-promoter, the syndicate and the speculator. Men who know not Nature, and whose God is Mammon, are in the field. They make pretence to be philanthropists. They would have us believe that they desire to benefit the peasantry and the economic tourist. It is a false pretence. What does the peasant, the guide, the driver, or the local innkeeper gain by the crowd, done by contract, that is whirled past his door? What does the tourist gain that is carted, tightly packed in a covered van, through scenery he could better see in a cinematoscope? I met the other day in Switzerland a specimen of the modern tourist. 'Sir,' said he, 'I wish to sample the glasher region. Can you tell me if I can do it from Berne in a day without sleeping out?' He did it, and found it 'less extensive than he had anticipated.'

"It is for this class of travellers that the modern engineer is set to work. For them he has veiled the Staubbach in sooty reek; for them he has turned the flowery turf of the Wengern Alp into a Happy Hampstead; for them he is ready to plant a moving platform in the sublime solitudes of the Aletsch Glacier; for them he proposes to furnish the Matterhorn with a lift, and to convert the summit into a grotto furnished with a restaurant, a consulting-room for sufferers from the rarity of the air, and a stall for the sale of picture postcards."

The foregoing extracts serve to illustrate the high estate to which a national institution such as the Alpine Club of England may arrive within a period of fifty years, and the valuable national asset it may become as a bond of sympathy and good feeling between men in various paths of life, as well as an exponent of all that is best in literature, science and art.

The text of the speeches in full is a brief history of the Club, most charmingly told, and our members are advised to obtain copies of the February number of the Alpine Journal, Vol. XXIV., No. 179 (Address Edward Stanford, 12, 13 and 14 Long Acre, London, W.C. Price two shillings). The same number contains an account of the accident on the Schwarzhorn written by Mr. G. L. Stewart, who, as well as the writer, was with the climbing party when the deplorable accident occurred. An account of this accident appeared also in the May number of “Rod and Gun," in the account given of the President's visit to England to attend the Alpine Club's Jubilee.

IN MEMORIAM.

Colonel A. Laussedat.

It is with deep sorrow we have to record the of one of our Honorary Members, Colonel Aime Laussedat, a scientist of world-wide reputation and a man of most lovable personality. Dr. E. Deville has kindly prepared the following biographical note for the Journal:

“In March of last year, the members of the Alpine Club of Canada were grieved to learn of the death of Col. Aimé Laussedat, a distinguished Honorary member of the Club, after a short illness of only six days. Although eighty-nine years old, he had, during the preceding summer, made what he called a pleasure trip to Italy, but which actually was a visit to the scientific establishments and an investigation of their work. The fatigue of the trip proved too much for him, and shortly after his return he became seriously ill. A good long rest at his country place restored his health. Feeling quite strong, he came back to his Paris residence to take part in a vote at the Academy of Sciences; he had also arranged to give, on March 24th, a lecture in which particular mention was to be made of Canada and of the honor conferred upon him by giving his name to one of the Rocky Mountain peaks. Alas! Six days before the date of the lecture the recent illness had returned and carried him away.

“Born in 1819, Laussedat was admitted to the Ecole Polytechnique in 1838, graduating in 1840 as an officer of Engineers. As Captain of Engineers he was detailed in 1846-48 to survey the Pyrennées Mountains in connection with the Franco-Spanish boundary. It was while making this survey that he conceived the idea of the application of perspective to surveying, his perspectives being drawn by means of a camera lucida of his own invention. After the discovery of Photography, the method developed into photographic surveying, or, as it is now called, Photogrammetry.

"From 1856 to 1870 he was Professor of Astronomy and Geodesy at the Ecole Polytechnique; Commissioner for the Franco-German boundary in 1871-73; Director of Studies at the Ecole Polytechnique in 1879-81, and from 1881 to 1900 Director of the Conservatoire des Arts et Métiers, the French counterpart of the South Kensington Museum. He was Grand Cross of the Legion of Honour, Colonel of Engineers and a member of the Academy of Sciences. The list of scientific societies, French and Foreign, who considered it an honor to enroll him as a member and were proud to have him as president or vice-president, is too long to be reproduced here.

"He was best known as the father of Photogrammetry. He was first to lay out the principles of the art and to indicate its applications. His papers, published in 1854, 1859 and 1864, contain a full treatment of the subject and little has been added to his methods since their publication. It was in Canada that Photogrammetry received its first practical and extensive application. Laussedat lived long enough to see it adopted in many countries, but Canada had always a warm place in his heart. The trees and plants of the Canadian Rockies, which he owed to a delicate attention of our President, were shown with pride to every visitor to his park, and were the object of special care.

“He was a most distinguished scientist and an indefatigable worker. He has contributed innumerable articles to scientific papers and periodicals. He was a favorite lecturer and the author of a large number of books. One of his last works, "Researches on Topographic Instruments, Methods and Drawing," a masterly treatise of 950 pages, large octavo, was written and published after he was eighty years old. Up to his last day

he maintained an active correspondence with his numerous friends and admirers in France, as well as abroad.

"Few men in France have been so much in the public eye as Laussedat. He counted among his friends almost every Frenchman who had become prominent either as a scientist, a literateur, an artist or otherwise. An optimist and an enthusiast, he was one of those few fortunate beings who can see only the bright side of human nature; to hear him, his friends were perfection, and all that he knew of them was to their advantage.

“A staunch Republican, like most of the graduates of the Ecole Polytechnique, he was so shocked by the coup d'etat when Napoleon III. forcibly dissolved parliament and seized the throne, that he tendered his resignation to his friend, Marshal Vaillant, one of the new emperor's minister. Vaillant knew Laussedat and appreciated his immense talent: he dissuaded him from this rash step.

"In September, 1852, he married a Miss Bruel. The coming clash between Austria and the allied armies of France and Italy was already foreseen. Of a practical turn of mind, Laussedat thought that this was a capital opportunity of combining business and pleasure by selecting for the wedding trip the probable scene of the struggle, the Austrian province of Venetia. It so happened that in their rambles the couple came to the neighborhood of fortifications; the unfeeling Austrian police pretended that their behaviour was suspicious and rudely interrupted the honeymoon by clapping them in jail. How, before being searched, Laussedat managed to get rid of his surveying instruments and how he demonstrated that he and his wife were just innocent tourists, is another story. They were eventually released, but not without a gentle hint to clear out before the authorities had time to change their mind. The result of this early experience for Mrs. Laussedat was a deep-rooted conviction that her husband's zeal and impulsive temperament might at times carry him too far and henceforth she always took care to counsel prudence and circumspection.

“But there is no watchfulness so constant that it will never relax and it might do so, for instance, just as a balloon ascension was preparing for the elucidation of some obscure point of meteorology. Who could resist such a temptation? Surely not Laussedat, and could any one be blamed if, after a rough landing, he had to be placed in the doctor's hands?

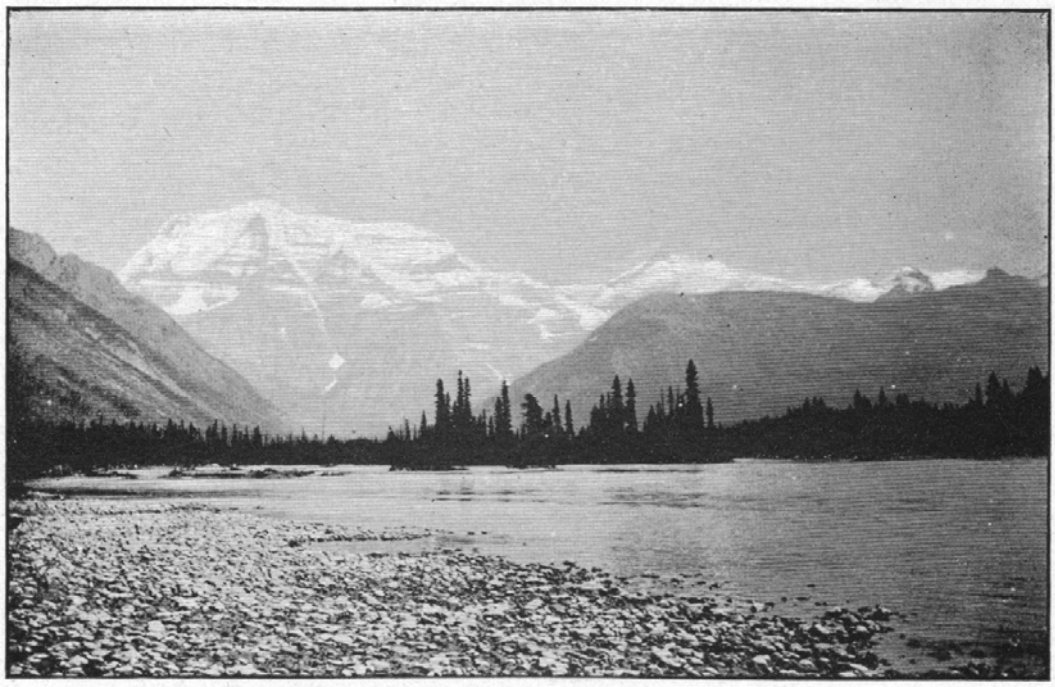
“The lovable nature of the man was best appreciated in the intimacy of his home. Those who have had the good fortune to enjoy the hospitality of his beautiful country place, “The Priory," remember him as a delightful conversationalist. Having known personally all the prominent men of his time and been an actor in most of the great events of French contemporary history, he had an inexhaustible fund to draw upon. To listen to him telling his reminiscences of men and things and explaining what had taken place behind the scenes, was a treat never to be forgotten.

E. D."

ALPINE NOTES.

Expedition To Mt. Robson.

In the Report of the Geological Survey of Canada for 1899 (Part D, Vol. XI), appears the following note by James McEvoy, B.A. Ss., who was in charge of an expedition to examine the geology and natural resources of the country traversed by the Yellow-Head Pass route from Edmonton to Tête Jaune Cache:—



McEvoy, James

Figure 52 Mt. Robson, Grand Fork, Fraser River

“Looking up Grand Fork is the most imposing view met with on the whole route. Great mountains are on every hand, but over all stands Robson Peak, ' a giant among giants and immeasurably supreme.' This, as well as the following, is from the description of the mountain by Milton and Cheadle.3 ' When we first caught sight of it, a shroud of mist partially enveloped the summit, but this presently rolled away, and we saw its upper portion dimmed by a necklace of feathery clouds, beyond which its pointed apex of ice, glittering in the morning sun, shot up into the blue heaven above.' The top of the mountain is usually completely hidden and rarely indeed is it seen entirely free from clouds. The actual height of the peak is 13,700 feet, or 10,750 feet above the valley. The face of the mountain is strongly marked by horizontal lines, due to the unequal weathering of the rocks, and has the appearance of a perpendicular wall. From the summit to the base on the Grand Fork, a height of over 10,500 feet, the slope is over 60° to the horizontal.

