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T.C. Dennis, Interprovincial Boundary Survey, 1913 North Face of Mt. Logan, 19,850 ft.; Showing the Junction of the Ogilvie Glacier (right) with the Logan Glacier (left). King Peak rising from the clouds

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# CANADIAN ALPINE JOURNAL vol xv published by the alpine club of canada

## THE MOUNT LOGAN EXPEDITION

#### **An Appreciation**

By J. W. A. Hickson

The first record of Alaska and its towering peaks is due to the pen of the naturalist of the Behring Expedition in July 1741, who wrote: "The land was at this place very lofty and a range of mountains was observed of such altitude that it could be seen for sixteen Holland miles from the shore. I cannot recall having seen so high a range in all Siberia and Kamchatka."

This high mountain range, the first discovered in Alaska, was St. Elias (18,024 ft.) visible from the sea at a distance of almost 200 miles, being only 40 miles from tidewater. It is said to have been named by the leader of the Expedition in honour of the day of the patron saint on which he saw it. The event marks the beginning of exploration, although not of mountaineering in Alaska. Alaska first appeared on the charts of Captain James Cook, who was also the first to determine the position of Mt. St. Elias with any degree of accuracy; and his remarkable profile is the first known drawing of this peak. Following Captain Cook, representatives of other nations explored the Alaskan seaboard down to the middle of the Nineteenth Century. H. W. Topham, who with a party visited the coast in 1888, and made the second attempt to reach St. Elias, correctly surmised that the highest part of the mountain system would be found north of this peak. By the time of the transfer of Russian America to the United States in 1867, most of the mountain ranges visible from the sea had been outlined and many of the higher peaks had been located, at least approximately.

Mt. Logan, the second highest peak of the Continent, was an exception. Not until 1890 was it clearly seen by Professor I. C. Russell of the United States Geological Survey on the first of his attempts to reach St. Elias,<sup>1</sup> then believed to be the highest peak in Alaska. He named it for the founder and first director of The Geological Survey of Canada, Sir William Logan, and estimated its height with remarkable accuracy at 19,500 ft. On a second attempt the Russell party reached an altitude of 14,500 ft., and had it not then encountered the worst possible weather, which continued, with a break of a single day only, for a fortnight, would probably have rendered unnecessary the splendidly equipped and brilliantly led party of the Duke of the Abruzzi that gained the summit in 1897. It will always be an interesting fact that, in a region where so little mountaineering had previously and has since been accomplished, that a rival party, namely, H. G. Bryant's of Philadelphia should have been on the way to the peak at the same time as the Duke's.

The view of Mt. Logan from the summit of St. Elias, twenty-six miles southwest of it, is very impressive and forbidding according to Sella's photograph. Mile after mile of precipitous crags and tumbled glaciers wall its entire southern face, apparently affording no inviting route for an ascent. So difficult appeared the approach by this the shortest route, sixty-five to seventy miles in direct line from Yakutat Bay, that it was abandoned by the recent Expedition in favour of the longer one by the northwest.

<sup>1</sup> This was the third attempt on the mountain, the first having been made in 1886, from which year dates the beginning of mountaineering in Alaska.



Interprovincial Boundary Survey

Mt. Logan, Looking South from Low Camera Station of the International Boundary Survey

It was not until some years after the ascent of St. Elias that the pre-eminence of Mt. Logan as the highest peak in the St. Elias group was finally established by a party in charge of the triangulation of the International Boundary Survey, of which H. F. Lambart of the Logan Expedition was a member; probably not until 1913. Since then Mt. Logan is recognized as the centre of the greatest glaciated area on our globe outside of the Antarctic and Greenland; a region bordering on the Pacific Coast for some 250 miles and extending inland varying distances with an average depth of nearly 100 miles. The combination of perpetual snow and ice and of lofty peaks, more than a dozen of which are known to be over 15,000 ft., the glaciers frequently descending to the sea, render this region unique.<sup>2</sup> Although over 9,000 ft. lower than Mt. Everest, Logan is 1500 miles nearer the North Pole, a circumstance which tends to equalize the temperatures around the two peaks. The cold experienced on the recent expedition is comparable with that experienced on similar expeditions in the Andes and Himalayas.<sup>3</sup> Of course there was not the same stress with regard to breathing and moving one's body upward. On the other hand the spending of weeks on snow and ice and the pulling of a heavily freighted sled and the carrying of heavy packs up some 13,000 ft., sometimes over the roughest moraines and ice, entailed a severe and continuous strain on the climbers and resulted in an inevitable sapping of their physical powers. On their respective ascents of Mt. McKinley, Belmore Browne and Herschell Parker got their supplies and equipment up to 11,000 ft., and Archdeacon Stuck his up to 11,500 ft. by means of dog teams. Even in the last stages of the ascent packs of 60 lb. were carried by the climbers of Logan. This was a burden which the conquerors of Elias were spared owing to the large number of porters provided for. The desire to do without professional assistance and to keep the cost of the Expedition within very reasonable limits, threw more responsibility on the leaders and a far heavier strain on the members of the Logan party.

When one of the Swiss guides who were in the Duke of the Abruzzi's party returned and was asked about the nature of the climbing, he replied, "It was like the Breithorn, only much higher"; which meant that it was not difficult as a climb. Nor did its altitude render its ascent an exceptional undertaking, seeing that summits over 20,000 feet had already been attained in the Andes. But under what different conditions!<sup>4</sup> Although the climbing was slow and monotonous and the last part of it not difficult; yet all the party, except the Duke and two of the Swiss guides, showed signs of distress and mountain sickness, probably due, therefore, to the long and fatiguing marches over snow and ice and weeks of discomfort before the base of the mountain was reached. There was probably glacier fatigue, a phenomenon definitely noticed on the Everest Expeditions. It was much the same with the Logan party. While there were no definitely marked symptoms of mountain sickness; yet nearly all the members were greatly reduced in weight, and, according to Mr. MacCarthy, were more or less dazed on the last stages of the climb. This could not have been due to the difficulty of the climb nor even to its height, since the ascent from 14,500 ft. was

<sup>2</sup> From Mt. Blanc, glaciers descend to 4000 ft.: there is thus a vertical zone of perpetual snow and ice of nearly 12,000 ft. On the north side of Everest, they descend to 16,500 ft., which means a similar zone of 12,500 ft. Mt. Logan rises 14,000 ft. above the immediately surrounding glaciers, and there is in its neighborhood a vertical zone of perpetual snow of 16,000 ft.

<sup>3</sup> From June 16 to 26 inclusive, with the exception of one day, the thermometer registered below 0°F., the lowest temperature being -33°F. On the Mt. McKinley expeditions, the lowest recorded temperature was -21°F.

<sup>4</sup> On the ascent of Aconcagua (22,970 ft.) in April, 1925, mules were taken up to 19,000 ft. On the climb from this camp there was no need to touch the rocks with one's, hands and there was no step cutting. In the Andes, there is no necessity to carry artificial fuel: wood is plentiful between 12,000 and 14,000 ft. Fresh meat and wine are not difficult to obtain. But Mt. Logan is separated from forest vegetation by 50 miles of snow and ice.



H. F. Lambart

Mt. St. Elias (left) and King Peak (right), Rising Above Cloud-bank From 15,000-foot camp gradual. From the 17,000 ft. level the party had to travel four miles in order to gain 1000 ft. These effects were therefore probably the result of sheer exhaustion of their physical vitality.

The Abruzzi parity had to sleep forty nights on glaciers and snow fields; the Canadian Alpine Club party had to spend forty-four. Its members do not appear to have suffered from insomnia. But the one factor that is particularly helpful in Alaskan and Yukon mountaineering in summer time, the almost continuous daylight, which enables work to be done at any hour, may unconsciously have had a disquieting effect on the organism and by reducing the quality of sleep have exercised an undermining effect on the nervous system. An additional cause of discomfort was the difference at times between the ground and upper temperatures sometimes as much as 45° F.; while one's feet were freezing one's face might be scorched by a strong sun reflected from the snow. Frozen toes and blistered skin were thus the painful contrast the organism had to endure.

On June 21st, 1925, the party made a camp in the snowfield at 18,500 ft. and had every reason for believing this to be the highest camp ever made on the North American continent. On the ascent of the south and highest peak of Mt. McKinley (20,300 ft.) in 1913, Archdeacon Stuck and party made a high camp at 18,000 ft. between the two summits of the mountain; previous to which Herschel Parker and Belmore Browne on their third Expedition in 1912, when they nearly gained the summit, had established a camp at 16,600 ft. The Logan party also camped at 16,760 and 17,500 ft.

Only a few higher camps than 18,500 ft. have been made in the Western Hemisphere, all of them on Andean climbs; the highest probably being that established at 20,000 ft. by the Peruvian Expedition, led by Professor Hiram Bingham, on the first ascent of Coropuna (21,700 ft.) in 1911. Both on the first and the most recent ascent of Aconcagua, camp was made at 19,000 ft.; and Whymper on his famous trip to the Ecuadorian Andes in 1880 camped even higher than this near the summit of Cotopaxi, when the temperature under his tent ranged from 50°F. to 110°F., and the minimum outside was 12°F. In none of these cases was there any length of snowfield to traverse, while supplies, including firewood, could readily be brought either by mules or porters, or by both, to camps which were not more than 4000 ft. below the summit of the peaks.

A. H. MacCarthy was the leader of the Expedition, ably supported by a band of both experienced and mature and of alert and enthusiastic younger men.5 Those who know him are well aware of his powers of physical endurance, of his indomitable will, and how brilliantly he can cope with serious situations. His election to the leadership was splendidly justified. His reconnaissance trip of 1924, undertaken, as he humorously said, as a holiday outing, was of fundamental importance in determining the final route and thus the success of the Expedition. His stepping into the breach in the winter of 1925 in order to see that the caches should be properly laid, whereby he subjected himself to a prolonged and severe strain before the climbing began, is worthy of the highest praise. He cut the steps on the final ice slope. On the return trip he, with Foster and Carpé, experienced a most dangerous adventure in the torrential waters of the Chitina, after which, with almost no food, they had to walk fifty miles to McCarthy. His admiration for Foster is a marked feature of his report. But it is hardly necessary to say that the success of the Expedition would have been impossible but for the splendid teamwork of all, who were determined to endure to the utmost in order to reach the goal. Lambart's walk of thirty miles to McCarthy in one day, with feet dreadfully injured through frostbite, was a heroic performance.

Since their return the writer has conversed with all the members of the Expedition, except

<sup>5</sup> To Lambart, in particular, belongs the credit of organizing the equipment of the party.

Foster and Taylor, and has been impressed with the unanimity of their praise of the work of the Canadian Alaskan, who carried a small library, and whose sound judgment, unselfish exertions and great experience of local conditions appear to be second only to the labors and the planning of MacCarthy in contributing to the outcome of the undertaking. Of all the party he was perhaps the least exhausted on the final stages of the climb, and seems to have suffered but little from cold and fatigue, to which he was doubtless more inured than the others. Nothing seems to have disturbed his balance and good humour. To him is owing the use of the willow switches without which the climbers might not have found so readily their way down from the higher snow fields to Windy Camp, and to safety. Mr. MacCarthy has declared that the Expedition was very lucky. It is indeed satisfactory that Logan fell to the first assault. It was fortunate that the crampons were so useful, thereby saving labour in step-cutting. But as to the luck, this seems to be of the kind which frequently attends intelligent planning and careful calculation of chances. The weather was not especially favourable.

As is generally known, the Expedition was organized under the auspices of the Alpine Club of Canada and its composition reflected the international character of the Club so far as the English-speaking mountaineering world was involved. Of its six members who belonged to Alpine clubs, five are members of the Alpine Club of Canada, five are members of the Alpine Club (England), and all are members of the American Alpine Club, to which club is due an unqualified recognition of the great support it extended to the enterprise. That two of the party did not reach the summit is the only regrettable incident in connection with it. The Dominion Government was not behindhand in extending assistance to the Expedition. Other clubs and organizations, whose practical interest were of great help, are the Alpine Club, the Royal Geographical Society, and the Canadian Pacific Railway.

Next to the successful ascent and happy return of the Expedition, the most satisfactory feature connected with the adventure, which has once more demonstrated the triumph of the human, mind over the impersonal forces of nature, has been the means it afforded of bringing the two leading Alpine clubs of the Continent into the closest co-operation and establishing the most cordial relationship between them. Surely this is bound to have the happiest influence in the promotion of mountaineering enterprise in North America.

The articles which follow this illustrate the conditions that confront the mountaineer in Alaska and the Yukon. It is still a field where there are no explored routes and no well trained guides in the Swiss sense. Every mountaineer must be his own guide and, unless possessed of very ample means, his own beast of burden. The three highest summits, and Mt. Blackburn (16,100.ft.) and Mt. Wrangell (14,000 ft.) have been conquered, and that is all. Mt. Lucania and the magnificent King Peak, both over 17,000 ft., still stand as further challenges to the powers of man; and there is probably at least a score of peaks to surmount the snow and ice-capped summits of which will put to the severest test the endurance and skill of the most experienced mountaineers.

# **A Few More Words Of Appreciation**

# By Arthur O. Wheeler

The Alpine Club of Canada, in an endeavour to take a place among the more prominent alpine organizations of the world, and thus to become the acknowledged representative of the

Canadian Rockies in mountaineering circles, has done quite a few things and has undoubtedly won to such a position. Following the example of the Alpine Club (England) in its endeavours to climb the highest mountain of the world—a feat that it may really have accomplished, although unable to establish the fact by absolute evidence, owing to the sad loss of the two climbers who were last seen near the top—the Canadian Club has successfully made the climb of the highest mountain of its own Dominion. The story is here told by the men who made the climb and, as is usually the case with those who do big things, one has to read between the lines to appreciate even in part all that has been done and the amount of physical suffering, bulldog determination and heartbreaking tenacity of purpose, under almost impossible conditions, that were involved by the doing of it.

During many years of photo-topographical surveys in the Canadian Rockies for the Dominion Government, the writer has had some little experience of what it means to fight a way up to the objective on an unprotected summit against biting cold, to stand for hours stamping and moving about, as much as space would permit, in a bank of dense bone-chilling clouds, and then to work a way down in a blinding snowstorm or stinging sleet and hail, when snow areas are a mass of soft white without form or evidence of slope, when rocks are iced and half covered by snow, when hands are without feeling and feet like lumps of lead, and every step is a problem and a danger. Thus, through a comparatively minor experience of similar nature, it is possible to appreciate the wonderful achievement that has been accomplished by will power alone, when all other power was practically exhausted.

The stories here told are replete with high hope, invincible courage, set determination with vitality at its lowest, despair, and then the triumph of success. No little band of heroes could have shown all these fine qualities in a more marked form.

MacCarthy the leader: to whose preliminary exploration in 1924, and severe preliminary work placing caches of supplies in 1925, is undoubtedly due the success of the expedition; read his story and then consider how such preliminary work must have told upon him, and yet he did not falter in again taking the lead, only sixteen days later, to carry out the main object of the expedition over more difficult ground and under much more trying circumstances. Few men could have done it with so short a rest between, but he bore himself wisely and well under all conditions and secured the success of the undertaking with absolutely no margin to spare; for, on reaching the summit, the party were almost all in, and it is doubtful whether another attempt would have been possible, owing to the existing weather conditions, even if physical endurance had permitted.

We hear of Lambart, the deputy leader, he of the happy smile and optimistic habit, insisting on taking the lead to break trail in the heavy, soft snow when overcome by lethargy due to high altitude and physical exhaustion, and even refusing to be relieved when almost at the last ounce of his strength. Again we hear of his return from the summit down endless, weary miles of snow and ice slopes, with a thermometer away below zero and an icy wind tearing at one's vitals, while suffering from feet so badly frozen that the skin had come off and the raw flesh was protruding. Of such stuff are heroes made.

His comrades tell of how Foster, at the end of a day or night of such gruelling travel, would first of all set to work to doctor the frost-bites of fellow-sufferers; and how his cheery self-sacrificing manner did much to relieve tension created by the long continued and almost unbearable conditions of cold and fatigue.

The intense disappointment of reaching the first summit and then finding that beyond it, some two miles of awful distance in their state of exhaustion, there was still a higher summit must have come as a severe blow to all. Again, by sheer force of will power, they faced it and Carpé,



**Group Taken at McCarthy, Alaska, May 11, 1925** L. to R.:- Reed, Carpe, Foster, MacCarthy, Hall Taylor, Morgan, Lambart

although all but done, would not yield and helped by his companions, equally in-capable, reached this further objective and secured his triumph, thereby obtaining several of the most valuable photographic views of all.

It is testified that there was no reason why Hall should not have stood upon the summit of Mt. Logan, but the plucky little Morgan was dangerously frostbitten and could not return from the point at which he was finally overcome without assistance, so Hall, most unselfishly, at what self-sacrifice, he only knows, gave up the goal for which he had so greatly striven, in order to insure the safety of his comrade. It is indeed conditions such as these that bring out the best or worst in a man.

Read, also, and Andy Taylor, although apparently suffering less than their companions, went through the same trials and were duly rewarded. Taylor had made the preliminary trip with MacCarthy and the second trip on the climb must have been a most strenuous undertaking notwithstanding the fact that he was a resident of the region and inured to the climatic vicissitudes of the Great North. All agree as to his outstanding competency, his encouraging disposition and his cheery unselfishness when things were at their worst. In fact, his companions are agreed that Andy's work had much to do with the final success.

In Mr. MacCarthy's article, entitled "Food," we note a list of supplies that seems luxurious to the average traveller and mountaineer, but in conjunction with this has to be considered the enormous difficulties of the cooking problem. All fuel had to be carried once timberline was passed, and as this consisted almost entirely of oil fuel, of which the supply would necessarily be very limited, much discomfort was created thereby.

Moreover, most of the supply would be needed for cooking purposes and very little available for producing heat, so that undoubtedly much suffering was endured when tied up by storm conditions and vitality could not be kept alive by physical action. This was by no means the least of the sufferings so willingly and successfully endured to attain the object sought, and although lightly touched upon in the text, is one that should be very thoroughly appreciated. Under such conditions good food, hot food, and properly cooked food is the only palliative for complete exhaustion. It is again due to MacCarthy's foresight and the wide range of items he selected that success was attained.

When contemplating the writing of the above few words to call attention to and give emphasis to the great physical difficulties under which the climb was made, difficulties which the writers of the following articles pass over as commonplaces incidental to the great object in view, I happened to see in an Ottawa paper sent me the report of a most powerful Christmas sermon preached by the Rev. George D. Kilpatrick, one of the ministers of Chalmers United Church at Ottawa, in which he referred to the Mt. Logan expedition. What he said so aptly embodied what I desired to say that I asked for and obtained his permission to quote the reference in his sermon, the exact words of which he very kindly sent me.

The text of the sermon was, "The dayspring from on high hath visited us, to give light to them that sit in darkness and in the shadow of death, to guide our feet into the way of peace." Mr. Kilpatrick then said:

"There rises to my mind the vision of six heroic members of the Mt. Logan expedition, lost at the very peak of that grim and merciless giant. At 8 o'clock on the evening of June 23rd last, they stood ice-clad and exhausted on their tiny platform of ice, 19,850 feet above the sea. For a moment the world lay spread out before them, a dead, frozen, silent vastness of nameless peaks and mighty glaciers, and then, as though unleashed by the angry spirit of the peak, another blizzard rushed

upon them, blotting out all vision, erasing that thin, broken trail which marked the brave ascent, leaving them to stumble along the wind-swept shoulder in the hope that they might light upon the slim willow wand which marked the way.

"An hour passed and those peering eyes saw nothing but the driving snow; another hour and still they groped and blundered on like blind men feeling the way, while the wind howled and shouted about them, though the avenging spirits of the defeated as mountain exulted in the bewildered plodding of these intruders.

"At last these worn and lost men, realizing the hopelessness of their position, with strength gone and night upon them, dug, or rather burrowed in the snow a pitiful shelter. They sat down 'in darkness and in the shadow of death' to wait for the coming of the light which might 'guide their feet' into the way.

"Through the murk of an. Alpine twilight they lay huddled in a kind of stupor. They lost track of time; they knew only cold and weariness. The wind had ceased; there was no sound save the hiss of falling snow; all about them was the age-old desolation of the heights; alone on the peak of Logan, within the shadow of death, these six waited for the day. At last it came; at first only a greyness, and then the fingers of light began to pierce the fog. They saw each other encased in ice and haggard of face; they saw the dreary contour of the slope. It was morning; whereupon that 'irreducible minimum of hope,' which is never quenched in the hearts of heroes, set them upon their feet; they went on; they found the saving willow wand, and so passed from death to life. 'The dayspring from on high had visited them, to give light to those who sat in darkness and in the shadow of death and to guide their feet into the way'."

This very apt and strikingly graphic reference covers the conditions of the entire expedition, and I feel most grateful to Mr. Kilpatrick for so powerfully conveying, in words more forcible than any I could have chosen, the impression it is desired to create. For, it is not so much the actual feat of accomplishment that should be honoured as the very fine characteristics of human nature that have been displayed, and so enabled it to be accomplished.

I feel sure I can. speak for all when I say that the grateful thanks of the Alpine Club of Canada are now tendered to all the members of the expedition, and that we sympathize with them most truly in the trials and tribulations we can only so partially visualize while following the trail of the expedition to its highest objective; and then homeward, weary, worn and dilapidated, but gloriously triumphant in the success of a magnificent achievement.

# **Topographic And Geographic Exploration Of The Mt. Logan Region**

# By H.F. Lambart

## Location and Area of the District

Mount Logan lies in the extreme southwestern corner of the Yukon Territory, the central and highest mountain of the district. It is 65 miles inland from the Pacific coast line and rises some 14,000 feet above the general level of the surrounding glaciers. It exceeds in elevation Mt. St. Elias, the next highest peak of the district, by nearly 2000 feet.

The highest relief of the region abruptly closes 70 miles further inland where it gives place along the valley of the White River to the verdure and timber covered country of the interior. The eastern and western boundaries need hardly be denned, as the same general characteristics stretch for miles along the coast in both directions.

#### **Historical Sketch**

At the outset a short historical sketch of the Mt. Logan region would seem in place before dealing with its physical features

The earliest recorded facts of the coast of Alaska come from the Russian navigator, Vitus Behring, who sailed across the North Pacific in the year 1741. The story of his first sight of the coast, his naming of St. Elias, the outstanding mountain of the whole coast, after the Patron Saint of the day (July 20), of his sufferings and trials and wintering in the vicinity of Icy Bay, is one full of that romance and courage which so thoroughly characterized the heroic spirits of the early navigators. After Behring came the Italian navigator, Malaspina, after whom was named the great Malaspina Glacier which fronts the sea (except for a narrow margin of terminal moraines) along a line sixty miles in extent. In 1794 we have the British navigator, Vancouver, in the Discovery and Chatham, who charted the coast. Here it may be stated, however, that Alaska first appeared on the charts of the British navigator, Captain Cook, in 1778. Finally, we have in Topham, who visited the coast in 1888, the interesting speculation that the highest portions of the system would be found north of Mt. St. Elias.

Coming down to our own times we find the great interest of this part of the world centered in the numerous efforts that were made to ascend Mt. St. Elias. First in the series of expeditions was that of C. E. S. Wood who, through difficulties encountered in getting passage along the coast, only managed to get as far as Cape Spencer. The second recorded expedition was that of the New York Times in 1886, under the guidance of Lieutenant Schwatka who followed in a general way the valley of the Yahtse River and managed to reach an elevation of about 7000 feet before he was forced to retire. In 1888 an expedition under W. H. and Edward Topham of London, by very much the same route, reached the highest elevation so far attained, 11,400 feet.

We come now to the two splendid records of the Russell expedition of 1890 and 1891, These, under the joint auspices of the National Geographic Society and the United States Geological Survey, were instrumental in adding greatly to our knowledge of the country. Russell's exhaustive studies while spending three months on the glaciers and in his second attempt, on which he reached an altitude of 14,500 feet, will ever remain as witness to his own courage and patience, and an inspiration to those who are yet to follow in his steps.

#### Mt. Logan First Seen

His reported discovery of Mt. Logan is told in the following interesting way:

"The clouds parted towards the northeast, revealing several giant peaks not before seen, some of which seemed to rival St. Elias itself. One stranger rising in three white domes far above the clouds was especially magnificent. As this was probably the first time its summit was ever seen, we took the liberty of giving it a name. It will appear on our maps as Mt. Logan, in honour of Sir William E. Logan, founder and for long Director of the Geological Survey of Canada."

Six years passed by before H.R.H. Duke d'Abruzzi, with his corps of Italian guides, entered the country with an expedition designed to make the ascent of Mt. St. Elias itself. After landing on the shores of Yakutat Bay and following a straight course across the forty-mile stretch of the Malaspina, Abruzzi reached the summit by the Nutan Glacier and Russell Col on the 31st day of July, 1897—thirty days after disembarking on the shores of the Pacific.

The photographs taken from the summit of Mt. St. Elias by Quintino Sella (of the Duke

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An oversized fold-out map showing the routes travelled by the boundary survey parties was included in the hardcopy version of the 1925 Canadian Alpine Journal.

It is not included in this digital version due to size restrictions.

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An oversized fold-out map of Mt. Logan and vicinity was included in the hardcopy version of the 1925 Canadian Alpine Journal.

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d'Abruzzi's party) showed for the first time the great mass of Mt. Logan stretching across the northern horizon and separated from the Elias system by the Seward and Columbus glaciers. These photographs subsequently proved of the greatest value in developing the topography of this section of the International Boundary Sheets in places where information was entirely lacking. Sella's photographs showed new worlds of mountains hitherto never seen. Through this expedition many new names were added to our maps and much information of all kinds obtained. Eighty miles to the northwestward a huge monster was seen which was named Mt. Bona (16,420ft.), another, Mt. Bear (14,850ft.), sixty-eight miles almost due north, and Mt. Lucania (17,150 ft.) fifty-three miles to the northeast. The sources of the Seward were also for the first time seen and a great new glacier, named the Columbus, was revealed flowing in an opposite direction from the head of the Seward. From the summit of Mt. St. Elias the Mt. Logan mass was referred to in the following words: "But the Logan chain was the most majestic of all."

#### Glaciers

The speed at which the expedition entered and left the country made it impossible to make any glacial studies. Especially is it regrettable that no new information was obtained regarding the motion of the glaciers traversed. The ablation of the surface of the Ogilvie Glacier, however, was very apparent by the formation of glacier tables during our absence. This would indicate that at the 6000-foot elevation the lowering of its surface was at the rate of about two inches per day, while at its head (elev. 7800 ft.) the amount of the daily drop would appear to be about half that amount.

Apart from the south Polar Ice Cap and the continent of Greenland this region, of which Mt. Logan is the predominating feature, presents probably the most intensely glaciated district of the globe. Of the total area of Alaska about 4% is glaciated ice-covered terrain, which amounts to something between 15,000 and 20,000 square miles.

#### **Meterological Stations**

Meteorological stations were placed at McCarthy, Kennicott and at the foot of the Chitina Glacier. Through the courtesy of Capt. Hubrick, Mr. Frank Brown and Mr. Laing, thrice daily, readings were taken of maximum and minimum thermometers and aneroid barometers.

#### The Work of the Boundary Surveys

The International Boundary Surveys between Canada and Alaska had been at work for a number of years on the southeastern section of the boundary before work on the 141st Meridian commenced in 1906 and photographs had been taken for the purpose of developing the topography of the country in Disenchantment and Yakutat Bay by Mr. A. J. Brabazon as far back as 1896. No real mapping of this section had been attempted, however, until the closing years of the survey of the 141st meridian in 1913. In this year, the engineers so engaged were faced with the difficulties of projecting the meridian from the northern margin of this glaciated system at the White Valley through to where the meridian intersected the shoulder of Mt. St. Elias. As the section was entirely devoid of vegetation and, but for the outcrops of rock, was covered with ice and snow, and as the extreme difficulty in projecting the eighty-five miles of line from the summit of the Natazhat range to the shoulder of Mt. St. Elias was fully realized, it was very wisely omitted. Instead of following the meridian, in projecting it from the north, the triangulation turned westward when the valley of the White River was reached and, making a large loop, returned to the boundary again on the Logan Glacier, sixty miles south of where it was left at the crossing of the White River. This

loop followed the White River to its head, crossed the Russell Glacier and followed thence down the Chitistone to the Nazina and then up the valley of the Chitina to the boundary again. Apart, therefore, from the three boundary monuments placed on the margins of the Logan Glacier valley, this stretch of the International Boundary of eighty-five miles is nowhere marked upon the ground. This short description, however, of the delimitation of the boundary line and the triangulation work necessary tells only half the story and apparently, from a layman's point of view, the least part of it. The topographical sheets as they stand show nothing of the immense amount of detail work which they represent.

It was the photo-topographical surveys which were made of the district that brought to the people interested the first realization of what this country really held. Five thousand square miles of new country were added to oar maps. Fortunately the area included the whole of the Mt. Logan massif but left out entirely the district lying to the eastward as far as Kluane Lake. This and other portions are still unknown areas of our country. Mt. Logan, if cut through at the 16,000-foot level, would form a plateau which, in an easterly and westerly direction, would be found eleven miles long and would comprise an area of thirty square miles. Upon this imaginary plateau is built up an amazingly complicated system of glaciers, snowfields, ridges and peaks rising all the way from 18,000 feet at the extreme entrance to the highest, 19,850 feet, on the eastern end. The great mass of Mt. Logan towers, from glaciers at its base, in sheer cliffs along the northern and southern faces from about the 6000-foot level some ten to fourteen thousand feet.

In 1913 also an attempt was made to gain some knowledge of the stretch of country lying directly south of the White River Valley by ascending some of the peaks forming a fringe on the southern side of the valley. This range, though comparatively low, its highest peak being Mt. Natazhat (13,440ft.), is very impressive and made all the more so by the fact that the snow peaks rise abruptly from the timbered valley of the White River.

Although Mt. Natazhat and several of the lower peaks were climbed with instruments the final results were rather disappointing; on no occasion while on the higher ones were we able to see through the perpetual fog that obscured the distant views towards the south, and the photographs obtained gave us only sufficient material to plot the topography as far as Mt. Bear and Mt. Craig.

Of rather more than usual interest in connection with the boundary surveys was the placing on the maps for the first time of the high peaks seen from Mt. St. Elias by the Duke d'Abruzzi in 1897.

#### Vegetation

The vegetation of the Chitina Valley is in general more advanced than is found in the valleys further from the coast. Spruce is the only valuable source of timber in the valley; it is long and straight and grows to a maximum diameter of eighteen inches, and a small quantity to twenty-four inches. Its distribution, is widespread from the mouth to the foot of the Chitina Glacier and from eight to ten miles beyond the toe of the ice. The tree line is, strange to say, 1000 feet higher at the head of the valley than it is at the foot, where it stands at about 4000 feet.

