of a finished narrative. In any case, his route must have been substantially the same as that taken by A. Wagnon and P. Beaumont, with two Salvan guides, in September, 1895, 'par le glacier de Tré-les-Eaux, la face N.E. et l'arête S.E. (arête d'Oreb),' which is claimed [26] as the first ascent by this route. Of course nothing was known of Paccard's climbs till 1913. His descent was made into the Bérard valley, and he mentions that he left the snow on the *Tête du Ret*, which is a wide rounded eminence (2233 m.) on the N. of that valley. Bourrit's first ascent of the Buet was made over it (though he does not name it), but he afterwards found the easier, though longer, route by the Pierre à Bérard.[27]

The excursion which Paccard recommends 'by the stream of the Leideden valley, above the glacier, along the rocks [of the Buet] and down the valley of the Diosaz to Servoz' would be a very long one, involving apparently the ascent of the Buet by its N. arête, and a descent into the Diosaz glen either by the Col des Chaux (to the S.W.) or the Col de Salenton (S.E. of the summit). But he was perfectly right in his geology, as witness de Saussure [28] ('the Buet itself is exactly on the line of separation between the limestone and the primitives') and Ball [29] ('the hollow trough at the head of the Diosaz valley at the junction of the granite and the limestone').

It will now be evident, I hope, that Dr. Paccard's account is exact in all its details, and affords conclusive proof of his habits of accurate observation and careful record, as well as of his mountaineering enterprise.

Mount Foraker, Alaska.

(*Denali's Queen.*)

By T. GRAHAM BROWN.

(*Continued from p.* 48.)

11. *Ascent to Camp* 6.

THE weather on July 31 at Camp 5 was too bad for movement, and August 1 was another stormy day, but we were able none the less to visit Camp 4 to bring up the remaining loads. We then took loads up to the First Platform in

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[26] *Guide de la Chaîne Frontière*, ii, p. 144.
[27] *Vallot*, M.M. i, p. 187.
[28] *Voyages*, tome i, p. 509.
[29] *Western Alps*, loc. cit.

falling snow, but were beaten by worsening conditions during an attempt to carry up a second cargo. The snow fell still more heavily later in the day, so that the new snow on the steep and narrow arêtes immediately above us made their ascent impracticable on August 2, which we spent lazily in Camp 5. It was a beautiful and sunny day and the rest did us much good. That evening was a clear one, and we looked out, not over a fine cloud-sea, but across the Central Plateau of Alaska. The nearer rivers and pools seamed and dotted an aquamarine plain, beyond which a wide belt of dark olive green must have been the spruce forests. The gleam of a distant sheet of water may have been Lake Minchúmina, and then a dark blue tint extended to the horizon. But floating on that in a light ethereal blue were far distant hills, perhaps the Endicott mountains. The sun rolled slowly along the horizon before making its brief dip, but I cannot dare to describe the colours of the sky.

To make up for our holiday, we had a very heavy day's work on August 3, when we established Camp 6 at the First Hump (11,320 ft.) and carried the whole of our possessions up to it in many heavily-laden journeys, besides taking one load further up to a cache on the Second Hump. When the base party retired on July 30, leaving us to make Camp 5, the climbing party had food for about 20 days, in addition to fuel, for warmth, cooking and snow-melting, which would last for several days longer. On August 3, at Camp 6, we felt fairly confident that we were almost within striking distance of the summit, and the provisions for about 16 days which we had raised to that place would enable us to await the appearance of suitable weather without anxiety. Our opportunity was to come much more quickly than we had hoped.

12. *The Final Reconnaissance, August* 4.

Our plan of campaign was to leave the Logan tent at Camp 6 and to push on with a light bivouac tent. But the site for the highest camp had still to be settled, so another reconnaissance was necessary. On August 4 we therefore set out, carrying heavy loads up to the First Hump, and then rather lighter ones up to the first rocks on the face above.

The slope up to the Second Hump was an easy one. Thereafter came the steep upper face, about 2100 ft. in height. The way led us at first for about 700 ft. up a steepening snow slope, made safe by an old avalanche track which we were able

to use. The rocks above this proved to be steep and slabby at first, so that they could only be led by an unladen man and were difficult enough at that. Careful rope tactics and slow and exceedingly arduous climbing were necessary for the raising of the loads, which could not be pulled up all the way on the rope because of the conformation of the rock. When the angle of the rocks eased a little, we made a rather precarious cache, as we had to go on more rapidly to explore the way and to find a possible camp site. At one place, less than 150 ft. of ascent had occupied us for at least an hour and a half, and perhaps longer.

Interesting and steepish rock now led directly upwards for about 600 ft., then came a slight easement formed by a snow slope set at an angle of 45° amongst rocks. For about 650 ft. up from this the rocks rose, steepening at first gradually, then more rapidly, until they ended at the skyline which we called the 'Cock'scomb.' The very lowest rocks had been rather loose, but these upper ones were firm—a magnificent pink or grey granite, fissured and ledged. It was easy enough to strike out a practicable line, while often there was variety of choice. In one place lay an interesting corner or chimney in two rises; at other places there were faces which had to be turned on snow and ice ledges; at yet others were interesting gullies and steps. This rock face now seems only a small incident on the climb, and it looks small enough when foreshortened in the view of the face from the foot. But its actual height, from the foot of the rocks below our cache to the upper edge of the face, must have been almost exactly 1400 ft.; while the whole height of the face from Second Hump to Cock'scomb was 2100 ft. The forms of the rocks were grand, and the climbing was delightful because of its variety and the way in which we had to twist about. But there was no excessive technical difficulty, and the 'effective' exposure was never very great, although the apparent exposure was amazing. We were here above the N. face itself, and not above our ridge of ascent; we looked down only the upper part of the face and then on to the Foraker Glacier, about 9000 ft. directly below us. Between us and it was no ledge upon which an object could rest. A little later my empty kit-bag fell off the platform on which we had pitched Camp 7. It slid down over slabs and snow until it passed out of sight to greater steepnesses.

Just to the right of the line of fall below us, a facet-edge of the upper face continued down at the same angle to become

the 'Sporting Ridge.' Although it was greatly foreshortened we could look down the whole length of the edge and ridge, one continuous crest of snow plunging through 9000 ft. of vertical difference from our level, and at a constant angle. If the sight had been amazing from Camp 5, hence it was doubly amazing—so continuous and steep a rib. For these qualities it must be unique or nearly so.

During this climb we rose ever nearer to the level of the grand wall of ice cliffs crowning the rocks to our right. These were obviously the discharge of the ice from the plateau trough between the two summits of Mount Foraker; they reminded me much of the séracs above the Old Brenva route. But our own rocks rose slightly higher, showing a clear skyline. A final slabby ascent, by no means easy, landed us abruptly on the crest, at 14,000 ft.

Here came a dramatic change, its cause long anticipated but its effect unexpected. For the past 10 days, since our ascent to Camp 4 on July 26, we had been, save whilst within the tent, on airy and steep ridges, or on a steep face. The feeling of great exposure had been almost continuous and it had not been appreciably lessened upon the small platforms. This feeling had risen to its climax as we ascended the rock face above the Second Hump—not greatly less in height than the S.E. face of Mont Blanc above *Col Eccles*, if not so steep. As we looked down, the face beneath spread out a little at the easement (if it may be thus described) where we pitched our bivouac tent next day. Then it plunged again, so that we could see only the floor of the Foraker basin beyond it and the 'Sporting Ridge' a little to our right. Great as were these depths, perhaps because of that greatness, the situation had not the urgent sensation which the steep but relatively short rock face gives—rather the serenity of an aeroplane view. It was in that curiously safe feeling of airiness that we came to the final crest of the Cock'scomb, and beyond that, unthinkingly, to flatness again—of all things under the sun!

We found ourselves on the edge of the trough and we looked across it at the fine mass of the S.W. peak. Imagine a nearly flat glacier about 3 miles in length, but kidney-shaped in plan. The far end of the kidney bends to the right, so that it is hidden, and on the inner curve is a mountain rising 3000 ft. or so above your level. That is the S.W. peak, a grand summit resembling the Lyskamm, as seen from the Gorner Glacier, both in shape and in dimensions. Its summit ridge, rising towards the E., must be four-fifths of a mile in length, its flank showing some

rock and many ice walls. At the corner of the kidney, on its outer curve and facing down the glacier, is the higher N.E. peak, a fine cone of rock-sprinkled ice. It had been a very curious thing to come, after all these days of exposure, not to a summit but to the flats of a Mer de Glace, so as it were to begin the climb over again.

The crest of the Cock'scomb, on which we now stood, rose directly towards the higher summit, which was completely hidden by it from our first viewpoint. We were anxious not only to see if the further way were practicable, but also to determine, if possible, which of the two summits was the higher. We therefore decided to gain the centre of the trough, from which we should have a clear view. The surface of snow and ice was wind-swept and very hard, so that the crampons only just bit into it.

A little way on I put my foot unexpectedly through the crust of a crevasse but managed to step back. There had been no indication whatsoever of the presence of crevasses here, and we had to break the crust to see in what direction it ran. That proving to be diagonal to our course, we proceeded, but Waterston immediately made the suggestion that we had better go back and up towards the high point of the Cock'scomb, which would take us at right angles to the crevasses. So we changed direction before Charlie Houston had yet crossed the crevasse. I went on gingerly until I had found its continuation and determined its near and far edges—about 4 or 5 ft. apart—and crossed.

Then occurred the only mishap of the whole expedition, save for a brief slip which had happened on the rock face below. Waterston failed to notice the crevasse : he went right through the crust like a condemned man. I heard Houston shout and turned to see only a hole, but in time to stamp in my feet and to take the jerk. Waterston had been holding coils of rope in his hand and he fell 15 ft., but fortunately, both for his sake and my own, the jerk was softened by the rope between him and Houston cutting through the thin crust of the crevasse in the direction of its length. The position was precarious for a few moments. Houston came carefully round to me and took the strain whilst I cut heel holes and then sat down with the rope round my body. After that, we found that Waterston was unhurt and able to ease his position by jamming his feet against the sides of the crevasse. Then Houston lowered the end of a rope and Waterston was able to tie on his pack-board, which was pulled up. The hour was 17.50 and the cold great, so that anxiety as to how long a man

could last in a crevasse under such conditions forced itself on us. Rapid action was essential, and Houston cut heel holes and sat himself beside me, holding the length of rope between himself and Waterston. The plan adopted was that of keeping the ropes round the small of the back with knees bent, next straightening the knees and so raising the man, then bending the knees again whilst taking the ropes in round the back, and so on. When Graven once refused to believe in the practicability of this method, I raised him up a slope of small scree until he surrendered, but I had never practised the technique in real misfortune. It worked with unexpected ease and we soon had Waterston out, half-frozen but otherwise undamaged. The whole incident seems now like a long nightmare, but not more than 10 minutes elapsed between the fall and the rescue. I judge that 30 minutes might well have been exceedingly dangerous. We learnt one lesson. The process will be found less arduous if the two rescuers bend successively, the one holding up the victim whilst the other bends and takes in his rope. After that, both should straighten the knees simultaneously.

There was now no possibility of further exploration. We went back to the Cock'scomb and made a cache there of our willow wands (used in Alaska, since Stuck's ascent of Mount McKinley or earlier, for planting on glaciers against the danger of mist on the return), and of a small store of provisions for future emergencies. Then we descended the rock face and reached Camp 6. The weather had been magnificent.