"Although Robson Peak has been long known, its height had never been determined, nor was it supposed to be particularly notable in that respect, but now since the height of Alts. Brown, Hooker and Murchison have been proved to be greatly exaggerated, it has the distinction of being the highest known peak in the Canadian Rockies.

" It is interesting to note that in a paper read before the Royal Society of Canada by Dr. G. M. Dawson, the following paragraph occurs: 'The Kamloops Indians affirm that the very highest mountain they know is on the north side of the valley at Tête Jaune Cache, about ten miles from the valley. This is named Yuh-hai-kas-kun, from the appearance of a spiral road running up it.' The mountain referred to is undoubtedly Robson Peak, as it is only fifteen miles north from the valley at Tête Jaune Cache. The 'spiral road' is probably an Indian's imperfect description of the horizontal lines on the face of the mountain. As far as can be learned no one, either Indian or white, has ever succeeded in reaching the summit."

The accompanying illustration has kindly been loaned to the Journal by the Director of the Geological Survey.

Early last August an expedition consisting of Prof. A. P. Coleman of Toronto

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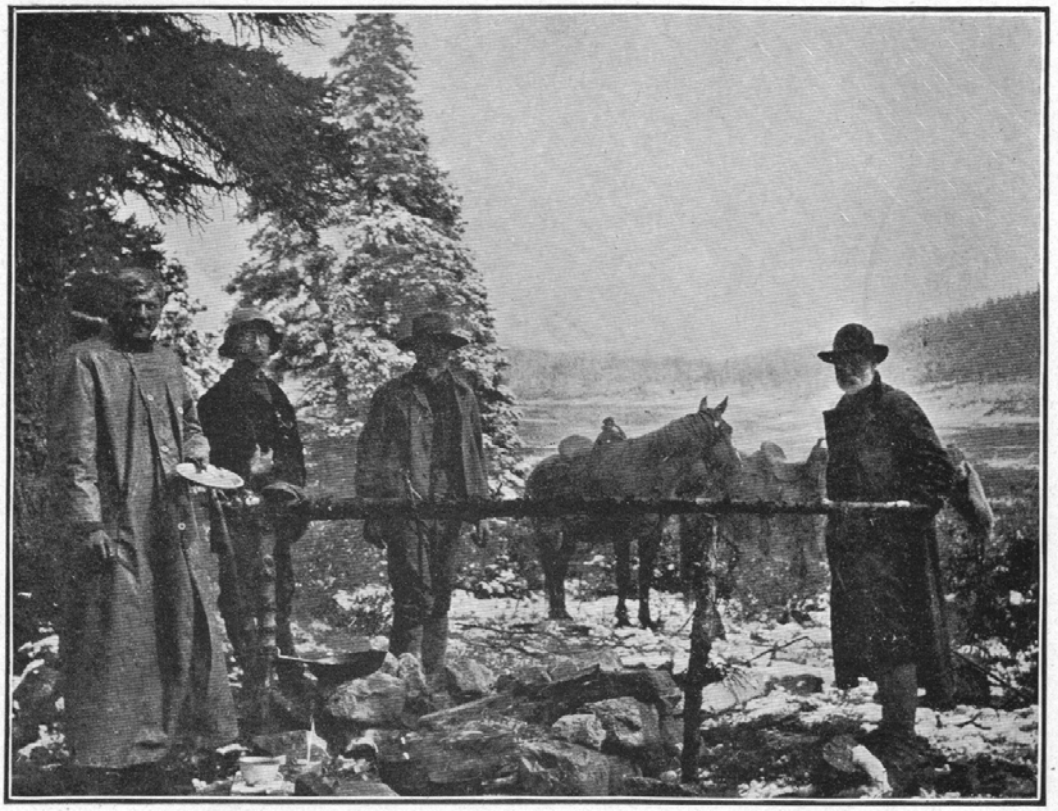
[3] The North-West Passage by Land, pp. 252-253.

University, Mr. L. Q. Coleman and the Rev. Geo. B. Kinney, all active members of the Club, started from Laggan, a station on the Canadian Pacific Railway, with the intention of making the first ascent of this virgin peak, estimated to be 180 miles distant from the starting point.



Mary T. S. Schaffer, Photo

PROF. A. P. COLEMAN AND PARTY ON WILCOX PASS

Schaffer, Mary T.S.

Figure 53 Prof. A.P. Coleman and party on Wilcox Pass

The party followed the Pipestone and Siffleur Rivers to the Saskatchewan; then along the south bank of that stream, fording its tributaries, Mistaya River and Little Fork River. Finally the Saskatchewan itself was forded, and followed northward beneath the towering mass of Mt. Wilson. It was again crossed above the West Branch, and the party was soon climbing the side of Mt. Saskatchewan, past the canyons and waterfalls at the head of the stream, to the watershed between the Saskatchewan and Sun Wapta Rivers; above which towered the snow and ice-clad heights of Mt. Athabaska. The watershed is locally known as Wilcox Pass. Before reaching this spot much rainy and bad weather had been encountered and it now climaxed in a wild snow-storm.

Descending from the Wilcox Pass by the valley of the Sun Wapta, over widespread shingle and mud flats and by trails badly obstructed by dead-fall or almost obscured by the growth of the young jack-pine, the main stream of the Athabaska was reached. This stream was followed to the junction of Miette River, the party being considerably delayed by brulé and second growth.

After a vain search for a ferry, which it was reported would be found near the mouth of the Miette, the Athabaska was crossed by rafting. Now ascending the Miette

to its source in Yellow-Head Lake, the pass was traversed and the headwaters of the Fraser River followed to Moose Lake. Continuing down the Fraser, at the junction of the Grand Fork the party obtained the first view of the "imperial mountain of our aspiration: one vast, lone, snow-clad, cloud-capped peak, wrapped in the solitude of centuries."

A day was spent seeking a short route from the Fraser to a tree-line camp on the flanks of the mountain. In the end, however, a path had to be cut, by dint of much chopping, up the Grand Fork, with traces of an old-time trail for guidance; but so sinuous and rough that it was with great difficulty pack-ponies could be taken over it to a camp beside the rushing torrent at the base of the mountain.

Two more days were spent searching for a route of ascent; and when, at length, the party had with great difficulty established a camp at timber-line, snow covered the ground and was still falling. Next morning it was so deep that the impossibility of an ascent within the limit of the time at its disposal was recognized and the party was compelled to admit defeat. It was doubtful if the heavy snow-fall would permit of an attempt being made, even if it had been possible to wait for an opportunity. "Perhaps the spirit that dwells in this towering fortress, alone and undisturbed, defies molestation and works with Fate against him who aspires to knock at its ancient door."

The Journal is indebted to Mr.A.P.. Coleman for the above notes, and sympathizes most sincerely with the failure of the plucky attempt to reach the summit of Mt. Robson, which involved an immense amount of hard work and much privation, as well as a considerable outlay. Should the party again attempt this achievement, as it is understood is intended, it is hoped the past experience will prove of value and lead its next expedition to a successful issue.

(editor)

Mount Douglas.

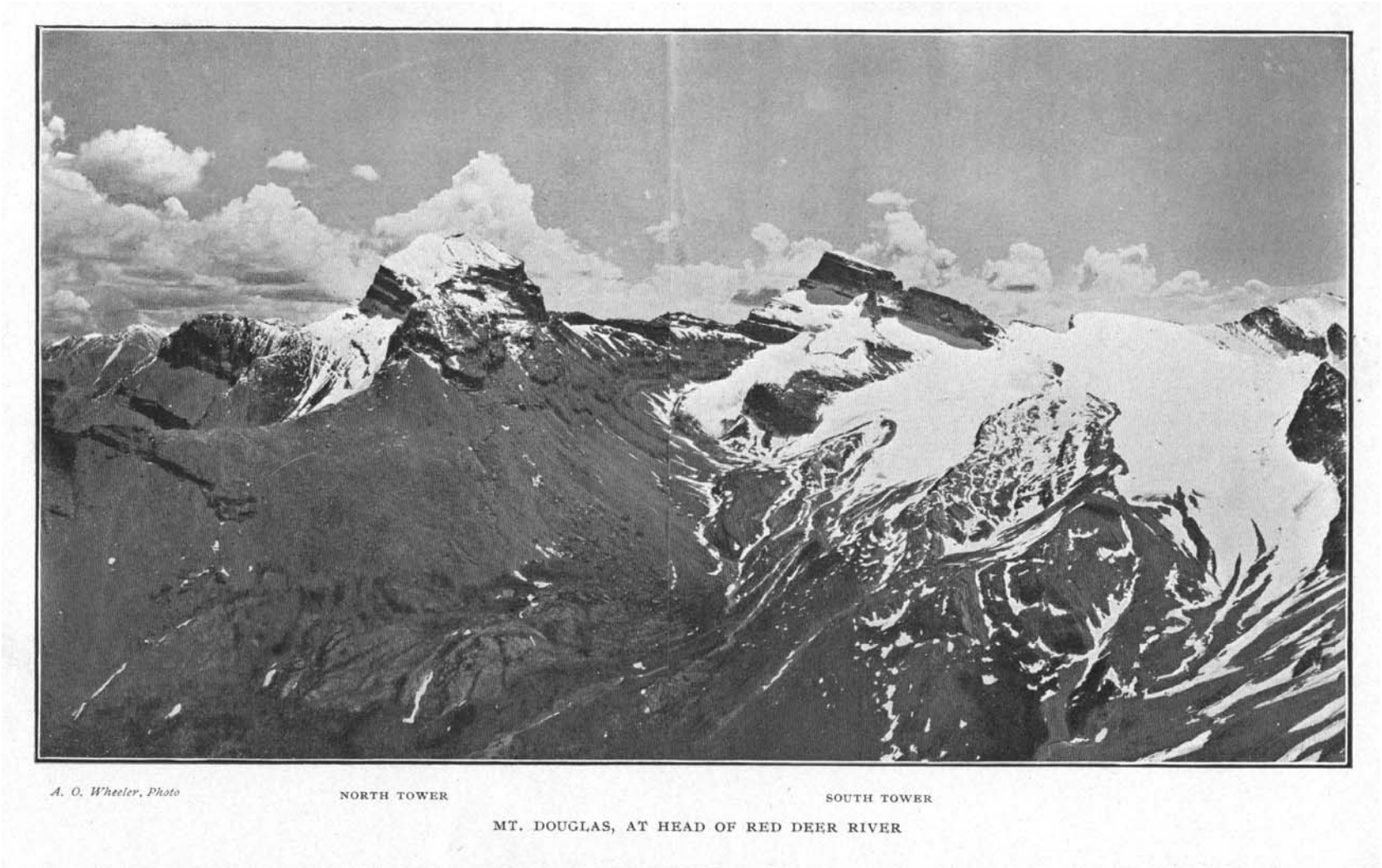
First Ascent Of North Tower. Attempt To Ascend South Tower.