Large areas of the pea vine are found distributed over the gravel bars, where horses have been known to winter out.

"Bunch grass" has a fair distribution throughout the valley and is found growing in the open places where there is some shelter.

The timbered ridges of the lower valley are covered with a carpet of wet and heavy moss through which the summer's sun never penetrates far enough to thaw out the ground to any depth.



Hy.S. Hall, Jr.

1. Bringing in Two Mtn Sheep Shot by Reed Above Hubricks 2. A Good Sheep Head (Ovis Dall); One of Two Shot by Reed

At the head of the valley the forest carpet is harder, with a profusion of shrubbery, floral and grassy growth. Beneath this the network of the roots of the trees seems to form a perfect mat.

#### Game

The Chitina Valley is rich in its animal life, although for some unknown reason few varieties are found. The caribou and moose are entirely absent, but the white sheep (Ovis Dalli) are very numerous, their chief ranges being confined to the middle and upper stretches of the hill sides. During the summer months they make their way up along the margins of the ice and have been seen fifty miles above the foot of the glacier by members of the Boundary Survey in 1913.

The brown and black bear are numerous along the whole valley, but here again their numbers seem to be greater near the head of the valley.

Goat are also found in the valley but confined almost entirely to the south side while the sheep are almost exclusively found on the north side.

#### **Distribution of Glaciers**

The existing glaciers are chiefly confined to the mountain regions and extend more or less continuously for about 1100 miles along the coast and through the Mt. St. Elias ranges. The snowfields and glacier belts average from 40 to 120 miles in width. There are also scattered glaciers on volcanoes through a distance of 500 miles along the Alaska Peninsula and Aleutian Islands.

## **Local Conditions Responsible**

It is the result of lofty mountains facing a sea coast where warm, humid, on-shore winds bring abundant moisture, in a northerly latitude, that gives the Pacific Mountains of Alaska from 80 to 200 inches of precipitation yearly. It is the loftiness of these mountains, and the northerly latitude, that causes a large proportion of this precipitation to fall in the form of snow. Therefore much more snow falls in a winter than can melt during a summer, causing permanent snowfields and great glaciers. The variations in altitude, in latitude, in precipitation, and in the direction of slope cause the principal variations in the present size and condition of the glaciers.

In glacial epochs snow and ice accumulated in the high mountains and gradually crept down into the smaller valleys and out into the larger ones till they filled them completely leaving only the tops of the high mountains uncovered. It is doubtless correct to assume that when the glacial epoch began nearly all the main drainage lines had been established in essentially their present position. The great trunk streams of ice were then doubtless as they are today. Named in the order of their magnitude, they are:—

1st. The Seward, directly to the south of the immense mass of Mt. Logan, takes its source at the western end of the great defile between the steep southern face of Mt. Logan and the Mt. St. Elias—Mt. Augusta ranges, joins another and larger trunk descending from the northeast and, flowing between the narrow passage of the Corwin cliffs and a spur of Mt. Cook, joins, as one of its main arteries, the mighty body of ice constituting the Malaspina glacier.

2nd. The Columbus Glacier, taking its source in the great tributaries of the west face of Mt. Logan — constituting the Quintino Sella glacier system — and receiving the tributary glaciers flowing from the northern face of the Mt. St. Elias range west of the International Boundary, flows out westward and finds its way eventually to the sea.

3rd. The Logan. Glacier immediately to the north of the Logan massif, carrying its width of three to four miles for a distance of fifty miles and being joined by the two large parallel systems

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of the Walsh and Chitina Glaciers, constitutes the main drainage of the Chitina River valley. Of the upper neves of these three great trunk streams little is known as they are still blanks upon our maps The summit of the drainage of the Walsh and the Logan may at least be vaguely defined as lying to the northeast of the Logan massif, and that of the Chitina Glacier as lying immediately on the Canadian side of the International Boundary and bounded by a mighty cirque created by the group of the highest peaks rising north of Mt. Logan, namely: Mt. Bear (14,850 ft.), Mt. Craig (13,250ft.), Mt. Wood (15,880ft.) and Mt. Lucania (17,150ft.).

4th. The great nameless and unknown chaos of mountain ranges and ice, stretching for sixty miles towards the northeast of Mt. Logan massif. A small fraction of this area was seen by Mr. Dennis and his party when, in 1913, the Boundary Surveys were operating in the upper reaches of the Logan Glacier and had penetrated to distances hitherto untrodden. Mr. Carpé's photographs from near the summit of Mt. Logan. on the northern and northeastern slopes of the massif this year gave for the first time some conception of the complexity of this system. Photographs taken at a distance of twenty miles revealed the high elevation of the vast snow fields but the direction of their flow could not be gauged; it appeared possible, however, that these might be at an altitude much greater than has hitherto been recorded for the district. The eastern drainage of this area is the Kalkawulsh Glacier and the Kluane Lake district. Also the Donjek River is fed by glaciers which border the northeastern side of this same area.

Of the exact rate of movement of these immense ice fields little is known; certainly there has been no recent movement of the Chitina Glacier. Some idea of the movement, or lack of movement, can be furnished by the timber that grows on the debris overlying the foot of the Chitina Glacier. Dr. D. W. Eaton of the Boundary Surveys has given the information that he cut a spruce on the end of the Chitina Glacier that showed 193 rings of growth. The overlying debris and loam accumulation is not very thick and the ice beneath evidently has moved but very little in many years.

Glaciation in these vast fields of upwards of 12,000 square miles in extent, it is said, is still effective in the higher parts of the district but may be regarded as the last great event in the geological history. The withdrawal of the ice, however, merely allows weathering to commence a new cycle of events that will eventually destroy all signs of the work of the ice. Few of the glaciers of Alaska are advancing and these great systems are gradually becoming smaller. The following reference to glacier action in Glacier Bay, 175 miles distant to the southeast, may prove of interest although its reliability cannot be vouched for: In 1886 it is said that the Muir glacier discharged over a cross-sectional area of 5,000,000 sq. feet, 200,000,000 cubic feet of ice per day. Of the 646.5 miles of International Boundary line from Mt. St. Elias to the shores of the Arctic Ocean only this portion of the southern end crosses snow clad mountains.

#### Temperatures

While on the mountains it was generally below freezing. At the 16,700-foot level the lowest temperature was recorded, namely 33° below zero, Fahr. The temperature on the summit on June 23rd was 4° above zero at 8 p.m. and was falling very rapidly at that time. On the lower stretches of the glacier in May and July it froze at night but during the bright days much water was running.

#### Geology

A general discussion of the geology of the district, but confined chiefly to the upper part of the Chitina valley, is to be found in Bulletin 675 of the U.S. Geological Survey. Its general



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H. F. Lambart
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Looking Down The Chitina Valley Showing Tree-covered Foot of Chitina Glacier (Left Front)



Hy. S. Hall, Jr

Showing Surface Stream On Ice Of Logan Glacier Morgan Looking for a Crossing statement is to the effect that the upper Chitina district contains both sedimentary and igneous rocks, of which the latter compose more than half the area, and range in age from Carboniferous to Cretaceous. The rocks are greatly folded and faulted, and are intruded by granite and related igneous rocks.

The expedition on reaching an elevation of 18,500 feet came to a crossing through rock cliffs which were of a very coarse grained gray granite. Broken granite was again touched between the two main peaks of Mt. Logan.

Stream gravels and morainal deposits are the most important unconsolidated deposits of the district.

Great deposits of pumice were seen on Holmes Creek and on the White River watershed in 1913; also found in very small quantities on the moraines of the Barnard Glacier and which evidently have been brought down from its head, as the Chitina Valley seems to be outside the range of the volcanic vent supposed to have been in the neighborhood of Mt. Natazhat. The deposit of this white or yellowish pumice is very great over the upper valley of the White River and is stated to have been thrown out about two thousand years ago.

The valley has been very lightly prospected and, although copper occurs throughout the district of the Chitina Valley, can only boast of a few prospects.

Gold has not been reported on the Chitina although mines have been worked for years in the Nizina River and its tributaries.

# **Preliminary Explorations**

By A.H. MacCarthy

When in November, 1923, at the first meeting of the Mount Logan Executive Committee, held in Vancouver, B.C., I very gladly but innocently accepted the position of leader of the expedition, little did I realize the task that lay before me in order to carry the undertaking to a successful conclusion; for until that day I knew nothing about Mt. Logan beyond the fact that it was the second highest peak on the North American Continent and was located somewhere in Canada.

A study of the General Map of the International Boundary Survey covering its work at the southern end of the 141st Meridian in the high alpine regions of Alaska and Yukon, a reading of its report on that region and a discussion of all other available data the day after I had accepted leadership in default of more logical men being available, convinced me that a comprehensive study should be made of all data available in. the archives at Ottawa and Washington, and then a reconnaissance in the field undertaken over that line of approach which seemed to offer the most definite assurance of reaching the base of the massif at its probably vulnerable point of attack.

The magnitude of the project soon became very apparent to all of us. Mt. Logan has many pronounced geographic and alpine features that require very serious consideration as they all contribute their quota of difficulties to make it a very hard mountain to climb.

Located in the southwest corner of Yukon Territory, it is at 60 degrees 35 minutes North Latitude, thus giving its lines of approach in winter a truly arctic character, with an immense snowfall, high winds and a great range of temperature from day to day and between, day and night, some of these conditions enduring throughout the summer months and thus intensifying



A.H. MacCarthy

The Start from McCarthy, Alaska, Feb. 17, 1925
The Start with the Dog Teams
Harness Not Off for Thirteen Days on Account of Freezing Stiff

the extremes of heat and cold. Its isolation is remarkable, being 150 miles from railhead and the nearest habitation, with an approach of 86 miles, up a treacherous glacier-fed stream, the Chitina River, and then over 50 miles of an extremely rough moraine, dirty, rough ice and heavily snow covered glacier stretches to the base of its massif. Its great altitude, 19,850 feet above sea level, towering 14,000 feet above the normal level of the surrounding glaciers; its stupendous bulk, the mightiest hump of Nature in the Western Hemisphere if not the largest in the world— having a circumference at its base of over 100 miles, with dimensions at the 10,000 foot level of 16 miles from east to west and 8 miles from north to south, and an ice-cap and snow-blanket of nearly 200 square miles—the centre of the greatest glaciated alpine area known, with its hundreds of hanging glaciers feeding the mighty Seward and Columbus Glaciers on the south and the Logan Glacier on the north side, the known and explored stretches of which are over 45 miles long and from three to five miles wide; its high plateau with many peaks and domes and vast areas extending for eleven miles from the point of its most favourable ascent to the base of its highest peak; its great number of violent storms with high winds and low temperatures, frequently breaking with little warning and sometimes lasting for many days; all these make its ascent unique as an alpine endeavour.

An inspection of photographs and study of all reports, supplemented by conferences with men who had been on the International Boundary Survey in that region soon convinced me that of the three available lines of approach —from the east, via White Horse and Kluane Lake; from the south via Yakutat Bay and over the Malaspina and Seward Glaciers, and from the northwest via the Chitina Valley from McCarthy, Alaska, the latter was the only known and fully explored route. Hence in June and July of 1924, with two local men from McCarthy, Taylor and Atkinson, I made a hastily organized trip of forty-five days, by way of the Chitina Valley. Although bad weather prevented an as extensive exploration as had been planned, it was found that this line of approach was practicable and should be adopted with modifications to suit conditions as found along the route and observed on the massif, the salient points being as follows: Steamer trip, Seattle to Cordova, Alaska, 1600 miles, 5 days; railway from Cordova to McCarthy, 191 miles, 2 days; pack train up Chitina Valley from McCarthy, 86 miles to beginning of ice, 6 days; back-packing over rough moraine and glacier stretches to base of massif at head of Ogilvie Glacier and the logical advance base camp site, 52 miles, 5 days.

In order to prospect this route to an altitude of 10,200 feet by a self-sustained party, backpacking its entire, outfit in from Trail End over the entire 52 miles of ice to Cascades, we had an experience of thirty-seven long, exhausting days of hard work, only four of which were available for reconnaissance above the highest camp established at 7,800 feet above sea level, thus leaving 12,000 feet of elevation and at least 18 miles to go to the summit. From this experience and 'the many distant views we had of the upper plateau, with its masses of snow and great ice slopes, it was clearly evident that the real labour of an attacking party would not begin before reaching the massif at the base of "Cascades" descending from the King Col Trench.

Weather conditions around Mt. Logan were very uncertain and bad most of the time with much fog and snow-fall, caused no doubt by the sudden cooling of moisture-laden winds from the Pacific Ocean as they struck the mountain's frigid blanket of snow and ice. This suggested the need of an ample outfit for a protracted campaign.

In order to afford the climbing party a minimum of hardship and a maximum of comfort, it was decided that during the winter of 1924-1925 all food, equipment and supplies for use on the massif should be freighted in to the advance base camp site at the foot of Cascades, and five small caches placed along the route from Trail End to Cascades for use of the party when coming in and

going out, so that each member would have to carry simply his own bare necessities from Trail End, while all other personal equipment would be taken in as part of the winter cargo.

The actual campaign against Mt. Logan therefore was divided into two parts, the placing of these caches during the winter, and then, the assault on the Peak in the spring and summer. My tale of events will be in that order.

#### Winter Freighting

With plans made for a party of ten and a possible three months campaign, one month being required for going in and returning to rail-head and two months for work around and on the mountain, the total outfit of equipment, fuel and supplies weighed 6724 pounds and with 2200 pounds of hay and oats for use of the pack train in May it made a total of 8924 pounds to be distributed in ten caches along the line between McCarthy and the advance base camp site.

The only feasible route for such work in winter was by way of the frozen river beds down the Kennicott and Nizina Rivers, through the latter's gorge to its junction with the Chitina and then up the Chitina to the forefoot of the Chitina Glacier, a distance of about 100 miles over which teams of horses as well as dogs could be used; but from there on the final 50 miles of the route to the Cascades lay alongside and over moraines and glaciers entirely too rough for horses and almost too dangerous in many places for dogs to operate.

With an intensely cold winter, heavy snowfall in the lower valley and very little overflow ice to make the going easy for big loads, I finally decided to use six heavy draft horses with two bob-sleds and three dog teams of seven dogs each. The following men of McCarthy, Alaska, were engaged for the work, the first two named having been with me on the reconnaissance in 1924: Andrew M. Taylor, Miles Atkinson and Henry Olsen, each with a dog team; Austin Trim with his six horses, and William Weyers, teamster. Let me say here that I am proud of the work done by these men; they had become enthusiastic over the sporting venture, and did far more than could have been expected of men working simply for pay. Thus with a party of six men, six horses and twenty-one dogs, our requirements of equipment, provisions and feed for the probable duration of the work weighed considerably over 10,000 pounds, which brought our total cargo up to almost 20,000 pounds, or 10 tons. In order, therefore, to ensure a good start from McCarthy by the middle of February, when it was hoped conditions and weather would be favourable, Taylor and Trim with five horses spent nine very strenuous days from February 4th to 13th in breaking trail and relaying two and a half tons of cargo to a cache 45 miles up the Chitina Valley, this work being done with the temperature frequently down to 40 and 45, with a minimum of 52 degrees below zero on one day. During this time I was making my way from Seattle to McCarthy, and, while on the Copper and Northwestern Railroad from Cordova to McCarthy experienced the arctic conditions that so greatly hampered their operations and were to interfere with our work for the next ten weeks.

On February 16th all hands were busy with horses, dogs, sleds, harness, feed and provisions as well as the Expedition cargoes, so that at 9 a.m. on the 17th the two big bob-sleds with six horses took to the trail down the Kennicott River, while an hour later the barking, excited dogs were brought out one by one and put into harness for the long task before them. They were full of energy and excitement and celebrated the event with many a joyous bark and offer to fight, and at about 11 o'clock took the corner into McCarthy's main street and down to the river-bed at a run.

The first stretch of the route was for six miles down the Kennicott River to its junction with the Nizina, then down the Nizina four miles to the head of its narrow, dangerous canyon which had claimed its many victims, caught at some bad point of its tortuous six mile course, where the



A.H. MacCarthy Granite Portal to Rock Canyon of the Gorge of Fate

A.H. MacCarthy Devil's Sentinel on Guard at Devil's Door

voyageur is in a veritable trap and must go on through what he may rashly have undertaken without proper preparation and equipment. Luckily for us there were no open stretches in the ice, our only difficulty being due to large patches of overflow water with but light coatings of ice that let our horses, dogs and sleds through from two to ten inches of water to the ice base below. These bad patches, alternating with long' stretches of deep, soft snow were very tiring to wallow through.

At six o'clock the dog teams turned in to the small log cabin at the junction of the Nizina with the Chitina River, sixteen miles from McCarthy, just as Trim unhitched his four powerful horses from their three-ton load. Bill Weyers had cached his ton and a half load three miles further and returned to Trim's ranch three miles below McCarthy to stay the night and return next day with a ton and a half load already cached there.

Our first day's stretch naturally was rather severe on the men as well as the animals, for the going was heavy and told severely on soft muscles as there was little riding of sleds; but while the men and horses were content to enjoy shelter in the little log cabin and the improvised stable in the forest, the dogs, happy to be on the trail again, after an hour's rest were ready for a frolic or a fight. To see them jumping about made one wonder if in reality there was any meaning to the expression "dog-tired," an expression so loosely used by most people that it has, in large measure, lost its real significance in the same way that good round cuss words have lost their effectiveness because of their senseless use on the slightest provocation or without any provocation whatever.

The first night out on the trail is always one of adjustment with more or less discomfort, and especially so when five men try to stretch out in a two-man shack; it really cannot successfully be done, so I left the other four to share their discomfort and pitched my "pup" tent in a snow bank and had a good night's rest.

Morning broke with a heavy snow storm which continued for most of the forenoon, but our outfit got under way up the Chitina Valley at 9 o'clock and soon had the first touch of the troubles that beset us over much of the entire route to the end of the bob-sled run: dry boulders on the gravel bars, covered with light snow, that gripped the metal runners and made the pulling extremely hard. Nature seemed to have reversed all customs of the valley and gave us the unexpected throughout the journey; open water appeared where it hampered most; there was no overflow ice where it was most needed, and dry boulders seemed to infest every bar that had to be traversed to get from one course of the river-bed to another, and ice jams occurred at intervals just where the going should have been good. Even the ravens seemed to be out of accord with nature; for their visits and peculiar call as they flew over us did not bring the good weather that such occurrences are supposed to portend.

Due to these unusual conditions, our loads had to be greatly reduced, which increased the number of relays. In consequence, our time schedule soon went to pot, each day could be credited simply with whatever we did, with no means of estimating results for succeeding days. During the first relay trips the temperature was around 40 to 45 degrees below zero and later during the last of February and the first part of March, the range was between 25° and 35° below zero Fahrenheit, so that on many days it was between 9 and 10 a.m. before the atmosphere was warm enough to make vigorous work on the part of horses and dogs safe from the freezing effect on the lungs, and this meant the loss of much valuable time.

One other feature that hampered us for a while was the refusal on the part of the dogs to eat their ration of cooked commeal and tallow; they had been living on good city scraps, and for days scorned the clean, wholesome dishes offered them. Continuing this hunger strike for about ten days, they became very thin and later had a hard time picking up in flesh and strength on



# A.H. MacCarthy

**Passing Through the Devil's Door** Fringe of ice on sides, showing height of water backed up by avalanche - see at arrows

A.H. MacCarthy Showing Fringe of Ice That Afforded a Passage at Several Points
the shortened rations of rice and lard or fish necessitated by the extension of the trip beyond our estimated time.

From February 18th until the 27th, when the head of the Chitina Valley was reached, the days were much alike in their series of set-backs and disappointments, but on the latter date Hubrick's camp was reached, an abandoned prospector's abode on the north side of the valley two miles below the forefoot of the glacier, this being considered as a milestone in the journey, since it was virtually the end of the valley stretch and the beginning of the glacier and mountain sections. At this point also a most important decision had to be taken, either making success possible or condemning our efforts to complete failure. The all-important question was: Could we find a practicable route up the south side of the Chitina and Logan Glaciers to the west side of Baldwin Glacier, the route abandoned by the Geodetic Survey in 1913, or must we endeavour to freight up the north side of the Chitina, then cross it and the Walsh Glacier to the smooth ice of the Logan, a route which although possible for light loads with plenty of time available, would be almost hopeless as a line for the transport of our large cargo.

On February 28th, while Trim was relaying, Andy Taylor baking and Henry Olsen mending harness, Scotty Atkinson and I snowshoed across the valley four miles to the south side of the Chitina Glacier and ascended the gorge on that side. I went only as far as the portal, a narrow right-angled passage between bold granite cliffs about 150 feet high. Here I put about and worked out and marked an ice route down the valley for five miles to effect a junction with the valley route to Hubrick's camp for use of the teams in case Scotty reported the south shore route feasible. This he did on his return to camp at 9 p.m. after twelve hours of almost constant "mushing," which took him completely through the gorge and landed him on the moraine at the south side of Baldwin Glacier. Thus it was proven that the route would go, but how easily or for how long it was very hard to say; and Scotty refused to prophesy on either point.

The Chitina Moraine looked very bare of snow and its roughness on the north side and across to Chitina Mountain, as we well knew from experience on it in 1924, was not at all suited to dog team work, so with the time short and conditions so badly against us I decided upon the route up the "Gorge of Fate," little realizing at the time the striking appropriateness of the name I had given it.

On March 1st Trim left to meet Weyers down the valley and to help him bring up the remainder of the outfit, while the three men and dog teams spent the day in taking small loads of supplies and camp outfit over to the spruce patch on the moraine at the forefoot of the glacier and about a mile from the gorge portal. This camp we called "Portal Camp" and moved over to it next day; and in the afternoon the dog teams broke trail up the gorge with light loads, while I re-marked the ice route down the valley for the teams, as during the night a strong wind had obliterated my tracks for long stretches. This time I blazed the trail by digging deep holes down to the ice and throwing up roughly shaped piles of snow at intervals.

The teamsters not having been sighted the next day by noon time, the dog teams returned to Hubrick's and brought over loads of about 300 pounds each; and on the 4th at 9 a.m. started with them, hoping to break trail clear through to the head of the gorge, but returned at 4:30 after caching the loads about five miles up the line, where the gorge had given us its first exhibition of unfriendliness by washing away the first ice bridge required to cross the rushing stream that dashes from side to side throughout its entire length. This bad news was somewhat counterbalanced by our good fortune in having Trim and Weyers arrive with their six horses and a small load of freight, the large bob having stuck in a five-foot snowdrift two miles below camp. It was extricated by



A.H. MacCarthy **Ten Thousand Ton Avalanche** That closed the Devil's Door for a day, separating the camp from provisions and cache

A.H. MacCarthy 4,700 lbs of Precious Outfit and Stores at A.B.C. Cache

1925

taking half the load off that evening and hauling out the bob with the balance next morning.

Early on the 5th the three dog teams and four-horse bob left with big loads, also taking logs with which to build the bridge. During that long day the entire outfit, excepting our bare camp requirements, were relayed and cached about four miles above the Portal, and the bridge was constructed. This completed the work for the teams and permitted of their return to McCarthy, which they succeeded in reaching' in five days after many long detours and doublings on their courses on account of open channels and deep overflows.

The next morning we broke camp and worked our way up the gorge which carried us past and over many very questionable stretches, until about six and a half miles above the Portal the shore side flattened and broke back to the mountain range paralleling the glacier; and here, with all critical dangers behind us, we pitched "Gorge Camp" that served as our inhospitable and frigid home for nine days. Our imperative need now was to get our outfit relayed up to this safe point, for not until then could we feel that we were safely started on our south shore route.

After a night of violent winds and heavy snowfall, the men left camp the next morning at 8 o'clock with their dog teams to begin, first, the relaying from the main cache up to and across our log bridge; after that, all was to be moved as rapidly as possible to a safe distance above the last dangerous stretch of the gorge which was a narrow ten-foot passage between bold granite cliffs which, because of its narrowness, its latent dangers and the satanic appearance of an ice gendarme that seemed to stand guard over it, we called the "Devil's Door." These combined relays were to be over a stretch of about two miles with many twists and turns shifting from the ice cover of the stream-bed, and crossing from side to side of open stretches of water on doubtful ice bridges; at times crawling carefully along the side wall fringe of ice that once had spanned the gorge bottom.

After "doing" the breakfast dishes (for upon settling down to the routine grind at Gorge Camp I became cook for men and dogs), I set out down the trail to help with the work at the bridge where the sleds had to be unloaded and each piece carried over by hand. Half a mile below camp I met the men returning with empty sleds and very long faces, which indicated that something rather serious had happened, and true it was, for the Devil's Door was closed, with our camp above and the rest of our entire outfit below it! Where a heavy flood of ice had given us an easy passage through the day before, there were now ten feet of water covering that ice, and a small lake was formed for two hundred yards up stream, effectually blocking our passage.

This was a serious blow, and especially so when we realized that we had no dog food in camp for that night, and but scanty supplies for ourselves. To meet these needs we immediately returned to camp, put away the dogs, and then Andy, Scotty and I set out at 10:30 on snowshoes for the cache by crossing the gorge stream and circling the Devil's door by way of the glacier and moraine. This we finally succeeded in doing after five hours of the heaviest sort of going, which indicated how hopeless it would have been to have tried to transport our cache over such a route. Another half hour was required to work up through the deep snow and reassure ourselves that our log bridge was still securely in place and then to find just below the Devil's Door the cause of our trouble. A thousand or more tons of ice had avalanched from the high seracs and filled the valley bottom, thus damming up the stream and also burying twenty feet under it the trail we had used the afternoon before, when going through with our camp outfit. But it was a great relief to find that during the time of our detour the water had forced a drainage channel through the ice dam and had drained down almost to its ice base, thus making it possible for us to return to camp with our bags of rice by the gorge trail.



A.H. MacCarthy

 Camp at Portal of the "Gorge of Fate" Sept tent on left
Gorge Camp At upper end of gorge

**3. Ice Camp No. 2** L. to R.:- Henry Olsen, Scotty Atkinson and the Cook This occurrence was clearly a warning to us to rush our outfit through the dangerous stretches as rapidly as possible, so all hands made off early next morning to accomplish this task. Andy and I tackled the avalanche with ice-axes and shovels to clear a line for the sleds, while Scotty and Henry used the twenty-one dogs and two sleds to get the cache up to and across the log bridge, whose ice abutments had already begun to show signs of weakness due to melting and erosion by the muddy water. The trail over the ice jam was finished before noon and then Andy used his team to relay loads from the bridge to a safe point above the Devil's Door, dropping off part of each load below the avalanche mound, as the trail over it was too steep for his team to haul full loads. This left a hundred and fifty pounds or more from each load for me to back-pack over and down to the level stretch on the other side, a distance of about one hundred and fifty yards, and here I worked in "No Man's Land" until six o'clock with the huge, overhanging ice cliff groaning in its menacing attitude until I had packed the last load over the hill just behind the dog team's final trip from the cache, and was glad in the thought that I was bidding the Devil's Sentinel goodbye for ever.

Early that morning, upon arrival at the Door, we found that the ice-fringe along the south wall, over which our trail had run, had broken off, thus forcing us to negotiate at two right angles an ice bridge lying on a side slant, for its north side was under water and gradually was being washed away, thus permitting it to increase its side pitch very rapidly. It was apparent that this bridge was very unstable and dangerous because of the deep rushing current below it, and we were doubly apprehensive about its lasting for our needs, for it was the only possible exit from the Door, and with it gone, nothing but a boat or raft would have filled the gap; we had neither, and timber was miles away. Instinct perhaps told the dogs that here danger lurked for, while they took other bad stretches with good spirit and tails high, on this bridge they cringed and crawled on their bellies and the younger ones had to be pulled across by their drivers. The last load crossed the bridge at 6:30 p.m., and a few minutes later the slab cracked and settled at its upper end until it was deep under the water, closing the Door for further ice travel that season. We had won out by the narrow margin of a few minutes and laughed over our good fortune.

Now securely established on the route, our aim was to work the easiest and shortest line to the smooth ice of the Baldwin Glacier which we must cross, first making, however, a three-mile stretch along the glacier side and a mile across its left moraine to the white ice channel until we reached the willow patch on Baldwin Point, where our last wood camp was to be made before taking to the Logan Glacier and camping on the ice. It was necessary to find a feasible route across the Chitina Glacier to Chitina Mountain Point in order to cache summer provisions and a small amount of dog feed.

Several days were spent in sending pioneer loads up the stream line, each load a bit further up than the preceding one, fixing the trail over stretches ice-strewn from avalanches, and moving the cargo forward with as heavy loads as conditions made possible. No matter how long and how hard we worked, the task seemed to be unending but we had had the temerity to undertake the job and there was no help for us; we must carry on and see it through to some sort of a finish.

On March 12th, while Andy baked bread and kept camp, I prospected a route over the moraine and glacier to the lake at Chitina Mountain Point. Leaving camp at 1:30 p.m., I followed up an ice trench that seemed to have been washed out especially to afford an easy route for our needs, as it continued for about a mile and a half in a fairly straight line towards the Point with a good smooth ice bottom, but finally came to an abrupt end in a high walled cirque, to get out of which required very steep climbing and landed one on the roughest sort of moraine. The trench

thus proved to be no feasible route for the caching trip.

Half an hour's travel on the moraine brought into view a fair line for the Yukon sled with the hundred-pound cache we had to make, so I started to break a trail back over it towards camp for use the next day, but soon became much hampered in selecting a line on account of an indistinct view of slopes and ridges due to a heavy snow storm that had set in and which cut my horizon down to an indistinct one hundred yards. I felt that I must be near the south shore line of the glacier and forged ahead through the deep snow drifts along the line of least resistance until, with the coming of darkness at about 5:30. I realized that I had lost all sense of direction and unless I could get a glimpse of the mountain ranges to indicate the direction to camp I must reverse my trail over its long circuitous route in order to ensure getting off the glacier before darkness forced me to a night on it. The fog and driving snow circumscribing my horizon to but a few yards, I hurriedly faced about and rushed back along my trail, but soon stumbled over a mound of snow, and there on its other side found my going tracks, which showed that in my trail breaking without compass or distinct bearing to help me I had made almost a complete circle. (After this experience I carried my compass constantly for fifty days and never had any use for it). This discovery at first startled me, for it showed how hopelessly I had wandered, but I was glad when I realized that I could cut out this whole loop in back-tracking and so save considerable time. However, it soon appeared that I had turned back too late for, with the strong wind blowing the snow in all directions and the impending darkness, I could no longer make out my old trail; and it seemed most certain that I was destined to endure a "Ring-around-a-rosy" night, circling some definite rock or object occasionally to stimulate circulation and wait for daylight and the chances another day would bring.