13. *Camp 7 established, August 5.*

On August 5, another arduous day, we established our final camp at 13,350 ft.—a small bivouac tent in place of the larger Logan, which we struck and left at Camp 6. We raised all our loads up to the cache above the first rocks and then ascended to find a site for our bivouac. A camp in the glacier trough at between 14,000 and 14,500 ft. should have the advantage that the last climb to the summit would be comparatively short. But against that were two disadvantages. It would not be possible to dig a hole in which the bivouac tent could be sheltered; and, if we were forced to retreat in a storm, the hidden crevasses would be dangerous while the descent of the upper rocks might prove impracticable. A camp on the easement in the rock face would add 650 ft. or so of rock to the final ascent, and make it one of about 4000 ft. in all—a formidable

enough business when the long traverse of the glacier trough had also to be taken into account ; but a forced descent from the camp in bad weather would be less dangerous. We were undecided, but the weather itself settled the question. Whilst we ascended the rocks above the cache, a sudden storm began to come up from the W. We at once decided to pitch camp on the easement.

The snow slope there had an angle of 45° and at one place two great rocks, one above the other, offered a fine site—one as the foundation for a platform, the other as a protection against any ice or snow which might come down from above. We cut into the snow slope between the blocks until we were stopped by ice and rock, but the hole would not take half a bivouac tent. Then we built up a snow platform from the foundation of the lower block and so made enough room and no more. The tent was erected, and securely anchored ; we then made a ledge about 2 ft. wide on to which it would be possible to crawl when coming out of the tent. There was no other standing place nearby save in our steps. The altitude of our tent was 13,350 ft., a low one as final camps go in Alaskan ascents. This restricted and exposed bivouac was destined to be our home for the next six days.

We had managed, working rapidly, to bring up all our loads from the cache at the foot of the rocks. The duration of packing up the glacier has been mentioned before. In the work on the ridge, six laden men ascended for a total of more than 12 hours (net) each. From Camp 5 upwards to Camp 7, each of the three members of the climbing party packed upwards for a total of 17 hours, the relays necessitating $3\frac{1}{4}$ hours of descents. So ended the upward portion of our packing. It had made for many journeys : by the time we again reached flat glacier we had ascended almost every part of the mountain at least *four* times as far as Camp 7, besides making one exploration and two final ascents beyond that. Some parts of the route had to be ascended a little more often than this, but the loads carried upwards were necessarily less heavy than those which we brought up the glacier. They varied between 56 lbs. and 78 lbs. (including the pack-boards), according to the work to be done and the type of climbing. The result of this labour was that we were now fully equipped and established at striking distance from the summits and with food and fuel for 14 days—or even for longer, if we shortened the rations. The storm kept below our level. It was a thunderstorm, the only one we experienced in Alaska.

14. *The N.E. Peak of Mount Foraker, August* 6.

The facet upon which our bivouac was pitched bore N.W. and, save for a short time after sunrise, remained in shadow until later in the day. The intense cold of the early hours made it impossible to set out at a conventional Alpine hour. It was therefore not until 08.25 that we left the bivouac on August 6, still undecided as to which peak was our proper object or which we would try. We reached the Cock'scomb in a strong wind and with some high cloud blowing over, and went along it for a time, but then descended into the trough and soon had a clear view of the N.E. peak. We saw that there was another overflow from the trough between the far end of the Cock'scomb and the peak, while from the further side of this gap an arête of broken rocks led up for the greater part of the 3000 ft. to the summit. But the final ascent was up a beautiful and steepening cone of ice, glittering in the sun.

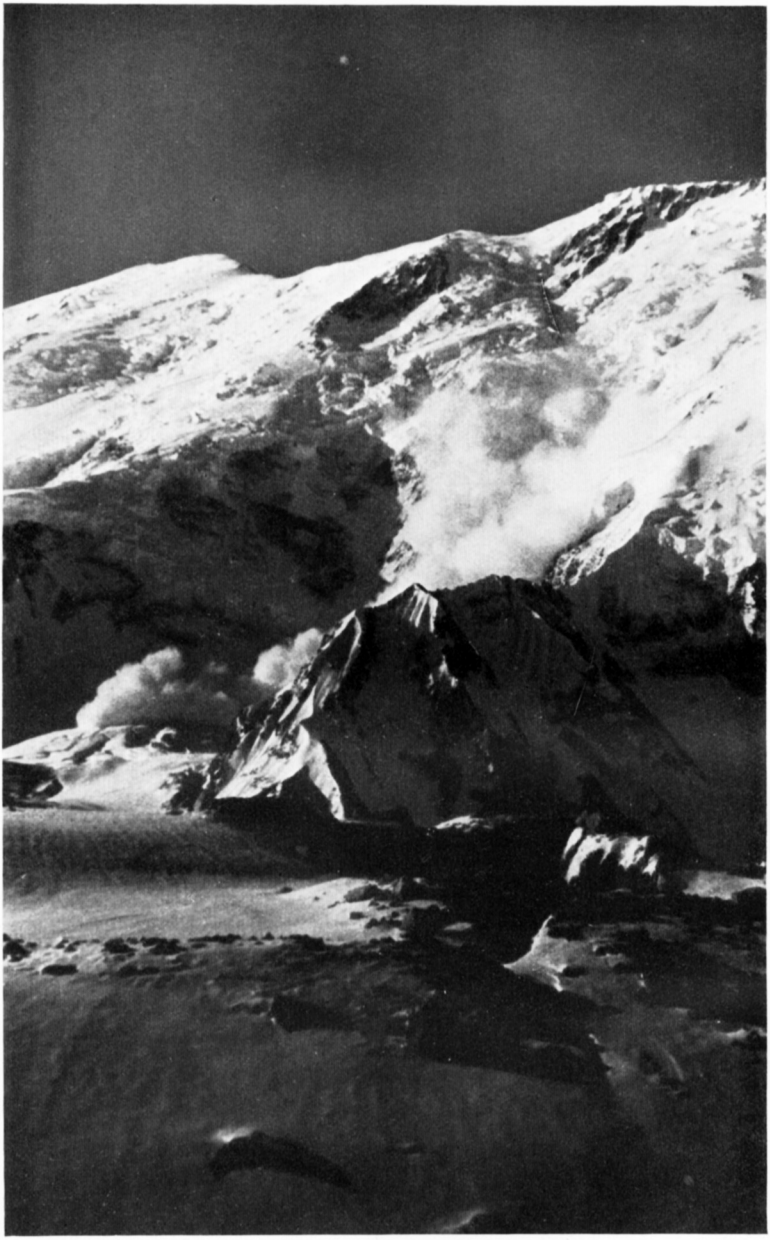
Having resolved at least to explore this arête, we walked up the trough to a huge ' erratic ' ice block resting in it at the bend, about $1\frac{1}{4}$ miles (3500 steps) from the Cock'scomb—a block perhaps 50 ft. long, rather less in breadth, and about 25 ft. high, surrounded by a curious moat in the ice, probably made by winds, because there were no water channels or other evidence of melting in the trough. This block must have fallen from the ice cliffs of the S.W. peak ; the lower end of the trough had many such blocks, but of much smaller size.

Where we descended into the trough, the surface was one of soft snow ; we planted willow wands at every 75 paces, in case we should be overtaken by mist on the return. From the block, we struck across the trough for about half a mile (1380 paces) to the arête, and reached it at 15,300 ft. by ascending its flank a considerable distance above the nearby outflow. Here we decided to continue the ascent as long as the weather seemed to justify ; but clouds were beginning to invade the trough, blowing every now and then from the W. through the gap between the two peaks. The ascent of about 2000 ft. to the summit presented no technical difficulty, although it was steep and arduous. The rocks were easy, and at one place there was a smooth block which looked to have been cut by a mason and was made half of grey granite and half of pink—the two meeting at a sharp and straight line down the middle. Above the rocks came wind-hardened snow in curious flakes. This was succeeded by steeper ice where steps had to be cut. Then the slope eased with suddenness, and we were on the

Photo, T. Graham Brown.]

UPPER BASIN OF W. FORAKER GLACIER AND THE 'ROCHEFORT-LIKE' BACKBONE RIDGE, ABOUT 3 MILES IN LENGTH, BETWEEN MOUNT FORAKER (FOOT OF N.E. ARÊTE JUST SEEN ON RIGHT) AND THE BRIDESMAIDS (JUST SEEN ON LEFT).

[*To face p.* 212.

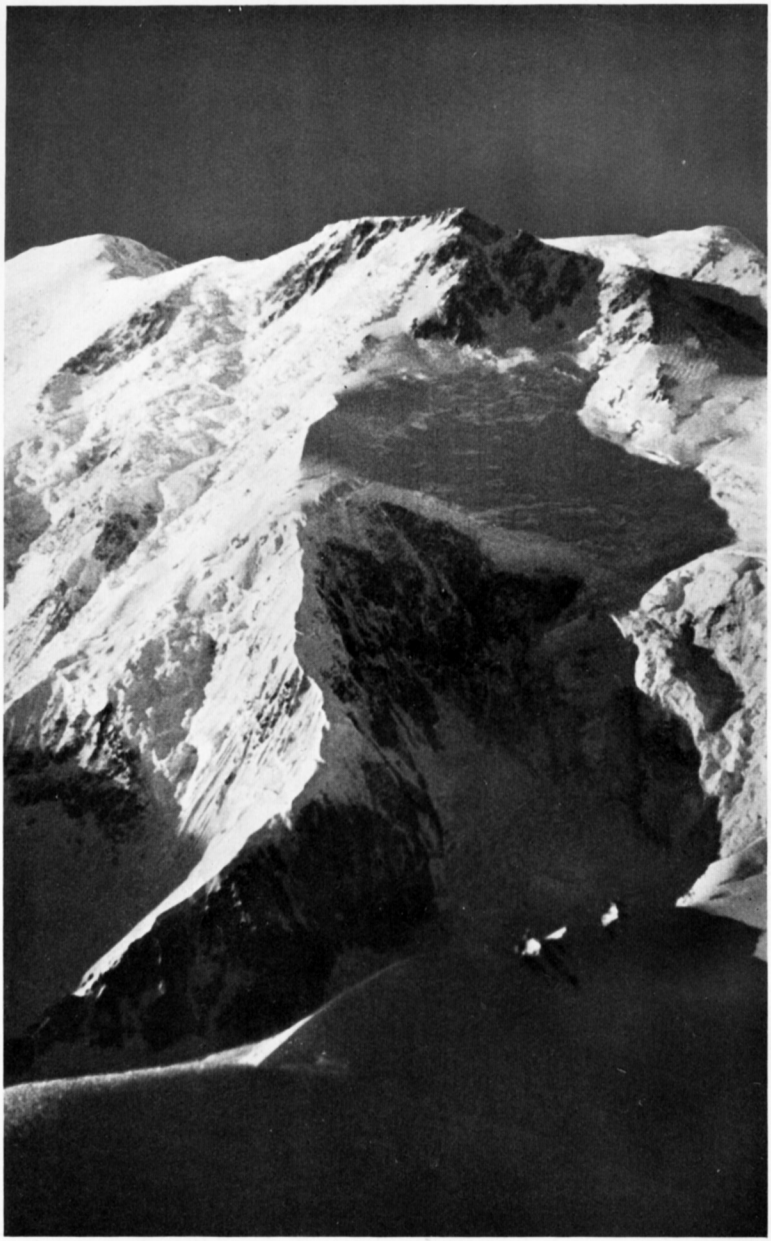


Photo, T. Graham Brown.]

MOUNT FORAKER: AN AVALANCHE ON THE N. FACE. UPPER PARTS OF MOUNTAIN MUCH FORESHORTENED; THE VERTICAL HEIGHT FROM SNOUT OF AVALANCHE TO SKYLINE ABOVE (WHENCE IT FELL) IS ABOUT 10,000 FT.

Photo, T. Graham Brown.]

MOUNT FORAKER: N. FACE, SEEN FROM R. MORAINE BELOW LOWEST BEND OF W. FORAKER GLACIER, NEAR CAMP 2.



Photo, T. Graham Brown.]

MOUNT FORAKER. THE 'SPORTING RIDGE' ON THE N. FACE.
TAKEN FROM SCREE PEAK.