A party consisting of L. M. Earle of the English Alpine Club and two ladies, accompanied by the Swiss guides Edouard Feuz Sr., and Gottfried Feuz, started from Lake Louise Chalet late in August or early in September of last year with the intention of making an attempt to ascend the still unconquered South Tower of Mt. Douglas.

The following notes are from a description of the expedition supplied by Mr. Earle:—

The party reached the headwaters of the Red Deer River by way of the Pipestone and Little Pipestone Valleys and camped on the third day at the head of a small valley leading southeast from the main valley and immediately under the North Tower of Mount Douglas on the west side. The peak now rose between the camp and the bed of the long lake directly below it on the east side, here referred to as “Lake Valley."

The North Tower was first ascended, and, though no great difficulty was experienced, much care was required owing to the looseness of the rock. The route selected was not the easiest one and led to some rather awkward scrambling on the first buttress: time 5 1/4 hours from camp to summit; barometer altitude 10,900 feet. The altitude of the North Tower, according to the Topographical Survey, is 11,015 feet. The summit commands an exceedingly fine view. There was no indication of a previous ascent.



Wheeler, A.O.

Figure 54 Mt. Douglas, At head of Red Deer River

An attempt was next made to ascend the South Tower. After viewing the contour of the South Peak through strong glasses, both from the North Peak and from the névé basin to the southeast, the general opinion was that it seemed almost certain that the mountain descends in sheer precipices to Lake Valley.

From Mount Douglas there runs a rocky ridge in a southwesterly direction, containing two well-marked gaps. From the first of these, which is well under the mass of the South Tower, the attempt was made. The gap was reached in 3 1/2 hours from the camp; first over the glacier flowing northwest from the base of the peak, the last slope being very steep and covered with treacherous snow, and then across a little rocky bay.

From the gap a rather repellant looking chimney leads upward. It was tried in turn but without success, and was not conquered until Edouard Feuz stood upon his nephew's shoulders and he on Mr. Earle's. Another short but difficult crack led to a good platform, which, by the aid of sundry ropes, was attained by all. Here a neck of easy rock connected with the base of some steep slabs. The party crawled up these for a short distance with but few handholds and no anchorage; and then came the impasse: the only possible way up was by a short but slightly overhanging chimney.

Had the rock been firm, or had there been any possibility of giving the leader a shoulder up, the difficulty would have been overcome; but every hold broke away as it was tried and the nature of the place precluded any possibility of assisting the leader.

Greatly disappointed, the party was compelled to retreat and descended to the gap, leaving eighty feet of Buckingham's best rope hanging from the chimney for the benefit of the next party.

According to the measurements of the Topographical Survey the height of the South Tower is 11,220 feet. (Editor)

OFFICIAL SECTION.

REPORT OF SECRETARY.

The Alpine Club of Canada passed its second birthday on March 28th. The original membership of 79 has increased to 400, of whom eight are honorary, and eleven are associate members. The new honorary members are the Rt. Hon James Bryce, His British Majesty's Ambassador at Washington, and the Rev. James Outram, author of "In the Heart of the Canadian Rockies." One new associate member was added, Mr. Schiller Flindt. The only loss by death came to the honorary list in the decease of Col. Laussedat, the eminent and venerable French scientist.

The constituency of the Club has extended to the Orient and Antipodes: India, Australia, South Africa, Holland and Switzerland and a dozen of the United States are represented in its membership, as well as Britain and all Canada.

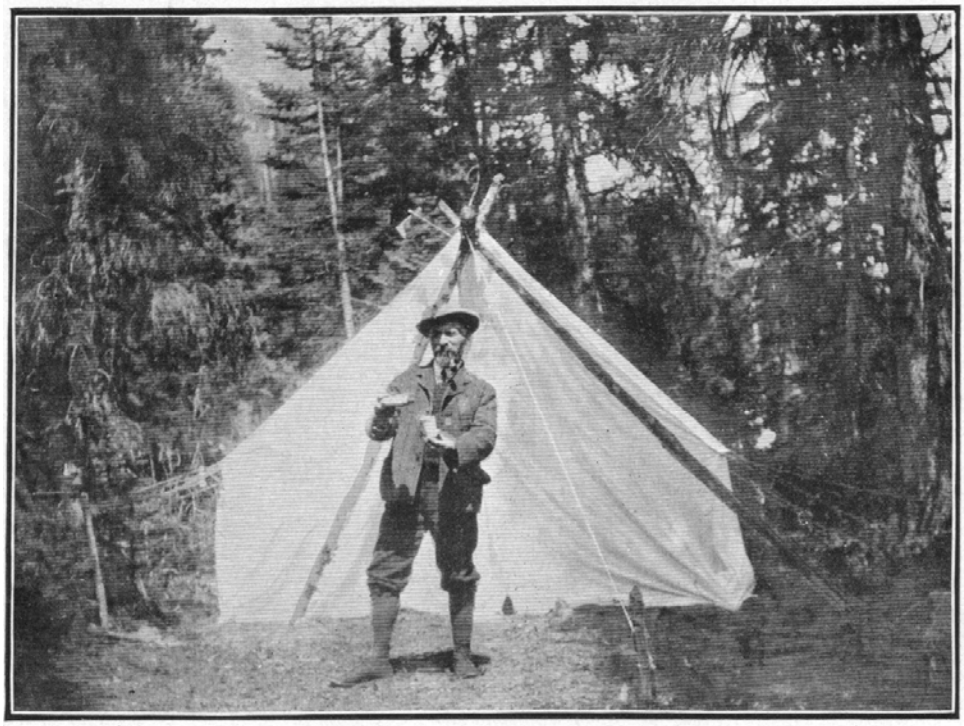
The second annual meet was held during the first week in July in Paradise Valley with 150 members and guests in attendance. Owing to the heavy snowfalls of the previous winter and an unusually late spring, the meadow at the head of the valley was too wet for an encampment, and it was necessary to hew out a place in the unbroken forest at the base of Mt. Aberdeen. This involved very considerable though speedy labour: but the trees were felled, the ground prepared, the tents erected and everything made comfortable by the opening day. In spite of bad weather—snow and rain and thunder—climbing began on the day appointed, and there was not one beginner who failed to accomplish one of the official climbs, Mts. Temple and Aberdeen. The total number qualifying for active membership was 66; also a large number of active members climbed these or other peaks every day. The President and his staff of mountaineers considered that the character of the climbing was greatly in advance of that done the previous year. The round ascents were made in less time; physical hardiness was more in evidence; and the camp-fire, that supreme test of good-fellowship, if not of mountaineering-stuff, witnessed no dampened buoyancy in those of the company who had spent the day on glacier and névé and rock. This was the general rule. The excursions, too, over the difficult snow-passes, notably Abbot Pass, were much more strenuous than the excursions from Yoho Pass, and, on the whole, the achievements of Paradise Valley Camp showed marked progress in amateur mountaineering.

The photographic exhibition, at which sixty pictures were shown by nine exhibitors, was an interesting feature of the meet. The prizes of a gentleman's and a lady's ice-axes were awarded to the President and to Mr. Bridgland, but all the exhibits reached a high standard of excellence.

The annual meeting was held around the camp-fire on the evening of July 9th. The chief business of the meeting was a resolve to build in the near future a Club House at Banff, where the Club's headquarters ought to be. Some fifty members promised to contribute $10.00 each to the scheme. A suitable site of three and a half acres on the side of Sulphur Mountain has been generously leased us by the Dominion government; and we expect soon to have there a building worthy of the Club, which shall give us a new visibility and a home to our growing library. Such a Club House will be a headquarters at which to rally our members for alpine work in the mountains, and from which to organize camps at advantageous points; so that members may make up parties

and go from one to the other at times suitable to them, finding good accommodation at each. The President at the last annual meeting threw out a suggestion which is likely to take tangible shape at no remote day, namely: that a series of camps in different climbing-centres be established each summer, for the better convenience of the whole Club, which is growing too large for a single annual session of only one week's climbing. This is a matter of development, and is dependent upon the erection of a Club House.

A happy and hearty transaction of the meeting was the standing vote, bestowing honorary membership upon the Rt. Hon. James Bryce, a past President of the English Alpine Club, a veteran mountaineer, who has been honored by having one of the loftiest mountains in the Rockies named after him.



P. D. McTavish, Photo

THE MORNING HORN AT CAMP

McTavish, P.D.

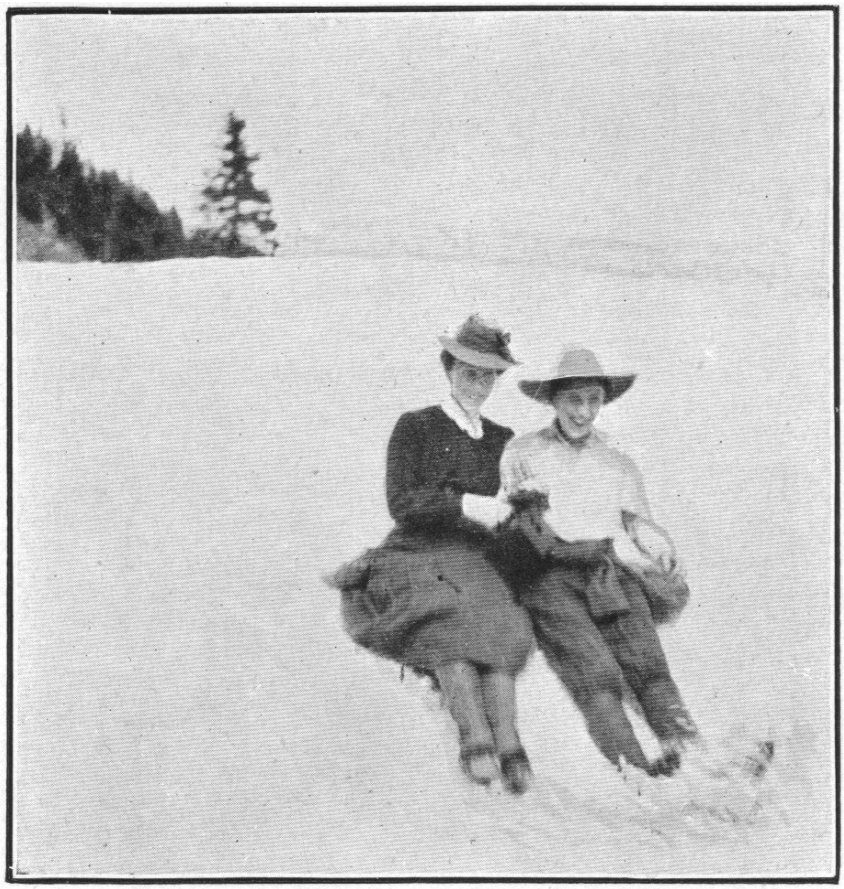
Figure 55 The Morning Horn at Camp

Resolutions of thanks were cordially passed to the Canadian Pacific Railway Company, the Alberta Government and the Federal Government for generous assistance to the Camp, without which it had not been possible to provide so excellent a school of mountaineering. There is no doubt about the interest which such gifts yield in something more than money to the nation. I quote Milton's words applied by Tyndall to mountaineering: "Such exercises constitute a good means of making them healthy, nimble, and well in breath, and of inspiring them with a gallant and fearless courage, which being tempered with seasonable precepts of true fortitude and patience, shall turn into a native and heroic valour, and make them hate the cowardice of wrongdoing."