Before resigning myself to such an outcome, however, I took a five-minutes rest, the first I had had since starting at 1:30, and tried to pierce the snow-fog for some. indication of the shore line or the mountain ridges, but obtaining no help in this way decided to try one straight course in the direction I felt the camp must lie, and if this did not succeed I would lay out my warming-up track and make the best of it for the night, making a lap or two occasionally to keep me from freezing, but not so often as to tire me out.

What a desolate feeling comes over one when he realizes that he has definitely lost all sense of direction; that the cardinal points have been literally wiped out of existence for him! With inhospitable surroundings and bad, freezing weather to accentuate my misfortune, I soon began to figure out my mistakes and to realize what I should have done—just the kind of thoughts to exert a sobering influence and to stimulate the mind towards normal thinking and away from the dangers of becoming bewildered or stampeded.

No more crooked routes for me that night! I struck straight as I could go up and down over that rough moraine suddenly lying flat up against a steep snow slope that I could not see or shooting down one that was invisible and occasionally wallowing almost waist deep in soft banks that seemed to rise before my tired feet; thus on I trudged as fast as I could go until shortly before seven when, without warning, the glorious thrill of my deliverance came, for there, not a hundred yards away, I distinctly saw the Sentinel still on duty keeping guard over the Devil's Door. This time he was indeed a friend to me for he told me exactly where I was—near the edge of the towering dangerous cliffs along the gorge and less than a mile below camp. Soon I was on familiar ground and easily gained the edge of the cliffs opposite the camp, and here spent half an hour searching for a safe line down to the stream bed. When darkness set in and I failed to return, the men became apprehensive and just as I started working down the cliffs rifle shots told me they were on the alert, and at my answering call Andy appeared with lantern and piloted me into camp

to enjoy a good hot supper at 8 o'clock. The storm raged throughout the night with the temperature very low; and the thought of how I might have had to spend those hours made my twenty-four-pound eiderdown sleeping bag on the boulder flat seem the ne plus ultra of solid comfort.

But my wandering trip and eight hours of heavy "mushing" were not without some gain, for it decided the route Andy and Scotty took on the 14th in order to make the cache at Chitina Mountain Point. With this accomplished and the freight moved about three miles up the gorge we proceeded on March 15th to "Boulder Camp" and pitched our tent among the high granite boulders, many of which were larger than the tent itself. Here, directly in front of the camp, stood a huge one hundred foot serac leaning at thirty degrees angle over the trail and groaning and cracking every few minutes as if it were about to crash and give us another mountain of ice over which to work our route.

This gorge from the Portal to Boulder Camp presents an interesting study of the work and power of the moving glacier and helps to explain many peculiar features found in the lower reaches of glaciated valleys. For several miles along this stretch the bold, high cliffs of glacier ice were jamming against a high fringe wall of granite beyond which, and between this wall and the shore cliffs, ran the drainage stream of the glacier as well as the shore slopes and ravines. Apparently the constant heavy pressure and piling of the glacier ice against the face of the granite cliffs had prevented .the stream from cutting a channel in the ice between the glacier and the shore, so the water found the line of least resistance and its final course in a cut through the solid rock, thus giving the stream many stretches through very narrow passages only a few feet wide, with the cliffs several hundred feet high. It was at such points, the Devil's Door and the Arched Door being two of them, that the route would be effectually closed to travel of any sort for man or beast unless the stream were covered by good safe ice.

Our next stretch of four miles was extremely rough, with many a steep pitch that the dog teams could barely negotiate with only half loads of from 250 to 300 pounds, and it took four days before we were ready to move to "Camp Comfort" on the east side of "No-name Gulch," our last camp in spruce timber where firewood was plentiful and there was good shelter for the dogs. Here, with our tent pitched three and a half feet deep in the snow and the stove going full blast, we were comfortable and warm most of the time, we were in camp. During much of this period the nightly temperatures fell to from fifteen to thirty degrees below zero, and unless the sun came out early it warmed up but little during the day time.

From this camp up to the smooth ice of the Baldwin Glacier, a stretch of three miles, was perhaps the roughest and most difficult part of the whole journey to negotiate, because it involved many sharp turns, sudden drops and steep climbs with bad side-hill stretches where the slightest wind would in a few minutes drift the trail full of snow and cause a capsizing of the sleds. These were the things that exhausted the strength of the dogs and men, so that with the day ended sometimes between six and seven o'clock supper was quickly disposed of, the dogs were fed their one daily ration, and all hands turned in to enjoy the warmth and comfort of their sleeping bags.

The smooth stretch of a mile or more across the white ice of the Baldwin was a treat, and fortunately a sample of what was to come further up on the Logan and Ogilvie Glaciers; but to gain this twenty-five mile stretch we had to cross the south lateral moraine 'of the Logan for three miles, hence, in order to be near the work, our camp was shifted to Baldwin Point, at the junction of the Baldwin with the Logan in a willow patch where the fuel problem proved a serious one for the cook. The green willows would not burn and the dry sticks burned rapidly, like tinder, with little heat. However, a camp cook is always supposed to have his troubles and no sympathy was

extended in this instance; the coffee must be just as hot and the flapjacks just as well cooked at Baldwin Point Camp as at Camp Comfort, and I venture to claim that such was the case. Even so, perhaps the fare was not all that could have been desired!

With much shovelling and ice chopping to make a passable trail over the rough stretches to the white ice channel, one day the men worked too far ahead of the dogs who finally decided to make a Roman holiday of it and all three teams got into a merry brawl, but fortunately Andy returned to them just in time to prevent any fatal result, which so frequently happens when strange teams get into a fight. Our casualties this time were "Scotty Dog" and "Jerry" who went on the sick list for a week or so to recover from their cuts and bruises. It was this same "Scotty Dog" that on our second day out from McCarthy resented the pace set by his team leader "Driver," and jumping on him from behind, bit Driver's left eye out. Poor Driver, being unable to lick his wound and thus keep it disinfected and clean, had to lick his paw and use it for the purpose, and during the following week suffered much pain, but after that apparently was not further bothered with it. What would have happened to one of us had we sustained such an injury and received such scant treatment? Dumb animals are possessed of much that men must envy.

On March 31st our camp was shifted to the beginning of white, smooth ice in the centre of Logan Glacier and here we were forced to begin the use of gasoline stoves for cooking and drying clothes, but we brought along and cached here our wood stove and a day's supply of wood for use on the return journey when the gas stoves would not be available. At this first ice camp we were greeted by a high piercing wind that blew most of the night, but with the tent pitched three feet deep in a snow bank and each dog given a little snow cave to curl up in (which many of them ignored), we were all fairly comfortable. The work went on rapidly next morning over the smooth stretches, and in four days we moved forward about seven miles and camped near the International Boundary Line between Alaska and Yukon Territory. Here on a large rock we cached provisions and equipment for the use of the climbing party in May, and three days later went forward five miles and pitched camp among the seracs along the fringe of an ice-rib probably resulting from the pressure of the Ogilvie Glacier pushing into the Logan as the two streams come together and readjust themselves in their course down the valley. Here we were coolly comfortable for three more days and then moved four miles to our farthest advance camp on the Ogilvie right lateral moraine about two miles west of Turn Point.

Being now fully two weeks behind our schedule and knowing we would have many difficulties to overcome on the run out and down the Chitina Valley, we decided to do straight hauling with one trip a day and cache all advance base camp freight as far up the Ogilvie as we could make in a day's run for each load and leave the balance on the moraine near Turn. We must then put about and take the north route over the glaciers to the valley head and the line that offered the best hope for good ice and hard snow back to McCarthy. In four days all advance base camp outfit, consisting of 4,700 pounds, was cached nine miles up the Ogilvie at the extreme south end of what appeared to be its west moraine, and 1000 pounds at the break in a medial moraine a mile up from the foot of the glacier. Parcels of meat and other articles whose odour might attract bear, wolves or wolverine, were placed in the centre of the piles and then all covered with heavy tarpaulins and weighted down with rocks and cases of gasoline. Pictures of these as well as other caches lower down on the Logan Glacier were taken to show their location and then, early on April 14th, with the lightest loads possible, we turned the dogs toward home. They seemed to know our programme, for with tails high they were off at a run and the stretch of sixteen miles back to Ice Camp was made in four hours. There we made camp and again began the use of our wood stove.

The four mile crossing of the Logan and Walsh glaciers to the old survey advance camp, and the base from which Baldwin and Fraser made their record trip to the high shoulder of Mt. St. Elias in 1913, was an extremely arduous one, and before the route was half negotiated one half of our light loads had to be cached for a second trip. At this camp provisions were cached for the May party and in four days of heavy "mushing," cutting and trail-breaking we succeeded in following the Chitina Mountain shoreline down for a crossing of the Chitina Glacier to Hubrick's Camp, two miles below its forefoot. With the lightest of loads and five days required to make the twenty miles of straight going, save for one short two-mile relay, it was very evident that our decision to try the south shore route by way of the Gorge of Fate was a wise one, for this north route afforded no line for transport work such as we had accomplished. Had the Gorge of Fate shut its doors upon us before we had passed through with our outfit our plan to make the caches high up near the base of Mt. Logan would have ended in disaster. Thus we counted ourselves doubly fortunate in having pushed through to a successful finish by the questionable spectacular south route.

At Hubrick's Camp a week's provisions for ten men had already been left as well as bags of oats and bales of double-compressed hay, and at three points down the valley caches of oats and hay had been made from our loads coming up. These caches together with one taken up Young Creek by Bill Maher on a single-ender made a total of 2200 pounds of feed for the pack train of ten horses, to be used in May when the season is not sufficiently advanced to ensure grass and pea-vine along the route.

A day was taken at this abandoned prospector's one-tent camp to rest up, repair harness, sort out provisions and supplies for the final home stretch, our plan being to descend the Chitina, make a cache of oats at Short River, then push on to the mouth of Canyon Creek for the first night's stop, and to return via Canyon Creek, Boulder and Young Creeks to the Nizina bridge and thence over the Sourdough Hill road to McCarthy; a fine plan that would have saved us much time, heavy work and worry had we surmounted the first difficulty encountered next morning, for trappers had beaten a well packed trail throughout the entire length of these streams that would have exactly met our requirements.

There were many long stretches of open water in the channels of the Chitina and when, at 11:30 a.m., the soft snow forced us to camp, we found ourselves at Goat Island on the south side of the valley opposite Canyon Creek and four miles from its mouth. We were off at five the next morning and glad to find that the snow crust held the dogs, so that within an hour we were approaching close to Canyon Creek mouth, when a wide open clear water channel was encountered and deflected us down the valley to find a safe ice bridge. The going was very good and soon we were several miles down stream before a bridge was found when, with such good condition, we felt it was too late to turn back, so the Canyon Creek route was given up and we continued down the Chitina, thus committing ourselves to two or three days of extra time and many hours of terribly heavy and needless work for men and dogs. Each day we worked from daylight at about 3 o'clock until noon against soft snow and open channels, trudging our way over the bare horse trail along the bank when driven there by impassable open stretches of the main channel until exhaustion forced a camping until next morning. This indeed was discouraging work, for on many rough stretches on the horse trail and at bad fordings of the streams the dogs had to be unhitched and sent ahead and the sleds man-handled until the going was again safe; the last bit of this sort of work was to let the sleds down a 150-foot drop of the cut-bank, at a thirty degree angle from the horizontal, through its timber growth at the mouth of Young Creek in order to gain the level of the Nizina River. This very dangerous bit was safely finished at 8 o'clock on the morning of



H. F. Lambart

**1. The Town of McCarthy, Alaska 2. Valley of Chitina River, Showing Gravel Flats and Tree-covered Foot of Chitina Glacier (left)**  April 26th, when our real labours were over. After a hasty second breakfast at Sourdough Cabin of the last of our tea and fried bread, we made a quick run to the end of the new partially completed bridge, crossed the river on the ice and took the two mile grade up the billside now practically have

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bridge, crossed the river on the ice and took the two mile grade up the hillside now practically bare of snow at a surprisingly fast pace, which clearly demonstrated the fact that our dog teams had suffered little from their long tour of hard work. At the top of the grade we joined the main road which, sloping towards McCarthy to the

At the top of the grade we joined the main road which, sloping towards McCarthy to the north, was still covered with a good thickness of hard snow and ice and brought us back to our starting point just at noon that day, our appearance effectually dispelling the rumour that something serious had happened to our party.

We started with over nineteen thousand pounds of cargo, had travelled nine hundred and fifty miles under arctic conditions, and cached eight thousand seven hundred pounds of provisions, feed and equipment where it would be needed by the Expedition. Even though we had exceeded the estimated time by nearly three weeks, the job proved to be twice as hard as anyone had calculated it would be; hence the work and resourcefulness of my companions from McCarthy, Alaska, to whom is due the credit for thus having completely set the stage for the advent of the climbing party, are deserving of the highest commendation.

## The Story Of The Expedition

# By W.W. Foster

To those assembled around the camp fire one evening at the ever-memorable Alpine Club gathering of 1913 the Director, Mr. A. O. Wheeler, after referring to the ascent of British Columbia's highest peak, Mt. Robson, beneath whose towering heights the camp was located, said: "And now for Canada's highest, Mt. Logan !" a mountain whose magnitude, isolation and extreme beauty had been emphasized recently in reports made by members of the International Boundary Survey and its height determined as 19,850 feet, 14,000 feet above the normal glaciated level. This commission had also taken many fine photographs of the massif from stations west and north, some within thirty miles of its actual summit, and these photographs, together with the photographs of Mt. Logan taken in 1897 by the Due d'Abruzzi from the summit of Mt. St. Elias, 45 miles southward, permitted the plotting of excellent working maps of the area.

During the years succeeding 1913 the matter naturally remained in abeyance. Those who formed the merry camp fire party at Mt. Robson were engulfed in the tragedy of war; and it was not until 1922 that the question of climbing Mt. Logan was reintroduced, on this occasion by Professor A. P. Coleman of Toronto, a former President of the Alpine Club of Canada. Professor Coleman's communication on the subject was considered at Larch Valley Camp and a committee appointed, at the Club's Annual Meeting there, to organize the expedition, its personnel being Dr. F. C. Bell, Messrs. A. H. MacCarthy, H. F. Lambart, A. O. Wheeler, and Lt.-Colonel W. W. Foster, then President of the Alpine Club of Canada. The last was appointed Chairman, Dr. Bell, Vice-chairman, Mr. Wheeler, Hon. Secretary, and the following were asked to act in an advisory capacity to this committee: Prof. A. P. Coleman, Toronto; J. D. Patterson, Woodstock; Prof. Chas. E. Fay, Tufts College; Walter D. Wilcox, Washington; Benj. F. Seaver, Brooklyn; Captain J. P. Farrar, London; A. L. Mumm, London. The committee also had the advice and assistance of Major E. O. Wheeler (First Mt. Everest Expedition) and Belmore Brown (Mt. McKinley Expeditions),



Interprovincial Boundary Survey

Mt. Logan and Ogilvie Glacier From Divide Station Showing Route of the Expedition and during the following year Dr. J. W. A. Hickson of Montreal, being elected as President of the Alpine Club of Canada, became keenly interested and gave material assistance to the committee.

The selection of a leader was recognized as the first essential to success and much anxious thought was given to it; but from the moment Captain A. H. MacCarthy agreed to accept this position the greatest confidence prevailed, his outstanding qualifications as a mountaineer and leader preeminently fitting him for the position. Then followed an intensive study of all information available, the Dominion Government maps already referred to being of the greatest value in all discussions. A brochure was prepared, outlining the project, which had already received the promise of hearty co-operation from the American Alpine Club, the Alpine Club (England), the Royal Geographical Society, and other scientific bodies, whilst the Government of Canada added to the support already promised by granting to the expedition the services of Mr. H. F. Lambart of the Department of the Interior as Deputy Leader and Chief of the topographical work, and the Department of Mines made a valuable contribution by attaching to it Mr. H. M. Laing as naturalist and, incidentally, moving picture expert.

There was a generous and gratifying response to the appeal made for financial assistance from organizations already interested and other corporations, local sections of the Alpine Club of Canada and private individuals. A special request for financial help, sent out by the Logan Committee of the American Alpine Club, of which Mr. Howard Palmer was General Chairman and Mr. B. F. Seaver, Treasurer, met with very liberal response and coupled with other forms of cooperation, gave a striking demonstration of the fine, cordial relationship between the two Alpine Clubs of the North American continent.

Owing to the fact that the only known route to Mt. Logan was via the Chitina Valley, and even that had only been established a portion of the way, i.e., to the junction of the Logan and Ogilvie Glaciers, and the mountain itself had never been approached nearer than a point approximately twenty-five miles distant, it was finally decided on February 13th, 1924, after several conferences, that instead of launching the expedition as at first suggested in 1924, that year should be devoted to a reconnaissance in the field which Captain MacCarthy undertook to carry out in order to ascertain the details of:

- (a) The route in.
- (b) Conditions likely to be encountered.
- (c) Supply and equipment required.
- (d) Possible lines of attack upon the massif itself.

The story of the trip during June and July, particulars of which appeared in Vol. XIV of this Journal, was related by Captain MacCarthy upon his return. After due consideration of his report and of the data secured for two alternative routes, viz.: Yakutat Bay and Whitehorse-Kluane Lake, in connection with which Mr. J. P. Forde gave valuable advice to the Committee, it was unanimously determined, at a meeting held in Vancouver on November 23rd of the same year, that the Yakutat Bay route was out of the question, being without a satisfactory base, traversing notoriously stormy areas and ending up on the wrong side of the mountain; and that, as the Whitehorse - Kluane Lake route embraced an absolutely unknown stretch of sixty miles which would involve at least another season for investigation, the route already reconnoitered from McCarthy in Alaska via the Chitina River and Logan Glacier to within striking distance should be adopted and the expedition proceed by it in the spring of 1925.



The Start From McCarthy



The Pack-Train Arriving At Hubricks



No. 1 Hy. S. Hall, Jr; Nos. 2 and 3 H.F. Lambart **1. Hubrick's Camp, May 17 2. Baldwin-Fraser Camp, May 19 3. Turn Cache Camp, May 23**  The general plan adopted involved:

1. Sending in food and other supplies by dog team from McCarthy, Alaska, during the winter; thus taking advantage of the possibility of travel on snow.

2. The main party to sail from Seattle on the 2nd May, 5, to Cordova in Alaska, and from that point travel by the Copper River and Northwestern Railway to McCarthy, which is practically the terminus of the railroad, then proceed from McCarthy by pack train eighty-eight miles up the Chitina, thence via the glaciers fifty miles to Mt. Logan, after which there would be eighteen miles upon the ice and snow of the massif itself.

The time for going in was determined by the facts that the Valley of the Chitina is only passable for a very short period between the spring and the main run-off of water, that is, during the slack period between the first melting of the winter snow and the heavy glacier melting later on, and that June appeared to be the most favorable month for the climb both by reason of the long days and what was known of local climatic conditions.

The general plan of the attack having been thus determined, there were many conferences to decide upon the vitally important details of personnel, food and equipment. The problem was to ensure a sufficient supply to withstand the demands of what would in all probability be a trip of considerable duration under difficult conditions, with the possibility of severe blizzards and extreme temperatures delaying climbing, and at the same time avoid more back-packing than the party could reasonably be expected to undertake.

It was felt that the personnel should be as small in number as was consistent with the objects of the expedition and the funds available, and yet large enough to avoid defeat in case of accident; also it should be purely amateur and undertake all its own work in the field. After a thorough survey of available personnel and consulting with the Alpine Club (England) and the American Alpine Club, the following selection was made of a climbing party :

Albert H. MacCarthy, H. F. Lambart, W. W. Foster. Allen Carpé.

The last was the representative of the American Alpine Club.

Three of those selected being also members of the Alpine Club (England), it was not felt necessary by that club, already heavily committed with its Everest expedition, to send out a special representative. To this party Mr. H. M. Laing was attached as Naturalist to investigate the flora and fauna of the Chitina Valley, and Andrew Taylor as transport officer.

It was further resolved to take advantage of the suggestion of Mr. H. S. Hall, Jr., of Boston, that some volunteers, who would go to McCarthy at their own expense, should accompany the party and be available to assist it in any way required. An invitation upon that basis was conveyed to and accepted by the following mountaineers of wide experience, who all had made application to join the expedition:

H. S. Hall, Jr., Boston.

R. M. Morgan, Dartmouth College.

N. H. Read, Manchester, Mass.

In the selection of equipment, particularly tentage, robes and instruments, the many years of practical experience of Messrs. E. O. Wheeler, H. F. Lambart and Belmore Brown were of great value and, coupled with the reconnaissance trip of 1924, enabled a choice to be made which proved its value in the field. Provision lists were carefully checked to ensure sufficient for the work in view and yet obtain minimum weights. A basis of four pounds per man per day was adopted on a



No. 1 Hy. S. Hall, Jr; No. 2 H.F. Lambart **1. Good going on the Logan Glacier 2. Sledding on the Logan Glacier**  schedule of one month en route in and out, and two months at and beyond the advance base camp, the total provision weight with containers being 5000 ft. For oil stoves the Primus and Coleman No. 2 were chosen and sixty-five gallons of gasoline, weighing with containers 400 lbs., provided for them.

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The equipment included wind-proof sleeping tents, sleeping robes, ropes, crampons, ice creepers, snow-shoes, rucksacks, instruments and other impedimenta, and a standard list was made up of personal equipment to be sent in during the winter by each member of the party, to include clothing, boots, etc., which, all combined, gave a further 1600 ft. of equipment to transport.

To this was added the dog feed of rice, tallow and fish, 1200 ft., and 1800 ft. of hay and grain for the pack train, or a total of five tons to be handled over the route between McCarthy and an advance base cache approximately 140 miles distant.

The sizes of containers and packages to suit different requirements of packing and the use of double bags, one being paraffined to withstand weather, were worked out with care. In determining what provisions to take it was essential to consider variety, bulk and weight, also to plan ahead so that the concentrated foods of light weight would be available for the final and more difficult stretches; and the fact that at no time did the food supply prove inadequate to the task justifies the thought and time given to its selection as well as to the carefully considered plans for its distribution.

To finance the expedition it was estimated that \$11,500 would be required, and this expenditure was not exceeded. The funds subscribed were used to provide tents, sleeping robes, ropes, food, cooking outfit and transportation of all kinds. Each member supplied his entire personal equipment, cameras and clothing without expense to the expedition.

On Saturday, February 7, 1925, the leader, implementing a decision which had given unbounded satisfaction to the committee and all interested in the expedition, left Seattle en route to Alaska in order personally to go in with the dog-teams and superintend the making of winter caches. The day prior to his departure was occupied by ;a conference with the committee and in the evening a very enjoyable function was arranged by "The Mountaineers," at which Captain MacCarthy, Colonel Foster and Mr. A. O. Wheeler were guests.

The story of the winter trip, which old-timers in Alaska described as the finest piece of winter freighting ever carried out in that section, is told elsewhere and will always remain an outstanding example of strenuous, unselfish work by which a fine exploit was made possible.

On May 2nd the party (excepting of course, their leader who was already north) said goodbye to Dr. Bell, Mr. Wheeler and other friends who saw them off on the steamer at Seattle and, after a delightful journey of 1600 miles running along the magnificent coast line of British Columbia and Alaska, arrived at Cordova Bay on the morning of the 7th to find to their great surprise and pleasure MacCarthy waiting for them on the dock with the welcome news that the caches had been successfully made. The following day a fine trip by rail, 191 miles up the scenic Copper River, passing great glaciers coming down to water level, and the little town of McCarthy, the base of the expedition, was reached. Several days were utilized, while waiting for ponies to be brought in for the pack train, in readjusting equipment and supplies, allocating duties, defining responsibilities and also meeting many residents who had become deeply interested in the expedition. In particular, mention of the town of McCarthy will always recall the help of Mr. Jack O'Neill, the general merchant there, in getting supplies forward, and the charming hospitality extended in his home.

On the 12th of May, to the good wishes of many new friends, supplementing the "bon voyage" telegrams already received, a start was made. Fine, cool weather prevailed; streams were

low, and travel up the valley of the Chitina, principally using the sand bars of the river bed, was very enjoyable, particularly upon open stretches when distant views of Mt. Logan were obtainable; and the large number of sheep (Ovis Dalli) on the slopes of the hills, running up from the valley bottom, added to the interest of the trip. Keeping to the schedule, Hubrick's was reached on the 17th and there the biologist, H. M. Laing, was established to continue his investigations until the remainder of the party returned from Mt. Logan.

The following day at Trail End, eighty-eight miles from McCarthy, "good-bye" was said to the pack train, which had to return through the valley before the waters rose. Then the fiftymile trip up the glaciers to Logan commenced, a trip which resulted in forty-four days being spent on ice and snow without any sign of plant or animal life. The wisdom of following the standard equipment suggested for each member to carry on his person was at once apparent, as even the minimum allowance brought the back-pack weight to an average of 80 Ibs., made up approximately as follows:

18 lb.
27 lb .
5 lb.
30 lb.

Items 1 and 2 were fixed, whilst 3 and 4 varied to suit the individual idea of what was essential.

On the 22nd "Boundary" cache on the Logan Glacier was reached and on the following morning the packs were lashed to two Yukon sleds taken in during the winter and cached, and at 1:30 a.m. the trip to Turn commenced. Towards noon it was very hot and the temperature in the sun being approximately fifty degrees more than that obtained at ground level, despite veils and gloves, the skin blistered; but even the change to sled pulling was acceptable after back-packing upon the rough moraines which literally overrun the whole surface of the ice upon the lower stretches of the Logan Glacier. Turn Camp (5750 ft.) at five o'clock was most welcome and the following day, the 25th, the main winter cache was reached (A.B.C. cache, 6050 ft.) on the Ogilvie Glacier and found to be about half way between Turn and Cascade, the latter being the point selected by the leader as best situated for the Advance Base Camp.

With Cascade in sight, eight miles away, and the further inspiration of glorious weather, the relaying of supplies from the cache to Cascade commenced. The Yukon sleds proved very useful, and by starting as soon as possible after 1 a.m. each morning a good crust was obtainable on the snow lying upon the glacier. The hard work received its compensation in the unique beauty of this vast area of ice and snow, and upon the occasion of the first trip to Cascade the party was saluted by a tremendous avalanche falling thousands of feet from the towering heights above, its volume so great that for fully ten minutes after fleecy clouds of pulverized ice were blowing up from the Ogilvie Glacier on which the avalanche had descended.

Except for part of a day for the reconnaissance of King Trench, undertaken after a relay with the sleds the first thing in the morning, the result of which the leader will deal with, the relaying of supplies was a continuous operation until May 31st, when consolidation was completed at Cascade. To accomplish this, 4000 ft. of equipment, provisions and supplies had been relayed 308 miles by the party itself, each member making an average carry of 70 ft. forty miles and relaying two tons eight miles.

From Cascade (7800 ft.)—named from the fine cascade of ice tumbling down from the King Glacier to the head of the Ogilvie, where in a semi-circle six fine glaciers feed the main channel of the ice—scores of cliff and hanging glaciers of wonderful design can be counted, and the highly mineralized and consequently multi-coloured rock adds to the beauty of the scene. It made a spectacular camping ground and from this point the leader will trace the ascent to the final objective.

Four weeks later, June 28th, at 9 p.m. on the ice and snow slope 900 feet above Cascade, might have been seen six unkempt, frost-bitten individuals gazing down at the camp where a stove and cook-tent had been left, and at midnight, doing in three hours what under ordinary conditions would have taken thirty minutes to accomplish, those who had battled with the summit of Mt. Logan returned to their advance base camp. Two days were occupied in obtaining rest and medical attention. Then on July 1st, at eight o'clock, with two sleds carrying the outfit, the return trek across the glaciers commenced. Before evening of that day a bird had been seen, then running water, and finally camp was made at "Turn" upon the rocks of the moraine; a welcome change after so much snow and ice.

On the Logan Glacier the surface was wet during the day, so travel was undertaken at night. Turn was vacated at 9 p.m., but with frost-bitten feet, travel was naturally slow. Sleds were used until noon next day and then abandoned, and the traverse of the moraines commenced, necessary equipment being carried on the back. Food had been cached for the return trip, and at twelve o'clock noon on July 4th the party arrived at the Baldwin-Fraser Cache, after thirty-nine hours on the glacier, only to find the cache destroyed by bear. Four hours rest and then the journey was resumed, the objective being the cache at Chitina, and that evening tremendous pleasure was obtained in stepping off the glacier to the green carpet of vegetation at its side, the first seen after forty-four days spent upon ice. At one a.m. of the 5th Chitina cache was reached, only to find that here also bear had demolished all supplies; but at Trail End, reached at 7:30 that night, a cache put up by the biologist was found, and the following day at Hubrick's the party met Laing, found that Morgan and Hall had gone on out, and revelled in the luxury of baths, food and rest.

Then came the question of returning to McCarthy, still eighty miles away. Three of the party, owing" to frostbitten feet, could walk no further, to build a boat, as at one time suggested, was impracticable, and recourse was had to rafts, two being built of six logs each, the logs keyed together and upon them a little platform to which baggage was tied. Laing elected to remain until the condition of the valley would permit a pack train to be sent in for himself and the fine collection he had secured, so that three persons were to go on each raft.

Shortly after noon on the 11th everything was in readiness, Laing stood on the shore, took photos and waved farewell, and the A.C.C. rafts "Logan" (Taylor, Read, Lambart) and "Loganette" (MacCarthy, Carpé, Foster) shot out into one of the many streams forming the source of the Chitina River. Late that evening the "Logan," having successfully run fifty miles of swift water, was beached at a point named "Rush Pond," opposite McCarthy, and the following night, after a walk across country, those aboard sent out news of the "Conquest of Logan." The "Loganette" was not as fortunate; carried by a strong current into the main channel of the Chitina River, after a turbulent passage through the rapids it was completely overturned in rough water at the junction of the Short River, eighteen miles from Hubrick's. With some difficulty and using the upturned raft, a landing was finally made, and what could be salvaged from the water-soaked baggage was cached in trees trusting that it could be picked up when the pack train went back for the naturalist later on. Then a walk of seventy miles to McCarthy ensued, that point being reached at noon of the 15th July just



H. F. Lambart

Advance Base Camp (A.B.C. Camp)
Camp at Foot of Cascades



H. F. Lambart

1. Ready to Start from Cascades Camp 2. Party Leaving Cascades Camp on First Relays to Top of Quartz Ridge, June 1 The start of the actual climb



H. F. Lambart

A Tremendous Avalanche Falling Thousands of Feet from the Towering Heights Above



H. F. Lambart

The Rafts "Logan" and "Loganette" Building and Ready to Start In the distance the tree-covered foot of the Chitina Glacier as a party organized by Andrew Taylor was leaving to search the Chitina.