[*To face p.* 213.

summit. Our climb had been a long one, and the hour was 16.15 ; our actual going had occupied 6 hours and 16 minutes. The upper part of the ascent had been disturbed by the strong and bitter wind which strengthened as we rose in height.

Our first thought was to determine whether the summit which we had reached was the higher of the two. We turned to look at the S.W. peak. A great bank of cloud, its upper surface about 17,000 ft. high, had been blown up from the W. during the 3 hours of our ascent of the final ridge and was breaking upon the S.W. peak, nearly submerging it and pouring into the glacier trough now far beneath us. The tip of the S.W. peak just appeared above the clouds and below the cloud horizon, so that it seemed that we were on the higher peak. But this was not quite certain, because the cloud-sea was irregular and towered up in some places in great cumuli—it being therefore possible that the horizon was unreliable. In any case, the difference in height between the two peaks could not be very great.

Then we turned to answer a question which had long been in our minds—what was on the S.E. side of our mountain? Stuck must have seen some of it when he had his miraculously clear view from the S. peak of Mount McKinley, but not all ; and the unmapped area of many hundreds of square miles of mountains was almost completely unknown. The cloud bank had not yet reached further than Mount Foraker's other summit, nor had it yet invaded by much the S.E. side of the range. But its shadow lay over everything, and we looked down into a faint pink mist which did not hide the most remarkable summit view it has been my lot to see. A common description of such views is that everything seems spread below the spectator ' as on a map ' ; but where the differences in height of neighbouring peaks are not very great, such descriptions are fanciful. Here the description was accurate for once.

It was an aeroplane view and not an ordinary summit view. As far as we could judge, none of the mountains down on to which we looked exceeded 10,000 ft. by much. They were finely moulded, sharp and diverse in shape, apparently much of a height and set in a great disorganized huddle. Their summits were probably 7000 ft. below us, and we could see the far sides of the nearer peaks. It was like looking down on to a relief map. There was no beauty in the view at all, nor grandeur ; complication and multitude of mountains at once drowned topographical interest in despair. The peaks were rocky, and they were set like chains of islands in an ocean of

snow. Through them ran broad channels, the paths of great glaciers, perhaps 30 to 40 miles long and maybe 2 or 3 miles wide, flat and scarcely broken. The largest of these which we could see had its collecting basin directly under the backbone ridge between Mount Foraker and Mount McKinley, and seemed to run almost straight to the S. or S.E. Across it, and seemingly at a very great distance, a white summit gleamed in the sun. All else was sombre.

We looked down to see what we could of the S.E. flank of our own mountain, but there was little to be seen. The summit cone descended even more steeply on that side for a little way, and the face below was yet steeper, so that nothing was visible save a near summit half hidden by the edge, and a flat névé basin, perhaps 12,000 ft. beneath us. From all indications, however, this face of our mountain is unribbed and unledged—a great cliff of rock, even steeper than the N. face. That seems also to be shown in Stuck's photograph taken from Mount McKinley.[27]

As to photographs, we did our best, but an evil influence seems to haunt the camera on Alaskan summits. Stuck's films were burnt during the ascent and he had to rely upon the cheap camera of an Indian half-breed boy. Lindley and Liek had camera misfortune when they paid the second visit to Mount McKinley's S. peak. In our case, bad light and great cold combined to give poor results. The cheap thermometer which was now the only one we had indicated a temperature of — 4° F., which was surprisingly high and may have been higher than the true temperature—we had been told to expect — 20° F. at most, and that is what it felt like.[28] It may have been the wind which exaggerated the coldness, but my hands were numb even with their heavy coverings; it was dangerous to take these off for more than a very short time.

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[27] Hudson Stuck: *Ascent of Denali*, p. 102, London, 1914.

[28] The minimum *winter* temperature on these summits must be amongst the lowest which occur on the surface of the earth. The recording thermometer left by Stuck in 1913 more than 5000 ft. *below* the summit of Mount McKinley was found by the Lindley-Liek party in 1932. Although the instrument was subsequently tested and found to be in good order, the index had retreated into the alcohol chamber. The minimum temperature which had occurred during the previous nineteen years was therefore lower than — 95° or — 100° F., but how much lower, it is impossible to say. That on the actual summit would be lower still than the minimum temperature at this level. Winter minima of — 60° F. or lower are experienced on the low plains of the Central Plateau. We were told that in summer aeroplanes may experience temperatures of — 20° F. to — 40° F. on sunny days at elevations lower than the height of Mount McKinley. See Harry J. Liek: *Sierra Club Bulletin*, vol. 18, p. 84, 1933.

Cameras should, however, have worked properly at the temperature given by the thermometer, but even the small cinematograph (which had been specially treated by aeroplane experts) worked slowly. I had carried my own camera next but one to my skin for warmth, but, as I walked round the rim of our summit taking my photographs, I could hear the shutter clicking over too slowly although the exposure should have been $\frac{1}{100}$ second.

The panorama brought us round to face the greatest view of all—the S.W. and S. faces of Mount McKinley, which had never been seen before in their entirety or from so close a viewpoint. Stuck has described the great view of Mount Foraker from Mount McKin'ey. It impressed him more deeply than anything which he had seen before, and Cook's omission to mention it seemed to Stuck a sufficient proof that Cook had not been on the summit, even had there been none other.[29] Curiously enough, Cook *did* remember that he should have seen Mount Foraker when he was dictating (so Barrill swore) Barrill's faked diary of the reputed ascent.[30] But Cook's failure of memory when he came to write his book is equal disproof, for his reputed view was of exceptional clearness. Indeed, Cook claimed to have seen the Arctic Circle itself, a little to the N., although until then it had been thought to be a fantasy of geographers; he wrote of the 'ice-blink' caused by the glacial fields near Mount St. Elias, 375 miles to the S.W.![31] Be that as it may, the sight which Cook forgot to describe seemed to Stuck to be one of the wonders of the mountain world, and he made good the deficiency: 'Immediately before us in the direction in which we had climbed, lay—nothing: an awful void, a sheer gulf many thousands of feet deep. . . . Beyond . . . with nothing but space between, was the great mass of Denali's Wife, or "Mount Foraker," as some white men misname her, majestically filling all the middle distance. . . . There are no slopes and ridges, no buttresses, no lesser peaks—nothing but that awful void from the top nigh to the bottom of the mountain.'[32]

It is a curious description, this intervening 'void,' when one remembers the long backbone ridge joining the two great summits. But now, when we looked across in the other direction at the yet grander, if less graceful, view of Mount

[29] Hudson Stuck: *Ascent of Denali*, p. 165, 1914.
[30] *New York Times* (Barrill's Diary), October 16, 1909.
[31] F. A. Cook: *To the Top of the Continent*, pp. 230–2, London, 1909.
[32] Hudson Stuck: *Scribner's Mag.*, vol. 54, p. 550, November 1913.

McKinley from Mount Foraker, we could see that Stuck's description must be apt. The backbone ridge bends in a long arc between the two summits, its concavity to the S.E. ; you look from one summit to the other, not along the backbone, but across a southern bay, floored by flat névé, the elevation of which is perhaps not much more than 6000 or 7000 ft. The depth of that, 10,000 to 11,000 ft. below Mount Foraker and 13,000 to 14,000 ft. below Mount McKinley, is sufficient to justify the word 'void' ; from its low level, the facing flanks of the two mountains rise precipitously in unledged cliffs.

Seen thus, Mount McKinley almost defies description. Even at its distance of 15 miles it looks huge. The face is a mass of granite cliffs, the smallness of the detail giving an unparalleled scale to the whole mountain. The backbone ridge ends against it at an angle to the axis of vision ; the cliffs ascend thence to the summit, there being an indication of a ridge on the line of the backbone. To the left (or N.W.) of this is a high névé-filled trough which discharges above pink cliffs. The backbone ridge hides the lower part of these, but we had seen them from Spy Glass Hill. A steep gully or chimney many hundreds of feet in height (perhaps thousands) bisects the mass of this cliff, and we could now just see its upper end. To the right of the backbone ridge and directly facing us, similar cliffs, but of greater height, fall from the summit itself to the glacier bay below—through a vertical depth of perhaps 13,000 ft. From near the foot of these, a low ridge juts out and then fans in branches into the névé, thus dividing that side of the bay into two smaller ones. The rightmost of these is under the right skyline of Mount McKinley, in itself an impressive sight. From the S. peak, a ridge, the edge of the rock face, descends to the S. at a steepening angle. Then, having fallen for perhaps 5000 ft., it extends horizontally as a long snow-crested ridge, probably 2 miles in length, descending but little, and perhaps curving slightly with its concavity to the W. The S. end of this is a little snow point (the 'fourth cone' seen from Spy-Glass Hill), which, as is important to note, is probably about 15,000 ft. in elevation. Then the ridge seems to plunge down S.W. in the direction of Mount Foraker, and it fans out in branch arêtes ; but there appeared also to be a ridge which fell direct and steeply from the snow point in a southerly direction. This ended at what looked to be the top of a feeder of the great glacier draining the bay between Mount McKinley and Mount Foraker ; it is possible that this col was that which Belmore Browne and Parker nearly reached from the other side

in 1910, in one of their attempts upon the former mountain.[33] If so, they would still have been far from their goal had they reached it. Such a long ridge might elsewhere appear to be a separate mountain chain ; here it looked to be properly proportioned as a detail of a single mountain.

This wonderful face is one of the great sights of the world. The upper part was in sunlight ; the lower part was dim : perhaps that dimness increased the effect of the whole. It was not beautiful, but it was great with a massiveness and grandeur recorded even in our over-exposed photographs.

One awaited sight we did *not* see. There should have been a third giant, ' Mount Hunter,' on the S.E. side of the watershed. Its proper position was easy to determine, because it is mapped at one corner of a more or less equilateral triangle at the other corners of which lie Mount Foraker and Mount McKinley. As nearly as could be judged, the proper site for this mountain was the exact centre of the great glacier already mentioned (or so we thought). That glacier is possibly the Kahilitna Glacier, the upper parts of which are not shown in the maps. The mountain is mysterious, because the height of 14,960 ft. with which it is marked is more precise (and therefore apparently more accurate) than the approximate elevations given to Mounts Foraker and McKinley. We thought it must be the S. point of the S. arête of Mount McKinley. The snow point which we also saw was on more or less the correct bearing, but looked far too distant to be Mount Hunter.[34]

Having made the best of our rare and brief opportunity (and having forgotten to read the rather unreliable aneroid), we turned to descend in increasing wind, intense cold and brief showers of hail. The excitement of such a summit affects one in curious ways. The aneroid was forgotten, but quite a trivial thing was remembered. Had we both experienced good luck, Tom Longstaff was to wave S. to me from the N.W. Passage, whilst I was to wave N. to him from Mount Foraker. This I did. Then the aneroid was remembered as we reached the topmost stones, after 10 minutes of descent and perhaps 300 ft. below the summit.[35] Here also we left a record in a tin

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[33] Belmore Browne : *The Conquest of Mount McKinley*, pp. 164–8, N.Y., 1913.

[34] See note at p. 235.

[35] The actual reading was 15·7 ins. This, corrected as carefully as possible (see C. S. Houston : *A.A.J.*, vol. 3, p. 293, 1935), gives an elevation of a little more than 17,000 ft. for the rocks, and an approximate elevation of about 17,300 ft. for the summit.

perched on the highest stone as securely as might be, but yet precariously. Then we went on, and as we descended the hail became continuous and thicker. At last we came to a place where we could halt partially sheltered by a rock ; we ate a little, but most of our food was frozen too hard to eat and biscuits had to satisfy us—these, and a pipe of tobacco for victory, loaded beforehand, but unlightable because of wind and numb hands until now.