A kindly feature of the meeting which was adjourned to the following evening, were two resolutions of appreciation presented to the Secretary: and Mrs. Wheeler, the wife of the President, who in addition was presented with the perpetual freedom of Camp and Club House. These resolutions were afterwards beautifully illuminated on

vellum, Mrs. Wheeler's being placed in a silver casket accompanied by a silver key. The President also, received a gold watch-chain and compass in token of the Club's appreciation of his arduous toil in the interest of organized mountaineering in Canada.

After the Camp in Paradise Valley had dispersed, the President received an invitation from the Alpine Club of England to be its guest for three days at its Jubilee on the 16th, 17th and 18th of December, 1907, and though greatly pressed for time, Mr. Wheeler was able to accept the invitation and make a hasty visit to the Club in London, where he was received with warm hospitality, and in spite of the limitations of time, managed to get a day or two in Switzerland to see with Canadian eyes the Swiss Alps. Cordial relations with British mountaineers have been established through this visit, the first fruits of which will appear when the British Association meets in Canada next year. A party of Alpinists are already arranging to climb in the Rockies under the auspices of the Alpine Club of Canada, before or after the great meetings to be held in Winnipeg.



C. W. Thompson Photo

DELIGHTS OF THE "GLISSADE"

Thompson, C.W.

Figure 56 Delights of the "Glissade"

Upon his return to Canada the President received the distinction of honorary membership from this Club, mother of organized mountaineering and first of the one hundred and sixty-eight alpine clubs in the world. By this courtesy, Mr. Wheeler is adopted into a distinguished alpine fraternity comprising men eminent in science,

letters, law, the Church, and every intellectual realm in Britain. The honor is also to the Club over which he so devotedly presides, and is the more marked that it is the first of the kind that has been bestowed upon a representative from any of the British dominions beyond the seas.

Local meetings of the Club have been held as follows: one in Calgary and two in Winnipeg where also two meetings of the Executive Committee were held. At all of these the President was present. Taking advantage of Mr. Wheeler's visit to London, the Executive appropriated $50.00 of the Club's funds to the purchase of rare volumes, now out of print, dealing with the early history of the Canadian Mountains. The recent changes in the Constitution were considered, each change having its birth not in the Executive, but in the Club itself, and taking shape in the form of an amendment by suggestion from members. These have been voted upon and are now Club law. Amendments two and three are too obviously necessary in this so large and democratic organization, for any comment; number one requires explanation. When a glacier region was discovered in the Cascade Range on the Pacific Coast, where climbing began almost at sea-level, it was evident that the ascent of a glacier-hung peak, whose altitude was below the 10,000 limit, was ample justification for active membership. It will be seen at a glance that the new clause impartially meets the requirements, and is thus an improvement in the Constitution.

The report would be incomplete without reference to the Club's modest social functions, functions necessarily local by reason of its widely scattered constituency. On the President's return from England he was the guest of the Winnipeg members at a delightful little dinner at the Tea Kettle Inn, when some thirty guests were present. The occasion was made the opportunity for an address, giving an account of his visit to attend the Jubilee Celebration and subsequent trip to Switzerland. A day later he lectured on the Canadian Mountains as a recreation ground at the Collegiate Institute of Portage la Prairie. The lecture was very well attended and half of the net proceeds were turned in to the Club House Fund. Several small reunions were held during the year by the Winnipeg members.

Calgary was not behind in matters of social amenities. Last February the second of the Annual Alpine Club Dinners was held at Horchover's Restaurant, sixty-five members and guests being present. On this occasion, also, an account was given of the Alpine Club's Jubilee Celebration. In April the President lectured to the A.Y.P.A. on the ""Wonderland of Canada." The house was crowded to the doors and many turned away. The result has been an addition to membership of a number of fine, athletic young men who give promise of "doing things" in the near future.

The Journal has met with a cordial reception. Orders for copies of Volume I are still received from various places in Canada and the United States. We are not unaware that it might be better, and we are not without hope that soon it will rank with any alpine journal in the world. The second volume will be placed in your hands at the Camp, and we may be pardoned if we congratulate ourselves on the excellence of its scientific articles. We would be grateful for any suggestion concerning the best means of discovering the literary talent undoubtedly existing among the members of the Club.

The Alpine Club of Canada: it is a good name and a significant one to quicken patriotism and to inspire a desire for experience in the hardships and delights of climbing mountains. There is much, very much, in a name, and the soul of Shakespeare would agree. We do not suppose that this Club will be the only one ever in Canada. No doubt in the next hundred or two hundred years, a great many mountaineering clubs will flourish in numerical strength and in esprit de corps: for mountaineering is going to be more and more a Canadian sport, and when Canada is as populous as the motherland, the Rockies of Canada will be as popular as the Swiss Alps. But the Alpine Club of Canada will still be the national mountaineering club, and will have gathered to itself a noble succession of Canada's good men in every high and useful vocation of life; will have added a worthy somewhat to Canadian literature, art and science.

Respectfully submitted,

Elizabeth Parker, Secretary.

STATEMENT OF TREASURER.

From 1st July, 1907, to 22nd May, 1908. Receipts.

Balance on Hand 1st July, 1907.....$	304.08
Associate Members' fees	150.00
Active Members' fees	655.00
Graduating Members' fees	122.50
Subscribing Members' fees	6.00
Life Members' fees	50.00
Proceeds from Camp in Paradise Valley, 1907.....	163.35
Bank interest	7.27
Total	$1458.20

Disbursements.

Printing, Stationery, etc.	$ 139.01
Typewriting assistance	87.50
Books for Library	59.08
Postage, Express and Exchange	. 58.12
Grant to President on account of his expenses to Alpine Club Jubilee in London	200.00
Printing and distributing of Journal for 1907 over sales arid previous payment	346.27
Printing and distributing Alpine Herald.	25.94
Total	$916.02
Balance on hand	$542.18
	$1458.20

D. H. Laird, Treasurer.

Winnipeg, 23rd May, 1908.

REPORT OF LIBRARIAN

There are now forty-two books and fifteen minor publications in the Library, besides seven volumes (1894-1907) of the Alpine Journal, the official organ issued quarterly by the English Alpine Club. This shows an increase over last year of thirty-two volumes. Of the whole forty-two, twenty-five were acquired by gift.

Exchanges have been made with: The English Alpine Club, the Scottish Mountaineering Club, the American Alpine Club, the Appalachian Club, the Sierra Club, the Mazama Club and the Smithsonian Institution. The English Alpine Club, also, presented the Library with the seven volumes of "The Alpine Journal" mentioned, and the Sierra Club of San Francisco with Vol. V and Nos. 1, 2 and 3 of Vol. VI. A complete set of the former publication may be had through a second-hand book seller in London for one hundred and twenty-seven dollars ($127.00). The price will increase as the Journal becomes more difficult to obtain every year. The matter of securing it for our Library will come before the Club at the Annual Meeting.

At a meeting of the Executive Committee the sum of fifty dollars ($50.00) was voted for the purchase of some rare books, dealing with the early history of the Rocky Mountains, and Mr. Wheeler was able to secure fourteen volumes while in London attending the Alpine Jubilee. The most important of those purchased were: Sir Alexander Mackenzie's very rare Journal; Sir George Simpson's "A Trip Round the World," and Ross Cox's valuable book. We have a dealer on the lookout for a complete copy of Palliser's Journal.

Too much stress cannot be laid on the importance of the Club library; and no reasonable opportunity should be lost, whereby we can obtain works of value dealing with mountains and mountaineering, on historical, scientific or aesthetic lines. We hope that the members will be loyal and help to extend the book-shelves. Soon, we also hope, it will have permanent shelter in the Club House.

CATALOGUE	PRESENTED BY
The Selkirk Range, Vol. I and II. A. O. Wheeler	Mr. Wheeler
Dent's Mountaineering Dent.	Mr. Mitchell
The House of Sport Composite Authorship	
From Old to New Westminster …Sir Sandford Fleming	Sir S. Fleming
Climbing in the Himalayas .J. Norman Collie	Dr. Collie
Climbs and Explorations in the Canadian Rockies Collie and Stutfield	
Ascent of Mt. St. Elias .Filippo de Pilippi	Mr. Tom Wilson
Voyages et Aventures dans 1'Alaska. Frederick Whymper	

CATALOGUE	PRESENTED BY
The Land of the Cliff Dwellers Frederick Chapin	
Mountaineering in Colorado ..Frederick Chapin	
Chamonix and Mt. Blanc Edward Whymper	Mr. Edward Whymper
A Guide to Zermatt and the Matterhorn Edward Whymper	
Camp-fires in the Canadian Rockies Hornaday and Phillips	Mrs. Parker
Glaciers of the Alps Tyndall	
The Playground of Europe ..Sir Leslie Stephen	
The Alps from End to End Sir Martin Conway	
Glaciers of the Canadian Rockies and Selkirks W. H. Sherzer	Dr. Sherzer
Mountain Wild Flowers of Canada Julia W. Henshaw.	Mrs. Henshaw
Alpine Flora of the Canadian Rocky Mountains .Stewardson-Brown and Schäffer	Mrs. Schäffer
Among the Selkirk Glaciers W. Spottswood Green	Mr. Meinecke
California and Alaska and Over the Canadian Pacific Railway William Seward Webb	Mr. Robson
Siberia Samuel Turner	Mr. Turner
Appalachia, Vol. vii, ix and x	Appalachian Club
A Trip Round the World, I and II Sir George Simpson	By purchase
Wanderings of an Artist Paul Kane	
Mission de 1'Oregon De Smet	
Saskatchewan and the Rocky Mountains, 1875 Southesk	
Astoria, 1836 Washington Irving	
The Northwest Passage by Land, 1863 Milton and Cheadle	
Ocean to Ocean, 1872 Geo. M. Grant	
Impressions of a Tenderfoot, 1890 St. Maur	
The Columbia River, Vol. I and II, 1832	

CATALOGUE	PRESENTED BY
Ross Cox	
The Solitary Hunter, 1859 Palliser	
Camps in the Rockies, 1883 Baillie-Grohman	
Mountain and Prairie, 1880 Daniel M. Gordon	
The Great Lone Land Butler	
A Voyage Through North America, 1891 Alexander Mackenzie	

PUBLICATIONS.
Alpina Americana.
Sierra Bulletin, Vol. V and Nos. 1, 2 and 3, Vol. VI.
Alpine Journal, Vols. XVII to XXIV.
The Mountaineers.
Scottish Mountaineering Club Journal.
Modern Glaciers.....Wm. S. Vaux..
The Great Glaciers of the Illecillewaet.. ....Geo. and Wm. S. Vaux
Glacial Studies in the Canadian Rockies and Selkirks.....W. H. Sherzer
Rod and Gun in Canada, April 1906 to date.