Looking back, there are many things which appear worthy of a more detailed description than is possible in this resume, but none more so than the wisdom of the leader in becoming personally acquainted by reconnaissance with the conditions to be encountered. As a result the fundamental matters of supply and transportation were thoroughly organized and, owing to his appreciation of the terrain, caches and stopping places en route and even the camping points on the massif were selected ahead and an itinerary planned which, except for variation on the actual climb, attributable to extreme weather conditions, was observed throughout.

In all preparations for this expedition there was also the feeling that the personnel of the advisory committee and technical advisers was such as to ensure every possible precaution being taken, and that this condition, coupled with the wonderful co-operation of those societies and individuals interested in the venture, would as far as humanly possible ensure its success.

The spectacular part of the expedition was naturally the conquest of the mountain but, in addition, the geographical and meteorological information obtained is of considerable magnitude; and the contribution to mountaineering lore, the beauty of still and moving photographs and the research and fine collection of the naturalist in the Chitina Valley has added considerably to the store of human knowledge; and it is hoped these features will in due course be recorded in book form, to amplify and consolidate the many fine articles that have already appeared in scientific and other journals.

#### l'envoi

The last farewell to friends at Kennicott and McCarthy, a few hours at Chitina and Cordova, and then aboard the SS Yukon for the most luxurious stretch of the homeward journey. There were still signs of both physical and mental strain but, when for a couple of hours on a beautiful summer day the great massif of Mt. Logan appeared behind Mt. St. Elias, forever setting at rest the supposition that it could not be scanned from the water —its domes of snow and ice gleaming in the sky—the parting thought could only be that of admiration for a mountain whose splendid isolation, extreme beauty and commanding bulk forever entitled it to an outstanding place in mountain lore.

### The Climb

## By A.H. MacCarthy

With so many factors entering into our problem to make results uncertain, but with an abundance of provisions and equipment at hand to ensure a sustained effort, it was decided that our party of eight members: H.F. Lambart, Assistant Leader; W.W. Foster, Recorder; A. Carpé, American Alpine Club Representative; H. S. Hall, Jr., N. H. Read, R. M. Morgan, A. Taylor and the writer should start from the advance base camp fully prepared for a four weeks' campaign. My preliminary schedule had called for a complete consolidation by June 1st at an advance base camp on top of Quartz Ridge, the last rock outcrop of any size along our line of ascent and rising about 1000 feet above the base of Cascades on their west side, a climb of the final peak by June 21st and a return to the advance base camp on June 23rd; so that with a twenty-eight days' supply of substantial provisions and an abundance of iron rations we were, in reality, provisioned for about



H. F. Lambart

First Journey to Cascades Looking Down Ogilvie Glacier
The Sled Reaching the Top of Quartz Ridge (8,800 ft.)



H. F. Lambart

1. Observation Camp Mist Rising From Ogilvie Glacier 2. Excavating for a Tent Site at King Col two weeks over the twenty-one days estimate for completion of the work and return to the advance base.

On the afternoon of May 31st we were consolidated in a camp at the base of Cascades (altitude 7800 ft.) in two ten by twelve by three wall tents and four alpine tents with about 4000 pounds of equipment and provisions, this entire outfit having been relayed up by us on Yukon sleds from the winter caches on the Ogilvie Glacier at "Turn," the base camp, and one on a moraine opposite the junction of the Mussell Glacier, and all the party were in good condition and anxious for the assault to begin.

During the next two days we relayed twenty-eight packs and one Yukon sled, about 1500 pounds, to the top of Quartz Ridge over an all-snow route of varying gradients, one considerable stretch being forty-five degrees from the horizontal. In the forenoon when the work was done the snow was in good, firm condition, affording good kick-steps and heeling down, but with no opportunity for glissading on account of the general steepness and the presence of many crevasses either open or shown by depressed bridges. At 6:30 on the morning of June 3rd with a clear sky and brilliant sunshine on the high ridges about us, we left the advance base camp with heavy packs and light hearts for the venture that had been in the minds of some of us for more than a year, and with a month's outfit already above us on Quartz Ridge and fully as much as that left behind in camp. With daylight now throughout the whole twenty-four hours, our chances for success seemed most favorable.

Making the top of Quartz Ridge in an hour and a quarter, we continued on up the route chosen on a reconnaissance to Observation Peak, made by MacCarthy, Lambart, Carpé and Foster on June 6th, when the whole of King Trench and its Col were first seen by anyone. Paralleling a broad, pronounced bergschrund, along the base of the ridge to the west of us, we were thus protected from any light avalanches that might descend from its twelve thousand foot crest, and, after crossing several securely bridged crevasses and ascending steep snow slopes, using snow shoes for the first trip, our packs were cached at the top of a snow dome about one thousand feet above Quartz Ridge and all hands made a second trip from the Ridge, this time bringing up the Yukon sled and a four-foot toboggan. Our efforts to back-pack and draw the sled at the same time failing, we left the sled and continued with the packs until we reached the Observation Campsite at the swale where the King Trench ice stream breaks into two branches, one running north down the Cascades to the Ogilvie Glacier and the other south to an arm of the Sella Glacier, the latter stream being by far the larger one. While Taylor and Morgan rigged camp the other six returned and brought in the sled load. During the afternoon a cold wind blew much of the time, accompanied by a light snow fall, but at 6:45, when supper was finished, the Trench and Col were brilliantly clear and showed an apparently easy route to our next camp site at the base of the Col. The next day, by making three relays from Quartz Ridge to the snow dome and two by sled to camp, we were fully consolidated by five in the evening with an outfit of 1837 pounds at Observation Camp at 10,200 feet elevation, the highest point reached in 1924; but with the cold wind coming in heavy gusts and driving clouds of sleet, the prospects for the morrow were not at all good. The storm continued throughout the night, sometimes with extreme violence, threatening to blow away our three alpine tents. The morning broke with no wind and a dense fog. By 9 o'clock there were signs of clearing, so all hands took packs of about 35 pounds and we set out on two ropes with snow shoes and a supply of willow markers, hoping to blaze a good trail and cache our packs at a good camp site near the Col.

At 1 p.m., four miles above camp, we reached the base of an icefall of about one thousand



H. F. Lambart

1. King Peak (17,130 ft.) From King Col Camp (14,500 ft.). Party Making Camp 2. King Peak (17,130 ft.) and Mt. St. Elias (18,024 ft) from Windy Camp (17,000 ft.) feet in height and of very easy gradient with its hundreds of crevasses all securely filled and bridged by hard snow so that the footing on snow shoes was safe and good, but at 3 p.m., at 13,200 feet elevation and about a mile beyond the top of the falls, we were forced to cache our packs and return to camp. During almost the entire day we had worked in a fog or driving sleet and the blast became so strong above the falls, where dangerous crevasses began to hamper us, that further advance seemed inadvisable.

During the return journey, with many stretches of our trail entirely wiped out by the driving snow storm, it was very evident how essential the willow markers were to us in fog or storm in order to preserve a safe line of travel. Having started in fog, with occasional gaps to give us our bearings, and then worked most of the day in what might have been called a mild blizzard at about zero temperature, our arrival in camp in brilliant warm sunshine with the Trench and Col again clear showed how local and uncertain storms might be around Mt. Logan. This fact gave rise to two suggestions with but one import: "Do not delay a start or alter your plans simply because conditions are bad, equip for it and go ahead"; and again: "Just because it is fine weather, do not bank upon its remaining so all day; prepare for the worst and be ready for it when it comes."

In preparing for this campaign and believing we were likely to have severe weather, every member of the party was advised to send in with the winter freight an ample supply of clothing to cope with such conditions, consequently in forging ahead when conditions were not favourable and occasionally very bad I did so, feeling that all members of the party had been given ample opportunity to provide themselves with suitable outfits, and that if there was any member not so provided he must be put to the courage of his convictions and either be contented with what he felt was sufficient or be ready to stay behind on such occasions.

Having blazed the trail with willows placed at every hundred feet up the Trench as far as our cache above the ice-falls, we were now prepared to relay our entire outfit forward to a camp site below the Col in almost any sort of weather. Accordingly next day we took a heavy sled to the base of the falls in four hours, all eight on the line and handle bars, with snow shoes. Here we cached the sled and 100 pounds of cargo and back-packed the rest to a point about a mile above the 13,200 foot cache and a mile below the Col, this spot appearing to be the most protected and logical site for the all-important Col Camp. Continuing up the Trench to the crest of the Col, we found, to our great disappointment, that it did not connect up with the ice slopes of the massif leading to the higher plateau by at least a thousand feet, and that this intervening stretch was a mass of very steep and badly broken ice slopes covered with varying depths of snow, while on the opposite side of the Trench the east shoulder of King Peak, rising a thousand feet or more above us, presented a steep face of perfect crampon snow. Our position in the Col gave us no clear view of the conditions of the massif above us, so the party divided, Lambart taking the second rope back to camp to prepare supper and make ready for the next day, the first rope ascending the King shoulder to its crest at 15,000 feet, whence it was possible to study the stretches above on the massif and to locate what appeared to be the only feasible line of ascent to the upper reaches of slopes leading to an elevation of about 17,000 feet. To the south of us and 9,000 feet below lay the Seward and Columbus Glaciers with the magnificent St. Elias range rising in the purple sky beyond, showing between its peaks grand views of the mighty Malaspina Glacier with its myriads of moraines, while, fringing the crests, the blue Pacific outlined the whole panorama, a truly grand sight that was not excelled by any other view during the whole climb.

Considering the veritable jumble of ice blocks, séracs, and cliffs, all of huge dimensions, lying on the steep and badly crevassed slopes above the Col, extending as far as the eye could



Hy.S. Hall Jr.

Observation Peak Camp
View E. Up to King Col From King Col Camp
King Col Camp. View N.W. Towards Ice Mass on Logan Massif

reach, and through which we must find a route, it was clearly evident that while camp was being consolidated at the base of the line tentatively chosen, a reconnaissance of the stretches to our next camp site must be made in order to conserve food and the strength of all the members of the party. We were now working at an altitude where the heavy exertion had begun to tell on several of its members.

On June 8th all hands left Observation Camp with a sled load of about 650 pounds, reached the foot of the icefalls at 8:45 a.m. and back-packed loads to the Col Camp site at 14,500 feet elevation, arriving there at 1:30 p.m. Here Lambart left Foster, Read and myself to rig camp and make a reconnaissance next day, while he led the others back to Observation Camp to begin the arduous task of "jerk-necking"<sup>6</sup> and back-packing all the outfit up to the Col camp. He that has not been in the support or the reserve forces in battle never can appreciate what it means in will power and endurance to do the drudgery while the others are enjoying the combat. Effort was made to divide drudgery and pleasure as far as was consistent with the demands of conditions as we found them, and it would be hard to say just who won the battle at each stage of the game, the first line or the support, for each was essential to success.

The Col Camp site was close under the steep slopes of the massif; in order to pitch the tents securely and to afford them as much protection as possible from the winds that occasionally swept the Col, sites had to be dug several feet into the snow bank. In doing this work with a long-handled shovel carried for the purpose, we soon noticed the enervating effect of long-sustained effort in a rarefied atmosphere to which we had not become accustomed. With two tents pitched, one for cooking and one for sleeping, we three turned in early, intending to make an early start in the morning, but on account of a weak, over-strained eye the night was one of perfect torture for me, and it was only by the efficient work of Foster as doctor and cook that we got away the next morning at 8 o'clock.

Starting with snow shoes on the first long, steep stretch that carried us to the beginning of the rough going, we here changed to crampons and found good conditions for them during the rest of the day, of which my diary says: "Spent seven hours going up to 16,500 feet over extremely picturesque snow and ice route with wonderful blocks of ice, seracs, crevasses and snow drifts, a long, steep, tortuous route all the way, over a distance of perhaps five miles." In the jumble of huge ice formations we found many similar shapes that suggested names for the various stretches, so that in case of need rendezvous might easily be arranged: the "Diamond Serac," under which our route lay; the "Dormer Window," over which we climbed; the "Cork Screw," a rise up which we went; the "Tent City," through which we passed; the "Hog Back," which we learned to avoid; "MacCarthy's Gap," that led us through a sinister ridge to the stretches above; the "Stage Coach," that moved too slowly for us; the "Avenue of Blocks," along which we strolled; the "Friendly Crevasse," that kept us going along a straight and narrow path to its secure bridge; and "Glissade Hill," down which we always heeled or mushed on the zig-zag trail. On the return journey we cut many good steps in the hard snow on the steepest slopes for use when heavy packs were to be carried, and with a fairly safe route outlined and a camp site chosen at 17,000 feet elevation, from which a clear view could be had of a double peak that topped the crest of the massif before us, we arrived in camp at 7 p.m. The others had already arrived with their heavy loads. Everything looked very promising for the next move, so my entry was: "Tomorrow day of rest-and work!" During the next day caches below the Col camp were relayed up and packs made ready for the advance,

<sup>6</sup> Sled hauling.

tents, grub, primus stoves, fuel, etc., being .assembled so that the Col Camp could remain intact as a refuge in case of need.

A heavy snowstorm raged during the early hours of the llth and it was nearly noon before Lambart, Foster, Hall and I set out for the upper levels with packs of equipment and provisions. The others went below to the icefalls to bring up the last of the cache there. The storm had completely wiped out all traces of our route above with deep, soft snow that necessitated the use of snow shoes the entire day, but our familiar landmarks showed us the way and this time knowing we had a feasible route, we planted the willow markers that later in fog and storm rendered such valuable assistance. The going was extremely slow and finally forced us to cache our loads on the Hog Back at about 15,400 feet and return to camp. Heavy snowfalls and fog made the work the next day and the forenoon of the 13th impossible, but in the afternoon the last of our provisions and fuel were brought up to camp and all the outfit for use above was made ready. All hands were away at 6:30 the next morning on snow shoes, with packs averaging about 45 pounds each, and my entry reads: "Soft snow on all stretches and slopes from 4 to 24 inches deep with crust about half an inch thick. Steep slopes rather dangerous from avalanche but none occurred as broke courses all possible." Made Hog Back cache at noon, had luncheon, picked up cache and continued until 5:30, when snow storm struck us and we camped at about 15,800 feet, with heavy storm raging as we turned in at 8:20. Storm and fog confined us to camp during the 15th, but on the 16th: "Broke camp at 6 a.m. and first rope away at 6:30, second at 8, leaving nothing behind at this fly camp. Reached upper slopes of Glissade Hill in fog, everything obscure, snow very heavy and glare on snow strong. After luncheon continued up apparent line to about 17,000 feet and three-miles from a double peak. Established camp at 6:30 (afterwards named "Windy Camp"). Billy, Fred and I went up to get a clear view of the whole route above. At 8 p. m. temperature was 27 degrees below and the minimum recorded during the night 33 below, warming to 20 below at 3:30 a.m. Party all in1 fair shape but not strong for the work to be done."

The next day broke fair, and there appearing some need for relaxation from drudgery, all hands went on a reconnaissance in order to determine our exact location of the massif, so: "In about five hours of easy but slow going, willowing the route, reached the steep stretches on the back side of the double peak and then the saddle at about 18,800 feet and waited half an hour for view. Fog too dense, so returned to camp and turned in at 8 p.m. Undecided about next move but probably another reconnaissance and relay food as both needed." The following day Lambart with Carpé, Hall, Morgan and Taylor dropped down to Col Camp for a good night's rest and thence to bring up big loads of provisions, while Foster, Read and I again ascended the double peak to its saddle but were unable to get higher because of the gale that was sweeping its crest. Lying prone and peering over the edge of the saddle we were able to get occasional glimpses of another double peak about three miles beyond; this evidently was the real double peak shown on the map to be northwest of the main peak and next in height to it, but nothing was visible beyond it. Opinions therefore divided as to whether or not it would prove to be our final goal or only next to the final goal; we felt, if at all possible, the two highest peaks of the massif should be climbed, in order to be certain of setting foot on the highest point of the mountain.

An inspection of the slopes to the south of the peak we now were on, which we called "False Double Peak," showed extremely steep and badly broken faces in both directions and as far down as we could see, a condition that is characteristic of the whole side of the massif to the east of King Col. While circling to the north side we passed over the main ridge of Mt. Logan by a saddle at 18,500 feet in the rock outcrop and there, to the east ahead of us, saw steep though smooth ice



No. 1 Hy. S. Hall, Jr; No. 2 H.F. Lambart

 Ice Cliff Camp (15,000 ft). View towards Mt. St. Elias

Windy Camp, Looking Up Glacier Leading to Twin Peaks and Great S.W. Wall of Logan Massif

and snow slopes leading down toward the north shoulder of Double Peak beyond, an easy route for us to take and a good camp site at the base of this north shoulder; but the serious question remained unanswered: "was there a final peak beyond this one, and if so, how far beyond, and what was the character of the terrain between the two?" Clearly our Windy Camp was too remote to make a dash from it for the summit; at least one more camp was needed, and that preferably at the base of the north shoulder of Double Peak.

Returning to camp at 11 p.m. that night the thermometer again registered 32 degrees below zero and showed 25 below at 7 a.m. with a heavy snow storm raging throughout the night and much of the forenoon, but at 1 o'clock we set out breaking trail in the deep snow down the slopes until we met the others at Stage Coach coming up with very heavy packs. Here cargo was shifted to equalize loads and the second rope took the lead up the trail. For the past hour or so the temperature had been mild and visibility fair with occasional rays of hot sunshine, but upon reaching the long, exposed slopes above Glissade Hill we were struck by a piercing cold wind that blew the soft snow into a veritable blizzard and in a moment changed conditions from mild summer to arctic winter. For a few moments it seemed as if we must put back to the camp below and thus lose all our hard-earned "uppings"; but there now was no assurance of good weather below and that camp was three times as far away as the remaining distance to Windy Camp, so changing the lead we went ahead and reached camp at about 9 p.m., all hands turning in by ten o'clock to secure the protection of our heavy eiderdown robes from the intense cold.

This trip gave Morgan's feet, already susceptible from a bad freezing some years ago, a touch of frost, and it caught several fingers too long exposed fixing packs and footgear; furthermore it showed that we had reached the limit for safe or comfortable use of rubber shoe packs or oiled leather foot gear and must change to dry-tanned moccasins with an abundance of heavy socks. This all hands did and continued to use them until our return to Col Camp after finishing the ascent. Morgan's feet now giving him much trouble, he wisely decided not to go further and Hall generously volunteered to accompany him down when we were ready to move camp forward, but insisted that he be allowed to take the heaviest of our packs on the relay of equipment and supplies to the next camp site which we decided should be on the plateau near the base of Double Peak.

The 20th broke cold and very stormy and it was not until 2 p.m. we were able to make a start for the higher camp site, but this was too late and the weather was too uncertain for us to back-pack the full distance desired. However, it was imperative that we should make distance forward as rapidly as possible, whenever there was even the slightest gain, and at 5 p.m. our loads were cached in the rock saddle of the main ridge at 18,500 feet, and having worked in storm most of the time, we returned to camp at 6.30 p.m., all hands tired out but in fair condition.

Throughout the night a violent storm raged with heavy snow fall, high winds and temperature at 5° below, moderating somewhat at 10 a.m., when Hall and Morgan set off on their 150-foot rope down the trail with its first willow just visible, and soon they were swallowed up in the fog and flying snow, leaving us to reap the benefit of their many days of arduous labor. The storm increasing in severity, no advance in it was possible, so all hands turned in at 3 p.m. when the wind ceased, the fog lifted and the camp and mountainside were bathed in warm sunshine. The call for "All hands rise and shine, lash and carry!" soon brought quick action; camp was struck and at 10 p.m. supper was eaten at our two-tent Ridge Camp at 18,500 feet, probably the highest regular camp ever pitched on the North American Continent. My diary says: "Day not lost, fine trip, a bit cold but comfortable and camp alongside food cache, but not close enough for final dash if at all possible to make one more camp, preferably beyond Double Peak."



H. F. Lambart

1. The Cascades and Cascades Camp (7,800 ft) 2. Plateau Camp (17,800 ft)
Here at our highest camp the altitude told severely on some members and visibly affected all of us, for we seemed to be content to sit and contemplate the work to be done rather than to do it; actions were painfully slow and inefficient and the smallest exertion caused rapid breathing and a desire for rest; but, contrary to expectation, I slept soundly without the slightest feeling of suffocation such as I had felt on a number of nights at lower levels, and especially after a day of comparative idleness, while a day of heavy work seemed to free me from this distress at night; this I believe was also the experience of the other members of the party.

The temperature fell to 7 degrees below zero that night and the atmosphere felt piercingly cold which, necessitating the use of heavy mittens or gloves to protect the hands, made packing up for the move next morning very slow work, and it was not until about 11 o'clock that we got under way with all our outfit but one two-day bag of provisions and set off over the rounded ice dome which we later came to know as Hurricane Hill. The snow on the slopes was very light on many stretches with a hard bottom, and the going was fairly good on snow shoes for about a mile and a half, and then the snow became soft and deep, so that at 2:30 p.m. we were forced to stop and rig Plateau Camp at about 17,800 feet. Fortunate indeed for us was it that we did so, for hardly had we finished our work when a violent wind swept over the plateau and engulfed us in a blinding snow storm that continued throughout the night. My diary reads: "Had supper at 4 p.m., discussed plans with all hands and decided to take the first good chance for mountain. Have eight days grub and fuel for venture; could hold out for ten or twelve days on grub available, but do not think strength of all members of the party would last that long, for task ahead —probably two peaks to make—will be severe strain; must push and push fast as possible and then some more."

June 23rd is the day we shall all long remember for it saw the end of our doubts and fears, even if not the finish of our labours and our troubles. We climbed our giant to its topmost pinnacle and nothing else mattered to us as long as all hands got down safely.

During the night the storm raged with great violence and at times threatened to blow our two Brownie tents to shreds, but its force gradually died out as morning came, leaving us in a deep blanket of soft snow and a dense fog which enveloped us until about 10 a.m., when it broke and lifted, giving us a glaring sunshine on the white slopes all about us. We were soon off on two ropes for the crucial test. The glare proving too severe through my two sets of dark glasses for my weakened eyes. Foster took the lead, thus meeting an emergency as he did scores of times during the campaign when progress was slow or conditions became serious, for he was our sheet anchor no matter what the difficulty. Circling at an easy gradient the shoulder of an ice ridge that lay between us and the double peak we made good progress and came into view of Double Peak at 11 o'clock, our winding course ever upward continuing until we reached the base of the final slopes that led to the saddle between the two domes. Here we rested, had a snack and put on the crampons. Again taking the lead at this point, I failed to do that which perhaps would have saved us much worry and suffering. Instead of laving a course around and beyond this north shoulder, so that we could have seen the higher peak that lay beyond and straightaway made for it, I set the course on the western side of the shoulder and thus blanked the eastern horizon. As final results clearly proved both going and returning, this course gave our party many hours of needless heavy work and serious strain. But in advance of complete knowledge of the mountain, would it have been good mountaineering to have ignored the high dome of Double Peak so near at hand, and directly attacked the high peak two miles beyond, when all our available data showed them to have but a possible difference of fifty feet in altitude? On many days in 1924 and during the winter trip I had studied the high peaks on the massif through my glasses from afar, and on alternate days

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Allen Carpe, at about 18,200 ft

**The Eventful Morning of June 23rd, Shortly After Leaving Plateau Camp** Foster leading on the rope. Distant peak to left, west face of first peak of Mt. Logan. The summit peak out of sight beyond.

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had assigned the glory of being the topmost pinnacle to each of these two peaks; thus in spite of the map I was yet to be convinced by level observations from the top of one to the other before I conceded the honour to either peak. Therefore I felt we must climb both peaks in order to be certain of our goal.

Ascending the first stretch of half a mile, the pitch became much steeper, and the side slopes we negotiated near the top, although perfect crampon snow, needing but few steps to be cut, were at such an angle that a slip by one climber would have meant a long slide for the whole rope. But much as each of us might have hoped it would prove otherwise, we all felt fairly certain that the main peak lay beyond this one. We were determined at least to see that final peak on this day, so our eight long, sharp steel prongs went deep into the snow crust at each step, and at 4:20 p.m., in brilliant sunshine, with an almost clear sky, we reached the summit of Double Peak. The height proved to be about 19,800 feet, the highest any member of the party had ever been above sea level on foot, Foster and Read having gone a bit higher in airplanes. But one glance to the southeast and we all knew that we must climb still higher. There, two miles away, with a 1000 foot drop between the peaks, towered the real summit of Mt. Logan, a sight on the levelling instrument confirming the supposition that the peak beyond must be a 100 or more feet higher than where we stood. Thus we were condemned to sling our packs and trek on.

Members of the second rope, having cached some things at the end of the blazed willow trail at the base of the north shoulder, were forced to descend as we had come up, while Foster, Carpé and the writer were able to make a traverse of this peak and drop down the easterly side to the saddle between the two peaks, thus soon gaining the location of the final camp site I had determined upon in the summer of 1924, but unfortunately did not establish during this campaign. Here, in the protection of the sharp rock outcrop that defines the summit ridge of the Logan massif for miles, and above which its eight or ten peaks tower, we awaited the arrival of the second rope. In half an hour we were again one party and the final assault began. From our position the summit ridge presented two summits, the southeast rise being the higher, the saddle between them and the slopes leading up to them being in the main of hard, wind-blown snow, with occasional outcroppings of brittle ice to slow up our progress or block the way. These ice intrusions we avoided by zig-zagging around them and after cutting not more than 200 steps in the hard crust my head topped the north ridge leading to the summit. Before me, close at hand, was a most startling and wonderful spectacle—the reflection of myself in the centre of a small and completely circular rainbow.

For several days we had all been visibly affected by the heavy work in the rarefied atmosphere; had been a bit light-headed, as when one feels he is soaring about in the air or hopping about in space and doing impossible physical feats; now I was possibly seeing the unreal, perhaps one of Nature's brilliant hoops through which I must jump when legs and feet felt like lead after their long ordeal. As quickly as possible, I cut large secure steps to land me on top of the ridge and there, tending the rope, awaited the verdict of Carpé and Foster as they came up; it was indeed a relief to hear Carpé say: "That is the Brocken Spectre with a halo," and Foster, close behind him, confirmed this verdict.

This was a rare treat for all of us, for I believe it is the first time it has been seen on this continent or, at least, has been recorded.<sup>7</sup> Lambart's rope, following close behind, saw the same sight, each his own reflection in the circular rainbow. But there was still serious work ahead for

Note. On page 78, Canadian Alpine Journal, Vol. VII, 1917, is recorded an instance of this spectre seen by Mr. A.0. Wheeler on Sentinel Mt., Highwood Range, overlooking the prairies of Alberta.







### N. H. Read

June 23rd, On the Summit of Mt. Logan, at 8 pm L. to R. - Carpe (getting camera), Foster, Taylor, Lambart, MacCarthy, Read (taking photo) me, for with a sharp drop of 50 feet or more in the ridge that led to the highest point there was still a question whether or not the route would carry to the top or we should find an unsurmountable difficulty lying between us and the final crest of the ridge. The drop was steep on our side to the crack that opened at its bottom which, although presenting an open face, fortunately was securely bridged. The rise, however, on the other side, of perhaps a hundred yards, although almost knife edge, seemed easy to negotiate with our crampons after all the trials we had been through, and in a few minutes landed us on the summit at 8 p.m., where we all shook hands and were foolishly happy in the success of our venture and the thought that our troubles were at an end.

I shall not attempt to describe the sight that lay before us from this pinnacle of ice. The summit was not more than large enough to accommodate our party of six comfortably, being in the shape of a triangle with a base of ten feet and a height of thirty feet, perhaps 150 square feet of level area for us to stand on. The sides dropped off very precipitously and from the centre of the base a sharp arête shot down for thousands of feet towards the Seward Glacier. We veritably seemed to be standing on the top of the world with King Peak and many others that had looked like insurmountable heights now lying below us and appearing in the vast sea of foam as a mere speck of flotsam. This effect, it seemed to me, was out of all proportion to the variation in the altitude; or is it with an altitude as with gravitation, radiation and hunger, in proportion to the square of the distance from the object? As the most ravenous member, perhaps, of the party described it: here below us was a huge layer cake, with its nuts showing through the frosting, a veritable sea of white expanse with myriads of islands, and all thousands of feet below us.

However, even though the horizon remained fairly clear in most directions and the panorama was most enthralling, there were clouds rolling in over the range between Mts. St Elias and Augusta that warned us to make haste down to the lower levels as another storm soon would be upon us. Lambart led off with the second rope and we began the descent at 8:20 p.m., keeping to the line of our steps cut in the final slopes near the top where the gradient was from about 45 to 60 degrees from the horizontal. In the dim light these steps assured a safe descent until the lower slopes were reached, where we had no steps, foot-prints, or willow markers, to guide us. Soon, with dense fog rolling in and enveloping the whole mountain side, the descent became painfully slow and increasingly dangerous as the wind rose and began to blow the snow in blinding gusts, so that after reaching about the 19,000 foot level at 1:30 a.m. of the 24th we were forced to hole into a snow bank and wait for better light and a possible break in the weather.

The work of digging caves into the snow bank big enough to house ourselves with nothing but ice axes and snow shoes to serve as shovels was most exhausting, and some of our holes were pitiful evidences of the weakened state of our party. The storm continued during the night and the temperature dropped until the air was penetratingly cold, the last reading of the thermometer before it was lost in the snow showing 12 degrees below. Although with the coming of the day the light was somewhat better, the falling snow was blinding and at noon visibility carried not more than 50 feet, so that it was impossible to get a bearing on any object in order to locate our position, in the fog-storm the snow slopes appearing simply as white level stretches ahead of us. How welcome would have been the sight of a rock outcrop or even of glare ice, for that would at least have helped us to see and gauge slopes. With no sign of let-up in the storm, it was imperative that we make an attempt to get further down the mountain side, and, as Andy suggested, one little bit of luck might still be with us and we might find a willowed their trail towards the main peak as far as the markers had lasted, but unfortunately needed about a hundred more to complete the trail. The long



Allen Carpe

# **1. View from Betwee the Two Highest Peaks of Mt. Logan at About 19,000 ft** Mt. St. Elias left of centre, 26 miles distant. First peak of Mt. Logan, right. Looking S.W. across the Seward Glacier

### 2. View from Summit of the First Peak of Mt. Logan at about 19,500 ft. Direction N.E. showing the unknown Kluane are. Highest summit of Mt. Logan extreme right

hours of shivering in the cold with fitful naps and doubtless many horrible nightmares had seriously drained the small reserve strength of our party, and a further period under such trying conditions might have reduced some of our members to a helpless state, so that at noon I called all hands and ordered a start with Andy leading. But here it was easier to order than to secure obedience to one's command, and especially so when perhaps the command was given in rather a weak, faltering voice. At any rate it was not until 2 p.m. that all were routed out of these miserable snow holes, the ropes securely tied, and we got under way, stumbling and staggering along. Bringing up the rear I could faintly see the outline of all our party as Andy cautiously wallowed through a deep blanket of light snow, feeling and testing his way along to be sure the apparent white plain before him was not too steep for his cumbersome snow shoes to afford a secure stance ---for it was a stance at almost every step. We needed action to stimulate circulation as well as to get down from the height, but also there were lives at stake and it required the combined strength of the whole party to put us safely in camp below. Hence the greatest caution was necessary to avoid the steep slopes and cliffs we knew lay below and between us and the valley between the two peaks. There the going would again become comparatively safe excepting for possible crevasses that were not in evidence during the ascent.