Here we were in cloud, incessant hail and wind-blown surface snow. Our old tracks served us on the ridge, because the wind prevented the hail from covering them, nor were tracks necessary there ; but when we reached the trough our traces had been obliterated for long stretches. Without the willow wands we should have been in difficulty or worse, and the precaution saved us ; even with them we occasionally strayed out of our line, because it was impossible to see the next one ahead through the storm, although they were set at intervals of 75 short paces. We had then to cast about to find our line. The return was disagreeable and strenuous, because of the wind and hail. When half-way down the trough, the Cock'scomb began to appear in brief glimpses, so that we could go by a compass bearing when we came to the harder surface where it had been impossible to plant wands during the ascent. The hidden crevasses gave us some anxiety, but were safely avoided. The hail had ceased and the wind had lessened when we reached the edge of the Cock'scomb, and we descended the rocks safely to the bivouac, still in good light. We regained our tent at 21.28, and the cold was intense. We got into our sacks happy that the struggle against wind and hail was over at last. It was an equally happy moment when we lit the primus stove to melt snow ; heat rather than drink was what we needed. Hot cocoa soon gave us that, but we were too tired to eat.

15. *At Camp* 7.

Although we were nearly certain that we had climbed the higher of the two peaks, certainty was yet not absolute ; and on account of this and also to have its view we decided to attempt the S.W. peak. But the preceding four days had been very heavy ones, so for that reason and also because the barometer had fallen markedly, we decided to take August 7 as a day of rest. An additional factor was given by the painful cramps which all suffered during the night. As these were due to a deficiency of salt (our ration perhaps being too small for the work in hand),

we at once corrected it by sucking cubes of concentrated soup. The salt in the cubes soon stopped the cramps, but we had well earned the right to take the day of rest. This we did, and the early morning proved fine and sunny : we spent it lazily. The sun shone brightly, but the cloud level was high and now covered everything except ourselves and Mount McKinley. Even the horizontal arête was covered, because the level of the magnificent sea of clouds was at about 12,000 ft. The predicted storm commenced in the forenoon with a high wind and snow, but we still had provisions for about 12 days and were in no anxiety on that account, although the violence of the wind caused us to fear for the tent.

August 8 and 9 *were* days of anxiety. A snow-storm increasing to a blizzard blew almost continuously. It was impossible to leave the tent for longer than a minute or two at a time, while the filling of the primus stoves, which had to be done outside for safety, was a bitter piece of work. New snow piled up from the small platform against the tent, so that it had to be burrowed through on exit ; it was difficult to find the store of petrol. The wind was very high, giving us anxiety for the tent. That was probably anchored safely enough, and, although its position was extremely exposed, we assured each other that it would not be blown away. But the continuous rapid flapping of its walls made us wonder if the canvas might not split. It was however very strong, and stood the test grandly—as its forerunners must have done many times in the Antarctic. At the height of the storm we could not hear each other speak across the minute tent. The cold was great, but we could not measure the temperature because the thermometer was buried somewhere outside and did not record its minimum. The snow inevitably brought into the tent remained powdery and did not coalesce. Even some snow which had got into the sack which formed my pillow remained powdery. A crust of ice formed inside the tent at the back where it did not flap, save at the height of the storm. The upper part of this melted when the primus stove was at work. When the stove was extinguished, the water froze again suddenly, almost all at once, so that there was a sound of crackling, like a Lilliputian battle. The lower part of the tent remained fairly cold during the cooking, snow failing to melt (as was said before), and thick icicles being formed by the drip from above. One near my head reached the floor, becoming a combined stalactite and stalagmite, too thick to break across by hand. We wore moccasins in our sleeping bags and had

our shoe-packs beside us. Thirty inches of snow fell and, collecting outside between the tent and the wall at the inner side of the platform, bulged the tent inwards and decreased our already inadequate space (6 $\times 6\frac{1}{2}$ ft.), so that it was not possible to lie flat on the back with arms by the side. That outer snow however served probably to protect us somewhat from the cold. The night of August 8 was the colder. Despite an air-mattress on the floor, a sleeping bag made heavier than the Everest model, every stitch of clothing which I could put on, my head well protected and also buried in the bag with only a small hole to breathe through, I yet shivered during it. The following day gave a respite and we managed to clear some of the snow away from the tent ; the wind died down towards the evening. The night was more temperate and it was possible to sleep in comparative comfort. We managed to find the thermometer and took the temperature inside the tent. At 04.00 next morning it was 14° F.—for what that may be worth. It must have been very much lower during the night of August 8.

We began after all to be anxious about the food supply, for we did not know how long the storm might last. There could be no question of cutting our losses and descending lightly laden. In a storm, or in bad conditions of the snow, we would be certain to be held up at the snow-bridge (if it still existed), and that would necessitate a tent, food and fuel, sufficient to stay there until it was possible to cross and descend. There was a little food at the site of Camp 5, but the bulk of the food was with us at Camp 7, and we had to stand by it until we could take it down with us. In these circumstances we naturally remembered the cache of food at the Cock'scomb, which we had placed there against a possible emergency on the final ascent ; we resolved to bring it down whenever the weather permitted us to do so. In the meanwhile, as also before this, we economized our rations, putting by as much of the food as we might and shortening our meals. We drank the water in which rice and so forth had been boiled, with a virtuous feeling that we were saving fuel thereby—but perhaps as much for the warmth and pleasantness of the drink. I had dreams of feasting.

These days seemed at the time to be interminably long and so they abide in my memory. We had to lie in our sacks, dozing, ruminating, or chatting. Charlie Houston had brought up ' The Oxford Book of English Verse,' and we took turns at reading aloud when the wind permitted. ' The Ancient

Mariner ' had a curiously new interest. Less simple forms of verse lost some of their significance. ' He Fell Amongst Thieves ' again seemed in some way to match the surroundings—save in the title! Upon the whole, ballads and the Elizabethans, with their simplicity and directness, seemed to be best in place. Our talk was of climbing and exploration chiefly. Curious topics, perhaps ; but it is equally curious that romances of adventure, especially of northern adventure, are notably popular in Alaska. Once we found ourselves talking about Scott's last bivouac and could realize a little of the circumstances, but not the heroic last hours, with food and fuel finished and hope dead—yet with a cache so near.

16. *The S.W. Peak, August* 10.

August 10 dawned as a fine day, so we made up our minds to go up to the Cock'scomb for the food there, and even to attempt the S.W. peak should that appear feasible. The high wind had prevented the new snow from lying except in sheltered places, but the rocks were distinctly difficult under the conditions. The temperature was 11° F. when we left the bivouac at 08.20, and still 13° F. when we reached the Cock'scomb 2 hours later. But the sun was shining brightly and the day seemed to be of sufficient promise to justify an attempt upon the S.W. peak. So we went on and reached the great ice block, where we had to spend an hour in order that sensation might be brought back to one pair of frost-bitten feet—and that although the day was calm and the sun bright. The row of willow wands had stood up to the storm, as they have always been said to do, but now we had to leave them, because we had planned to try the peak from the E., and our way led us up round the bend of the glacier trough. We planted new wands as we went.

The E. ridge, promising the easiest way to our summit, was of curious formation. The foot of its flank was a steep snow slope above which was a long horizontal band of ice cliffs, lower and less continuous ice cliffs appearing also in the slope itself. As we faced it, the summit was to the right (W.), and the foot of the ridge to the left. The ice wall, having run to the left, then turned at right angles across the line of the ridge, thus forming an ice step in it. The band was very solid above the flank, but in one place it looked as if it would be possible to mount through breaches in the wall.

Having gone up the trough for about 1½ miles (4175 steps)

above the ice block, we came below these breaches in the wall. We then turned directly up the flank towards them. The snow was good but very steep, here and there deep in patches, and in one or two places it steepened into bulges of black ice—rudimentary ice walls. A direct ascent of about 1000 ft. with occasional bits of step-cutting brought us to the ice wall, about 40 ft. high. It was indeed very nearly vertical while the breach proved to be impracticable, because this flank was in shadow and the cold too great to admit of the immobility which the long spell of step-cutting would impose upon all but one of the party. Our only chance was to make a horizontal traverse until we could turn the corner of the wall and come under its face across the ridge. Previous experience suggested that we might find fractures there.

This traverse was about 450 to 500 ft. in length and was rather delicate, because of the softness and angle of the snow, the latter being at about 50°. The wall above was of unbroken black ice, becoming vertical overhead as we went along the top of the slope towards the left, using careful axe-belays and moving one at a time. Then we came to a curious intrusion between wall and snow slope, a sort of glacis of white ice of intermediate steepness. This offered firm steps if these were to be cut, and the fact that some of our snow steps had broken during the traverse suggested this procedure. But again came the factor of the cold, and the time which would be occupied ; so we adhered to the original line along the actual top of the snow slope.

On rounding the corner of the ' glacis,' it was at once seen that the ice wall, now turned across the line of the ridge, was split by two crevasses parallel with that line. One or other of these offered a possible way up and the nearer one was reached by steps up the short and steep glacis. The further way proved to be awkward. A steeply sloping floor of hard but rickety snow led up inside the crevasse, safe anchorage being given in some places ; at last a few steps gave exit to a platform above the level of the ice wall, but below the crest of the main ridge. Another crevasse in this was turned and then a short slope led up in 10 minutes to another platform on the crest of the ridge itself and at the foot of the final ice cone of the S.W. peak. The ascent in the crevasse had been delicate, because the floor had been an intermediate one and not continuously solid.

From the glacier trough to this place had occupied as long as 2 hours and 57 minutes, during which time we had been

completely in shadow. It was well that no slowing of movement had occurred through avoidable step-cutting, because, even as it was, frost-bite had attacked a second pair of feet. The hour, 18.15, was unfavourably late ; but delay was again enforced, while, during the pause needed to bring back sensation, it began to be a problem if the further ascent would be justified at so late an hour and in the increasing cold, and whether we were to be cheated of our summit after all. The treatment of the frost-bite, however, gave success more rapidly than was to be expected and in half an hour we were able to set off again towards the peak. It rose in front as a fine cone of ice, fissured in places by crevasses and in shadow. The sun lay now behind it, while the top looked much further above us than it really was. The ice itself held the crampons without necessitating steps and it was possible to turn the crevasses, so that we reached the top of the S.W. peak at 19.14—in 30 minutes of climbing from the platform, and much sooner than had seemed probable.

As both peaks of Mount Foraker had now fallen, the question of their respective heights was merely academic, but we turned to look at the N.E. peak. It rose as a rock-sprinkled pyramid, showing our long ridge of ascent on its left skyline, with Mount McKinley in the distance to the left of the summit. It was easy to see that the N.E. peak is definitely the higher, although by no great difference.

Then we turned to the S.W., but mist, again that pinkish-brown colour, prevented a clear view, and my memory is equally hazy. A great glacier seemed to stretch across in the S.W. more or less at right angles to the direction of the Range, and at a considerable distance from us. Either from the summit or from the platform below there was a fine view of the S.E. side of the Fin. My memory is that this slope was as steep as the other, that a branch arête descended to the S.E. from the S.W. ridge beyond the Fin, and that there was a very deep glacier bay at our feet between it and the mountain. That bay is almost certainly drained by a different glacier from that which we saw from the N.E. peak.

The summit ridge between the two peaks of Mount Foraker forms two sides of a right-angled triangle, and the angle itself is higher than the lowest depression of the ridge lying between it and the S.W. peak. The flank of this ridge on the side opposite to that by which we had first gained it is apparently a very steep face, probably mostly of rock, which descends to this glacier bay. It faces more or less to the S.W. and appears

to be quite as steep as that other face of the mountain down which we had looked from the N.E. peak. These two faces seem to join at a right angle, and it looked as if a very abrupt ridge descended to the S. (or perhaps a little more easterly) from the corner. At the foot of this is probably a pass from the basin draining the bay between Mount Foraker and Mount McKinley to that under the face down which we now looked. The axis of this pass, a depression between Mount Foraker and a chain of much lower summits lying to the S.E., seems to run more or less parallel with the main axis of the Alaska Range. From the N.E. peak, it had looked as if there were a long glacier moat between this chain and the base of Mount Foraker. But the mist was too dense to show us very much or to leave clear memories; our photographs failed to record the view—not unexpectedly.