Respectfully submitted,
Jean Parker, Librarian.
April 26th, 1908.

REPORT OF 1907 CAMP.

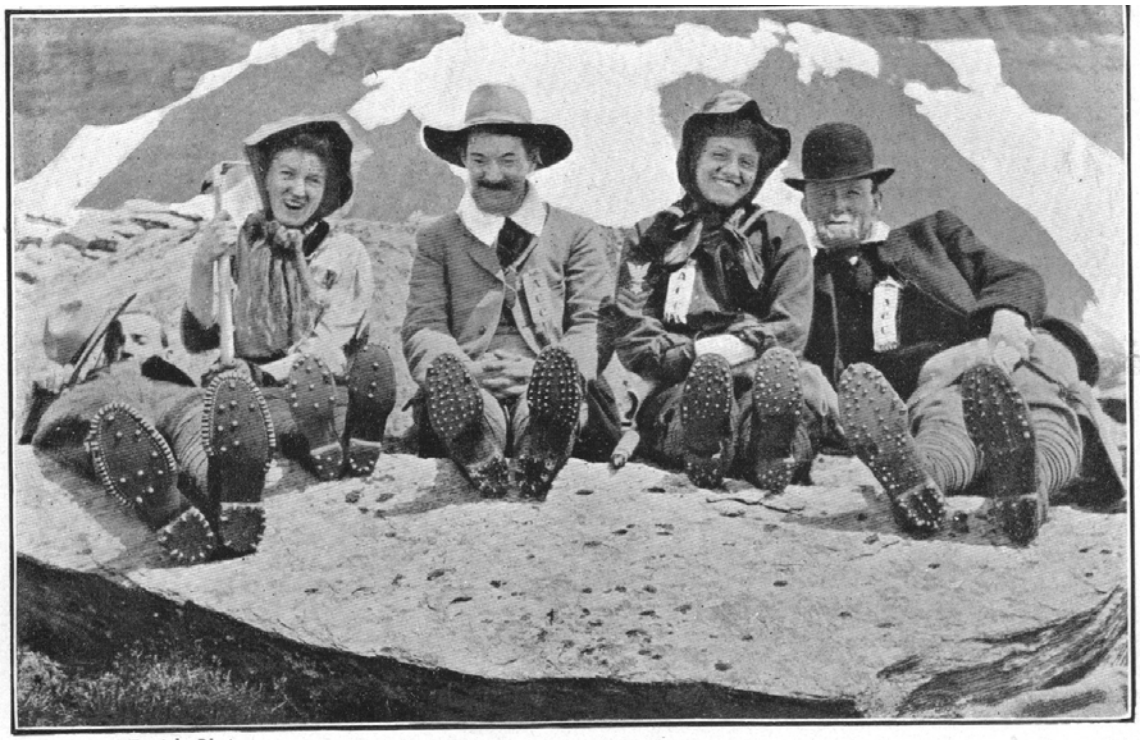
Paradise Valley is situated about six miles easterly, by road and trail, from Laggan Station on the Canadian Pacific Railway, and about three miles from Lake Louise. A characteristic glacier-fed stream dominates the valley for the greater part of its length—some six miles. The source is in the Horseshoe Glacier, a glacier of the piedmont type, surrounded by the towering precipices of Mts. Lefroy, Hungabee, Temple, Eiffel and Pinnacle; from whose hanging glaciers the supply is received.

The valley was so named in 1894 by S. E. S. Allen, D. W. Wilcox and party, who climbed to the summit of the Mitre Pass from the Lake Louise side upon a day that was gloomy and depressing in the extreme. As they reached the summit the sun broke through the clouds and flooded the valley on the eastern side of the pass with light, bringing out so charmingly the varied contrasts in color, of forest and alpland, veined by glittering silver streams, of rock and snow, that it was promptly named "Wastach" or "Paradise" Valley.

It was on the borders of these alp-lands, where the bright green larches grow sparsely in a park-like fashion, and pink and white heather carpets the ground, that it was originally intended to place the Club Camp for 1907. Unfortunately the heavy snowfall of the previous winter and the late spring had left this part of the valley still covered at the time when it became necessary to select a camp ground. An expedition for the purpose was made on the 22nd of June, when the President was accompanied by J. P. Forde and C. W. Rowley. It was now too late to change the locality, so a site was selected lower down the valley, immediately below the slopes of Mt. Aberdeen, and a camp-ground literally carved from the virgin forest, which luckily at this altitude, 6,300 feet above sea level, is not very dense.

Valuable assistance in making the camp-ground was rendered by a trail-gang of the Canadian Pacific Railway Company, sent in by the Resident Engineer, Mr. J. P. Forde, to improve the pony trail up the valley and construct bridges where it crossed the stream. Owing to limitations of space, the camp was divided into two parts: the Main Camp, Official and Ladies' Quarters being on the west side and the Gentlemen's Quarters on the east side of the stream. Official Square was arranged in symmetrical order, as at the Yoho Camp, but the sleeping tents were scattered promiscuously through the woods, and paths leading to them cut through the underbrush.

Everything was in readiness on the opening day, July 4th, and although the morning opened with sleet and rain, from then on the weather was perfect throughout the entire week, and left nothing to be desired in that respect.

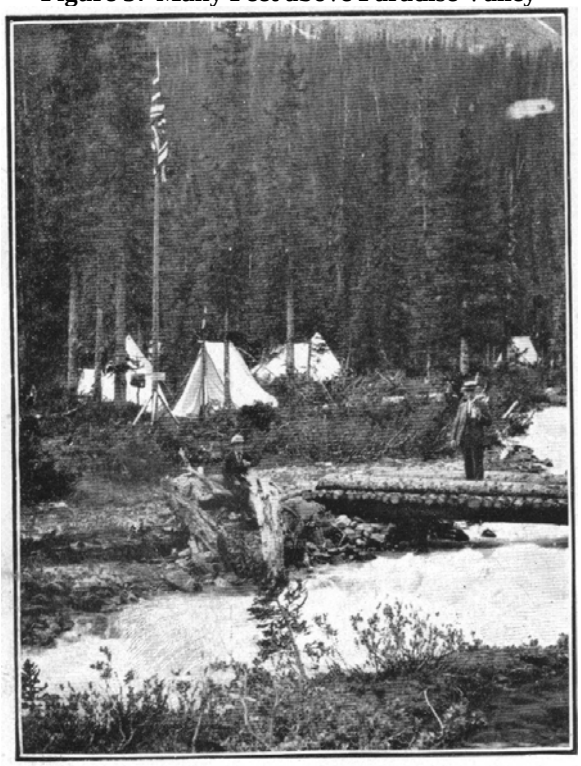


P. D. McTavish, Photo

MANY FEET ABOVE PARADISE VALLEY

McTavish, P.D.

Figure 57 Many Feet above Paradise Valley

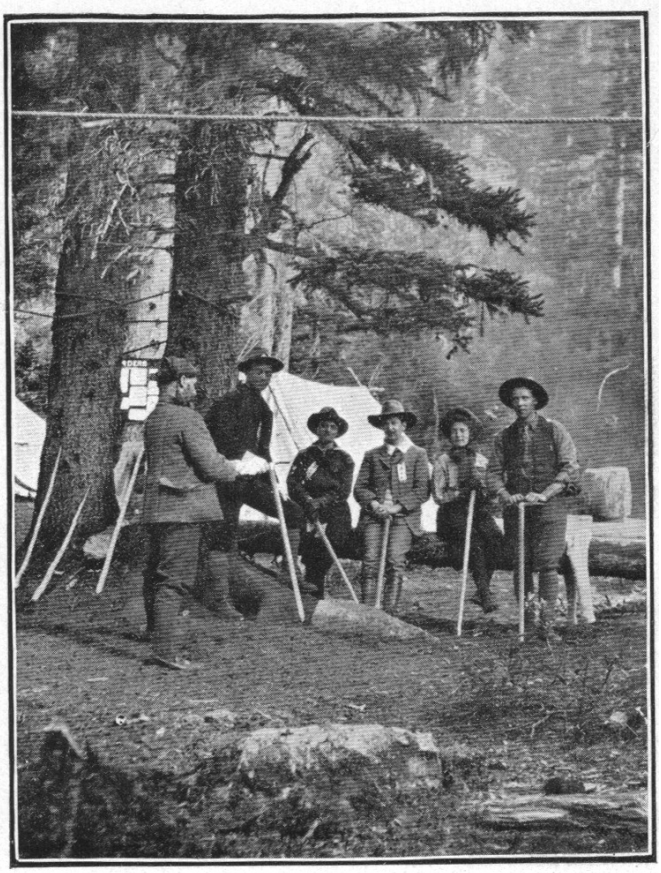


E. S. Barnes, Photo

GENTLEMEN'S QUARTERS

Barnes, E.S.

Figure 58 Gentlemen's Quarters



E. S. Barnes, Photo

ROLL CALL FOR O'HARA

Barnes, E.S.

Figure 59 Roll Call for O'Hara

In all one hundred and fifty-seven persons attended the Camp, inclusive of the staff of assistants.

In Canada the following places were represented:

BRITISH COLUMBIA, Field, Golden, Kelowna, Revelstoke, Vancouver, Victoria.
ALBERTA, Banff, Calgary, High River, Laggan, Lethbridge, Morley, Olds, Stettler.
MANITOBA, Portage la Prairie, Winnipeg, Virden.
NEW BRUNSWICK, St. John.
ONTARIO, Carleton Place, Kingston, London, Ottawa, Toronto.
QUEBEC, Montreal.
SASKATCHEWAN, Indian Head, Regina.