Travelling thus for some time with an apparently smooth and fairly level ridge ahead and to the right of us, on which side the longed-for valley lay, I suddenly made out a faint black streak to my right only a few feet away, and upon creeping over toward it found that it was an ice outcrop edging a cliff, with no indication of how far it descended; so I hastened forward to give Andy warning, but it was too late, for in a moment he suddenly disappeared from sight—he had gone over the cliff with the rope left taut in Read's hands. Hastening forward to help Read, I gradually worked to the edge of the precipice and there, thirty feet below, saw Andy sitting half buried in a bank of snow. My call to him receiving no response, my apprehensions doubled the vigour of my next call, and then came a faint though most welcome reply from Andy; he was not hurt, but had lost his breath and must rest for a few minutes. This gave me time to look along the cliff and find a low point, where we finally pulled Andy up to rejoin us, little the worse for his experience, but more cautious and critical of the white, innocent-looking stretches he thought he saw about him. Perhaps to punish me for my facetious remark to Andy that it was not considered good form to leave other members of a rope without warning, I soon afterwards took a tumble of fifteen feet over a snow bank with a proper rib-breaking check administered by Carpé and Foster to correct my own error.

Fortunately the shock of these startling experiences was soon relieved by Read's discovery of a willow marker near where Andy had prophesied we should find them, and so we knew luck again was with us. How revitalizing the sight of that willow switch was to us weary travellers! With me the reaction was the same as I once felt when struggling in a hopeless surf that rapidly carried me seaward with combers strangling every effort I made to catch breath. I finally gave up, let go and my feet suddenly touched bottom; in an instant I had the strength of a giant and incautiously jumped to my feet, only to have them swept from under me again, but deliverance was there if I only kept my head, and I did not say good-bye to this world that day. So it was with us at the sight of the little willow switch, a bit of our own handiwork when we were advancing in bright sunshine from our comfortable Plateau Camp, with its stove, fuel, food and warm sleeping robes. We knew deliverance from our world of cold, dreary unreality was at hand, and we could again enjoy these things so long as we followed the line of our little black beacons in the limitless sea of white expanse. An easy thing to do when all is clear and the party in normal condition, for

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N. H. Read

**Party on Hurricane Hill in Lee of Granite Ridge Behind the 18,500 ft Camp** July 26th, the date of fierce blizzard L. to R.:- Taylor, Foster, Carpe, Lambart, MacCarthy, Read taking picture

small black willows the size of a pencil will show up like a veritable tree trunk a quarter of a mile away on a white background; but the atmosphere was not clear, the party not normal, and the wind gave us a bombardment of stinging sleet, hence precious moments were lost in finding each willow only a hundred feet ahead. The second rope, alternately led by Andy and Read carefully scouting each succeeding willow, finally reached Plateau Camp at 8:30 that night; my rope, however, during one check in our progress to fix a pack, lost touch with the leading rope, became confused in the driving storm that enveloped us and back-tracked for an hour or more, until Carpé raised a question concerning the pitch of the slope we were traversing. The rise was on the right side when, for the route to camp, all uniform rises should have been on the left side. The snow shoe tracks we made were obliterated in a moment by the driving wind, so the failure to find prints of those on the other rope was not surprising and gave us no check on the proper direction to go. It seemed evident, however, that Carpé's point was well taken, so we put about and thus lost two or more valuable hours' time in correcting our error, which finally resulted in our gropping along throughout the whole night in a world of dreary unreality. High cliffs of ice would seem to rise up before us to block our way and yet we never encountered them; barns and shelters would suddenly appear that we knew could not exist, for otherwise one's companions would surely suggest taking refuge in them; thus we trudged on, taking two restless naps in miserable little holes we scooped out for ourselves. As morning came the light was better, the fog rose and familiar peaks came into view, and at 5 a.m. we were glad to end our 34-hour ordeal with a fine breakfast prepared by Andy on two sputtering primus stoves, consisting of an abundant supply of boned chicken, granulated potatoes au gratin, with ovaltine as a chaser. At 6 a.m. we turned in for a real rest, and it was not until 4 p.m. that the next meal was served, soon after which we all turned in again for an early start next morning.

The 26th broke fairly clear but windy, and the "mares-tails" in the sky above us were a warning for us to be off as promptly as possible, but although we were up-I'll not claim we were fully alive and awake—at 6 o'clock, it was not until after 11 that we succeeded in making up our small packs and putting off on two ropes, leaving the two brownie tents, mattresses, spare clothing, provisions and all other spare articles to the fate of Mt. Logan's merciless vengeance. The second rope led off on snow shoes following our willow trail around and up the slopes towards our Ridge Camp site. The going was good and all looked promising until we reached the steep, rounded dome below the ridge which we found wind-swept and presenting a hard crust of snow, impossible to negotiate on snow shoes. Hardly had we begun to change to crampons when a terrific hurricane struck us with an extremely low temperature, rendering the task of taking off ice-encrusted snow shoes and putting on crampons with their long, senseless, frozen tape lashings, a most difficult operation. Hands necessarily exposed for this work suffered severely from frost-bite. With some of our party snowblind, others near the limit of exhaustion, and all with either feet or hands or both touched with frost, I am sure that terrible ordeal on Hurricane Hill will long remain in the recollection of every member of the party as the most dangerous menace to life and limb the expedition offered. By 3 p.m., all hands were safely sheltered in the lee of the granite ridge just behind our 18,500-foot camp site of five days before and, after a short rest, we roped again and continued down our trail in the lee of the ridge.

Reaching Windy Camp, where we had left one green tent, our rubber shoe-packs, other clothes and considerable food supplies, we found the tent covered with a light blanket of snow. With six big men at hand, the apparent available strength of the party just sufficed to extract the shoe-packs from one corner of the tent and, regardless of what was left behind, we set out down the willow trail and soon again were in dense fog and a heavy snow fall. Passing down, along Friendly



Vittorio Sella, Due d'Abruzzi Expedition **The Southern Face of the Mt. Logan Massif From the Summit of Mt. St. Elias** Showing the route and camps of the expedition

82

1925





H. F. Lambart

1925

Andy Taylor, the Heroic Packer of McCarthy, Alaska



H.S. Hall, Jr.

Col. Foster

A.H. MacCarthy

H.F. Lambart

1925

Colonel Foster Doctors The Cripples From Frost-Bite, Including Himself.

Crevasse, sliding the lower bit of Glissade Hill, wallowing along the Avenue of Blocks and passing Stage Coach as it seemed to be diligence complete, we were soon through the Gap, had circled the Hog Back, passed the Avenue of Tents, and, carefully working our way through a new avalanche of ice, heeled down the Corkscrew and around Dormer Window and "mushed" rapidly along until we were clear of Diamond Serac when, greatly to our relief of mind, we saw far below us our three brownie tents at King Col Camp all standing, although half buried in snow. The last part of the descent was made very slowly, due to the extreme danger of avalanching the snow blanket and on account of the precarious footing on the steep side-hill slopes. There was a change from snow shoes to crampons and back again four times until, in desperation, on the final straight leg down to camp some of us plowed along with neither and arrived at 1:30 a.m., "all hands in rather exhausted condition but feeling happy." Here, with another outfit of pneumatic mattresses, primus stoves and an abundance of food and fuel we rested 36 hours: "with Foster busy treating and bandaging frozen fingers and toes, all first joints on my fingers, Carpé two toes and two fingers, Andy one finger . . ..."

Again, although we knew the altitude was not good for us when in such an exhausted state and that there was an abundance of everything to make us comfortable at Cascade Camp, it was hard to make a start, and it was not until afternoon that we bade adieu to our three brownie tents and everything else we did not actually need, and back-packed down to the foot of the icefalls where we had cached our Yukon sled three weeks before. Here we found food for a cold luncheon, made a bit more palatable by some strong, hot tea from our thermos bottles. Then, shifting our packs to the sled, we went at a good pace down our old well-beaten trail until we reached the snow dome above Quartz Ridge, where the sled was abandoned and back-packing resumed by all members but Andy, who led off alone "rawhiding" his huge pack in a small tent canvas as a container, thus plowing and packing a good trench in the soft snow in which the rest of us descended; no doubt a questionable operation for any one less skilled than Andy to indulge in, but his years of experience on the glaciers of Alaska and his excellent judgment took us quickly and safely down over our old line of ascent and landed us at the top of Quartz Ridge at 9 pm. with Cascade Camp plainly in view, a descent of but a thousand feet to our luxurious advance base camp.<sup>8</sup>

My diary of June 2nd has a line reading: ".... made summit in 45 minutes, down in 15 minutes," but an entry for June 28th reads: "Snow here in avalanche condition. Skirted rocks down and took three hours to make Cascade Camp. Tents in bad shape, but I in worse condition."

Thus, at midnight of June 28th, we again were down to the level where men think and breathe and work in a rational way and so may be held accountable for their actions. If sometimes while above that level, I was harsh and disagreeable, I ask that my companions please forgive me.

<sup>8</sup> As a recognition from the Club of his invaluable services throughout the entire Mt. Logan campaign Andrew M. Taylor was unanimously elected a Life Member of the Alpine Club of Canada.

1925



Hy. S. Hall Jr.

 View at Source of Quintino Sella Glacier Showing the King Peak trench leading to it
2. The Cascade Icefall A minor dissipator of the King Peak Trench Glacier

# By Allen Carpé

The following notes are compiled from observations of various kinds made during the Mt. Logan Expedition, incidental to the work of the ascent. The observations were made without preparation on the part of the writer, except in regard to photography, and instruments and equipment were necessarily restricted to what could be carried personally by members of the climbing party. No time was available for scientific purposes except incidental to the other activities of the ascent.

### **General Topographic Observations**

The mountain having already been surveyed by the International Boundary Commission in 1913, topographical observations were in general limited to the determination of our own position and altitude during the climb, and to minor additions and corrections of existing map data. Such observations were in the main as follows:

(1) The King glacier, shown on the map as terminating above the head of the Ogilvie glacier and draining to it by the "Cascade" icefall, actually continues as a smooth glacial valley to the Quintino Sella glacier, which is tributary to the Columbus glacier and connects by through passes with the Fraser and Baldwin glaciers of the Logan-Walsh-Chitina system. The "Cascade" ice-fall is a minor lateral dissipator.

(2) King col was found to terminate in abrupt cliffs toward the Seward glacier, overhung by highly broken ice masses on the side adjoining Mt. Logan, instead of merging smoothly with the upper slopes of Mt. Logan as indicated on the map. The map is based on the photograph taken by Vittorio Sella from the summit of Mt. St. Elias in 1897, which has been the only existing source of information regarding this side of Mt. Logan. In this photograph, King col is partially masked by a snow-covered spur of King peak.

(3) Many features of the summit area of the mountain were observed in greater detail than had previously been possible from distant stations of relatively lower altitude.

(4) The altitude relations of the summit peaks were checked by local observation! (see below), and the indications of the map confirmed.

### **Instrumental Observations**

Small pocket aneroids were carried by several members of the party. Some of these had been calibrated by comparison with mercurial standards at room temperature, but none had been checked for temperature errors at low temperatures. A larger aneroid, Short & Mason, London, was furnished specially for the expedition by the Canadian government, and was provided with complete calibrations by the Physical Testing Laboratory, Ottawa. This was also the only instrument embracing a sufficiently low pressure range for use at the highest levels of the mountain.

Readings on the mountain were taken with two or more instruments whenever possible, and were at all times corrected for air temperature. On the lower valley glaciers, the small gradients and relatively large distances covered were unfavorable to barometric levelling. For this reason, the altitude of "Cascade Camp," at the head of the Ogilvie glacier, was taken as a datum and scaled from the map at 7800 feet. Above this point, repeated relays enabled elevations to be carried forward with considerable precision by the mean of ascending and descending difference readings, and elevations up to King col were established in this way. At higher altitudes the aneroids were





Allen Carpe Plate loaned Geographical Society, Philadelphia **19,800 Feet Summit of Mt. Logan from 19,000 ft Level Between Summits** (Escarpment to Seward Glacier at left) unreliable, the pressure indication being in general too low (altitude too high). This is in accordance with the experience of Dr. Stuck on Mt. McKinley, and of other observers and is probably associated with temperature errors in the instruments themselves, errors due to the formal method of correcting for temperature of the air from the mean of the temperatures at the end stations, and departures from the basic assumptions of static equilibrium of the atmosphere in the vicinity of large mountain masses. Instrumental errors are known to be large at the low temperatures encountered, and are a frequently neglected source of error in the use of aneroid barometers, as the instruments are supposed to be "compensated" for temperature. Actually, this compensation is never exact, and may not be even approximate except within rather limited ranges of temperature. The large Short and Mason aneroid is now being tested at the temperatures encountered on the expedition, so that a correction can be applied for temperature error in this instrument. Final analysis of the discrepancies noted should be deferred until these test data are available.

Drift (lag or hysteresis), which causes the indications of the aneroid to creep and show troublesome secular changes after being subjected to a new pressure, has been the cause of much uncertainty in altitudes established by aneroids. It has been treated very comprehensibly by the late Edward Whymper and other mountaineers. Latterly, however, considerable improvement has been made in aneroid construction, and the drift in good modern instruments should be small. Mr. Lambart advises that the drift in the large Short and Mason aneroid is almost negligibly small, probably the smallest of any aneroid ever used heretofore on a mountain ascent. Specifications and test data for this aneroid and for one other instrument are attached.

Comparison records of pressure and air temperature were kept at Kennicott, McCarthy and "Hubrick's Camp" (foot of Chitina glacier) during (the period of the expedition. In view, however, of the considerable distances involved, it is uncertain, until the figures are fully worked up, whether the observations made at these points can be successfully applied to correct the readings observed on the mountain itself.

Vertical angles were measured by means of an Abney type hand level, previously adjusted and calibrated against a transit. The altitude of "Windy Camp" was determined with this instrument from readings on Mt. St. Elias and King peak, as follows:

June 16, 1925	
Angle to King Peak	5.25 miles <sup>9</sup>
Estimated Map Distance	47'
Height of King Peak	17,130 feet
Less—	
Diff. for 47' at 5.25 miles.	379
Curvature and Refraction 16	395
	16,735 feet
Angle to Mt. St. Elias	22'
Estimated Map Distance	24.75 miles
Height of Mt. St. Elias	18,008 feet

<sup>9</sup> Distances are as scaled in the field. It is subsequently suggested by Mr. Lambart that the distance of 5.25 miles to King peak should be decreased. Obviously, this would increase the resulting altitude of "Windy Camp," bringing it into closer agreement with that obtained from the sight on Mt. St. Elias. The agreement should, of course, be regarded as partly accidental, as the angles can probably not be relied upon to better than about 5 minutes.



Allen Carpe



1,185

16,823 feet

1925

Weighted Mean Altitude of Windy Camp.....

16,760 feet.

Barometric levels were carried forward from this point but are not considered reliable for the reasons stated above.

The hand level also served to determine the slope of a steep part of the ascent above "Cascade Camp," where a slope of 39° 30' was measured at an altitude of about 8700 feet. This is the steepest pitch actually measured on the ascent. The level was also used to determine the relative altitudes of the two summits climbed on June 23, the second of these appearing under an elevation angle of about 50' when sighted from the first. This corresponds to a difference of about 77 feet per mile, an amount not readily distinguished by the eye. A third summit to the N.E. was not sighted with the level.

Maximum and minimum thermometers carried on the expedition were supplied to the writer by the kindness of Mr. Howard Palmer and Dr. W. S. Ladd. These consisted of one pocketsize combined maximum and minimum instrument (Six's type) reading to about -20°F. with an accuracy of about 1°F., and one alcohol minimum thermometer reading to -75°F.; the former was unfortunately snowed up and lost during the night of June 23. In general, the overnight minimum was read each morning, and the actual temperature was read whenever possible in connection with barometer observations during the day, but no attempt was made to record maximum temperatures.

A record of the temperatures during the expedition is given in the attached table. The lowest temperatures in the valleys appeared to occur during the early hours of the morning, while at the higher elevations, on clear nights, the temperature frequently dropped with great rapidity after sundown, the minimum probably being approximated before midnight. Differences of several degrees were found between the minima registered by the two thermometers when placed in different locations about the tents. The lowest temperature recorded was -33°F. on June 18-19.

A prismatic compass was carried, but there was little occasion to use it.

### **Physiological Observations**

Tests were made by the writer of the time of holding the breath while at rest at different altitudes up to 18,500 feet. The results are tabulated herewith and are shown on the attached chart (upper part). The times could be duplicated to about 5 seconds, and are so recorded.

Altitude	Seconds breath held
0	75
3,500	60
13,875	35
16,760	25
18,500	20

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The dotted line on the chart indicates for comparison the data furnished by Major Kingston for the Mt. Everest Expedition, Geogr. Journ. 65, 1925, pp. 4-23. These are shown as plotted by Major Kingston, the tabulated observations given in his report having evidently been adjusted in some way before plotting to correct for the fact that different subjects were tested at the different altitudes. The data from Mt. Logan and from Mt. Everest are in very good agreement, considering the widely different conditions of climate and type of work in the two cases. The normal diminution of air pressure with altitude is shown to an arbitrary scale for comparison on the same chart.

It will be noted that the ability to hold the breath decreases in both cases roughly in proportion to the density of the air up to an elevation of about 14,000 feet, and that a marked increase in the effect of altitude is indicated above this height in both cases. This is made more evident in the second chart, in which the ratio of the holding time to the normal barometric pressure is plotted against altitude. It will be seen that this ratio decreases sharply above 14,000 feet. This appears to have been in agreement with the sensations actually experienced on both expeditions. I quote from Major Kingston: "It (shortness of breath) was definitely apparent at 14,000 feet, and above 19,000 feet the slightest exertion made breathing laboured and severe."

Pronounced Cheyne-Stokes respiration was noted in the case of one member of the party while sleeping at 13,800 feet; this member later turned back because of frostbite. Another had some difficulty in breathing while passing the night at about 19,000 feet on June 23. No other cases of departure from normal respiration while at rest were noted. The effects during exertion appeared to the writer to be in the nature of extreme weakness rather than any acute distress, and differed in no way, in so far as the writer could observe, from the effects of exhaustion at lower altitudes. 'No particular correlation was noted between age and the effect of altitude.

Loss of appetite, sleeplessness, increased nervousness or irritability, "glacier lassitude," hallucinations, delusions or any other aberrations of the senses were not observed by the writer, nor were such observations brought to his attention by other members of the party. Estimations of mental conditions are necessarily personal. The effects noted by the writer were substantially identical with those experienced under great physical exhaustion at low altitudes, being characterized by a deadening of the nervous, emotional and volitional faculties, without any particular impairment of the faculties of observation. In regard to "glacier lassitude," it may be said that we had little basis for judgment, as we were on glacier all the time.

### **Photography**

Mr. Hamilton M. Laing, representing the Canadian Government, Department of Mines, took still and motion pictures of the expedition up to its departure from "Trail End" (foot of Chitina glacier). A number of still cameras were carried by members of the expedition, a small vest-pocket camera being particularly useful under conditions of exposure.

Motion pictures of the mountaineering phases of the expedition were obtained by the writer, using portable equipment. In the choice of cameras for this purpose it was felt that spring motor drive was essential, although a light tripod was carried and used whenever possible. The only cameras available for such use at the time of the expedition were (a) the "Sept," having a magazine capacity of 15 feet of standard gauge film, (b) the Bell & Howell "Filmo," chambered for daylight loading 100-foot reels of 16mm. narrow-gauge film. Before proceeding with the use of the latter, assurance was had from the Eastman Kodak Company that enlargements could be made from the narrow-gauge film to standard gauge, and a satisfactory test enlargement was so made.

A "Sept" camera was employed in the lower work and up to an altitude of about 9,000 feet.



Hy. S. Hall, Jr

**1. King Col Camp** "King Col was found to terminate in abrupt cliffs, overhung by highly broken ice masses on the side adjoining Mt. Logan."

**2. Looking Down Logan Glacier** "The lower part of the glaciers observed appeared stagnant under a continuous moraine cover."

The small magazine capacity of this camera, with consequent frequent reloading, and the necessity of charging the magazines with the aid of a change-bag, greatly restrict its use in the field and render it quite impracticable at the higher levels under conditions of exposure.

The "Filmo" was used interchangeably with the "Sept" at the lower levels and exclusively above 9,000 feet. The large capacity of this camera without reloading, being equivalent in picture capacity to 250 feet of standard gauge film, together with the fact that the film is supplied ready spooled in daylight loading containers, is of inestimable advantage in working at low temperatures and under adverse weather conditions. Frequent rethreading or manipulation of a change bag is impossible in a storm with frozen fingers; even operation of the camera is difficult.

Photographically, the results obtained with the narrow gauge film are inherently inferior in definition and grain to those obtainable with standard film. Surprisingly good projection enlargements can be made from the small film, considering the size of the original image, but the writer's experience in this connection does not lead him to recommend its use except where the advantages mentioned above are controlling. The advantage of weight alone, while appreciable, is not in proportion to the reduction in size of the image, due to the weight of the special daylight loading package. Cooke 35mm. and Dallmeyer 4-inch telephoto lenses were carried, but little use was found for the latter. The motor drive of the "Filmo" camera functioned smoothly and consistently at all temperatures encountered up to the summit of the mountain.

Wratten No. 3 (Aero No. 1) filters in varnished gelatine were used permanently in the lenses of the "Filmo" and the writer's still camera. They were found very effective in penetrating such aerial haze as was encountered and in rendering distant views and cloud effects; a Wratten No. 15 ("G") filter in glass was used in addition in a few cases. The Aero No. 1 is a light yellow filter cutting quite sharply at 4500 A.U., and requires an exposure factor of only 3 with ordinary ortho-chromatic material. The "G" filter cuts at about 5100 A.U., and requires an exposure factor of about 25.

A word may not be out of place here as to the general problem of operating photographic or other instruments under the conditions experienced on Mt. Logan. Lenses frost over with ice at the slightest provocation. Dry snow of the consistency of fine sand finds its way into every recess. Delicate mechanical controls cannot be manipulated while wearing heavy gloves or mittens, often coated with ice, while if these are removed, the fingers freeze quickly and become useless. Contact with bare metal parts, of course, causes almost immediate frostbite. The seriousness of these limitations is difficult to appreciate without actual experience of them. It is suggested that anyone contemplating instrumental work under similar conditions will do well to consider carefully the design of the apparatus used, in regard particularly to ruggedness and accessibility of controls, simplicity of operation, protection of the instrument from drift snow and of the operator from contact with exposed metal.

### **Rock Samples**

A number of rock samples were collected, most of which were, however, lost or abandoned during the descent or as a result of the wreck of one of the rafts on July 12. Three remaining samples, all taken<sup>10</sup> near the summit of "Observation Pk" (about 11,000 feet, at the head of "Cascade" ice fall), have been determined through the courtesy of Prof. R. T. Chamberlin, of the University of Chicago, as follows: "Nos. 3 and 6 are a biotite-diorite gneiss. No. 5 appears to be the same rock,

<sup>10</sup> By Mr. E. M. Morgan.



Hall, Jr. **1. Looking Across Logan Glacier from Baldwin-Fraser Cache Camp** Baldwin Glacier Coming in at Centre **2. Dust Storm in the Chitina Valley, May 14th**  much weathered. These determinations were made by flaking off small bits and determining their characteristics under the microscope. For a more thorough determination thin section slides are necessary." Such slides have not been made as yet, as it is doubtful whether a further determination is warranted in view of the very isolated nature of the specimens.

Samples Nos. 3 and 6, referred to above, are of a clear grey, coarse-grained material which a layman would probably describe as "granite." Sample No. 5 is of similar appearance, but stained yellowish-brown. It occurred in close proximity to the other two. All the exposures on the summit area of the mountain were similar to the above specimens. Limestones, schists, quartzites, greywackes, conglomerates and other rocks are found on the lower portions of the mountain. The larger boulders on the valley glaciers were of gneissic appearance, some dissected by narrow quartz veins.

### **Glacier, Snow and Meteorological Conditions**

The lower part of all the glaciers observed appeared to be substantially stagnant under a continuous moraine cover. At the confluence of the Ogilvie and Logan glaciers, active melting of the moraine-covered surface under our camp was shown during the period of our absence on the mountain, a cache consisting of wooden boxes and other material under a canvas cover being elevated on a pillar of ice some three feet above the surrounding surface on our return. Melting and opening of crevasses was also in evidence around "Cascade Camp." Surface activity of the lower glaciers was considerable during the warmth of the day, large boulders being continually overturned and seeking lower levels due to melting down of the surface. Large mud areas exist along the right margin of the Chitina glacier. There was no opportunity for measurements of rate of flow or other quantitative 'measurements on the glaciers.

Erratic ice blocks of considerable size occur at or above 15,000 feet along our route above King col. The faces of these blocks reveal dirt-bearing layers inter-stratified with clear ice, possibly resulting from volcanic deposit. The blocks have evidently been in situ for some time. Their origin from existing glacial forms is not very clear. The ice cover at this part of the mountain is much broken, and the minor surface features were subject to change even during our brief period of observation as a result of snow fall and avalanching.

An interesting problem in snow movement at the higher levels is presented by the high winds which sweep the exposed ridges and open slopes in the upper part of the massif and apparently carry with them large quantities of surface snow. In view of the low temperatures existing at these altitudes, and the consequent dryness of the snow, it is at first thought surprising that the snow is not completely carried off and conveyed to lower levels by the wind. Yet a part at least of the precipitation must be compacted and converted into ice at these levels, for many active cliff glaciers are nourished from the summit ice-cap, and true glacial forms occur on the summit area where, so far as can be observed, thawing temperatures must be very rare. The mechanism of neve formation under these conditions is an interesting problem.

One wind storm of the character mentioned was encountered on June 19 between 15,000 and 16,800 feet. Another was met with on June 26 above 18,000 feet. In both cases the temperature was probably well above zero (F.), and the wind, while severe, was not such as to prevent a man from walking upright. These storms appear to be largely a surface phenomenon, and may be of local extent. On June 26, blue sky could be seen overhead during much of the time, although visibility along the ground was greatly impaired. It was noted on this occasion that the finely divided material was carried along with considerable force by the gusts of wind, but appeared to

eddy back and adhere to the surface crust at certain points in a manner very suggestive of electrical attraction, forming drifts of considerable solidity. It is well known that substantial electric charges can be built up by friction and comminution in snow and dust storms, the smaller particles becoming negatively charged with respect to the larger masses or the ground. While the part played by such forces in the present instance must be a matter of conjecture, it is evident that the resulting attraction would tend to retard the loss of snow from the high levels of the mountain, and might assist in the formation of permanent crust. In clear weather, the high ridges are frequently seen to be surrounded by clouds of snow blowing off into space, but it may be that much of this snow is not permanently lost.<sup>11</sup>

Shadow images, commonly known as "spectre of the Brocken," were observed on the summit of Mt. Logan at about 8 p.m. on June 23, the sum being, of course, at that time still well above the horizon. Such shadows are formed in an obvious manner within a cloud or fog-batik, the peculiarity of the phenomenon arising from the fact that the observer, if he be within or very close to the edge of the cloud mass, sees distinctly only his own shadow, and not those of his companions or other objects. This is due to the fact that the shadows are formed in depth within the mist, and the successive shadow planes are only superposed to form a visible image if the direction of observation coincides closely with that of the sun's rays. Thus each observer sees in particular the shadow of his own head and shoulders. In the present case, clouds lay up against the summit on the east, but were probably momentarily prevented from drifting across the ridge by the wind.

This phenomenon is not restricted to great heights. It had been observed twice previously by the writer, both times in the Elbsandsteingebirge of Saxony at elevations of a few hundred feet.

An interesting feature was the appearance of a fog-bow or halo around the shadow image, indicating the existence of liquid droplets in the air at a temperature of +4° F. The existence of the supercooled liquid phase at such temperatures is not unusual, Wegener observed a fog-bow in Greenland at -29°F.,<sup>12</sup> but it would seem that the droplet size should be small. The reported observation by some members of the party of rainbow colours in the halo, presumably indicating larger drops, is therefore very interesting. The writer cannot recall any definite colouration in the halo, although he is under the impression that there was a slight chromatic fringe around the shadow image. This may have been due to frost on the snow glasses. Since liquid drops of any

<sup>11</sup> Since the above was written, there has come to my attention a summary description of Arctic climate by W. Werenskiold (Practical Hints to Scientific Travellers, edited by H. A. Brouwer; Martinus Nijhoff, 1925), which exhibits so well the parallelism between high altitude and polar conditions—generally speaking, between low temperature conditions however produced—that I should like to quote a few sentences:

<sup>&</sup>quot;On clear, calm days, the temperature sinks rapidly (in the dark season), often down to some -40-50°; if then a wind begins to blow, the temperature generally rises, no matter from what quarter the wind comes. The extremely low temperatures are due to the radiation and cause pronounced temperature inversions; and with a sufficiently strong wind the air is mixed, and the inversion disappears ..."

<sup>&</sup>quot;The newly fallen snow is soft and loose, as the single crystals form thin plates and stars; but the wind soon begins to handle the snow and rolls the particles, which become rounded, and they are then packed more tightly together, and the snow becomes compact and firm. At the same time the snow is blown together into long ridges (Russ. 'Sastrugi') parallel to the direction of the previous gale ..." [These were much in evidence on Mt. Logan, sometimes assuming very fantastic shapes.]

<sup>&</sup>quot;In strong wind the snow blows up from the ground and fills the air with ice crystals, forming an intransparent layer many metres thick; it is often possible to see the blue sky at zenith, while objects only a few metres away disappear in the drifting snow. In such weather it is difficult and dangerous to move about."

<sup>12</sup> Meteorol. Zeitschr. 37, 9 (1921).

appreciable size in the clouds in contact with the summit mass of Mt. Logan at such relatively high 'temperatures would presumably precipitate as sleet, their existence would be significant in connection with the formation of neve at this altitude.

It remains only to mention the dust storms which occur in the Chitina valley, dry silt being blown to considerable heights from the gravel plain of the river and carried great distances up the Chitina and Logan glaciers by up-valley winds. The dust is sufficient to interfere with visibility, and is reminiscent of the smoke so frequently encountered in the mountains at lower latitudes.