The day had been a very fine one and there was no wind; so that we had no anxiety about our return although the hour was late when we set off on the descent at 19.30. On regaining the platform, we looked with success for a less awkward line of descent than that of our ascent. The ice wall, already mentioned, ran across our ridge at right angles below the platform, and two parallel snow arêtes prolonged the ridge in the downwards direction, one from either end of the wall. That nearest the glacier trough commenced from below the glacis at the base of the wall; the other, forming the true crest of the S.W. face of the mountain, descended from the top of the cliff; between the two lay a wide and deep hollow with no exit. This is certainly a permanent feature of the mountain—its size proved that—and the prevailing winds probably account for it.

We now descended the outer arête, narrow, but presenting little difficulty. Then we traversed the curious hollow and mounted the other arête below its steep part. The opposite flank gave us a shorter and less steep descent to the glacier trough than our original line would have done, and there is no doubt but that our route of descent would have given a much easier and quicker line of ascent than the way chosen. But there had been nothing to lead us to suspect its existence; the formation is indeed a most unusual one.

We went down the trough, reached the Cock'scomb and descended the rock face towards our bivouac. The views down into the glaciers were dark and impressive. It seemed as if night were there, while at our height twilight still reigned. At 23.15, whilst the light was still just sufficient for climbing, we

arrived at the tent. The S.W. peak had given us by far the more interesting ascent of the two, although the misty views had been disappointing: at any rate we had now no doubts in our mind that the mountain was truly climbed.

17. *Commencement of the Descent.*

On the following day we commenced our descent. The sun was brilliant and the glacier bays below us clear of cloud. We packed up our goods and the tent, looking down for the last time from its empty platform—reluctant, almost, to start our retreat, for when would any of us again look into such amazing depths? The great face slid down its short visible slope, then vanished abruptly; the floor of the glacier with its manifold etching of fine lines in beautiful patterns looked dim; we ourselves stood in bright light. It was like looking from one world on to another, the two connected by that marvellous thread of the 'Sporting Ridge'—*its* like at any rate we may never see again. To the left lay the more solid ladder of our own ridge, the way down; toward this we had at last to turn.

It was possible to lower much of our baggage with ropes for a little way, but we had to make several trips before we had brought all our loads to near the cache above the last rocks. These latter gave much trouble because they were iced, while the slopes below were not easy. As there was a sufficient platform beneath, it was possible to allow some of the loads to slide down the slope, but the rest, some carried and some lowered on ropes, nearly took charge of the descent. This also happened between the second and first humps, but we reached the latter safely at 20.20. The day had been an exacting one but had given us almost the last fine weather we were to meet on the mountain. When we had set up and entered the Logan tent it seemed like a spacious palace. One could stand upright and move one's arms about—a pleasant experience after our six nights in cramped surroundings. A violent wind blew that night.

Next day, August 12, was yet more arduous, for we brought all our loads down to the ice cave at the site of Camp 4. We were able to lower our whole load for a few hundred feet. But this process had to stop short of the Second Platform, and the loads thereafter had to be carried piecemeal in heavy packs. The work necessitated two complete descents and one complete ascent, between Camp 6 (or a little below it) and Camp 4. The day started well enough, but snow began to fall later on. One

curious passage remains vividly in memory. On reaching the Outer End Point of the horizontal arête for the first time that day, it looked as if there were a well-marked track along the further arête towards Junction Point, parallel with its edge and a few feet down its steep left (W.) flank. The arête there was heavily corniched to the right, and the track looked to be in the line of our old steps, so that we wondered how it had come to last during the eleven days which had elapsed since we had last traversed that part of the ridge—and in spite of the storms. But, on approaching nearer, we discovered that the appearance was due to an irregular crevasse which had developed nearly in the line of our former tracks and lengthwise to the arête. It was an insoluble problem whether this fracture was one at which the corniche was about to slip off to the right, or whether it was the upper edge from which the very steep snow slope on the left side was about to slide. Either theory seemed to be possible, and there was nothing to show whether the safe line was above or below the crack. We compromised in a manner making for complete safety in either case. Two members of the party traversed above the crack, the third below it. Had the corniche slipped, the upper two would have been landed on the slope left behind and would have been easy to hold over the new edge by the man on the other slope. He, for his part, would have been easy to hold by the others had the snow slope slid from the crack. The length of the crack was about 170 ft. and we were compelled to pass along beside it three times. But nothing of interest occurred. Snow fell lightly during the latter part of the day, which was a very hard one ; we were thankful when we had brought the last loads down to the ice cave at 20.31. We had then been at work almost continuously for nearly 10 hours, while our loads had been heavy.

18. *Check at the Crevasse.*

Speculation as to what we would find at the snow-bridge, or whether we would find anything there at all, had for some time occupied our thoughts. In case an alternative plan for crossing the crevasse were to be necessary, we had with us a bundle of long wooden rods, used for anchoring the tents, which might be used as a belay and left behind. This would enable us to rope down the near wall of the crevasse at its centre. If the floor then proved to be impracticable, it might also have been possible to cross at the far end from the bridge, where a partial filling of large débris perhaps offered a firmer

passage, but one not entirely free from the danger of ice fall from above. Snow had fallen during the night, although not heavily, and the air had been ominously warm, so that our own warmth in the cave had been sufficient to prevent water from freezing. The conditions were therefore extremely bad when we set out next morning, August 13, to find the answer to our problem.

For a short distance the slopes were easy and we carried very heavy loads, dragging the remainder of our gear. The snow was very soft and the covered crevasses gave us much trouble. Then the slopes steepened, the gear taking the lead and finally dragging *us*. With still steeper slopes below, we halted and made a cache of what we could not carry, then going on again. The narrow and steep ridge leading down to the slopes above the crevasse was the worst part of the day's work, but we reached the upper lip of the crevasse at last and returned for the remainder of our loads. This we decided to bring down in a single flitting, and so carried very heavy packs indeed. Again the narrow ridge was the most awkward part, and particularly where it was cracked across by a contracted and partially masked crevasse. The steps made at the first descent broke in several places under the greater weight, and the bearers sank to above the thigh. It was then a matter of hard work, perhaps 10 minutes' delay and delicate balance, to regain upright stance on the crest, raising body and load on a single limb being quite impossible. It was not until 15.00 that we reached the upper lip of the great crevasse with our final loads.

Time then pressed because there were obvious signs of an approaching storm, but we thought that we might reach flat glacier before it broke and bivouac there without further anxiety even if we could not reach Camp 3. The snow-bridge, if practicable at all, would take about 15 minutes to cross, the descent of the lower slopes not quite so long. To that might be added half an hour for the ferrying of our loads over the crevasse. It looked as if we might have enough time, but the question of the snow-bridge had to be settled first. As the progressive steepening of the slope prevented this from being seen from above, one of us descended on the rope, to find that the bridge, although still existing, was quite impracticable in its present state and might even be impossible after a cold night.

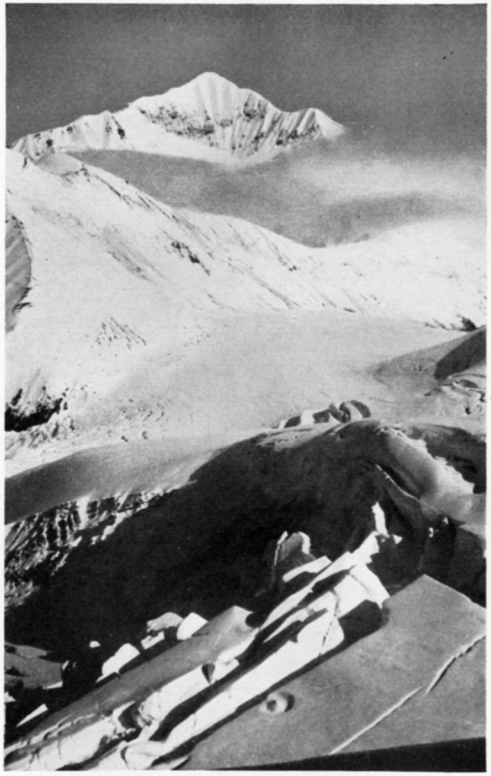
There was nothing for it save to try our roping-down plan or to wait here until early next morning, when the bridge would be at its best. But the first of the approaching snow began to

fall, and we realized that we must bivouac in any case. We had dug a platform for our loads above the upper lip of the crevasse. At a higher level on our left (facing out) there was an overhanging ice wall about 450 ft. distant across the steep slope. This was solid, and a shelf below it offered a bivouac site, partially sheltered from the wind and wholly protected from avalanche danger. To this we moved the necessary gear along with what looked to be a sufficient stock of food, and then quickly erected the tent, because the snow was now falling heavily. In 4 hours' time from the first fall of snow, 4 inches of new snow lay on everything, while the storm showed no sign of abating.

Our experience here was similar to that at Camp 7, save that we were in the roomier Logan tent and were better protected from the wind. Our position had an element of comedy in it. Once across the snow-bridge, 10 minutes of descent would land us on flat glacier within easy enough reach of our friends at Camp 3 unless the storm proved to be too severe. The final slope itself, about 600 ft. in height, was dangerously steep and avalanches fell there, but their tracks would offer a safe line of descent. The chief obstacle to our retreat was the steeper slope down to the bridge, which offered no escape if the new snow slid and therefore could not be risked. So here we were, within a few minutes of the finish of the climb and yet unable to go down. The new snow was falling on soft older snow and not on ice. It would therefore consolidate quickly ; we planned accordingly to make our descent after waiting for a single fine day after the snowfall ceased. But our supplies had run low, food for five days only still remaining, or for a little longer if we shortened rations, as we did. Part of this supply was at the cache above the crevasse. We accordingly decided to bring it to the tent whenever a lull in the storm permitted, then to await our fine day or the exhaustion of our food, whichever should come first.

The storm continued all next day without ceasing. We lay in the tent, talking and dozing. One pleasure we were already experiencing. In July it had been possible to read in the tent at midnight even on clouded nights, but the brightness prevented sound sleep unless the head were buried. This same night-brightness had lingered into the middle of August at the height of Camp 7, but now was replaced by proper night at our lesser elevation, that being aided by the darkness given by the snow on the tent.

The snowfall continued as heavily as ever on the morning



Photo, T. Graham Brown.]

CLIMBERS' PEAK, FROM THE W. BRANCH OF THE N.W. ARÊTE OF MOUNT FORAKER, THE BROAD COL TO THE RIGHT BELOW THE NEARER RIDGE IS TRANQUILLITY PASS.

Photo, T. Graham Brown.]

FLUTED PEAK (E.) moraine from right of W. Foraker Glacier.

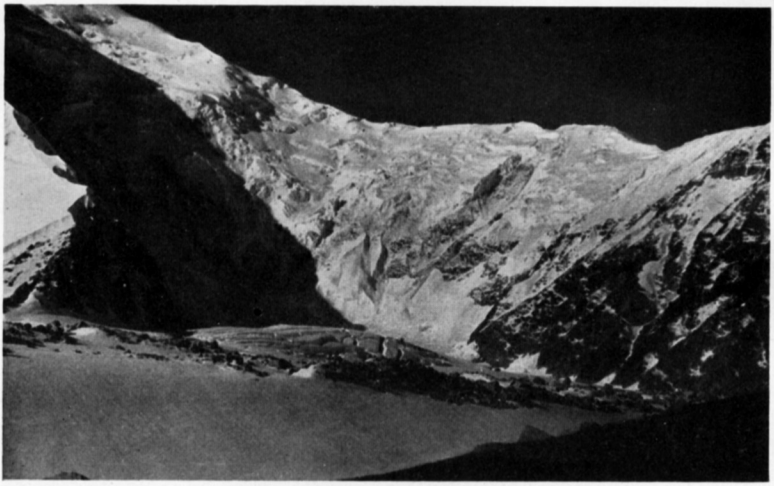
[*To face p.* 228.