From the United States of America:

CALIFORNIA, Berkeley, Oakland.
ILLINOIS, Galesburg, Lake Forest.

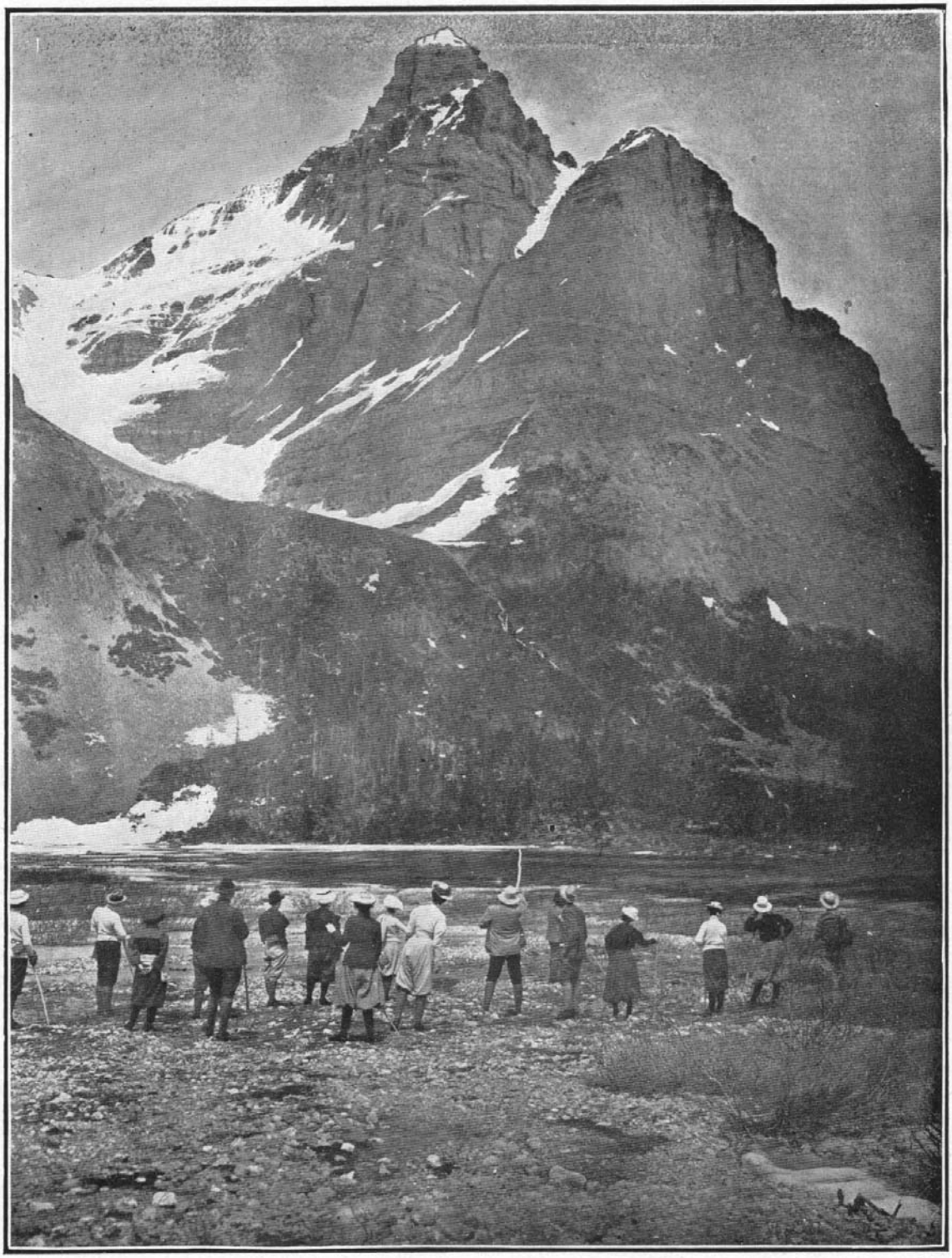
INDIANA, Fairmount.
MASSACHUSETTS, Boston.
NEW YORK, New York.
NORTH DAKOTA, Bismark.
SOUTH DAKOTA, Sioux Falls.
OREGON, Portland.

From Over Seas:

AUSTRALIA, Melbourne.
ENGLAND, Bristol.
SWITZERLAND, Interlaken.

For the great success of the Camp we are indebted, in a considerable measure, to the Dominion Government, the Provincial Government of Alberta, and the Canadian Pacific Railway Company, all of whom, both on this occasion and on the previous one at the Yoho Camp, have given the Club every possible assistance in the endeavour to make known to Canadians the attractions of the Rockies as a field for mountaineering and recreation, and to place the same within easy reach, realizing the great benefit that will accrue from this noble and enthralling sport.

To the Canadian Pacific Railway, moreover, we are grateful; for, by providing a special rate over its lines to the summer Camp, it has conferred a great boon upon many who otherwise could not possibly avail themselves of the opportunities created by the Club. At the same time these Camp visitors are the means of bringing many to the mountain regions, who, through the amounts they spend, provide a revenue for those employed in catering to tourists.