### **Record of Temperatures**

Note: Entries which are estimated, or which are uncertain or doubtful for any other reason, are indicated by question mark, as follows: (?).

			°F
May 12	7:30a.m.	McCarthy	48
	1:30p.m.	Nizina Bridge	66
	8:10p.m.	Young Creek	49
May 13	Minimum overnight	Young Creek	33
	6:00a.m.	Young Creek	40.5
	8:30 a.m.	Young Creek	48
	3:20 p.m.	Hill between Young Creek and Chitina River	55
	5:30 p.m.	Camp in Woods	48
	9.30 p.m	Camp in Woods	10
May 14	Minimum overnight	Camp in Woods	31
	7:00 a.m.	Camp in Woods	39
	12:40 p.m.	Rush Pond	66
	2:10 p.m.	Rush Pond	70
	6:05 p.m.	Camp in Chitina Valley	61
	(Temperature of Chit	ina River)	44
May 15	Minimum overnight	Camp in Chitina Valley	33
	8:30a.m.	Camp in Chitina Valley	30
	5:30 p.m.	Bryson's	54
	9:00p.m.	Bryson's	50
May 16	Minimum overnight	Bryson's	31.5 (?)
	8:00 a.m.	Bryson's	49

	8:00 p.m.	Camp, above Short River	48
May 17	Minimum overnight	Camp, above Short River	28
	6.25 a.m.	Camp, above Short River	41
May 18	3:35 p.m.	Trail End	65
May 19	Minimum overnight	Trail End	31
	5:30 p.m.	Camp, foot of Chitina Mt.	55
	8:30 p.m.	Camp, foot of Chitina Mt.	45(?)
May 20	Minimum overnight	Camp, foot of Chitina Mt.	27
	5:45 a.m.	Camp, foot of Chitina Mt.	34
	7:30 a.m.	Camp, foot of Chitina Mt.	42
	2:30 p.m.	Fraser-Baldwin Cache (Walsh Glacier)	55
	8:30 p.m.	Fraser-Baldwin Cache (Walsh Glacier)	39
May 21	Minimum overnight	Fraser-Baldwin Cache (Walsh Glacier)	28
May 22	Minimum overnight	Fraser-Baldwin Cache (Walsh Glacier)	31
	Minimum overnight	Cache, centre Chitina Glacier	31
	3:30 a.m.	Fraser-Baldwin Cache	32.5
	8:25p.m.	Camp, foot of Eaton Glacier	32
May 23	Minimum overnight	Camp, foot of Eaton Glacier	22
	4:30 a.m.	Camp, foot of Eaton Glacier	26
	8:00 p.m.	Turn Camp foot of Ogilvie Glacier	26
May 24	Minimum overnight	Turn Camp foot of Ogilvie Glacier	14
	12:00 noon	Turn Camp foot of Ogilvie Glacier	42 (?)
	6:00 p.m.	Turn Camp foot of Ogilvie Glacier	42
May 25	Minimum to 1 a.m.	Turn Camp foot of Ogilvie Glacier	25.5
	5:00 p.m.	Camp foot of Mussell Glacier	34
May 26	Minimum to 12:30 a.m.	Camp foot of Mussell Glacier	18
	1:30 a.m.	Camp foot of Mussell Glacier	20
May 27	Minimum to 12 p.m.	Camp foot of Mussell Glacier	13
	Minimum to 2 a.m.	Camp foot of Mussell Glacier	9
	2:00 a.m.	Camp foot of Mussell Glacier	16

	5:00 a.m.	Cascade Camp .	21.5
	3:00 p.m.	Cascade Camp	32.5
May 28	Minimum overnight	foot of Mussell Glacier	22
	Minimum overnight	Cascade Camp	18
	7:00 a.m.	Cascade Camp	26
	5:00 p.m.	Cascade Camp	32 (?)
May 29	Minimum to 12 p.m.	Cascade Camp	24
	1:00 a.m. (?)	Cascade Camp	28
	9:00 a.m.	Cascade Camp	28
	3:00 p.m.	Cascade Camp	32 (?)
May 30	Minimum to 2 a.m.	foot of Mussell Glacier	7
	Minimum overnight	Cascade Camp	9
	5:00 a.m.	Cascade Camp	15
	3:00 p.m.	Cascade Camp	29
May 31	Minimum overnight	Cascade Camp	18
June 1	Minimum overnight	Cascade Camp	20
	5:30 a.m.	Cascade Camp	25
	6:50 a.m.	Cascade Camp	27
	8:10a.m.	Rock Ridge, above Cascade	25(?)
	9:20 a.m.	Cascade Camp	34
	10:20 a.m.	Cascade Camp	38
	7:00 p.m.	Cascade Camp	32
June 2	Minimum overnight	Cascade Camp	25
	5:00 a.m.	Cascade Camp	27
	6:15 a.m.	Cascade Camp	29.5
	7:40 a.m.	Cascade Camp	39
	10:30 a.m.	Rock Ridge, above Cascade	60
June 3	Minimum overnight	Cascade Camp	20
	4:30a.m.	Cascade Camp	21
	10:00 a.m.	Snow Dome, above Rock Ridge	50

	10:35 a.m.	Rock Ridge	57 (?)
	6:00 p.m.	Observation Camp	30
June 4	Minimum overnight	Observation Camp	3
	5:00 am	Observation Camp	15
	3:30 am	Observation Camp	29
	5:00 pm	Observation Camp	20
June 5	Minimum overnight	Observation Camp	4
	7:00 am	Observation Camp	19
	9:30 am	Observation Camp	27 (?)
	3:15 pm	Below King Col	20-25 (?)
	5:00 pm	Observation Camp	20
June 6	Minimum overnight	Observation Camp	-4
	7:00 am	Observation Camp	9
	12:30 pm	Sled Dump (about 11,600 ft.)	35 (?)
	4:10 pm	Below King Col	30 (?)
	9:10 pm	Observation Camp	10
June 7	Minimum overnight	Observation Camp	4
June 8	Minimum overnight	Observation Camp	0
	6:00 am	Observation Camp	5
	8:40 am	Sled Dump (about 11,600 ft.)	28
	11:27 am	Below King Col	40
	(?)	King Col Camp	41
	3:30 pm	Sled Dump (about 11,600 ft.)	50 (?)
	4:45 pm	Observation Camp	30 (?)
	6:00 pm	Observation Camp	24
June 9	Minimum overnight	Observation Camp	5
	4:00 am	Observation Camp	9
	12:00 noon	Sled Dump (about 11,600 ft.)	35 (?)
	5:30 pm	King Col Camp	23
	8:00 pm	King Col Camp	9

June 10	Minimum overnight	King Col Camp	4
	8:00 am (?)	King Col Camp	20 (?)
	(?)	Sled Dump (about 11,600 ft.)	32 (?)
	6:00 pm	King Col Camp	19
June 11	Minimum overnight	King Col Camp	2
June 11-13		King Col Camp - no record, snowstorm	
June 14	Minimum overnight	King Col Camp	-10
	4:30 am	King Col Camp	-4
	7:10 pm	Camp, above Col	18
June 15	Minimum overnight	Camp, above Col	7
	12:00 noon (?)	Camp, above Col	25 (?)
June 16	Minimum overnight	Camp, above Col	-8
	6:00 am	Camp, above Col	-3
	8:00 pm	Windy Camp	-29
June 17	Minimum overnight	Windy Camp	-32
	8:00 am	Windy Camp	-5 (?)
June 18	Minimum overnight	Windy Camp	-25 (?)
June 19	Minimum overnight	Windy Camp	-33
	Minimum overnight	King Col Camp	-5
	8:45 am	King Col Camp	20
	10:00 am	King Col Camp	25-30 (?)
	4:30 pm	Site of Camp above Col	26
June 20	8:00 am	Windy Camp	10
	7:00 pm	Windy Camp	25
June 21	Minimum overnight	Windy Camp	-5
	6:30 pm	Windy Camp	15
	11:00 pm	18,500 ft. Camp	-10
June 22	Minimum overnight	18,500 ft. Camp	-17
June 23	Minimum overnight	Plateau Camp (thermometer snowed up)	-12
	8:00 pm	Summit	4
June 24	Minimum to 1 am	Bivouac, below Summit	-12

June 25	Minimum overnight	Plateau Camp	-21
June 26	Minimum overnight	Plateau Camp	-22
June 28	Minimum overnight	King Col Camp	-5
June 29	Minimum overnight	Cascade Camp	20
July 1	Minimum overnight	Cascade Camp	23
July 2	Minimum overnight	Turn Camp, foot of Ogilvie Glacier	28

### PHYSICAL TESTING LABORATORY SUMMARY OF TEST OF ANEROID BAROMETER NO. PTL 8408

Name: Mountain Special. Maker: Short & Mason Range: 31 to 14 in. Diam.: 4 in. Smallest Scale Division: 0.05 in. Submitted by: Geodetic Survey of Canada. Test No.: 8408. Date: April 27th, 1925.

	Actual	Specifications for
Criteria	Amount	Special Aneroid
1. Average Deviation by Tapping	0.02	0.02 Inch
2. Shift	0.03	0.03 "
3.Vertical Correction	0.04	0.04 "
4. Proportional Drift	0.002	0.010 "
5a. Mean Calibration Deviation	0.03	0.02 "
5b. Maximum Calibration Deviation	0.04	0.04 "
5c. Maximum difference between deviation	ons	
at any two consecutive inches	0.03	0.03 "
6a. Correction at Normal Pressure at 0°C.	0.00	
Correction at Normal Pressure at 20° C	0.00	
Correction at Normal Pressure at 40°C	0.01	0.08 " At 21 in. Pres.
Difference at Normal Pressure, between		
the corrections at 0° and 40°C	0.01	
6b. Maximum difference at Normal		
Pressure, between corrections at 0° and		
20°, or 20° and 40°C	+0.01	0.005 Inch At 21 in. Pres
7. Scale Value at 0°C	1.02	
Scale Value at 20°C	1.01	
Scale value at 40°C	1.00	
Greatest Difference in Scale Value		
in the Range 0°-40°C	0.02	0.04 Inch
-		

### PHYSICAL TESTING LABORATORY SUMMARY OF TEST OF ANEROID BAROMETER No. 1455

Name: Stanley, London. Maker: Stanley, London. Range: 31 to 21 in. Diam.: 4% in. Smallest Scale Division: 0.05 in. Submitted by: Geodetic Survey of Canada. Test No.: 8416. Date: April 27th, 1925.

	Actual	Tolerance
Criteria	Amount	Allowed
1. Average deviation by Tapping	0.02	0.02 Inch
2. Shift	0.10	0.03 "
3. Vertical Correction	0.05	0.04 ''
4. Proportional Drift	0.027	0.02 ''
5a. Mean Calibration Deviation	0.02	0.03 "
5b. Maximum Calibration Deviation	0.04	0.05 "
6a. Correction at Normal Pressure at 0°C	0.02	
Correction at Normal Pressure at 20°C	0.00	
Correction at Normal Pressure at 40°C	0.01	
Difference at Normal Pressure, between		
the corrections at $0^\circ$ and $40^\circ$ C	0.01	0.10 "
6b. Maximum difference at Normal Pressu	re,	
between corrections at 0° and		
20°, or 20° and 40°C	0.02	0.06 "
7. Scale Value at 0°C	1.01	
Scale Value at 20°C	1.00	
Scale Value at 40°C	0.99	
Greatest Difference in Scale Value in		
the Range 0° -40°C	0.02	0.05 "

# Wild Life Of The Upper Chitina

By Hamilton M. Laing

On May 18th, 1925, leaving the party of climbers at Trail End, I returned about eight miles lower to the Hubrick Camp. This was the only available base camp from which biological work could be successfully carried on through the summer, Turn, of course, being too high, and there was no other food cache lower down the valley.

The region adjoining this camp had appeared in passing to be an interesting and picturesque section, and now I was to have opportunity to explore its possibilities more fully. To the eye it was beautiful but a trifle crude and raw and forbidding. Before the tent lay a wide valley of grey gravel, very flat and as barren as any desert. The valley floor was cut and furrowed by many white streams of glacial water that hurried rather aimlessly in uncertain channels. The mountain





Hamilton M. Laing of Comox, B.C. Naturalist to the Expedition



1925

H. F. Lambart The Home of the Naturalist at Hubricks Camp

sides rose steeply right from the gravel—green timber at the lowest levels, and a mixture of open uplands, rocky cliffs and snowy ridges rising up to the skyline. The eastern or upper end of the valley was choked with the grey moraine of the Chitina Glacier; there was a little timber on its extreme front and behind this lay a chaos of jumbled rocks with gray-green pot-holes and lakelets scattered plentifully. Far up the valley, over the forbidding barrier of the moraine loomed the white Chitina and Boundary Mountain, and beyond, the great, massive top of the mighty Logan.

From the standpoint of the naturalist the woods and hills were attractive and held out promise of many interesting things. If the valley floor was almost utterly barren of life and plainly must remain so throughout the summer on account of the floods at time of high water, the green spruce woods and the alpine slopes above timberline offered better prospects. Already white-winged crossbills<sup>13</sup> and redpolls<sup>14</sup> were chattering commonly in the timber. Whisky Jack<sup>15</sup> was on hand at the camp; the voice of the raven<sup>16</sup> echoed across the valley, and his cousin the magpie<sup>17</sup> showed his black and white coat as he flitted about the dark spruces. The red-tailed hawk<sup>18</sup> was at his airy circling over the hillsides, and almost at any hour the big golden eagle,<sup>19</sup> black and ominous, could be seen wheeling far aloft about the cliffs. Nor were all the wild neighbors members of the winged tribes, for we had seen bear tracks, both black and grizzly, commonly in the sand and mud of the gravel bars, and we were now in the home of the white mountain sheep. On the day we reached the Hubrick Camp a big black bruin, still sleek in his winter coat, was busily working in a bearberry patch on a sunny slope close above the tent; fifty or sixty sheep in small groups were dotting the hillsides from timberline down to the lower pastures near the river.

In working a new region it is essential that the field naturalist secure a representative collection; that is, representative of every form of life as far as possible, and comparative series of specimens as far as time will allow. As I had come supplied with a collecting outfit for preparing skins of birds and mammals, a plant press, a still camera and a movie camera, there seemed little prospect that time would hang heavy on my hands, even in a region that was known to be rather lacking in faunal variety. The days were now nearly twenty-four hours long; there was no real darkness as the sun took but a shallow dip below the mountains. But long, busy days were perhaps the best antidote for loneliness and not even a palliative was needed, though from mid-May till mid-August no human face was seen except in the two weeks in July, during which the successful climbers passed through on their return.

The region worked from this headquarters included only the north side of the river. It was impossible to cross the main stream of the Chitina, and thus the only means of reaching the southern side of the valley was a long traverse over the moraine far back from its foot—a detour over country so rough and forbidding (the canyons of the opposite side were often studied in the glasses from camp), that all adventure in that direction was discouraged. So expeditions afield were limited to trips up or down the valley from Trail End above (the end of timber), to Short River below, and climbs up from the river bed to the various divisions of the range that formed the valley wall. For this range was cut at short intervals —often of less than a mile—by deep canyons that

18 Buteo lorealis harlani.

<sup>13</sup> Loxia leucoptera.

<sup>14</sup> Acanthis linaria linaria.

<sup>15</sup> Perisorius canadensis.

<sup>16</sup> Corvus corax principalis.

<sup>17</sup> Pica pica hudsonia.

<sup>19</sup> Aquila ohrysaetos.



H. M. Laing

 Hedysarum Mackenzii - A Flower Garden at Low Elevation Chitina River Valley, Alaska, June 19th
White Heather (Cassiope Tetragona) in Alpine Garden Above Timberline, 5,000 ft. Chitina River Valley, Alaska, June 4th allowed no crossing. It was a region exacting and relentless on the legs of the field worker. The longest stretches of open travelling were, of course, on the river flat, but here the cobbly, sandy footing made progress difficult; the rushing streams that were braided across the valley, constantly forced the traveller to take to the timber where the moss underfoot and the tangled windfalls tried leg muscles and patience to the limit. The pack trails formerly cut by the U.S. Boundary Survey had long since become almost useless on account of the windfallen timber. Expeditions up into the alpine country proved an even more strenuous game, for the sheep trails that led up to the high slopes were steep. The angle of ascent was always sharply upward, often 45 degrees in long stretches. To work from camp at 2000 feet elevation up to the bald uplands near the icefields at 6500 feet and back meant a hard day. Some of the easiest travelling was found in the burns of the lower hills. For even here the fire fiend had bitten deeply into the spruce forest<sup>20</sup> and though the timber along the river bank was mainly intact, former and recent fires had swept upwards in many places leaving only the skeleton forest devoid of underbrush in its wake.

There are few things in Nature more fascinating than the unfolding of spring in the north country—especially in such a region as the Chitina, where one may watch the progress of the season as it climbs the mountain sides, or follow in its steps day by day. The camp was on the warm slope, or southern exposure, and already by mid-May the first anemones were holding up their sweet faces in the warm corners of the woods—this, while the willows and black and white poplars were only opening their catkins, and the sheep on the lowest slopes in the burns were getting their first nibbles of new greenery from, the sprouting tufts of a Zygadenus<sup>21</sup> shooting up profusely there. The first lupine bloomed at the tent door May 27th and through the next two months there was scarcely a day that did not bring a new flowering plant to the botanical collection, as the season of bloom climbed up the slopes to the very rim of the ice and perpetual snow. With the coming of June the first tints of tender green leafage spread through the poplar woods of the rock slides, and about the middle of the month, following some light rains, the flowers from the lower woods to the green slopes above timber line all came with a rush and in a profusion to delight the heart of the visitor.

Getting acquainted with this region—getting its plants in the press and the bird and mammal skins on the drying boards and the photographic records stored away—took much time. This was mainly due to the diversity of the country. The hard trips had to be mixed with the easy and so all available corners were visited. There were about a dozen different types of country at hand and each had its characteristic types of floral and faunal life; spruce woods, poplar woods, burned woods, willow slopes above timberline, bare alpine summits, canyons, muskegs, moraines, lakelets in the woods, etc.

Even the desert gravel of the river beds yielded some returns in plant life and at least one species of bird life. For example: On the day (May 17) that we first trudged up the wide river flat from Short River to the Hubrick Camp, I heard the tinkling melody of a horned lark<sup>22</sup> and saw the male bird rise in his curving flight to sing his sky song. As the bird could not then be secured and was seen nowhere else, an expedition here was in order; but a specimen of this bird—here found to be so wild and elusive—was not secured until a third trip had been made—this necessitating travel in the aggregate of some thirty-odd miles.

The bird and plant life claimed more attention than did mammalian life. With the exception

<sup>20</sup> Picea canadensis.

<sup>21</sup> Zygadenus Elegans.

<sup>22</sup> Otocoris alpestris arcticola.
of the white Dall sheep<sup>23</sup> and bears<sup>24</sup> there was no large game on the north side of the river, the moose having left or been exterminated some time. The lynx<sup>25</sup>, coyote<sup>26</sup> and beaver were present but far from numerous. Of smaller animals, mice were little in evidence and hard to trap and the only small mammal of the woods that could be said to be numerous was the red squirrel. <sup>27</sup>There was a sprinkling of rabbits<sup>28</sup> from the river right up to timberline and all apparently flourishing in spite of the fact that at lower levels the periodical "epidemic" had swept them almost from the range. Above the line of timber were found colonies of mountain voles<sup>29</sup> and a few far-scattered pikas<sup>30</sup>, but the only mammal that could be said to be numerous in the high country was the ground squirrel<sup>31</sup>, and he was even more numerous than the red squirrel of the woods.

Bird life was in greater abundance or at least in greater variety. Yet though about fifty species were taken and a few more identified in the field but not secured, very few species were present in numbers. Only the cone-eaters: the white- winged crossbills, redpolls and pine finches<sup>32</sup> could be said to be abundant, though juncos<sup>33</sup> and myrtle warblers also were commonly met over the entire range of trees from timberline downward. Most of the forty-odd species were found well scattered and in many cases but a few individuals were seen. Elusive species identified by sight or call notes but not secured for the collection were: golden eagle, duck hawk, sparrow hawk, sharp-shinned hawk and red-breasted nuthatch.

Considerable wild life, both avian and mammalian, was more or less dependent on the cone crop of the spruces. Huge mounds of cone scales in the woods, often a foot or eighteen inches in depth and fifteen feet in diameter, told of the work of the red squirrels that year after year had extracted spruce seeds and discarded cone scales on certain chosen spots. The crossbills, redpolls and pine finches seemed as directly dependent and carried on their busy work in the tree-tops at all times. The pigeon hawk<sup>34</sup> goshawk<sup>35</sup> and hawk owl,<sup>36</sup> all three more or less foes of the smaller birds, undoubtedly drew subsistence indirectly by killing bird prey. Also stomachs of hawk owl, red-tailed hawk and goshawk contained the remains of red squirrels. Lynx and coyote, too, must have taken toll of cone-fed chicadee, though the only coyote stomach examined held the remains of a full grown rabbit.

The plant life of this region was something of a surprise, this due, of course, to the unexpected dryness of the climate. Though the season was said to be an unusually wet one at McCarthy, little rain fell in the Chitina Valley and it was apparent from the vegetation that the annual precipitation was light. No rains during the summer were heavy enough to wet the earth below the heaviest spruces; the sheep trails on the lower slopes were dry and sometimes powdery; the soil on many

- 27 Sciurus hudsonicus petulans.
- 28 Lepus americanus macfarlani
- 29 Microtus yakcutatensis and Microtus macrurus.
- 30 Ochotona collaris.
- 31 Citellus plesius ablusus.
- 32 Spinus pinus.
- 33 Junco hyemalis hyemalis.
- 34 Falco columbarius columbarius.
- 35 Astur atricapillus striatulus.
- 36 Surnia ululia caparoch.

<sup>23</sup> Ovis dalli dalli.

<sup>24</sup> The black bear of the region proved Euarctos americanus americanus; no specimens of grizzlies were secured.

<sup>25</sup> Lynx canadensis canadensis.

<sup>26</sup> Canis lestes.



H. M. Laing

1. Hubricks Camp, Showing North Slope of Chitina River Valley, Alaska **2. Dall Mountain Sheep (Ovis Dalli Dalli)** Ewes and young stock on edge of cliff, Chitina River Valley, Alaska

1925

hillsides was so dry that it supported plants of semi-arid habitat; and the valley floor was so baked that when the wind blew up stream, as it did invariably every afternoon, heavy dust storms were an unpleasant feature.

I must, of necessity, touch lightly upon the floral attractions of these woods and slopes. The season of bloom began at river level in the middle of May and when on August 9th I made a last high climb up to the snow banks after sheep I found the last of the season's floral offerings hugging the ground at 6,000 feet elevation and over. Though the flowers of the slopes above timberline did not colonize in the way often seen in the alpine gardens of the Cascades, yet from the edges of the river gravel where a yellow-flowering vetch<sup>37</sup> in some spots grew profusely, to the last short-stemmed anemone<sup>38</sup> or buttercup<sup>39</sup> at the edge of the icy snow banks far aloft near the perpetual snow, there were few acres that did not yield something of botanic interest.

Leguminous plants were the most numerous and striking throughout all the lower slopes. The lupine<sup>40</sup> in the spruce woods, beaming in blue and white masses in the sunlit spaces, was a thing of exceeding beauty. Throughout all the woods, including the burns and in some places the edges of the river gravel, two other rankly growing members of the same family<sup>41</sup> formed whole acreages of red-purple—a truly royal mantle upon the earth. Several other relatives, in yellow or purple or blue, ascended the mountains, the highest form<sup>42</sup> at the limit of vegetation being almost stemless.

The only other flowers vying with the leguminous tribes in painting the landscape were the Epilobiums, of which the fireweed<sup>43</sup> in the burns and a larger, gaudier relative<sup>44</sup> on the river mud, did much to light up with living colour whole acres that otherwise would have been desolate. The burns, especially, were richly painted, and their purple glow could be seen afar.

Not far from the Hubrick Camp, down stream and close to the river, was a half mile of old trail running through a muskeg, and this spot always repaid a visit. There was scarcely a day in late June that two or three late flower species did not bloom and provide new material for the collection. Of eight or nine orchids collected within a few miles, nearly all were found here, Calypso,<sup>45</sup> the fairy orchid of the mossy woods, being the exception and found farther up the valley. It was here that the white bloom-clusters of Hudson's Bay Tea<sup>46</sup> were found at their best and the little white lady's slipper<sup>47</sup> was in its finest colonies and the yellow shrubby cinquefoil<sup>48</sup> and red-purple vetch,<sup>49</sup> strange lousewort<sup>50</sup> and tall arnica<sup>51</sup> all combined to provide a variety not

- 45 Calypso bulbosa.
- 46 Ledum groenlandicum.
- 47 Cypripedium passerinum.
- 48 Potentilla fruticosa
- 49 Hedysarum mackenzii
- 50 Pedicularis capitata.
- 51 Arnica attenuata.

<sup>37</sup> Oxytropis villosus.

<sup>38</sup> Anemone parviflora.

<sup>39</sup> Ranunculus affinis.

<sup>40</sup> Lupinus nootkatensis.

<sup>41</sup> Hedysarum mackenzii and Hedysarum boreale.

<sup>42</sup> Oxytropis nigrescens.

<sup>43</sup> Epilobium angustifolium.

<sup>44</sup> Epilobium latifolium.

found elsewhere. It was found that many of the more alpine plants such as the tiny polygonum<sup>52</sup> and the beautiful mountain avens (Dryas)<sup>53</sup> grew here in a sort of early outpost of the more teeming colonies on the hills.

One of the most ubiquitous plants of the valley was a form of Dryas<sup>54</sup> that sprawled in dense masses over the gravel and rock slides wherever there was a place on such footing it could get hold. In late June its myriad, half-open, yellow blooms nodded on slender steins and later its whiskered heads waved conspicuously in every breeze. This plant was the first to take possession of the barren soil everywhere. The moraine back of the timbered fringe of the extreme front was covered by an almost unbroken matting of it; the higher portions of the river gravel, not subject to violent flooding, were grey with it, and the lower parts of the rock slides that had reached near river level, were invariably partly covered, as though the plant would hide the crude and ugly debris under its grey mantle.

In any such period spent in the wilderness there are bound to be certain little adventures that stand out in memory as high lights afterwards. Some days of hard climbing in the alpine country on the roof of the ranges; little meetings with grizzlies; the successful hunts for sheep, coyote, black bear and lynx; the quests—finally successful—for nesting red-tailed hawks and goshawks in the timber; the war of reprisal against the red squirrels that robbed the camp of pilot biscuits; the wild visitors such as Whisky Jack and raven that came to camp and were welcomed; the wild visitors, such as the red squirrels and meddling black bear, that came to camp and were not welcome; the little camera adventures at all times—each and all went to 'break the monotony and banish loneliness in camp where there was not even a timepiece for company and the days of the week had ceased to be.

One of the first callers was a grizzly that on the first night here walked by camp and left his tracks thirty yards before the door. Two days later in the evening at sunset a fine large Ephraim walked boldly up the open flat and passed at two hundred yards. That he did not go to the museum was due to the fact that the rifle sight had been damaged in the rough game of packing, but this was not known until three shots had been fired and the animal wounded and lost—a lamentable affair that was never retrieved by better fortune. Half a dozen times later grizzlies were met at fairly close range, but always when the rifle was in camp. On one occasion on the high, bald pastures of Horned Lark Mountain (all main physical features were christened in order to facilitate note writing), a creamy-coated grizzly lay on a breezy knoll and paid not the slightest heed to whistlings and shoutings calculated to drive him off. As he seemed to want that particular knoll on which to lie and paw his mosquitoes, it was deemed wisest to leave him in possession. Many torn burrows showed that he had been busily digging out the ground squirrels. One must neighbour awhile with the grizzly in order to appreciate what a fast walking, fast running, capable yet shy animal he is.

The white sheep were of extreme interest through most of the summer. In early May they were almost at the level of the river. Then their coats were in a sad state of repair and one of their daily devotions consisted in scraping 'themselves against projecting rocks to remove the shedding coat and doubtless to incommode the ticks that infested them. Over the flocks almost constantly hovered the golden eagle, watching evidently for a chance to snatch a lamb from its mother. Lambs, however, were little in evidence in May and it was plain that the mothers then cached their young somewhere through the critical time of their early days and brought them out to the pastures later

<sup>52</sup> Polygonum viviparum.

<sup>53</sup> Dryas octopetala

<sup>54</sup> Dryas drummondi.

when they were larger and stronger. The sheep followed 'the progress of the spring constantly upward, keeping always along the line of new vegetation and at the time of the warmest weather in the latter part of July none were to be seen on any of the nearby mountains. They were then on their highest ranges. An expedition up Horned Lark Mountain on July 25th for the purpose of locating their whereabouts found them at the edge of perpetual snow, near where the glacial streams of the canyons were born. Even at this elevation they apparently were suffering from the heat, for they were noted panting from even the exertion of easy climbing. Only ewes and lambs and young stock were seen during this day in upland pastures. The rams at this time were banded together and occupying ranges farther up the valley, mainly above Trail End Camp.

About the first of August the sheep again began to dot the green slopes above timberline and below the rocky ranges of cliffs. First to wander back into the old haunts were some scattered old rams and by the time of breaking camp (Aug. 16th) the usual flocks were back in the timberline pastures. But it was noted that the sexes were mainly still separate. The old rams were either solitary or in company with others of their sex; and usually these were hovering on the outskirts of the little flocks rather than mixed with them.

On account of the fact that these sheep had little contact with hunters, they were usually very tame and sometimes even stupid. But it was hard to tell in advance how they would behave toward the stranger—a rather momentous thing when good specimens or good photographs were wanted. Also, a poor, half-shed, tick-infested ram in the spring was one thing and the same animal late in July when he was sleek and plump and full of mettle, was quite another. The climax of wildness was seen one day in a two-year-old ram that at first sight, or perhaps first sniff of a human invader of his high pasture, rushed off and showed 'himself in silhouette only a moment on the skyline. The reverse of this was seen one day in June when at Raven Canyon a small ewe was encountered suddenly at close quarters. On meeting her surprised but unabashed stare and recalling the stories of the effect of the human voice on wild creatures, I began to talk to her. Following my invitation to come up and get acquainted, off repeated, the animal actually approached mincingly until we were separated by only a few yards. Just where this growing friendship would have ended cannot be stated as a big ram came dashing up the slope in fright, and his fear of the man foe became at once contagious.