Photo, T. Graham Brown.]

Flank of the W. branch of the N.W. ridge. The route of ascent led up through the crevasses seen in the centre of the photograph.

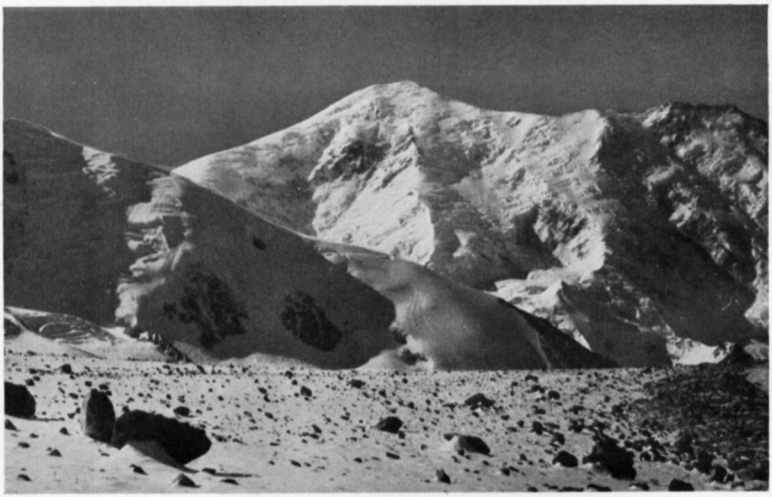
Photo, T. Graham Brown.]

An avalanche on the N. face. The camera is tilted up and the face is greatly foreshortened. The skyline from which the avalanche fell is about 10,000 ft. above the spectator; and the snout of the avalanche has descended through but little short of two vertical miles.



Photo, T. Graham Brown.]

THE HORIZONTAL SECTION OF THE N.W. RIDGE SEEN FROM THE BIVOUAC PLACE ON THE EDGE OF THE W. FORAKER GLACIER. THE FLANK OF THE RIDGE IS ABOUT 4,500 FT. IN HEIGHT; NOTE THE SMALLNESS OF THE DETAIL.



Photo, T. Graham Brown.]

N. FACE OF MOUNT FORAKER FROM NEAR LOWEST BEND OF W. FORAKER GLACIER. THIS PHOTO SHOWS THE SMALLNESS OF THE ICE DETAIL ON THE FACE, WHICH IS ABOUT 12,500 FT. IN HEIGHT.

[*To face p.* 229.

of August 15, but showed signs of abating at midday, and a little later had died down sufficiently to enable us to retrieve the remainder of our food from the cache. The snowfall finally ceased and the sun came out for a time, but snow began to fall again at 15.30, ceased again after an hour, then recommenced and was still coming down lightly when we went to sleep. By the morning of August 16 as much as 40 inches of new snow had fallen.

There had been a sort of persistent finality about the storm, so that, safe as we were while the food lasted, we became half-anxious about the future and half amused at our extraordinary position, held up within shouting distance of our friends should they come up to the foot of the slope. They, for their part, had real anxiety. Our party had been seen on August 12 near the site of Camp 5 during the descent, and the members of the base party were therefore fairly certain that we must have reached the ice cave at Camp 4 that day. Carl Anderson considered that the bad conditions would hold us there next day, although, as has been seen, we actually descended. They nevertheless visited Tranquillity Pass, but could not see us (we had not yet reached the crevasse), therefore concluding that their guess had been correct. They ascended through the storm on August 14, but naturally could not see our tent, and Carl Anderson, who knows as much as anybody about Alaskan snow, considered that there was too great avalanche danger to justify the traverse from Tranquillity Pass to the foot of our slope. He also considered that the state of the snow on the latter would hold us four or five days should the snowstorm not cease that afternoon. On August 15 Carl searched the mountain with his glasses from the slopes above Camp 3 and discovered our position, the base party then for the first time being assured of our safety.

19. *Final Descent.*

The snow ceased early next morning and the day became clear and brilliant, with fragments of low cloud clinging to the lesser peaks and lying on the glaciers. We decided to adhere to our plan and to postpone our descent until next day. Then a faint shout surprised us, just as the primus stove was heating up to flash-point and would have drowned all other noise. The base party had come up to the glacier beneath us and two of its members stood below in a deep snow-shoe track; and Carl Anderson, having gone forward alone, was now coming up our slope, despite his previous opinion. It was a splendid

and brave thing to do. On arrival on the lower lip of the crevasse he informed us that he had seen that the crevasse had not yet broken through into the lower ice face, and that the bridge might still be safe.

We put our things together hurriedly and struck the tent. Then a rope was thrown across the crevasse and everything was ferried over. After that, the snow-bridge had to be attempted, but now with the additional precaution of a long rope from Carl Anderson from a safe stance above the other side. That might have made all the difference, but there was no dramatic incident. The snow slopes cohered and the bridge itself, more fragile than when we had last crossed it, held up. Every precaution had however to be taken, 20 minutes passing before the last of us joined Carl Anderson on the lower lip of the crevasse. Then, finding that four men could carry our depleted loads in a single trip, we went down the steep slope—leaving behind us a single petrol tin, the only thing abandoned upon the mountain. The next party to ascend Mount McKinley will be able to eat its way up from cache to cache, because of the stores which have been left there. Mount Foraker will still be barren, save for our record near the summit and this petrol tin. Even my unfortunate duffle bag must have got off the mountain when it fell from Camp 7.

The slope below the crevasse was in little more than justifiable condition and in 10 minutes of very quick descent we reached the foot. Then another 15 minutes took us across to where Oscar Houston and Charles Storey waited. So we reached flat glacier again, having spent a few hours more than 21 days on the great ridge above. During that time snow had fallen for shorter or longer spells on 14 days, and on another 3 during the night.

There we sat for a while to eat (for we had not yet breakfasted) and to hear the news of the base party. They had crossed Tranquillity Pass on August 3 and had then descended the Herron Glacier, making a bivouac low down on it after 8 hours of march. Thence they traversed along the edge of the foothills to the snout of the W. Foraker Glacier, so regaining the site of the base camp. August 6, the day upon which we ourselves had reached the N.E. peak, was so hot there that they did not set out until night for their return to Camp 3, the subsequent bad weather preventing further exploration. But Charles Storey and Carl Anderson reached the foot of the W. arête of the nearest Bridesmaid on August 11 and looked over into the basins of the E. Foraker and Peters Glaciers.

Having talked and eaten, it was time for us to be moving again. The abundant new snow made the further descent to Camp 3 an arduous one even with snow shoes and in a now deep track. We were one pair short and (being the lightest) I came last in rubber boots, hoping that the track would be sufficiently trodden to bear my weight. That was not the case and progress was very laborious and slow. Forty inches of new snow had fallen in the last storm, and the total depth of recent snow must indeed have been very great. A pair of skis, planted upright on the glacier below the crevasse, could not be found again when we came down. It is of course possible that the skis were blown over before being buried ; but in any case, the snow fallen during our ascent and descent must have been several feet in depth.

At last we arrived back at Camp 3, to experience all the simple pleasures which are so surprising after any sojourn in the snow. It was quite an extraordinary feeling to be able to step out of a tent and walk about without having to be careful ; and it was a real delight, which it had not occurred to us to anticipate, to be able to drink water regardless of the cost. But we were still above the snow-line, and everything was white. Greenery and open fires were pleasures yet to come. I have rarely had so keen a longing as I had then to see green vegetation.

That was the real end of the climb, although we still had the descent of the glacier in front of us. The mountain had proved to be a most worthy and generous opponent and there had not been the slightest hitch. The expedition could not have been successful but for Charlie Houston's organization, and he proved himself to be as fine an organizer as he is a climber. The salt ration was *very* slightly too small. That is mentioned only to emphasize that there was *no* other deficiency or failure of any sort or at any time—where so much *may* go wrong.

One point deserves special mention. The manner of the expedition was in accordance with the oldest traditions. No method was employed, either for exploration or for climbing, not used in the earliest attempts on Alaskan mountains. The equipment, of the most modern and improved form, was nevertheless *merely* improved. Skis taken by two members were used by one only, and that on not more than three short occasions. The greatest departure from older equipment was perhaps the air mattresses, by which the former piles of moose skins are now replaced. Even the preparatory freighting of food stores up the glacier in early spring by dog-teams was

absent. In other words, Charlie Houston's expedition tackled Mount Foraker with the same technique and type of equipment (but that much improved) as the very first climbing party to pass by the Herron snout would have used in 1903 ; no more was known of the approaches to the mountain or of its formation than had then been seen by Cook's party from the plains—and that was almost nothing.

This may well be the last occasion upon which such old-fashioned methods are used without modern aids ; they were imposed upon us by necessity and not by virtue. Our original intention had been to reach the base camp by aeroplane and to examine the mountain therefrom, but that proved to be impossible. Osgood Field [36] had been the first to suggest aeroplane reconnaissance, and for Mount Foraker itself. Lindley examined Mount McKinley from an aeroplane the year before his ascent—to see if Karsten's Ridge had yet recovered from its shattering by earthquake twenty years before.[37] Carpe and Koven not only used aeroplanes for the dropping of supplies upon the Muldrow glacier for their attempt upon Mount McKinley in 1932, but actually for landing the climbing party upon it.[38] There can be little doubt that this excellent and time-saving technique will be used yet more in the future, now that aeroplanes can land upon glaciers safely and rise from them again. It is indeed a cheaper mode of approach than the horse-train. But aeroplane reconnaissance, completely justifiable although it be, will take something from the glamour of exploration while perhaps adding to the breadth and interest. The grapes are not sour if we say that we are happy to have been enforced to an older simplicity, and that possibly for the last time in the case of a major Alaskan summit.

20. *Return down the Glacier.*

It had been fortunate that we descended when we did, because snow began to fall again that afternoon, and continued off and on for several days. On August 17, the day after our return, we moved camp down to the old site of Camp 2, where a partial disappointment met us. The scanty vegetation was brown and red and gold—not the green to which we had looked forward. This complete change in the 30 days since we had

[36] Osgood Field : *Harvard Mountaineering*, vol. 1, p. 44, 1928.
[37] A. D. Lindley : *A.A.J.*, vol. 2, p. 37, 1933.
[38] E. P. Beckwith : *A.A.J.*, vol. 2, p. 45, 1933.

taken to the glacier was surprising. We had travelled 'in' during the late spring, as it were; and there were then still unmelted ice-floes on the McKinley bar. We had left the base camp in early summer, so it seemed. Now, at this elevation, and although the intervening days had been few, it was as if we were in the autumn. It actually *was* autumn. Not only had the colour of the vegetation changed (as had that of the tundra lower down), but the ptarmigan were now white—some almost completely so, others with white wings.

These days were dull and we employed them in carrying our loads without remission down to the base camp, to which we returned on August 20 (the pleasure of a fire!). A little after midnight that night there was an earthquake. The first shock awakened me. The second lasted about 10 seconds, but was prolonged by a low rumble like the sound of an avalanche. The ground shook from side to side with great frequency. It was easy to see a sort of significance in this event: Mount Foraker shaking itself free of the irritation we had caused—just as Mount McKinley shook when Parker and Browne had descended.[39] But the fact of the matter is that earthquake shocks are so frequent in Alaska that some of the phenomena of glacier-flow met with have been attributed to them.[40] The state of 'Karsten's Ridge' on Mount McKinley, when Stuck traversed it in 1913, was undoubtedly due to the earthquake of the preceding year; so shattered was that ridge that Stuck's party had to spend 21 days in traversing what had occupied Parker and Browne for a few days only, and the 'pioneers' for one day.[41] Our own conjecture that the amazing formations which we met upon the snow ridges may have been due to a similar cause is therefore by no means far-fetched. It now seemed to us that we had been fortunate in getting off the mountain when we did. What about that curious crack on the arête, and the snow bridge at the crevasse?