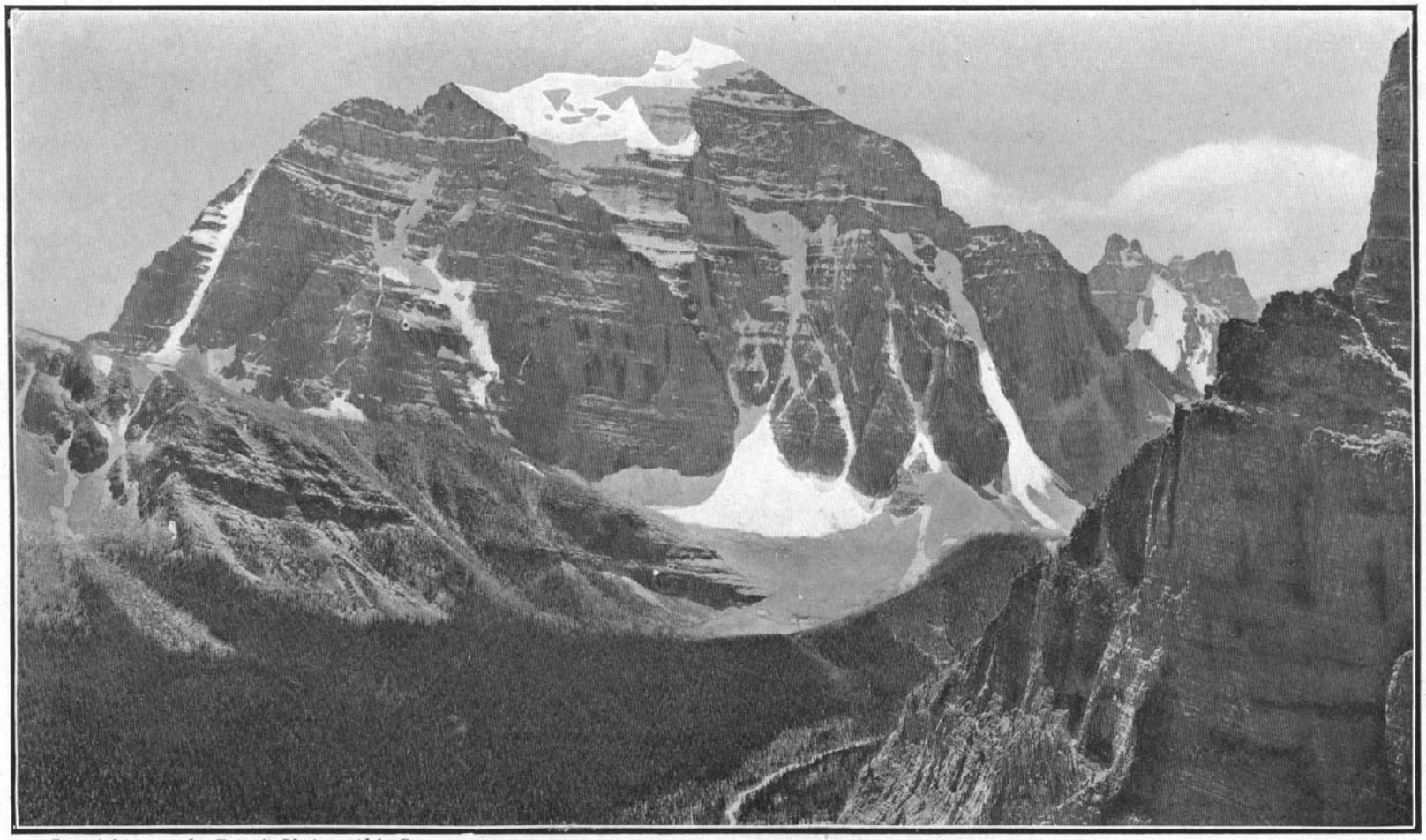


Byron Harmon, Photo

MOUNT ABERDEEN FROM PARADISE VALLEY

Harmon, Byron

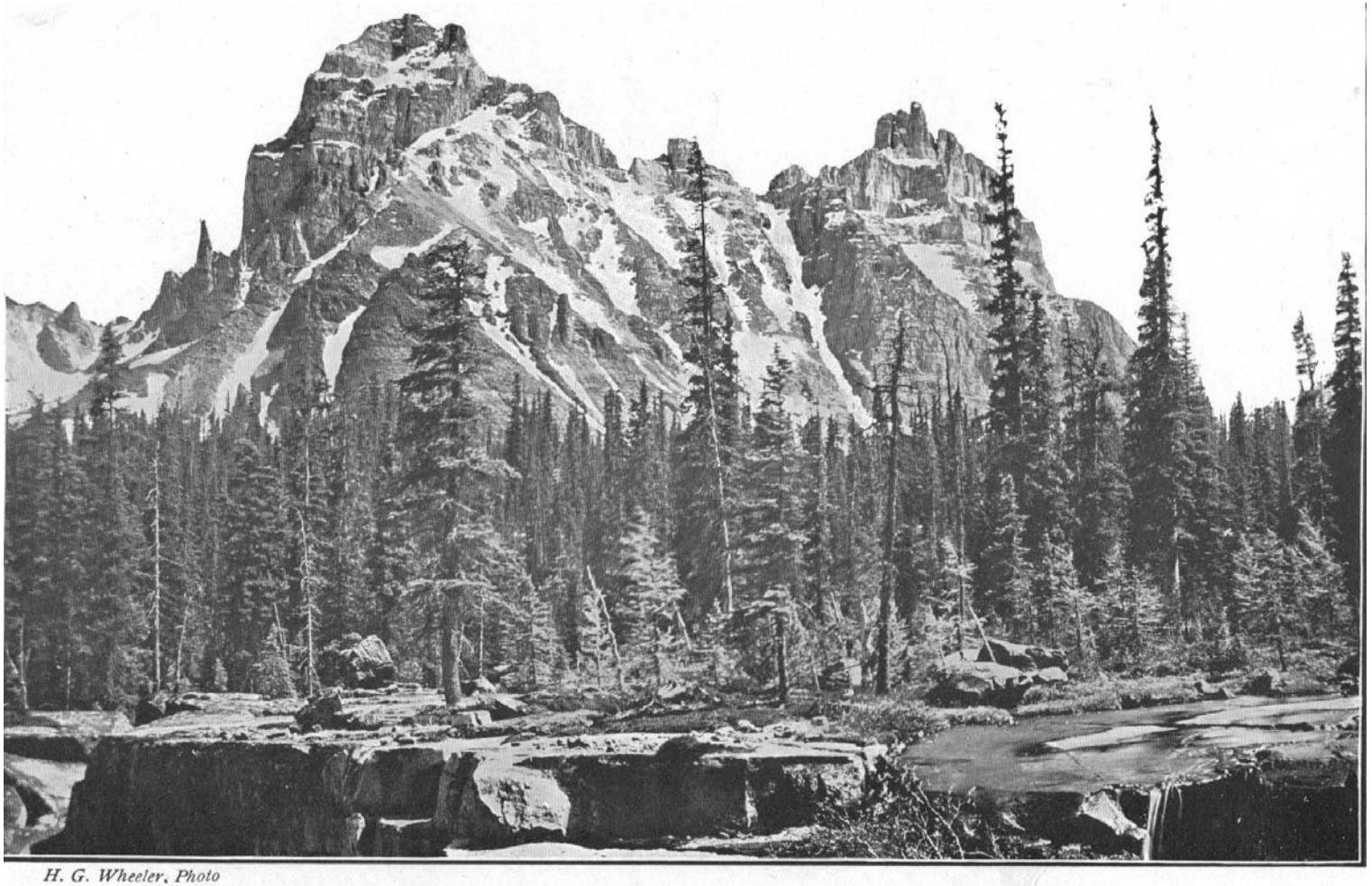
Figure 60 Mount Aberdeen from Paradise Valley



MOUNT TEMPLE AND PARADISE VALLEY, ALBERTA

Detroit Photographic Co.

Figure 61 Mount Temple and Paradise Valley, Alberta



H. G. Wheeler, Photo

PINNACLE MT. FROM PARADISE VALLEY

Wheeler, H.G.

Figure 62 Pinnacle Mt. From Paradise Valley

REPORT OF CHIEF MOUNTAINEER.

The mountaineering was again in charge of M. P. Bridgland, assisted by H. G. Wheeler and E. O. Wheeler. The two Swiss guides, Edouard Feuz and Gottfried Feuz, of Interlaken, who were at the Yoho Camp, were placed at the disposal of the Club by the courtesy of Mr. Hayter Reed, Manager-in-Chief of C.P.R. hotels for the week of the meet. Peter Kaufmann, of Grindelwald, a new Swiss guide in the Canadian Rockies, was also used during the first few days of the Camp, having been sent there to get some knowledge of the mountains in the vicinity of Lake Louise. Later, he was attached to the party of B. S. Comstock by whom he had been retained.

Gentlemen who were placed in responsible positions as guides to various ascents and expeditions were: Rev. J. C. Herdman, Rev. Geo. B. Kinney, P. D. McTavish and D. N. McTavish.

Mts. Temple (11,626 ft.) and Aberdeen (10,340 ft.) were the official climbs by which Graduating members qualified for Active membership. Sixty-six graduated, as follows:

ON MT. ABERDEEN

June 23rd.
Rowley, C. W.
Sutherland, E. G.
Watson,
Miss H. W.
Yeigh, Frank.

July 4th.
Ladler, J. W.

July 5th.
Armstrong, T. B.
Bleasdale, H.
Hart, A. R.
Hart, P. W.
McKillican, W. C
Miller, H. H.
Reid, J. A.
Wilson, L. C.

July 6th.
Bell, F. C.
Bell, Miss N.
Bennett, W. J.
Burch, R. E.
Campbell, Mrs. P. M.

Darling, G.
Gillies, D. A.
Houston, Miss M. B.
Hutchinson, Miss A.
Klingenhagen, Miss A. M.
Le Sueur, Miss E. D.
Pearce, Miss M.
Slee, J. N. H. Smith, B. S.

July 8th.
Adams, Miss C. E.
Anderson, G. A.
Ballantine, A. B.
Craig, H. S.
Foote, Miss A. G.
Hugg, Miss A. M.
Hunt, W. G.
Irvine, Miss H. S.
Lally, C. T.
McClelland, K. D.
McFarlane, Miss M.
McKitterick, M. T.
Paterson, Miss M. E.
Patterson, Miss M. E.
Springate, Miss M.
Walker, F. C.
Walker, W. J. S.

July 9th.
Lennox, Miss M.

July 10th.
Barnes, E. M.
Barnes, Miss L.
Boardman, W. W.
Copeland, C. H.
Lindsay, L.

ON MOUNT TEMPLE.

July 4th.
Sutherland, D. A.
July 6th.
Duval, Miss L. E.,
Graham, T. H,.
Herdman, F. W.,
Humme, P. M.,
McKay, Miss H.,

Morrison J. C.,
Morrison, Mrs. J. C.,
Schofield, E.

July 8th
Thomas, A.V.
July 9th.
Dewey, T. C.
Fiskin, A. D.
Goddard, M.
Hunt, J. S.
Overend, F. C.
July 11th.
(On Mt. Fay)
Haggith, Rev. W. J.

MOUNT ABERDEEN. (10,340 ft.)

The ascent of Aberdeen was commenced at the Main Camp. The parties followed a small watercourse immediately in the rear, to above timber-line, and then ascended steep shale slopes and rock slides to the foot of some perpendicular cliffs of the shoulder, seen directly above, from the Camp. The first parties reached the top of these by an interesting climb up a small chimney and then followed the arête of the final slope. This consisted of a steep snow ridge, leading straight to the summit, which, though requiring care, offered no special difficulty.

After the first two or three days the chimney to the top of the cliffs became slippery with ice owing to the melting snow freezing at night, and, to avoid this, a short detour was taken to the left and the ascent to the arête made at a point about half way between the shoulder and the summit.

The return was by a different route, the parties descending to a low part of the ridge, south of the summit, at head of a long snow-filled couloir. From this point one continuous glissade of nearly 2,000 feet carried the climbers to timber-line. A short tramp over grassy slopes to the watercourse ascended in the morning brought them quickly to the Camp.

MOUNT TEMPLE (11,626 ft.)

Leaving Camp for Mt. Temple, the parties followed the trail up Paradise Valley for a short distance, and, turning to the left, climbed some steep timbered slopes reaching to the base of the southwest shoulder of the mountain. The path then lay over grassy ridges and fallen rocks to the foot of Sentinel Pass. A steep snow slope led to the summit of the pass and offered no greater difficulty than that of cutting steps if the previous night had been cold. After this the route followed was up steep shale slopes, rockslides and snow-filled couloirs till the final arête was reached. The arête, leading directly to the summit of the mountain, was precipitous and very heavily corniced on the side next Moraine Lake. The only precaution necessary was to avoid going too near the edge.

The descent was made by almost the same route, the only variation being, that when possible, glissades were taken down snow slopes instead of climbing down the rocks.

EIFFEL PEAK. (10,091 ft.)

On July 4th a party in charge of the Swiss guide, Peter Kaufmann, made the ascent of Eiffel Peak, which is joined to Pinnacle Mountain by a short arête. No details of this climb can be given owing to the records having been lost, as explained below in the report of the Camp Committee.

PINNACLE MOUNTAIN. (10,062 ft.)

This peak, but little over 10,000 ft., has proved a veritable surprise. Three separate panties tried to make the summit during the summer of 1907 but returned vanquished.

The first attempt was made on June 4th by Mr. J. P. Forde and the guide, Peter Kaufmann. The second was on July 9th by the Rev. J. C. Herdman, Rev. G. B. Kinney, Rev. J. R. Robertson and P. D. McTavish, in charge of the Swiss guide Edouard Feuz Jr.

Later during the summer Dr. Hickson with the two guides Edouard Feuz Jr. and Gottfried Feuz made the third and last attempt for the year, without success.

As a full account of the three climbs is given in the mountaineering section of this number, nothing further need be said here.

MOUNT FAY. (10,612 ft.)

On July 11th a party in charge of the guide Gottfried Feuz made the ascent of Mt. Fay (formerly "Higi", No. 1 of the Ten Peaks) from the camp at Moraine Lake. On this climb the Rev. W. J. Haggith of Banff graduated.

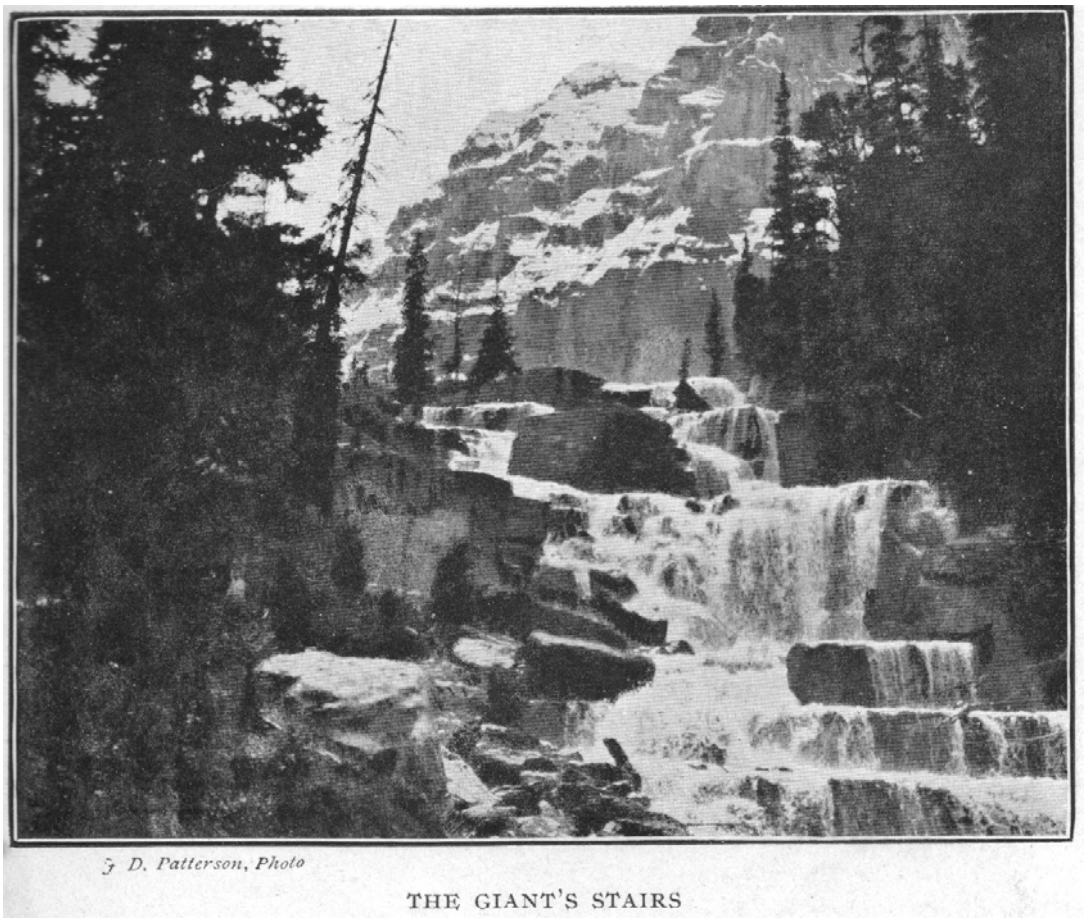
MOUNT VICTORIA. (11,355 ft.)