Specimens of sheep were taken in early August. Two or three hunts after choice material on the highest pastures, up among the drifting clouds, provided the thrills that must come to every one who carries a drop of sporting blood. To peer over a ridge and for half an hour hobnob with twenty-odd sheep at close quarters as they played hide and seek among the cloud banks; to meet after a gruelling climb the white monarch of the hills and kill him fairly; to pack him to the valley—a far more strenuous game than the climb upward; to feast on this roasted, juicy wild mutton of the hills—Alaskans say it is the sweetest on hoof—all brought pleasing breaks in the less exciting work of hunting smaller, tamer game.

But to the biological field worker the thing that is new is ever the real thriller, the desideratum that ever is in his head. It is a great day when the ornithologist meets a bird new to him. This thrill was furnished by the wheatear,<sup>55</sup> a small Old World bird that includes Alaska in his summer range and was here found at the southernmost point of his summer home. High up on the rim of Raven Canyon, near where the cliff walls shut down on all but winged travellers, a male wheatear was found one day in early June singing his flight song aloft and bobbing excitedly from dizzy points

<sup>55</sup> Saxicola oenanthe oenanthe.

jutting out into the canyon. His capture by strategy brought one of the exciting moments of the summer.

Photography of wild life also brought its ups and downs, its delights and disappointments. Let one example suffice. As the movie camera was too heavy to be used in stalking sheep, the large still camera was used instead. Two rams had been noted sunning in the afternoon on the farther side of the Hubrick Canyon and a stalk was planned and carried out. By a detour through the timber—this to keep out of sight and to leeward—the two sleeping (?) rams were approached till their white forms could be discerned faintly on the sunny slope fifty yards distant. In order to get into more killing range another little turn was made in the doubtful shelter of the burn. But when I came to the edge with the camera ready, the slope was bare. The eye of the sheep is one of the very keenest eyes on earth.

Stealing quickly forward I came almost out to the canyon rim—it was very deep here with precipitous walls and a noisy stream tumbled along in the bottom-and then above the voice of the stream I heard a dull clattering as of my quarry making abrupt and hasty descent in the canyon. In a few moments the smaller of the two rams came into view at the stream, then crossed and began to ascend the opposite wall where a dozen of his species—ewes and young stock—were standing in line watching the show. That a four-footed animal of such size could scale this wall seemed incredible and I set down the camera, with the slide replaced carefully, and took out my field glasses to study better this acrobatic marvel. The animal was half way up to the summit when suddenly I heard another nearby clatter, and out of the canyon in front of my very nose popped the bigger ram. He had turned back. He mounted a rocky prominence and stood side-on with his gaze turned squarely upon me and posed like a marble statue as he revolved in his head the problem of this new creature that had come to his mountain. In an agony of chagrin and suspense I put away the glasses, picked up the camera, got the slide out, just as he gave a sudden start and shiver, and whirling about, headed into the canyon. I had him on the finder in an instant, but only now I realized that I was standing behind a fallen, leaning spruce, and its hundred obstructions blocked my lens. I did not press the release. And so a wild-life picture of years — the subject, the background, were as perfect as Nature could make them —was not taken; and no such opportunity came again.

Although I have stated earlier that I was alone in camp, this was only true as regards the lack of human companionship. Whisky Jack was always on hand and ready for a meal; a raven family made its headquarters near camp, a rabbit during a good part of the summer used a brushpile near the camp as a hiding place, red squirrels were too constant visitors; a black bear visited camp on two or three occasions; and there were Brownie and Satan, two young hawks that were kept as wards and dependents.

Whisky Jack, the camp robber jay, and his mate were very constantly near the tent and, as is always the case with these thieving birds, had an eye for food plunder. They were fed regularly on a table wear the door and afforded considerable amusement. When I nailed down a hard bannock or tough pancake they invariably chopped it out and packed away the pieces. They were not nearly as fond of raw meat at this time as of cooked foods. Though they loved the taste of it, oatmeal porridge or boiled rice was their bete noire because they were unable to carry more than a billful; but the climax of boredom came to them when I suspended a tough biscuit on an elastic where it could not easily be reached either from above or below. But Whisky Jack is a member of a brainy family and soon developed a system. He hammered the elusive bait from above so that it flipped over the limb and thus was wound up on a short tether, and then he chopped into it with a vengeance. Sometimes, too, he seized upon it with his feet and, suspending himself, swung back

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and forth while he pecked vigorously. It seemed strange that the pair always kept their young in the background and never brought them to camp. Not till later in the season, when the dark-coated young were independent, did the latter come to the feeding-table.

The raven family also came to camp and showed many interesting things about corvine life. On my first ascent of the mountain by way of Raven Canyon—the latter was named so from this day—a raven, a female, came winging overhead and was shot for the collection. It was discovered soon after that the male of the pair was raising an ambitious and very noisy brood of five young in the canyon. Some atonement to the lone parent seemed due; so all skinned bird bodies and mammal remains were placed out on the bar, where, of course, he found them at once—for there is no keener scout in the wild—and so through the hardest weeks of summer his labours in securing provender were lightened. The bait was moved closer and closer to camp, and just as soon as the young-could fly the parent brought them down and quartered them in the neighborhood. The young became far tamer than the parent, and often perched on the scaffold before the door.

As noise makers a raven family could scarcely be beaten. No alarm clock was ever needed in camp. The young had not the throaty, raucous croak of the father, but they made far more noise in their own way by repetition. Feeding time—which rather generally was all the time—was always an entertaining sight. Strangely enough, for a long time, the young refused to pick up food for themselves, though they seemed quite capable of doing so. Invariably they stood around near the food while the parent attended to the distribution. When I placed the skinned body of a coyote upon their table they began a busy week. For several days they did little except line up beside the body and shout encouragement while father did the carving. Later, when in August the ripening berries offered easy provender afield, the ravens gradually deserted the camp.

Brownie was a young, red-tailed hawk taken from the nest and raised in camp. At first he was tethered under a spruce where he soon learned to make himself at home, provided always he was well supplied with fresh meat. A red squirrel was his favorite tidbit and special weakness, and as these little pests insisted on coming into camp on burglary bent, Brownie was seldom hungry long. His capacity was large; his digestion was perfect; in three weeks he grew from a stub-tailed fledging into a fine, large specimen of his kind.

On July 29th when I packed up the valley to establish a secondary camp for a few days at Trail End, I gave him four squirrels and his liberty and hoped that hunger would not pinch him hard before my return. Like all young hawks, he was, of course, incapable of hunting for himself. When, on my return, I looked eagerly under the hawk tree I was surprised to find only four flyblown squirrels and no Brownie. Next day I heard his hungry call in the woods at a little distance, but though I searched and called he refused to show himself. But next day the prodigal returned—hungry. For six days he had fasted. He begged piteously for food and seizing upon some knucklebones of a sheep, tried to swallow them whole. He had sampled freedom and found it lacking. Henceforth he frequented the vicinity of camp, coming daily, early in the afternoon, for a gorge of meat; and if it was only a bread-and-butter friendship, he—or perhaps "he" was "she"—was a comrade of a sort in a lonely land.

How differently was the hawk nature expressed in Satan, the young goshawk, captured just after he left the nest and kept in camp under the same conditions as the red-tail. This young terror of the woods never relaxed a whit in his savagery. The glare from his yellow eye never dimmed or softened toward his captor; he fought the tether that held him and hung himself by a foot every day and learned nothing by experience. He was ready to fight always, at any moment, and he tore his meals only when unobserved. It was almost a relief when he severed the tether close to his foot



H. M. Laing

Young Red-tailed Hawk, Companion of the Camp Raven Family at Work Upon a Cayote Body Chitina River Valley, Alaska and went whirling off into the timber. Yet he, too, returned after several days, if not repentant at least ravenous, and I finally made an end of him with little computcion.

So the days on the Chitina sped by. The spring climbed the green hills. July's heat, bringing raging white torrents on the gravel flats and roaring streams in the canyons, gave place to the cloudier skies of August and quieter waters everywhere. Bird voices chirped again more plentifully as the earliest migrants came flocking in the southward movement. The white sheep again dotted upland pastures above timber. The season of bloom turned to season of berry and seedpod and a few yellow leaves began to shine among the poplars. And then, on the 15th of August, the little pack train filed out of Cut-Off Draw and crawled camp-ward up the gravelly flat, and my solitary sojourn in the wilderness was at an end.

In the foregoing, rambling account of nature work on the Chitina only a few of the high lights have been touched upon. At the time of writing the collected material had only reached the museum and had not been fully worked over by the various departments. When this has been accomplished and comparative work is complete, it is hoped that the material will warrant the publication of a systematic list.

## Food

## A.H. MacCarthy

A short word of only four letters, but a significant word on which, perhaps more than anything else, depends the success or failure of a difficult undertaking; for it is not in battle alone that men fight on their stomachs; almost every vigorous, gruelling, long-sustained effort by its final victory reflects the efficiency and sufficiency of the food supply.

With a record of scores of ambitious mountaineering campaigns resulting in failure, due to lack of sufficient or proper food supplies, the Mount Logan Committee was put on notice that a failure of the Logan Expedition on account of miscalculation in this essential requirement would stamp across the record of its work the significant word "Cultus."<sup>56</sup> Therefore, after a most thorough investigation of the hazards of the undertaking and the possible long delays that might be encountered in the attack on Mount Logan, the Committee decided that provision should be made for a possible three months campaign from rail head and it accordingly authorized the purchase of an outfit for that period. Later events clearly justified the decision on the part of the Committee and the responsibility for any miscalculation that may have been found in the food supply must rest upon my shoulders, for I undertook the work of determining the quantities and character of provisions and supplies for the trip as well as the methods of putting up the same.

In settling these questions four major features entered as determining factors: a long, difficult approach to the base of the massif, long difficult work at high altitudes, exposure of the entire supply to freezing temperatures and the possibility of many weeks of sustained effort without fresh food of any kind.

The long and difficult route from rail - head and the consequent heavy transportation expense made it imperative that, as far as possible, a selection of lightweight foods should be made and also that it should not include items requiring heavy or bulky containers. Consistent with the supply of essential elements the list was divided into three types—food of a normal

<sup>56</sup> Chinook jargon — "No Good."

heavy quality to be used along the line of approach and at the advance base camp, little or none of which would require further transportation after being cached during the winter; next, a supply of concentrated and light-weight foods that must be relayed by back-packing along the upper reaches of the massif, where every ounce of weight would be vitally important, and, finally, an ample supply of emergency or "iron" rations always to be carried and available during work at high altitude for use if storm bound away from camp.

As virtually the entire outfit of equipment and supplies had to be taken in during the winter when transport work could best be done over the ice stretches and there, at several points, cached for many weeks until the climbing party arrived in May, it was reasonably probable that a certain percentage of it would be spoiled by dampness or because of repeated freezing and thawing; also it was possible that some of the caches in or near the limit of timber might be destroyed by wild animals. Hence it seemed advisable to make a reasonable allowance for such contingencies and the supply was finally figured out on a basis of four pounds per man per day, this being considered liberal because of the concentrated strength and light character of many items of the list. Thus, figured on the basis of a party of ten men for ninety days, it resulted in 3600 pounds of food, with forty per cent added for containers.

With the prospect of being many weeks on the trail without fresh provisions and the possibility of being storm bound for many days at a time in camp, it was very necessary that, at least in the heavier foods, there should be a good variety in order to afford a frequent change of diet and thus help to keep appetites normally strong.

While a long list of food may seem to increase the difficulties of the commissary, in fact the difficulties are more imaginary than real, provided care is taken to have commodities put up in systematic convenient form; and had our expedition been checked with many days of inaction and consequent lack of exercise, I am sure the great value of our large variety of meats, vegetables, cereals, fruits and beverages would have been more patent than was brought out by our few welldistributed days of enforced rest.

In order to facilitate the handling of foods during the campaign and also to afford them the best protection from bad weather conditions all commodities such as sugar, flour, cornmeal, rice, salt, cereals, dried fruits, dehydrated vegetables and the like, were put up in three and five pound bags and these were then assembled in from fifty to sixty pound lots which were then packed in heavy paraffined bags, with an' outer cover of heavy canvas bags, on which was stencilled the bag number and its contents. This method of double bagging was also used to protect the bacon, boned hams and the two-day caches left along the line of approach,

As far as possible all other commodities were provided in small unit containers suitable for one meal for one mean of for one meal for the party, thus avoiding the trouble of carting half-used packages.

Caches along the line, where stops of several days were to be expected, were made up of heavy solid foods, with a supply of flour for biscuits and bread in order to afford a change from the hardtack which served us so well while on the trail and during high elevation work. One other excellent substitute for the bread ration and a relief from the hardtack, was a good supply of flapjack flour, which was used with much satisfaction as far up the route as "Windy Camp." A sourdough pot was not practicable because of the scarcity of fuel and no proper camp facilities to keep it from freezing.

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consisted of eight men, thus giving us an extra margin in our food supply, this percentage of gain being repeated on the plateau when, after having made provision for eight men, two turned back and subsisted on the food left as reserves in the chain of camps below.

With these occurrences in our favour and but two days delay in our schedule on account of bad weather, we had an abundance of food at all stages of the advance as well as the retreat, excepting when a bear or wolverine destroyed our two small caches at the beginning of timber, where it really made little difference to us. There was no need at any time to put the party on limited rations, so no data was kept as to the actual consumption per day, nor was any check made of the food abandoned at the various camps during the retreat. I think, however, it was evident to all that the four-pound allowance per man would have been ample for considerably more than the 90 days for a party of ten as originally figured upon.

In reverse order of their use and attractiveness the following are the lists of items for each group of food supplies:

Emergency or Iron Rations: - Lump sugar, hulled walnuts, raisins, pitted dates, sweet chocolate, cheese and Vita-Food.

High Altitude Food:-Bacon, sausage, boned chicken and veal loaf; butter, cheese, dried eggs, dehydrated potatoes and carrots; hardtack, ginger snaps, flap jack flour, erbswurst, rolled oats, klim and brown sugar, tea, cocoa, ovaltine, bovril and vegex, salt, pepper, nutmeg, cinnamon and dried horseradish.

Heavy Food for Bases and Caches:-Bacon, boned ham, corned beef, veal loaf, sausage, and dried eggs; dehydrated potatoes, carrots, onions and string beans; baked beans, butter, cheese, minced meat and plum pudding; flour, cornmeal, macaroni, 'hardtack, rice, rolled oats, wheat flakes, white sugar, klim, evaporated and condensed milk, tea, coffee, cocoa; pickle's, mustard, sauces, salt and pepper; curry powder; jam, marmalade, and dried fruits, extracts and flavourings, etc.

For convenience in transporting, using, and keeping account of the supply of provisions during the advance on high levels, all rations, other than the meats, were assembled in two-day lots for eight men and packed in one paraffin bag with a total weight of 35 pounds each; the meats were put in white canvas bags, each bag containing bacon 6 pounds, sausage 8 pounds and boned chicken 24 pounds, giving a total of 39 pounds; thus each of these bags made a compact comfortable pack for one man to handle.

The two-day allows	ances were as f	ollows:	
Bacon	2 pounds	Ginger snaps	1 pound
Boned chicken	4 ''	Erbswurst	1/2 "
Sausage	2 "	Klim	1 ''
Dried eggs	1 "	Vegex or bovril	1 "
Dehydrated		Cocoa or	
potatoes	2 "	ovaltine	1 "
Dehydrated		Tea	1/2 "
carrots	1 "	Salt, pepper,	
Butter	2 "	nutmeg,	
Cheese	2 "	cinnamon	1/2 ''
Oatmeal or rice	4 ''		
Sugar	.5 "	Dried fruits	4 ''
Jam	2 "	Hardtack	5 "

. ..

Food Weight	41 1/2 pc	ounds
Bag	1 1/2 "	
Total	43 '	4

There was also a liberal supply of sardines in oil for use at luncheon time, which was easy to carry and a sustaining food.

While the lists of articles to be issued on the various stages of the expedition were not especially difficult to compile, the question of the quantities of each were a matter of considerable speculation and in some instances resulted in a compromise or surrender to individual tastes; for instance, a penchant for cocoa and a feeling that it was absolutely essential to success made one climber almost refuse to join the party for fear he might find lacking that particular beverage to carry him over the top; another felt that it was jam that was the prime requisite; ham was advocated above bacon, while two others agreed as to bacon but disagreed as to the proper way to serve it; one felt certain that bacon cooked to a crisp would ensure success while his "buddie" extolled its virtues when thoroughly warmed through—and so on down the list.

In despair, but with a hope of satisfying all tastes, I adhered to my original lists but added a more liberal supply of condiments: black pepper, celery salt, cinnamon, nutmeg, curry powder, horse-radish, Worces¬tershire and H.P. Sauce, Gulden's Mustard, and suggested to each man that he must be satisfied with what the cook served or choose his own "pizen"; I added a supply of malted milk, Jamaica Ginger, and brandy to the medical chest as palliatives against indiscretion.

This method apparently proved effective, for at no time was there any complaint about the menu and the supply was more than ample for every demand made upon it.

If an expedition is at all worth while, certainly, above all else, it warrants an ample supply of proper food, the vital need in dumb brute and human life that has carried society on from year to year in its conquest of the world about us.

#### **Notes On Equipment**

### H.S. Hall, Jr.

In describing the equipment used on the Mount Logan Expedition it will be well first to record briefly the conditions prevailing while the party was in the field.

During the first week after leaving McCarthy on May 12th the weather and travel conditions were not unlike that of the Canadian Rockies in June: temperature ranging from 32° to 50°F. between night and day; the ground was wet and often marshy in the woods; streams were low, and weather generally fair; all at an altitude of 1500 to 3000 feet. The second week's travel in varying weather was over the moraines of the Chitina, Walsh and Logan Glaciers, up the main ice stream of the last, which, at first bare, was buried above 4500 feet by snow; and then up the snow-covered Ogilvie Glacier. By this time the night temperatures were from 10° to 20°F., with the days fair to snowing. By the end of the third week winter conditions prevailed, except that 'the reflected heat of the sun on the snow was still considerable on clear, still days. The temperature gradually dropped and the severity of storm and winds increased as higher altitudes were reached, until minimums of more than -30° were encountered with a mean temperature for the twenty-four hours of well below zero. On the return journey in the lower valleys, normal summer conditions prevailed. In the brief

period of two months the party experienced a range of weather and travel conditions varying from spring to winter and back to summer. Equipment had to be provided to meet these extremes.

#### **Personal Equipment**

In the valleys below the glaciers personal equipment approximated that used on a summer trip in the Canadian Rockies, with the exception of the footwear, which varied from ordinary walking boots to shoe-pacs. The latter were preferred by several of the party because of their adaptability to almost any marching conditions. Once the glaciers were reached, and particularly above 5000 feet, the special equipment required for an expedition of this kind was used. It was about as follows, although each man's personal outfit varied somewhat to suit his particular requirements:

Footwear:—Shoe-pacs or "barker boots" as they are known in New England, consisting of a rubber foot-piece with leather upper, the whole about twelve inches high and secured by lacing, ordinary or rawhide. An inner sole of felt, hair, leather, cork, or some combination of these, was generally used inside the shoe-pac. Above the altitude of day-melting the shoe-pac was displaced by the dry-tanned Indian moccasin. The moccasins, to be effective, had to be of a size to allow at least four and sometimes five pairs of socks. In the shoe-pacs two pairs of socks were the average.

The socks used varied from different weights of wool to the so-called Eskimo socks, consisting of an outer knitted wool and an inner fleece-like lining which, by setting up friction, increased the circulation in the feet. Socks were changed from day to night, even at the highest camps, as a more effective means of combatting the cold. The greatest difficulty experienced with the socks was to obtain pairs which would go well over one another so as not to bind and thus restrict the circulation by the time the fourth pair was put on. This is a matter which requires careful planning at home

Underwear:—Some members of the party who habitually wear the light cotton B.V.D. type continued to do so during the earlier stages of glacier travel, but later changed to light wool, then to heavy wool, and finally to two pairs of heaviest wool at the higher altitudes. Two-piece were preferable to union suits.

Shirts:—These generally varied from the light O.D. wool of the familiar army type to Woods (Ottawa) kersey cloth, or its equivalent, a heavy rough wool cloth used by lumbermen. As many as three shirts were sometimes worn at one time.

Trousers:—Two principal types used were either the waterproof or windproof canvas of -the "Duxbak" pattern or the mackinaw or other wool cloth. The Duxbak proved the most satisfactory under all conditions and were worn by some of the party throughout the trip. It was a luxury to change to wool trousers at night when this could be managed.

Gloves:—Until wool was required by the cold, a cotton glove with leather palm proved very satisfactory as a means of protecting the hands against wind and sunburn and general rough usage. Later, one or two wool mittens with leather outer mittens and, in extreme cold, a large windproof outer mitten with longer gauntlet were generally worn.

Headgear:—Canvas or felt, with brim, at lower altitudes; one or two woollen helmets, at least one of the Balaclava type for wear higher up.

Outer Clothing:—Drill cloth "parkas" with hoods and extending to, or below, the knees were worn over all as protection against wind and storm often at the middle and, nearly always, at the higher altitudes. These were invaluable. Sweaters were sometimes worn just inside the parka, if not nearer the skin. No furs were used.



### H. F. Lambart

 Showing High-level Clothing, Equipment: Parkas, Snow Glasses, etc. L. to R. - Lambart, Foster, Carpe, MacCarthy, Taylor
Showing Clothing Equipment, etc.: Snow Glasses, Shoe-pacs, Mosquito Veils and Chest

Strap



Hy. S. Hall, Jr.

Observation Peak Camp, View Towards King Col Showing alpine tents used Ice Cliff Camp (15,000 ft) Showing funnel-shaped entrance to alpine tents. L., Morgan R., Read Henry S. Hall, Jr. King Peak (Centre)



 Nos. 1 and 2 H.F. Lambart No. 3 A.H. MacCarthy
1. Ice Dome Above Quartz Ridge. The Party and Its Equipment Showing at right and left of picture the pack-boards used
2. Camp at Foot of Cascades Showing pack-board in use (figure left)
3. Ice Camp No. 2 Showing Alaskan Snowshoe (left) and Canadian Snowshoe (right)

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H. F. Lambart

1. Showing Sleds Used on the Lower Glacier Stretches as far as Cascade Camp. L. to R. Carpe, MacCarthy, Foster

2. Arrival With Back-pack Equipment at King Col Camp Site Note willow wands for marking route



Nos. 1 and 2 H.F. Lambart No. 3 A.H. MacCarthy **1. Ice Dome Above Quartz Ridge. The Party and Its Equipment** Showing at right and left of picture the pack-boards used **2. Camp at Foot of Cascades** Showing pack-board in use (figure left)

**3. Ice Camp No. 2 Showing Alaskan Snowshoe (left) and Canadian Snowshoe (right)** L. to R. Henry Olsen, Scotty Atkinson and Andy Taylor Snow and Wind Glare Protection:—Snow glasses of several types were employed. The light aluminum frame of the so-called Chamonix glass was perhaps the most satisfactory. Smoked, amber, fieuzal and Crookes glass were tried. After a fair trial of all these types, under varying and particularly severe conditions, I personally found amber the best. More light is admitted through amber than through either dark smoked or dark fieuzal, but I found it a restful light and one which did not tire my eyes or cause the slightest blindness. I had no eye trouble of any kind. Others of the party used smoked or fieuzal glass exclusively with varying success. Experience of many expeditions has shown a lack of agreement as to the best type or shade of snow glass. Personal experience is the most important factor and should govern each case.

A dark-stained mosquito head-net was found to be very effective as a protection for the face and neck from the sun's glare and, to a lesser degree, even from the wind. It seemed to lessen the glare by fifty per cent. For such sunburn as was unavoidable lanolin rubbed into the skin at night was found to be effective. The use of grease during the day on portions exposed to sunburn was at best of questionable value and, in some cases, positively harmful.

Snowshoes:—The snowshoes used were of three types: (I) the ordinary Canadian shoe with simple attachable leather foot strap. These proved fairly satisfactory; (2) the Alaskan shoe with thong foot attachment. Except that the foot not infrequently slipped from the thong, these seemed generally satisfactory; (3) bearpaw shoe with strong leather toe-piece and heel-strap, the whole attached by an articulated metal hinge to a metal bar in the shoe. This type of snowshoe seemed by all odds to give the least trouble to its wearer and to be the most efficient for all the uses to which it was put, such as walking in hard or soft snow with or without packs, uphill or on the level, as well as for sled pulling. For trail breaking in deep powdery snow the long snowshoe is better. I do not think a bearpaw shoe can be equalled for climbing. The hinged toe-piece made by Sprague in Boston is the best I have ever seen.

Crampons used were generally the Swiss. The web straps froze and gave trouble in the zero temperatures. Heavy felt soles had to be used as an insulation against the cold metal. Another type used, not strictly a crampon, consisted of a flat-soled leather foot-piece to which were clamped tempered steel sharpened spikes, four on the ball and four on the heel of each foot. A strap across the toes, one across the instep and one from a heelpiece just below the ankle bone held this contrivance firmly on the foot . It was much more easily put on and taken off than the Swiss crampon in cold weather but it was considerably heavier and more awkward to carry.

#### **Other Equipment**

Packboards, packsacks and packstraps were used for back-packing. The Duluth or Poire packsack was preferred by some members of the party for carrying their packs, whether light or heavy. For the heavier packs of sixty pounds and upwards the packboard was generally used, the type with slightly curved frame to fit the back being preferable to the straight back. A packstrap consisting of a chest harness with ropes to which backpacks of almost any size and weight in bag containers could be fastened was tried, but did not meet with unqualified success.

The tents used were of two types The Alpine tent with sewed-in floor was about eight feet square at the base and rose, supported by a single sectional metal pole, to a seven-foot peak. At the rear was an eighteen-inch wall. The entrance was funnel-shaped and could be drawn together and securely tied with pucker strings. There was a mosquito bar of the same design. The metal pole was supported by a number of guy ropes attached either to pegs or at higher altitudes to ice axes or snowshoes. There were two ventilators in the rear wall and one just below the peak. These

tents withstood well the severest storms. Two tents of slightly smaller and lighter fabrication were used, being supported by a bamboo pole with a two-foot crosspiece at the peak. They weighed ten pounds and accommodated three men, while the larger tents housed four. They did not stand the high winds quite as well as the Alpine tents, but were more easily carried.

The sleeping bags made by the Woods Manufacturing Co., of Ottawa, consisted of two eiderdown quilts, a camel's hair blanket, a waterproof cover and a ground cloth. The outer cover was joined at the edge by clasps. Each of these bags could be unclasped, laid out flat and a similar bag clasped into it, making one double bag. One such bag was about six feet wide over all. Four men slept in it for twelve days, above 14,000 feet. This arrangement gave added warmth but allowed less than normal relaxation. The single bags weighed twenty-four pounds complete. Only about sixteen pounds were taken.

Air mattresses were used under the sleeping bags for the six weeks spent on the snow and ice. Without them above the base camp with the aim of reducing weights, it would have been difficult to have kept warm, so persistent is the chill emanating from an icy bed even through the waterproof tent floor. These mattresses weighed eight pounds and were filled by means of a bicycle pump.

Cooking was done on gasoline stoves: Coleman No. 2 as far as the base camp at Cascade; and Primus, roarer type, above this. Both these stoves caused some trouble but were, on the whole, satisfactory. The gasoline was carried in gallon tins, our consumption being about one gallon per day at the lower camps and decreasing to half a gallon per day above King Col, where the exigencies of transportation made it an extremely precious commodity.

## **IN MEMORIAM**

## Sir James Outram

Some years ago there was talk among English critics of the apparent disappearance of the Spirit of Wonder, the essence of Romance. But Romance never disappears. There are always zealous disciples to hand on the torch brightly blazing.

Those who have read "In the Heart of the Canadian Rockies," by Sir James Outram, will recognize that it is pervaded by the romantic spirit, in this lying the reason that the book appeals to many who have not yet learned the charm of the mighty hills nor fathomed the secrets of the snow.

Sir James Outram was born in London in 1864, the grandson of the famous General of the Indian Mutiny, and first baronet of the name. He was educated at Haileybury, where he distinguished himself at football among other things, and thence proceeded to Pembroke College, Cambridge. On graduating he was ordained in the Church of England and held several cures, but in 1900 a complete breakdown of health necessitated an absolute change and he was ordered abroad.

Outram became prominent in the Canadian Rockies for the first time in 1901. He was then associated with the late Edward Whymper, who was sixty years old when he "discovered" the Canadian Rockies. He was too old to make difficult climbs, so he arranged with Mr. Outram to climb for him and report discoveries. It was reported that Whymper had come especially to make the first ascent of Mt. Assiniboine, the Canadian Matterhorn. He made no attack, but the same year Outram conquered it on an expedition of his own.

In 1902 Outram was again in the Canadian Rockies and in that year did his best work, making many first ascents of the highest peaks, some, until then, like Mts. Brown and Hooker, of somewhat mythical fame. He even took part in the search for these two famous mountains of Douglas, reported to be respectively 16,000 and 17,000 feet in altitude. Among the greater peaks ascended for the first time in this wonderful year were Mts. Columbia, 12,294 ft.; Forbes, 11,902 ft.; Lyell, 11,495 ft.; Bryce, 11,507 ft.; and Alexandra, 11,214 ft. In that same year Outram met the future founder of the Alpine Club of Canada and spent two weeks with him at his camp in the Selkirks, while he was engaged in the survey of that region for the government. Thus his mountain interest became known, and when the Club was formed he was elected one of its earliest honorary members. He was a frequent guest at its Annual Camps and was always a centre of interest.

Sir James was well known as a charming and instructive lecturer. Almost to the end he periodically delighted audiences by his fluent and enthusiastic descriptions of the many wonderful and unique attractions of our mountain regions. His early religious training 'had enabled him to appreciate the perpetual presence in the great Hills of the Almighty Creator, a realization of which comes so forcibly to very many who visit these sanctuaries of the earth in reverent spirit. This inspiration breathes through all his association with mountains and mountaineers.

He passed away on March 12th, 1925, in Victoria, and after service in> Christ Church Cathedral, was buried in the beautiful Royal Oak Park cemetery a few miles from the city.