On August 21 we brought down our last loads from above (having by then each spent 22¼ hours during the packing down the glacier from Camp 3), and so the climb came to its finish, save for the journey 'out.' From base camp to base camp, we had been on the move (or had been imprisoned in our tents by the weather) for 40 days; 22 of these had been spent on the actual ridge of the climb, above the glacier.

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[39] Belmore Browne: *The Conquest of Mount McKinley*, p. 355, N.Y., 1913.
[40] Tarr and Martin: *Alaskan Glacier Studies*, p. 168, Washington, 1914.
[41] Hudson Stuck: *Ascent of Denali*, p. 42, London, 1914.

Ruminating on such matters, it seemed to me to be a long time to spend upon one mountain; accordingly, I later examined them, to find that there were some points of interest, perhaps of value, for those who plan expeditions on this scale.

Had the route been known and had there been provisioned huts upon it at suitable places, the total net time for the ascent of both peaks (about 15,500 ft., base camp to summit) and the subsequent descent would have been 53 hours, or considerably less. That was the time we took, made up out of the individual times for the first traverse of each part of the route on our explorations; but we went at no great pace although lightly laden, for much had to be tested, the new views were arresting and we never gave ourselves a far objective necessitating speed and entailing risk. On the actual ridge from Tranquillity Pass upwards to the N.E. peak (excluding the ascent of the S.W. peak), the ascent alone (so reckoned) took a little less than 19½ hours and the descent a little less than 10 hours—the total net time being thus 29 hours 21 minutes (about 11,500 ft., Tranquillity Pass to summit).

In contrast with that, the time taken by each member of the climbing party was 206 hours (net), *including* ascents and descents. Of this total, 61½ hours were occupied in the various preliminary explorations (including that to Spy-Glass Hill), the ascents on these taking a total of 36¾ hours; the back-packing occupied a total of 123 hours (including unladen descents or ascents in relaying, packs were carried *up* during 62 hours and *down* during 30¾ hours), while the two lightly-laden final ascents took a total of 21¼ hours. As the members of the base party each packed for a total of about 93¼ hours (including unladen return trips), the total net climbing time for each member of an *unsupported* party would have been almost exactly 300 hours, or about 6 times as long as the unladen ascent would occupy. Part of that (say ⅕) represents the time taken by exploration; and if we say that the laden ascent (including subsequent descent) takes about 4½ times as long as 'free' climbing would do, it would be nearer the mark.[42]

That ratio represents in the first place the necessity for carrying shelter, food and fuel in any case on so long a climb; but over and above that, it represents the margin of safety imposed by the possibility of bad weather and its danger. Expressed without statistics, a party, even when supported as

[42] But the supporters had of course to carry shelter, food and fuel for their own needs. The true ratio is, therefore, smaller than is here given—say 4 : 1 ?

we were, has to climb the mountain *three* times (or its equivalent) and to carry heavy loads in doing so. *Including the explorations*, we had to climb almost the whole of the route as far as Camp 7 *four* separate times and some passages even more often.

To return to our actual experiences : August 22 was another day of sleet and rain. On August 23 Carl Anderson, Charlie Houston, Storey and I set out for a 2 days' exploration of the E. Foraker Glacier. The weather grew progressively worse and the storm drove us back to the base camp after we had penetrated for 3½ hours. The pack horses arrived next day under Bill Alloway, and we had our first news of the outside world, learning of the deaths of Hindenburg and Dollfuss, but relieved to hear that there was no fresh war ! On August 25 we started for our long journey ' out,' being joined at Birch Creek that night by Lew Corbley, chief ranger of the Park. Our trip was a delightful one and we enjoyed some of the views which had been covered on our journey ' in ' two months before. We reached Savage Camp (and modified civilization) near midnight on August 28, to hear that Mount McKinley had not once been visible that month until the day of our arrival and to have a magnificent exhibition of the Northern Lights on the way, now seen against the darkened midnight sky of late August. There we had to spend two and a half days waiting for our train (the only ' record ' which we can claim) and were most kindly entertained by Mr. and Mrs. Liek (good friends to all who would climb in the Park), Mr. Galen and the Park rangers—Lew Corbley and Grant Pearson not least amongst them. What fine men they are ! Leaving again on August 31, our journey home was continuous until we reached New York on September 14. We had met new friends everywhere, and the whole expedition had been an uninterrupted pleasure.

Note on ' Mount Hunter.'

Mount Hunter (14,960 ft.) was first surveyed by R. W. Porter, the topographer in Dr. F. A. Cook's expedition of 1906. He spent two days on the range of foothills between the lower ends of the Tokichitna and ' Ruth ' Glaciers,[43] and then went along the S.E. flank of the Range in the direction S.W. ' Large

[43] The latter had been called the ' Mud ' Glacier for some years by the prospectors. The above name was given by Cook to commemorate his daughter. Belmore Browne calls it the ' Great ' Glacier. See Cook : *To the Top of the Continent*, p. 90, London, 1909, and Browne : *The Conquest of Mount McKinley*, N.Y., 1913.

areas . . . were not mapped on the plane-table sheets, for lack of time and facilities for their survey.'[44] The result of this rough survey was embodied in two maps published in 1911,[45] one of which (1 : 625,000) combines Porter's results on the S.E. flank of the Range with those of other explorers on the N.W. flank and elsewhere, while the other (1 : 250,000) is by Porter alone. Belmore Browne used Porter's map with additions made on the basis of his explorations with Hershel Parker in 1906, 1910 and 1912 (they were members of Cook's 1906 party).[46] The current maps (*e.g.* Alaska Road Commission, 1923, 1 : 500,000) merely repeat these older ones, apparently without addition or correction for the part of the Range here under consideration.

Porter's map marks a high mountain ('Mt. Hunter, 14,960 ft.'). On his 1 : 250,000 map this is placed $10\frac{3}{4}$ miles nearly due E. of the summit of Mount Foraker and $8\frac{1}{2}$ miles S.S.W. of the S. peak of Mount McKinley. (Belmore Browne places it a little farther from Mount Foraker and nearer to Mount McKinley.) The elevation of the main ('backbone') ridge mid-way between Mount Foraker and Mount McKinley is given as 9300 ft. in the 'combined' map of 1911, and as about 10,000 ft. in the other maps—as estimated by the contours. All maps agree in leaving the triangle between Mounts Foraker, McKinley and Hunter blank, as well as much else to the S. and S.W. The Tokichitna Glacier is drawn as arising from under a N.E. extension of the ridge of Mount Hunter, from which it runs S. or S.S.E. Parallel with it, and close on the E., is the Ruth Glacier, one feeder of which is made to come from a gap between Mount Hunter and Mount McKinley. To the W. of the Tokichitna Glacier the lower part of a parallel glacier is drawn (Kanicula Glacier), and still farther on the W. is the lower part of the great Kahiltna Glacier, perhaps the longest of the lot. Judging from the maps, it is probably this last glacier which drains the great collecting fields between Mount Foraker and Mount McKinley on the S.E. flank of the main backbone.

A mountain 15,000 ft. in elevation located as is Mount Hunter on the maps should be clearly visible not only from the Pacific side of the Range, but also from the plains on the Arctic flank. From Lake Minchùmina to the N.N.W. and from

[44] Porter, in Brooks, U.S. *Geological Survey*, Professional Paper No. 70, 1911, p. 40.
[45] U.S. *Geological Survey*, Professional Paper No. 70, 1911.
[46] Browne: *The Conquest of Mount McKinley*, N.Y., 1913.

points to the W. of it, Mount Hunter should appear as a third great peak between Mount Foraker and Mount McKinley. From more north-easterly view-points, such as Thoroughfare Pass (N.N.E.), it should perhaps be visible as a smaller peak on the left (S.E.) of Mount McKinley.

We may exclude Osgood Field's guess that a point shown in his photograph from near the snout of the W. Foraker Glacier is Mount Hunter,[47] because that point is certainly the S.E. peak of the three Bridesmaids which is on the main backbone ridge itself. With that exception, and one other most curious one, Mount Hunter has apparently never been seen from the Arctic flank, either from the N. or the N.W. In the former case the mountain may be hidden by Mount Brooks (12,000 ft.). Photographs taken from that direction certainly show a high subsidiary peak immediately to the left (S.E.) of the S. peak of Mount McKinley. This is the point shown in one of Lindley's photographs taken during the 1932 ascent of Mount McKinley [48] and appears to be the culminating point (S.W.) of the south-easterly of the three parallel ridges which go to form the mountain. Lindley's photograph was taken from near the Parker Pass on the ascent of Mount McKinley, and probably shows the point which Stuck saw from about the same place and thought might be Mount Hunter (but if so, was probably mistaken).[49] The incredible fact remains that Stuck's tentative supposition is the only mention of Mount Hunter by any member of the three parties which have reached or nearly reached the actual summit of Mount McKinley.

Still more extraordinary is the absence of Mount Hunter in descriptions of the view from Lake Minchùmina. It should be seen as a third great summit rising 5000 ft. higher than the backbone ridge of the Range between Mount Foraker and Mount McKinley, but nearer the latter. Here we have Stuck's definite description of the view—two giants (*not* three), ' while between them, near the base, little sharp peaks stretched like a corridor of ruined arches from mass to mass.' [50]

Our own view-point on Spy-Glass Hill bore more nearly N.W. than Lake Minchùmina, and of course was far nearer to the Range. From it, Mount Hunter should have appeared towering above the main backbone ridge nearly midway between

[47] Field: *Harvard Mountaineering*, vol. 1, upper photograph on p. 42, 1928.
[48] *A.J.* **45**, upper photograph facing p. 90, 1933.
[49] Stuck: *Ascent of Denali*, p. 75, London, 1914.
[50] Stuck: *Ten Thousand Miles with a Dog Sled*, p. 305, London, N.D. (1914).

Mount McKinley and Mount Foraker. If the map elevations are accurate, the upper 3000 to 3500 ft. of Mount Hunter should have been visible. As we were very anxious to see the mountain in question, its absence puzzled us greatly. We speculated at the time that a large error must have been made in its location and elevation, so that it was really represented by the S.E. Bridesmaid. Its absence from the view needs some sort of explanation. The possibilities are that Mount Hunter is incorrectly located on the maps, that its elevation is over-estimated, that the elevation of the backbone ridge is under-estimated (which is very likely), or that any combination of these errors has been made.

We were naturally eager to identify Mount Hunter from the summit of Mount Foraker, but failed to do so. As far as could be judged (but the estimate was difficult), the place which should have been occupied by Mount Hunter according to Porter's map was occupied by a very wide glacier. On the same bearing, but apparently at a very great distance indeed, was a white summit. This looked to be very much farther from us than Mount McKinley, perhaps twice as far, so that we dismissed it at the time as a possibility. The only substitute we could make out was the S. point on the S. arête of Mount McKinley itself. I am now rather inclined to think that the ' white peak ' was nearer than we thought, but not nearer than about 12 or 13 miles. There was much haze, and a bank of thicker haze just below the actual summit of the white peak might have given the appearance of great distance.

Mount Hunter seems never to be described in views obtained from the S., but a mountain at the mapped location would certainly be lost against the greater bulk of Mount McKinley as seen from that bearing. A high mountain other than Mount Foraker and Mount McKinley is, however, mentioned in descriptions of views from the S.E.—the ' coronet-shaped Titan ' of Dunn.[51] Henry S. Hall, jun., has let me see the fine photographs which he took in 1931 from ' Regal View ' near Curry on this bearing, and a high mountain is shown between Mount Foraker and Mount McKinley, but nearer the former and more or less in the mapped position of Mount Hunter. This is obviously much nearer the camera than Mount Foraker.