An attempt was made on July 11th to reach the summit of Mt. Victoria, although it was early in the season for climbing this snow-clad peak. The party was in charge of the guide Edouard Feuz Jr. Crossing the Mitre Pass from Paradise Valley it rounded the shoulder of Mt. Lefroy and ascended the Victoria Glacier to the crest of Abbot Pass. From here the party climbed the shoulder above the pass and reached the arête leading to the summit, but, owing to the bad condition of the snow and lack of time, failed to reach the final peak. The return was made that night to the C.P.R. chalet at Lake Louise.

A word for the future: It is advisable that members coming to the Annual Camps should bring their own ice-axes or alpenstocks. It has been found that the demand is greatly in excess of the available supply, and on each expedition some have to go with makeshifts. This fact renders it unsafe for the whole party. Ice-axes should be ordered through the Executive Committee not later than March of each year. The cost of an ice-axe with the owner's name stamped upon the steel head is about $5.00. It is pleasing to note that many members are taking advantage of the opportunities offered by the Club to obtain these indispensible mountaineering-implements, and at least fifty must now be in the possession of its members.

M. P. Bridgland, Chief Mountaineer.

The above report sets forth shortly a statement of the mountaineering done during the meet. Unfortunately, the Camp papers were lost while in transmission from Winnipeg to Calgary, the piece of baggage in which they had been placed having been stolen. In consequence the details of the various climbs, such as times, routes, etc., have been omitted.

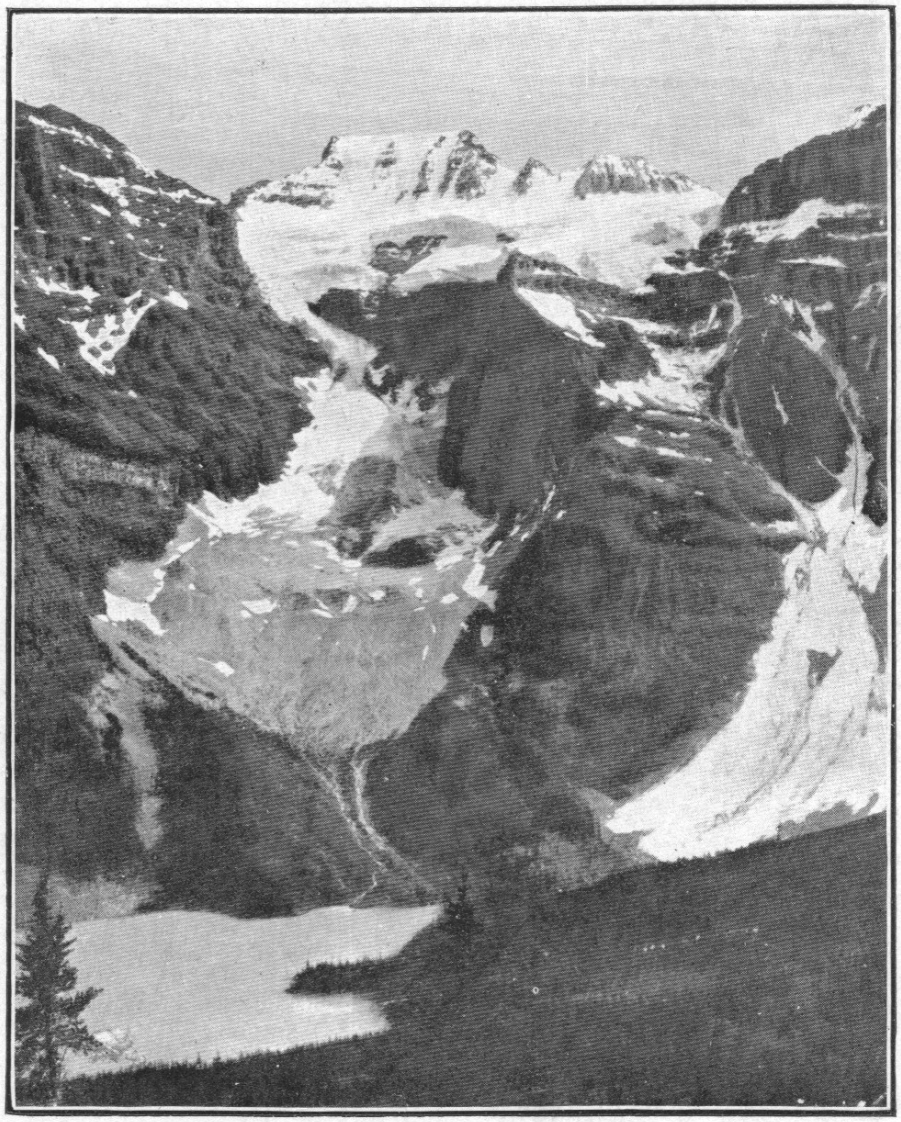


G. D. Patterson, Photo

THE GIANT'S STAIRS

Patterson, G.D.

Figure 63 The Giant's Steps



Howard Palmer, Photo

MT. FAY, VALLEY OF THE TEN PEAKS

Palmer, Howard

Figure 64 Mt Fay, Valley of the Ten Peaks

EXPEDITIONS.

A number of expeditions were arranged daily, and two auxiliary camps placed at outside points: one at Lake O'Hara and one at Moraine Lake.

Chief among the expeditions was that encircling Mts. Lefroy, Ringrose and Hungabee. The route was a full twenty miles in length and occupied two days. It crossed five mountain passes—the Mitre, Abbot, Opabin, Wenkchemna and Sentinel; and traversed five glaciers—the Lefroy, Victoria, Opabin, Wenkchemna and Horseshoe. It wag distinctly strenuous and presented some good phases of mountaineering while crossing the passes and traversing the glaciers. A half-way stop was made at the O'Hara Camp. An account of this expedition will be found in another part of the Journal, entitled "Expedition to Lake O'Hara." Four such expeditions started from the Camp and returned safely, sometimes reversing the order of route and going

by the Wastach Pass.

A favorite but less strenuous expedition was the encircling of Mt. Temple, via the Sentinel or Wastach Passes—the former between Mts. Temple and Pinnacle and the latter between Eiffel Peak and Mt. Hungabee—and the Valley of the Ten Peaks. A night could be spent, if desired, at the Camp placed at the foot of Moraine Lake, and the following day the expedition extended up Consolation Valley and a visit paid to the two beautiful lakelets near its head, the upper one distinctly a glacial lake. The bright sunshine bringing out the golden yellow of the meadows, for spring had hardly commenced here, the deep green of the surrounding pine forest, the dark grey rock and the white snow, with the reflection of the surrounding peaks intensified in the placid surface of the lakes, made this minor expedition one of very great delight during the fine weather of the Camp. The Moraine Lake Camp was reached from both directions: those who were not ardent mountain-climbers going by trail and then returning via Larch Valley and Sentinel Pass, or, proceeding up the Valley of the Ten Peaks, by the Wastach Pass, or simply returning by trail as they had gone.

There were a number of minor one-day expeditions in the valley itself: (1) To Lake Annette, perched at timber-line on the western slopes of Mt. Temple, a lakelet of brilliant green, most beautifully picturesque in its surroundings. The expedition was a great favorite. (2) To the Horseshoe Glacier at the head of the valley. It is to be regretted that, owing to the heavy snowfall of the previous winter, the entire surface of the ice was covered and in consequence the usual interesting features of a glacier were hidden. The covering of snow also prevented observations for advance or retreat being initiated, as had been intended. Notwithstanding this, the visitors to the Camp seemed to like going up on the névé to enjoy the delights of glissading down the steep stretches of the forefoot. Two or more parties would be sent out daily. (3) Not far from the Camp were the "Giant's Stairs," where the western branch of Paradise Creek leaps wildly down ledges of rock so symmetrically carved out that, when the stream is at a low stage, the bed at this place looks like a gigantic stairway. During the period of the Camp the water was at a fairly high level and the effect, as it tumbled over the ledges in sheets of foam and flying spray, was picturesque in the extreme. It was seldom that members of the Camp were not to be found at this spot, and especially was it the haunt of the exponent of the camera.

Taken as a whole the Second Annual Camp of the Alpine Club was a brilliant success and much advancement was made in the science of mountaineering. The peaks climbed were of a more difficult type, and a keenness and zest were shown for work that was most pleasing. Added to this the full attendance throughout the week spoke for the popularity of the work being done by the Club, and the fact that many of the members there hailed from other countries proclaimed the worth of the Canadian Rockies as a field for alpine research and recreation

RECEIPTS AND EXPENDITURES

PARADISE VALLEY CAMP, 1907.

Receipts.

Grant from Alberta Government	$ 500.00
Receipts for Board and Accommodation	1230.00
Paid in for distribution among employees	90.00
Sale of ice-axes, drinking cups, snow glasses, etc	116.35
	$1944.20
Surplus supplies sold	7.85

Expenditures.

Expense Account	$1587.30
Paid for Ice-axes and Alpen-stocks	103.55
Distributed among employees	90.00
Balance to credit	$ 163.35

Balance applied on account of first issue of Canadian Alpine Journal.
Arthur O. Wheeler,
Chairman of Camp Committee.