### **ALPINE CLUB NOTES**

#### In the Cariboo Range—Mt. David Thompson

Early in July, 1925, Mr. and Mrs. W. A. D. Munday made an expedition into the Cariboo Range. Two parties of climbers had preceded them: Professor Holway and Dr. Gilmour in 1916 and Mr. A. Carpé and Professor R. T. Chamberlin in 1924. The latter party made two major climbs, the first ascents of Mt. Titan (11,850 ft.) and Mt. Challenger (10,900 ft.). They also climbed three minor mountains: Gunboat (10,000 ft.); a shoulder of Mt. Titan which they called Bivouac Peak (10,150 ft.) and a triple summit (10,250 ft.), which Mr. Munday refers to as Holway's Peak, he having made the first ascent of its northerly summit. (The elevation and other names are Mr. Carpé's.) Mr. Munday writes:

"On July 10th we camped opposite the tongue of the glacier flowing from Mt. Challenger at an elevation of nearly 4000 feet. Holway's 'Mt. Welcome' was most alluring. The main glacier was not visible and Mt. Titan was hidden behind the shoulder of Carpé's 'Forks Peak' (10,300 ft.). The hanging valley entering at the east side of this peak is too small to be called a fork. "

"On the llth we reached a camp site six hundred yards from the main glacier, having been all day making three miles. The elevation was about 4500 feet. Downstream Mt. Robson, although thirty miles away, filled the whole valley—by the evening glow it was a vision of unforgettable beauty."

"On the 12th we consolidated our position, the violent blasts of wind off the glacier forcing us to build a windbreak of boughs to protect the tent. A creek emerged from a fine cave in the glacier. Part of the forefoot was ploughing up the boulders, indicating some advance, apparently only temporary in character. The position of the ice-front was recorded photographically and any recession can be determined by future parties. "

"On the 14th storm gathered on the peaks and we abandoned the ascent of Mt. Welcome,

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Mrs. W.A.D. Munday East Peak of Mt. Titan (left), Bivouac Peak (right), from a Camp Below Holway Glacier Mt. Titan rises 7,200 ft. above the foreground and is two miles distant but continued up the main glacier past the base of the big nunatak below Holway's Peak to the crest of the magnificent icefall extending westward a mile to another nunatak and along the base of Mt. Titan, parallel to the main glacier. We ploughed across the upper snowfield to the true pass to the McLennan watershed, climbed the quartz-tipped summit to the west, descended 200 feet to another col, then up 350 feet to another peak of the sharp ridge connecting with the southern slopes of Mt. Titan. To the northwest the whole eastern precipice of Mt. Titan shone with its powdering of fresh snow, an unbroken cliff, 4000 feet above the upper glacier. The mountain is too massive, however, to reveal its true height, though obviously monarch of the range. "

"The dominant feature of the scene was the magnificent mountain which the Carpé-Chamberlin party proposed to name Mt. David Thompson (11,250 ft.) in the belief that the pass north of it was the true source of the North Thompson River. Northward of this pass gleamed an ice guarded mountain which we refer to as Mt. Hostility (11,000 ft.). The sunlight threw into relief the whole expanse of glacier, the lower part marked by great concentric ridges where the dry glacier describes an arc of nearly 90 degrees. "

"Rain fell generously on the 15th, clearing late in the afternoon. We started at 5:25 p.m. and reached the brow of Gentian Dome about 7300 feet, where we camped. At 3:30 a.m. we started up Bivouac Peak. The lower part of the arête is crumbling, garnet sprinkled, micaceous rock; the upper part firmer, and here were stretches of sodden snow overhanging the cirque of the small glacier between Bivouac and Mt. Welcome. The sun came up directly behind Lynx Mountain. We found in several places recognizable footprints and marks of axe points of the Carpé expedition.

"The summit revealed the forbiddingly bare ice of the mile-long ridge soaring 2500 feet to the eastern peak of Mt. Titan. Three miles to the westward, across the huge neve which drains to Kiwa Creek, rose the symmetrical form of Kiwa Peak (11,250 ft.), its broken ice-wall outlined along the crest by pencillings of rock. Northeastward stood the fine rock mountain whose peak was visible 6000 feet above our base camp and is seen from Tête Jaune station. We named it Mt. Aspiration (10,500 ft.). To left of it showed the most amazing steeple, crowning three equal buttresses rising almost perpendicularly out of unseen depths. We named it Symmetry Spire. "

"Descending a thousand feet to the neve we skirted the base of the ice-cliffs of Mt. Titan, mounting gradually to the barer west face where ice was met, necessitating step cutting. So strong was the wind that we kept our feet with difficulty. Outcropping rock near the summit was glazed with ice. At the top of the rocks we passed the cairn. Visibility was good. "

"A terrific wind made the descent exceedingly difficult. Bivouac Peak was reached at 7:05 p.m. and camp at 8:40, thus completing the second ascent of Mt. Titan, which Mr. Carpé calls the highest point in the interior ranges of British Columbia. "

"In the morning a fierce storm compelled us to move camp 800 feet lower where scrub trees promised tent poles and firewood but no shelter. "

"At midnight we got up; the sky held no encouragement and we were loath to start at 2:20. On top of Gentian Dome the ground was frozen and the mud around a morainal lake bore our weight. "

"Thanks to our Tricouni nails we just escaped having to cut steps on a long upward traverse to the main stretch of Titan Terrace. On the crest of Promise Point I picked up a mitt, left behind on our previous visit. Crouching along the snow-festoons on an unwarmed sunward ledge we ate a little food before beginning the 1500-foot descent across the McLennan Glacier. Opening crevasses promised trouble on the return when the snow bridges softened. " "An ascent of 500 feet landed us in David Pass, revealing the wide expanse of David Glacier and the splendid ice-draped northwest face of the mountain. The north ridge and the southeast ridge had been rejected upon consideration and the only justifiable way to gain the long west ridge was obviously up a minor rib of the face in front of us. "

"Structurally the same as Mt. Titan, Mt. David Thompson has been dissected more severely, thereby gaining in grace and beauty. There is even considerable similarity in the northern ice faces of both. "

"Descending a thousand feet of gradual neve we began the actual ascent. The snow remained firm and nothing came down though we crossed the remains of avalanches. What might be called the lower bergschrund was outflanked at the chosen point, but on the ice immediately above it—the slope was ice almost to the crest —cutting steps caused the slope to subside visibly, accomplished by hollow crashings in hidden caverns within. This was repeated several times so the steps thereabouts were skimpy indeed. Higher, the stepening ice was thinly covered with crisp snow. "

"At 10:20 the crest of the shoulder was reached. As the peak threatened to cloud, a halt was made to photograph a scene so surprisingly unlike its description by Mr. Carpé. "

"The peak, reached at 11:20, was a tiny ice platform only big enough to accommodate one person at a time and was the actual meeting point of the three ridges of the mountain. This was the firs ascent. "

"Mr. Carpé in the Alpine Journal describes the view from Mt. Titan as indicating that:

"The North Thompson River curves around it (Mt. David Thompson) like a great horseshoe, rising from its northern slopes, flowing at first almost due W., then turning in an enormous arc through nearly 180 degrees to its confluence with the Albreda River, 40 miles to the S.E. ..... The source of the Canoe River is enclosed within this arc, between the Thompson and McLennan Rivers, but we could not see it clearly. Immediately north of the source of the North Thompson, somewhat between us and Mt. David Thompson, was a long ridge-shaped mountain of considerable height (nearly 11,000 feet) which separates the North Thompson from the Shuswap River.'

"These conclusions are mistaken ones. Mr. Carpé simply beheaded the Shuswap west of Mt. Hostility (the 'ridge shaped mountain') and presented it to the North Thompson. The latter river actually heads in low country about five miles west of Mt. David Thompson, a pass connecting with the Shuswap; both branches of the Clearwater River head in the vicinity. Thus Mt. David Thompson, although the dominant peak near the Thompson's source, stands entirely within the watersheds of the McLennan and Shuswap Rivers. On the glacial plateau, between the converging-upper reaches of the Shuswap and North Thompson Rivers, is a continuous icefield, probably nearly 40 square miles in area and extending S.E. towards the Canoe River; the valley of the latter was hidden among numerous jagged peaks.

At about 30 feet below the summit we left our record in a cairn dizzily perched on the very edge of the precipice. We then hurried down. The climb to David Pass was in deep, sodden snow. The McLennan neve was worse. Crevasses were troublesome on the 1500-foot climb to Promise Point, where we found water, the first drink for fifteen hours. Camp was reached at 7:20. The total time was seventeen hours, in the space of which we had ascended and descended 10,000 feet and travelled fifteen miles.

"The Cariboo Mountains resemble the Selkirks in their deep, narrow valleys, lack of alplands and lakes. The flora appears limited. The chief glaciers descend to 4500 feet. This entails high camps for all important climbs. Much bare ice is likely to be encountered early in the season.



Mrs. W.A.D. Munday

**Summit Ridge of Mt. David Thompson** The summit is about 200 yards beyond highest point in view The mountain has two bergschrunds; the upper one is seen

1925



W.A.D. Munday

## Sketch Map of Part of the Cariboo Mountains

"Maps of the B.C. Department of Lands call this range the McLennan Mountains. The local name of Big Shuswap conflicts with Shuswap River further south and appears on recent government maps as Raushwap or Rausch River (from Riviere au Shuswap). Kiwa Creek is known locally as Little Shuswap. The stream here called McLennan River, its real source, is also known as Mica Creek. Names applied to peaks, passes and glaciers in this article have not been confirmed by the Geographic Board.

W. A. D. Munday.

## First Ascent of Hungabee by the North Arête

I believe that the first ascent of Hungabee made under the guidance of the Kaufmanns started from Opabin Pass and followed the ridge which rises from the Pass in the direction of the summit, until the yellow rock was reached. The worst obstacle which this yellow rock presents is a practically perpendicular wall which runs north and south at right angles to the west arête. In order to overcome this obstacle, the Kaufmanns traversed south and went up the second chimney they came to. This chimney is narrow, steep and exposed to stones.

I do not know which way they turned after overcoming this first wall. It is probable that they turned north and gradually regained the prolongation of the arête which rises from Opabin Pass. I think they used the last part of this rib and finally landed on the north or main ridge of the mountain, within half an hour of the summit.

When I made the second ascent of this peak in 1909, with Oliver Wheeler, I followed practically the same route, except that I turned south after overcoming the dangerous chimney and utilized a series of ribs which brought me close below the main summit. At the point where the yellow rock gives way to the green-brown, one is met with a second very steep wall. I traversed north for a short distance to a point where the wall was sufficiently broken to make it possible to climb, and thus reached the treacherous black rock, of which the summit is composed. The summit itself was reached over the west face of black rock.

These two routes are not safe because of the chimney in the first wall, and even in other places one is more or less exposed to falling rock.

In 1909 Rudolph Aemmer inaugurated a second route by traversing north under the first wall and past a subsidiary rib which runs parallel to the west arête. From this point he gradually worked back to the west arête, reaching same where it runs into the black rock strata. From this point on his route is the same as that of the Kaufmanns, but is not absolutely safe for the reason that the rocks on the north slope of the west rib are very rotten.

The new route, followed July 17th, 1925, by Rudolph Aemmer and the writer, goes almost straight up the west face of the north or main ridge, striking this ridge at its lowest and most pronounced gap, between Ringrose and Hungabee, and then following the north ridge to the summit. The rocks are attacked at a point which lies perpendicularly below the summit of Ringrose, and the line of ascent very gradually bears south until the gap in question is reached. There are no difficulties at all up to the gap. The ridge itself is very rotten in places, but never so steep as to be really difficult. Part of it is about 8 feet wide and quite flat, so that Rudolph and I were able to link arms and stroll up side by each. This flat portion of the ridge is followed by an interesting, but easy, scramble in somewhat steep rocks, which lead through the brown and green strata to the treacherous black rocks. In no part of the ascent is one exposed to stones.



The Summit Ridge Of Mt. Hungabee - Shows The Final Part Of The North Ridge And is Taken from the Point where the West Ridge Joins the North Ridge



Shows The East Face Of The North Ridge Near The Summit The Stone-Man is Clearly Visible on the Summit We left the C.P.R. Camp at Lake O'Hara at 2:45 a.m. and reached the foot of the west face of the north ridge at 5:15. The night was very dark, and as there is no path up to this point, we lost considerable time, notwithstanding the fact that we were using a lantern, mainly because one has to cross an extended patch of loose boulders. After breakfast we reached the pronounced gap in the main ridge at 8:10 and the summit at 11:30. Remaining until 11.50, we were back in camp at 4:45, via the Aemmer Route.

I believe that this is by far the best route up Hungabee, and it is very little more difficult than the two others.

Val. A. Fynn.

## The Second Ascent of Cathedral Crags

In Dr. Hickson's interesting article (C.A.J. 1924, p. 10) the following passage occurs: "A second ascent is said to have been made some seven or eight years later (than 1903) by a party of three, including the Swiss guide, Gottfried Feuz, who returned to Switzerland before the war. Of the details I have not been able to find any account, nor have any of Feuz's Swiss associates been able to give any information."

The ascent above referred to was made in July, 1908, by E. Vincent Cowdray, of Waterford, Ont., and Gottfried Feuz. The third member of the party was Mr. Cowdray's father, who accompanied them as far as the base of the cliffs, but did not participate in the ascent. Vincent Cowdray and his father were staying at Mt. Stephen House after the A.C.C. Camp at Roger's Pass and had just made a guideless ascent of Mt. Stephen from the base of the great amphitheatre on the south side of the mountain, following a route much to the east of the regular route at that time.

On the climb of the Crags, the route taken was easterly along the railway some four miles from Field, then straight up the rock-strewn side of the mountain to the steep tongue of the glacier protruding between the rocky walls of the mountain. At this point, Mr. Cowdray, senior, remained behind, while Gottfried and his companion cut steps up the tongue. Then, as now, the Crags were in an extremely rotten condition and the stones fell frequently. At one point in the passage up the glacier, the party made its way along the edge of a crevasse subject to a bombardment of stones, and Vincent remarked afterwards that they both made a mental note of a suitable landing place on the opposite side of the crevasse, being fully prepared to jump in case any rock fragment came unduly close.

A. A. McCoubrey.

In July Mr. Yuko Maki and five companions, all members of the Japanese Alpine Club, with the Swiss guides, H. Fuhrer and H. Kohler, and the Swiss amateur, J. Weber, made the first ascent of Mt. Alberta and also of Mt. Woolley. This is the first organized Japanese expedition in the Canadian mountains.

Dr. J. W. A. Hickson and Mr. Howard Palmer, with the Swiss guide, Hans Kohler, made last August the first ascent of Bastion Peak (9812 ft.), in the Rampart Group, southwest of Jasper, from a camp at Moat Lake (6400 ft.). At a thousand feet below the summit, ruck-sacks and ice-axes were left behind and rope-soled shoes were put on. Near the top there were some vertical slabs which were by no means easy; on the descent at these places a belayed rope would have been necessary for the last man had his feet not been supported by the climber next below.

In August, Mr. and Mrs. A. A. McCoubrey, Miss K. MacCallum and Mr. Noel Reilly made the first ascent of Mt. Coppercrown (10,218 ft.) in the Purcell Range.

In September, Dr. Hickson, with L. S. Crosby, of Banff, and the Swiss guide, Edward Feuz, made the first ascent of the Devil's Head (9174 ft.), northeast from Banff, from a camp on Ghost River. This precipitously walled peak, which has been an object of attraction to alpinists for some years, and was attempted as early as 1891, afforded some stiff bits of climbing. The party carried out the round trip from Banff in three and a half days.

In September Mr. and Mrs. W. A. D. Munday and Mr. A. E. Agur made the first ascent of the mountain south of Mt. Rodney, at the head of Bute Inlet, which was provisionally named Blade Mountain. On the same day Mr. T. H. Ingram made the first ascent of the west peak of Mt. Rodney. The main peak was first climbed by a survey party under the leadership of Mr. R. Bishop.

## REVIEW

## The Fight for Everest: 1924 — Lieutenant-Colonel E. F. Norton, D.S.O., and Other Members of the Mount Everest (1924) Expedition

This, the third volume dealing with the epic struggle to conquer Mt. Everest, is the record of a repulse, but it is in keeping with the character of this monarch of mountains that the story of another failure is more engrossing in the telling than would be that of the mastering of any other peak. More and more the world in general, and the British race in particular, regard Mt. Everest as a challenge to the race.

Sir Francis Younghusband in the preface to the book, once more seeks to justify the climbing of Everest by trying to indicate to the general public the increased knowledge of human capabilities won in seeking to reach the summit. His logic is excellent and convincing, but he must have felt that most people fail to see the vise of it still.

The opening chapter of the book is by Brigadier-General Hon. C. G. Bruce, who, it will be recalled, had the misfortune to contract malaria, and was forced to relinquish command of the Expedition to Lieutenant-Colonel E. F. Norton. The latter pays the leader this tribute on behalf of all the members of the Expedition: "It was said of Wellington in the Peninsula that 'the sight of his old nose was worth 10,000 men' in a critical situation. General Bruce's nose may not be much like that of the Great Duke, but it might well have been worth the last 1000 feet of the mountain to an Everest Expedition."

Captain J. G. Bruce contributes a chapter on the difficulties encountered in establishing the camps to the North Col. The severity of the weather while this was being done probably robbed the Expedition of success on the mountain. Porters and climbers alike were sapped of their strength, and full recuperation does not take place at these altitudes.

The telling of the larger share of the narrative falls to Colonel Norton, and he pays generous tribute to the splendid qualities of every member of the party, but particularly to Mallory and Irvine who died upon the mountain. Words fail him, and all the unsaid things are summed up thus: "It was worth dying on the mountain to leave a reputation like that." Men have had worse epitaphs.

"Did Mallory and Irvine reach the top?" is the question whose answer the reader seeks eagerly in this book. The members of the Expedition debated the question long and carefully, and Colonel Norton says: "It remains a case of 'not proven,' and that is all there is to be said about it." Odell clung to the view that they reached the top late, and, benighted on the way down to Camp VI., succumbed to exhaustion and exposure. The rest of the party attributed the loss of the climbers to a simple mountaineering accident—a slip and sudden death. There is no shred of direct evidence that they reached the summit. Only another and more fortunate party can solve the riddle.

Odell tells of Mallory and Irvine's attempt. His feats of endurance on the mountain in support of their climb and in searching for them were amazing, and one feels there is little question indeed that men of his calibre can reach the top of Everest. He is stout in his belief that Mallory and Irvine did.

Mallory's letters to his wife throw an intimate side-light on his own character and on his part in the fight. He was officially the leader of the climbing party, and well-fitted, both by experience and temperament, for the responsibility.

The fine illustrations include few that can be termed climbing pictures, but there can be little doubt the nature of the mountain does not lend itself readily to satisfactory photographs of this sort. The eight coloured reproductions of water colours help to visualize Mt. Everest and the surrounding country more vividly than black and white.

The scientific contributions of the Expedition are important. Major Kingston collected 10,000 specimens of animal life and 500 specimens of plants. Odell gained important knowledge of the geological structure of Everest, and also found time for study of glaciology, in addition to handling the highly unsatisfactory oxygen apparatus. On the keenly-debated question of the value of oxygen, he concludes that a climber should put his trust in acclimatization.

"The Fight for Everest" will convince the reader that if good weather and good men meet on Everest next time, the title of the next volume will be "The Conquest of Everest."

W. A. D. Munday.

# **OFFICIAL SECTION**

## O'Hara Lake Camp, 1925

The Twentieth Annual Camp of the Alpine Club of Canada was pitched on the Club's own lot on the south shore of Lake O'Hara. Surrounded on three sides by trees, the stream from Opabin Pass flowing through its centre, it faced across the lake perhaps the loveliest view of any camp since the beginning. Above the trees in the middle distance rose Mts. Odaray, Stephen, Cathedral in its finest aspect, Wiwaxy Peaks and the slopes of Abbot Pass.

The weather was most propitious; what rain there was came at night, there was no snow fall, and though there were some smoky days they were not in succession and many photographers achieved very satisfactory results. An unexpected and pleasant experience was the absence both of mosquitoes and "bull dogs."

A subsidiary camp was placed in McArthur Pass, but a few days' experience showed that members preferred to make the longer approach to their climbs and spend the night at the Main Camp.

The thanks of the Camp in particular and the Club in general, are due to the President, Dr. J. W. A. Hickson, for his generous gift of a complete set of table equipment for camp use. It was greatly needed and highly appreciated.

The hut on Abbot Pass proved a very great convenience, making the ascents of Mts. Victoria and Lefroy pure climbs, unspoiled by the comparatively uninteresting trudges during the night.

1925

The Climbing Committee was composed of Messrs. T. B. Moffat, M. D. Geddes, A. S. Sibbald, C. G. Wates, A. W. Drinnan, H. E. Sampson and the Director.

Mts. Victoria, Lefroy, Huber, Hungabee, Odaray, Schaffer and Wiwaxy Peaks were all climbed several times, but always with enjoyment. The two-day trip through the passes encircling the Mitre, Mt. Lefroy and Hungabee was taken several times, and gave as great delight as when it was originated from the Club's Paradise Valley Camp in 1907. Probably no excursion of such little difficulty gives so fine an insight into the secrets of the mountains.

The following passed the test of Active membership:

July 29, Mt. Huber.

K. A. Henderson.

July 30, Mt. Odaray.

Miss C. Nelson. Miss W. Temple. I. F. Morrison. P. Chambers. R. E. Richardson.

July 31, Mt. Odaray.

Miss E. Bright. Miss J. Bright. Miss M. F. Cooper. Miss H. Moroney. H. C. Dickinson.

- Aug. 2, Mt. Yukness (by W. Face). Miss J. Tatlock. Miss C. M. Aylard. Miss W. MacLaren.
- Aug. 4, Mt. Yukness (by W. Face). Miss E. Black. D. Whitney.

Aug. 4, Mt Odaray. Miss J. Moffat. Miss K. Moffat. Miss E. Alford. T. H. Rawles. W. P- Rawles. K. B. Rushworth.

Aug. 6, Mt. Huber. Miss R. Rushworth. Mrs. F. W. Miller. Aug. 8, Mt. Lefroy.

E. B. Moses.

Aug. 8, Mt. Victoria. O. Veblen. E. W. Sheldon. H. F. Ulrichs.

Apart from the climbing, the most interesting event in the history of the Camp was the account of the climb of Mt. Logan, given by Captain A. H. MacCarthy, the leader of the Expedition.

The Swiss guides, kindly lent by the Canadian Pacific Railway, were Edward and Ernest Feuz, old friends who gave efficient and kindly service.

The winners of the Photographic Competition were: Class A (Challenge Cup).—Miss E. Storer, Waltham, Mass. Hon. Mention.—A. A. McCoubrey, Winnipeg. Class B (Landscapes).—Miss E. Storer. Hon. Mention.—Mrs. F. A. MacFadden, New Denver. Class C (Ice Climbing).—No Award. Class D ("The Monarch of the Rockies").—T. 0. A. West, Edmonton. Hon. Mention.—Mrs. F. A. McFadden. Class E (Camp Pictures).—Mrs. F. A. MacFadden. Hon. Mention.—T. 0. A. West. The judges were Major F. V. Longstaff, H. Pollard and H. E. Sampson.

The Club was delighted to welcome again its old friends Mrs. W. E. Stone and Professor and Mrs. Fay.

There were 141 placed under canvas, among them representa-tives of the Alpine Club, England; the English Ladies' Alpine Club; the American, French and Swiss Alpine Clubs; the British Columbia Mountaineering Club; the Appalachian Mountain Club; the Mazamas; the Sierra Club, and the Royal Geographical Society. Members present were drawn from the following places:

## CANADA

British Columbia.—Invermere, New Denver, Sidney, Vancouver, Victoria, Wilmer. Alberta.—Banff, Calgary, Coleman, Edmonton, Lethbridge. Saskatchewan.—Regina, Saskatoon. Manitoba.—Winnipeg. Ontario.—Toronto. Quebec.—Buckingham, Montreal. Nova Scotia.—Halifax.

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Courtesy of Associated Screen News of Canada, Ltd. Group of Members of The Alpine Club of Canada's Lake O'Hara Camp, August 1925 **ENGLAND** London. UNITED STATES California.—Berkeley, San Francisco.. District of Columbia.-Washington. Illinois.—Chicago. Indiana.—Bloomington. Iowa.—Dubuque. Massachusetts.-Boston, Cambridge, Dedham, West Newton. Minnesota.—Minneapolis. Missouri.-St. Louis. N. Carolina.—Henderson. New Hampshire.—Hanover. New Jersey.-Hoboken, Princeton, Summit. New York.—Brooklyn, New York. Hawaii.—Honolulu. PHILIPPINE ISLANDS Corregidor.

# Annual Meeting, 1925

The Annual Meeting of the Club was held at Lake O'Hara Camp on August 5th, 1925. The President, Dr. J. W. A. Hickson, occupied the chair and called the meeting to order.

The minutes of the previous meeting were taken as read. The President recalled the activities of the preceding season and congratulated the Club on the conquest of Mt. Logan. He explained the delights of mountaineering, the physical, intellectual and aesthetic attractions to which must be added the qualities of inexhaustibleness and even unattainability.

He alluded to approaching resignation of the Director, Mr. A. O. Wheeler, who had worked so long and so devotedly for the welfare of the Club, and then enumerated various matters of business which would be brought before the meeting in due course.

The Director then delivered his address, beginning by expressing welcome to the members of the Mt. Logan Expedition, and alluding to the aid which the Club had received towards the undertaking from many sources. He alluded to the rapidly advancing day of his retirement and gave a concise summary of the events of the twenty years of the Club's life. He made plain to the members present the solemn duty of maintaining and raising the standing of the Club which had been attained by the devoted work of their predecessors. "It is worth while."

The question of the annual fees came before the meeting, the Committee appointed at last Annual Meeting having presented its report. Many points of view were considered, but it was decided that the annual fee for both Active and Graduating members should be \$7.50 and a Registration fee of \$5.00 should be instituted for those attending the Annual Camp. It was also decided that Life membership fees should be invested in first class securities.

Letters regretting their inability to be present were read from Dr. J. N. Collie and Mr. W. D. Wilcox.
In accordance with the Constitution, Badges were awarded to D. A. Eggers, Mr. G. A. Gambs, Miss N. B. D. Hendrie, Mr. W. A. D. Munday, Mrs. W. A. D. Munday.

The President brought before the meeting the recommendation of the Executive Committee that Captain A. H. MacCarthy be elected an Honorary Member of the Club. It was carried unanimously.

It was decided that a Publication Committee should be appointed and also that the Annual Financial Statement should be presented at the Annual Meeting with a view to having it discussed and adopted.

A committee was appointed to handle a scheme for erecting a Club climbing hut in a suitable position, to be built from funds specially collected, entailing no drain on the Club's exchequer.

Votes of thanks were passed to the C.P.R. for the use of the Swiss guides, to the ladies' committee, to the amateur guides, and the camp staff.

There being no further business, the President called on Captain A. H. MacCarthy to address the meeting on the Mt. Logan Expedition. He gave a most vivid and humorous account of the experiences of the party and paid a generous tribute to his associates. The meeting then adjourned.

## The Banff Club House, 1925

The attendance at the Club House was very satisfactory. During the earlier parts of the season the weather was excellent, but the latter part of August and September did not encourage visitors to prolong their stay.

Owing to the vigorous work of the Parks Department, mosquitoes are now rare. To those who remember the summer of 1920, this will seem as remarkable as it is delightful.

As usual many calls were received from strangers who require information on mountain matters. Visits from members of other mountaineering clubs are common and keep up the spirit of fellowship.

Much appreciated improvements have been made in the tent houses, and the seventeen year old Club House is in excellent condition. It was opened on Dominion Day, 1909.

Mr. M. B. Morrow presented a fine enlargement from a photograph of his own taking.

The homes of the guests were widely scattered. A list is given below:

CANADA

British Columbia.—Sidney, Victoria, Wilmer.

Alberta.—Calgary, Coleman, Edmonton, Lethbridge, Springdale.

Saskatchewan.—Battleford, Regina, Saskatoon.

Manitoba.—Winnipeg.

Ontario.-Kitchener, Toronto, Woodstock.

Quebec.—Buckingham, Montreal.

Nova Scotia.—Halifax.

ENGLAND

London, Oxford, Southampton

IRELAND

Moycullen.



Courtesy of Associated Screen News of Canada, Ltd. A.H. MacCarthy, Leader of Mt. Logan Expedition and Mrs. MacCarthy At the Lake O'Hara ACC Camp, on his return from the expedition Connecticut.—New Haven. District of Columbia.—Washington. Iowa.—Dubuque. Massachusetts.—Boston, Brookline, Cambridge, Worcester. Minnesota.—Minneapolis. New Jersey.—Hoboken, Princeton, Summit, Westfield. New York.—Brooklyn, New York, Rochester. Ohio.—Cleveland.

## The Club Library

Presentations and a purchase add interesting volumes to the Club Library. Since the last report two of the volumes for which we asked have been presented: Albert Smith's famous Story of Mt. Blanc and Pike's Barren Ground of Northern Canada. This encourages further asking. We should like to see on our shelves:

The Fight for Everest, 1924.—Reviewed on a previous page. Below the Snow Line.—By Douglas W. Freshfield. The Pyrenees.—By H. Belloc. Life of De Saussure.—By Douglas W. Freshfield.

We should also welcome another book case.

The list of additions follows:

The Story of Mt. Blanc, 1854.—By Albert Smith. Presented by Dr. J. Monroe Thorington.

**Narrative of an Ascent to the Summit of Mt. Blanc in 1828.**—By John Auldjo. Presented by Dr. J. Monroe Thorington.

**Picture Guide to Mt. Blanc**.—By M. Roger Tissot. A modern guide and interpreter, beautifully illustrated. Purchase.

Across the Sub-Arctics of Canada.—By J. W. Tyrrell. Barren Ground of Northern Canada.—By Warburton Pike. On Snowshoes to the Barren Grounds.—By Caspar Whitney. Travels Through North America in 1795-6-7.—By Isaac Weld.

These four books were presented by Mr. Tom Wilson. The first three are well known; the last tells of an Irishman's visit to Upper and Lower Canada and his recollections of Alexander Mackenzie's two expeditions as related by his partners before the book was available to be public.

Guide to Paths in the White Mountains.—Presented by the Appalachian Mountain Club.

Samuel de Champlain, Works of, Vol. II.—Champlain Society.

Subscription. Journal of a Lady of Quality.—A narrative of a journey from Scotland to

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the West Indies, N. Carolina and Portugal, 1774 to 1776. Edited by Prof, and Mrs. C. M. Andrews. Presented by the editors.

The Peace Negotiations.—By Robert Lansing. Presented by Mrs. B. B. Edwards.

Fourteen Thousand Feet.—A record of the names and early ascents of the High Colorado Peaks. By J. J. J. Hart. Presented by the Colorado Mountain Club.

Papers of the Michigan Academy of Science, Vol. V, 1925.—Exchange.

Index to Palaeontology (Geological Publications of the Geological Survey of Canada, 1947-1916). By Frank Nicolas. Presented by H. F. Lambart.

We have also received **"A Note on the Original Journals of David Douglas,"** by Dr. J. Munroe Thorington, and **"The First Ascent of Mt. King Edward with a Note on Mt. Alberta,"** by Howard Palmer. Both articles are reprinted from the Alpine Journal. Presented by the authors.

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## GOING

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