It must therefore be concluded that there does exist a high mountain more or less in the location given to Mount Hunter on the maps. Our failure to identify it in the view from the

[51] Dunn: *Shameless Diary of an Explorer*, p. 293, N.Y., 1907.

summit of Mount Foraker may have been due to the haze, but it is very difficult to reconcile the photographs taken from the summit with the presence of a high mountain in the mapped location. Its absence in the view from Spy-Glass Hill can be due only to the backbone ridge being higher or the summit in question lower than the elevations given on the maps.

So far so good, but the astounding fact remains that Mount Hunter was first discovered and christened from the *Arctic* flank of the Range, whence it seems to be invisible. When Dr. F. A. Cook made his first attempts on Mount McKinley in 1903, he approached the mountain on the Arctic flank from the S.W. along Brooks' trail of the preceding year. Having passed by the snout of the E. Foraker Glacier, he then penetrated at right angles towards the base of Mount McKinley until he reached the crest of the low range of foothills which forms the N.W. bank of Peters Glacier. This glacier arises under the S.W. face of Mount McKinley, encircles the base of the W. (or W.N.W.) ridge, then flows N.E. parallel with the Range, and finally turns at right angles to the N.W. to penetrate the front range of foothills and end on the tundra plain. Cook retired and then continued along the Arctic flank until he reached the snout of the Peters Glacier, thence to make a really remarkable attempt on Mount McKinley which has been obscured by his lamentable deception on a later occasion. The party lacked Alpine experience and was ill-equipped (one member having to use a tent pole because of the shortage of ice axes). Nevertheless, it penetrated Peters Glacier for nearly its whole length, reaching the base of the N. flank of the W.N.W. arête. This is the ridge which descends directly in the direction of Spy-Glass Hill with the great pink cliffs split by a vertical gorge on the immediate S. of it. The party ascended the flank in question, reaching the crest of the arête and mounting it until stopped by rocks when still below the level of the top of the pink cliffs and at an estimated elevation of 11,400 ft.[52] The ridge of ascent and the approximate point reached are identifiable without any shadow of doubt by means of the photograph of the cliffs taken by Dunn [53] clearly showing the vertical gorge which is mentioned by him in his narrative and is a feature of the view from Spy-Glass Hill.[54]

When Cook's party was ascending the crest of this ridge

[52] Cook: *Bull. Amer. Geol. Soc.*, vol. 36, p. 321, 1903.
[53] Dunn: *Shameless Diary of an Explorer*, N.Y., 1907.
[54] See panorama in first part of this paper, p. 16.

(Cook calls it the S.W. ridge, in error), a great mountain was seen to the right. Cook describes this as 'a dome-shaped mountain . . . entirely covered with ice, and its summit attained an altitude of fourteen thousand feet. This will appear on our map as Mt. Hunter in honour of Miss Hunter of Newport.' [55] Now comes some confusion. Dunn describes it as being seen through a gap in the main backbone ridge—'Then toward Foraker, through that gap, gathering all the southern ridges about the final bend in Peters [Glacier], and yet beyond all, rose and rose a turret-like summit.' [56] This description would perhaps best apply to the S. point of the S. ridge of Mount McKinley, but Dunn nevertheless actually *maps* the peak as on the main backbone ridge, its contours being continuous with those of Mount McKinley. This hardly fits in with the view of the peak through a gap in the backbone ridge, but it seems without doubt to identify Mount Hunter with the great white peak seen in the view from Spy-Glass Hill on the main backbone ridge between Mount McKinley and the Bridesmaids.[57] This identification is also supported by one of Dunn's photographs.[58]

Cook's 1903 party was perhaps not very strong in its topography, but we may conclude that, if Cook and Dunn describe the same peak, the original authentic 'Mount Hunter' was a point on the main backbone ridge between Mount McKinley and the Bridesmaids, the alternative being that it was the S. point of the S. ridge of Mount McKinley.

Cook again attempted Mount McKinley in 1906, Belmore Browne and Herschel Parker being in the party, which also included Porter as topographer. The party made some interesting explorations in the vicinity of the lower parts of the Tokochitna and Ruth Glaciers before Cook went off with Barrill up the latter glacier to practise his deception. A fine view was obtained from the foothills on the true right (W. or S.W.) bank of the Tokochitna Glacier. Cook's description is interesting:

'Beyond part of the South-east ridge of Mount McKinley we noted Mount Hunter, which loomed up as a great mountain from our line of ascent from the West in 1903, but from the South this was seen to be a spur of the main mountain.' [59] The bearing of the S. peak of Mount McKinley was almost

[55] Cook: *To the Top of the Continent*, p. 73, London, 1909.
[56] Dunn: *Shameless Diary*, p. 228, 1907.
[57] Marked 'Unnamed Peak' in the panorama, *A.J.* **47**, 16.
[58] Dunn: *Shameless Diary*, p. 250, 1907.
[59] Cook: *To the Top of the Continent*, p. 169, London, 1909.

due N., and therefore Cook's ' South-east ridge ' is either a bad topographical mistake or really means ' the South-easterly (*i.e.* nearest) of the three parallel ridges (each bearing N.E.–S.W. in direction) which form Mount McKinley,' and Mount Hunter was seen across its S.W. end. Cook's inadequate map indicates what may be Mount Hunter (not named) as a little due S. of Mount McKinley, and there is no indication of any such peak on the main ridge between Mount McKinley and Mount Foraker. Belmore Browne places ' Mt. Hunter ' at approximately the same place as that indicated by Cook. It is therefore probable (from Cook's present description and from the map indications) that Cook's own original Mount Hunter was the S. point of the S. ridge of Mount McKinley.

But Cook also saw the high mountain which has been described above : ' A larger surprise than all this [the view of Mount McKinley] was the discovery of a huge peak midway between Mt. Foraker and Mt. McKinley, but much nearer our point of observation . . . it was a giant peak in the midst of a separate group of mountains. . . . This mountain was christened Mt. Disston, in honour of my friend Henry Disston [the ' eastern sportsman ' of Cook's narrative and his financial backer]. . . . Between it [Mount Hunter] and Mt. Disston there was noted a narrow but deep gap through which the Ruth Glacier sends an arm to the south shoulder of Mount McKinley. . . . Mt. Disston has three peaks, the highest of which is 14,970 feet high.' [60] Cook marks this on his map more or less at the site of the present Mount Hunter.

The probable conclusion is therefore as follows : The original Mount Hunter was the S. point of the S. arête of Mount McKinley—probably about 15,000 ft. in elevation. Dunn confused it with the ' unnamed peak ' on the main backbone ridge which we saw from Spy-Glass Hill. Cook saw another high mountain on the S.E. flank of the Range and independent of Mount McKinley and Mount Foraker, naming it ' Mount Disston.' Porter, Cook's topographer, confused this with Mount Hunter and so named it on the map. In consequence thereof, the present maps give the name ' Mt. Hunter ' to the high three-peaked mountain which is seen from the S.E. Its exact elevation and mapped location in relation to Mount Foraker and Mount McKinley should perhaps be received with some caution, as should also be the mapped elevation of the

[60] Cook : *To the Top of the Continent*, pp. 168–169, and map at pp. 152–153, London, 1909.

main backbone ridge between the two greater giants, and perhaps with better reason. The topography of the S.E. flank of the Alaska Range in this region offers a fascinating problem. Mount Hunter itself would certainly be a difficult mountain to climb, and perhaps even more difficult to reach.

Note on the Herron Glacier.

By OSCAR R. HOUSTON.

After we three beasts of burden (Anderson, Storey and myself) had deposited our loads at Camp 5 on the morning of July 30 we began the descent of the ridge in snow and mist. By the time we reached the site of Camp 4 the snow conditions were so bad that we were afraid of starting slides on the steeper slopes below and decided accordingly to spend the night there. The climbers had the Logan and bivouac tents, but we found the igloo very comfortable. Carl Anderson had dug this into the lee side of the steep ridge during leisure hours on the way up, in the manner frequently followed in the winter in Alaska. The entrance was a narrow tunnel opening into a chamber about 7 ft. square with a domed roof, from the centre of which a small ventilating hole, made with the long handle of the snow shovel, ran to the surface. In each of the three walls of the chamber a shelf was dug large enough to hold a sleeper. The whole was suggestive of a white marble mausoleum, designed for a family of three. Lying in our bags, protected from direct contact with the snow by air mattresses, we defied the snow and storm, and to us it was a comfortable home.

The next morning the snow surface was firmer, and we descended without difficulty to Camp 3, where we spent two nights.

Early on the next morning (August 2) we retraced our steps to Tranquillity Pass, followed a sheep trail down beside a small tributary glacier to the Herron Glacier, and thence down its eastern moraine to the timber below its snout.

The Herron Glacier has its source in half a dozen small glaciers or rather icefalls draining the western face of Foraker and a circle of lesser ridges prolonging the main range to the westward. Its beginning is somewhat lower than the snout of the W. Foraker Glacier, the slope to its foot is more gradual, and its course is nearly straight, lacking the right-angle curve of the W. Foraker. From these facts we thought it ought to be a much smoother glacier and wondered if perhaps we should have fared better had we chosen it for our ascent. But on reaching the Herron we found it so crevassed and broken throughout its 18 miles (more or less) of length as to be impracticable for travel. Without a longer examination than ours I would not venture to state the reason for this forbidding character, but I may hazard the following possible theory: From the E. two long and several short valleys run down to the glacier, and between

them are ridges of rock somewhat less friable than along the W. Foraker. It may be that these ridges extend across under the Herron Glacier and that its bed is a series of basins alternating with the remains of the ridges, and that the ice is fractured as it rises to top them. In one place near the lower end we could see that the level of the glacier rose over the extension of one ridge, and that rough cubes of ice, large as houses, stood above the general level.

The largest of the valleys, through which ran a glacial stream down to a lake at the edge of the glacier, we called ' Cariboo Valley.' It was the highest real grass and, where the ground was soft, the cariboo tracks were so thick that they overlapped and no untrodden earth remained. The day on which we crossed it was warm (speaking comparatively) and sunny, and the cariboo were high on the ridges, many of them on the skyline, and, through the glasses, they sometimes gave the effect of weird iron fences on the skyline. On another occasion, when Carl Anderson looked down into the valley from one of the scree ridges as a storm gathered, he saw a herd of some 1500 cariboo gathered on the lower grazing fields. We had seen no cariboo along the W. Foraker Glacier and the contrast was interesting. Sheep (*Ovis Dalli*) had no such preferences; every little rocky gulch on the side of both glaciers sheltered its little band of from five to twenty of them. Although none of these sheep or their ancestors have probably ever been hunted by man, they are very wary and could not be approached, except by stalking, for which we had no time. Perhaps they took us for wolves, which are their greatest foes.

Cariboo Valley probably affords an alternative route to the N.W. ridge for future climbing parties. It is practicable to bring a pack train up the moraine to the valley and then several miles up the glen. There seems to be a col at the head of the valley over which supplies could be carried into the upper glen of the W. Foraker Glacier and thence either up that glacier or along its moraine to Camp 3. Such a route would have the advantage of shortening materially the distance over which supplies must be carried by man power.

We spent the night beside a camp fire—a grateful change from the primus stove—and the next day skirted the foothills, largely following cariboo and moose trails, to our base camp. August 5 was spent at the base camp, where we picked up a few supplies that we thought would be useful if our stay at Tranquillity Camp should be prolonged, and that evening began our return, following our familiar route up the W. Foraker Glacier. We reached Camp 3 about noon the following day and, as the sky was clear and the weather superb, we scanned the mountain with glasses in the hope of seeing the climbers on the last lap of their way. We saw that they had moved on from Camp 5, but could see nothing more. So, after some 80 miles in two and a half days, we turned in and so missed seeing the successful party on the N. summit that afternoon.