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AURORA
AUSTRALIS



PUBLISHED AT THE
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OF THE BRITISH
ANTARCTIC EXPED
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ILLUSTRATED WITH
LITHOGRAPHS AND
ETCHINGS; BY
GEORGE MARSTON

PRINTED AT THE SIGN OF
'THE PENGUINS'; BY JOYCE
AND WILD.

LATITUDE $77^{\circ} \cdot 32'$ SOUTH
LONGITUDE $166^{\circ} \cdot 12'$ EAST
ANTARCTICA



TRADE MARK

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DEDICATED
TO
MISS DAWSON-LAMBTON.
AND
MISS ELIZABETH DAWSON-LAMBTON.
WHO HAVE EVER SHOWN THE DEEPEST
INTEREST IN ANTARCTIC EXPLORATION,
AND OUR WELFARE.

PREFACE

Some six years ago it fell to my lot to edit and print the first Antarctic publication; it is my fortune now to edit another.

There are essential differences between the two efforts, for *The South Polar Times* was typewritten and only one copy could be issued, whereas *Aurora Australis* is actually printed, and therefore allows of a larger edition. Again; the labours of the Editor are light, for the bulk of the work falls on the shoulders of the Printers and Artist.

If it had not been for the great generosity of the firm of Sir J. Causton & Sons, Ltd., we would never have had this opportunity of making such a memento of the winter months, for the above firm not only presented us with an entire printing and lithographic outfit including the necessary paper, but also allowed our Printers and Artist to obtain instruction at their works.

Now; seven years is the usual time to serve as apprentice to the printing and lithographic trades, and as only three weeks could be spared by the producers of this little book to learn the business, any shortcomings will be leniently viewed both by the small public in this colony and by our friends at home to whom we trust these pages will be of interest.

I take this opportunity to specially thank not only the heads of the firm that made this book possible, but also the managers of the various departments and the foremen, who did everything in their power to help our people.

During the sunless months which are now our portion; months lit only by vagrant moon and elusive aurora; we have found in this work an interest and a relaxation, and hope eventually it will prove the same to our friends in the distant Northland.

E. H. SHACKLETON.



ADDITIONAL PREFACE.

Since writing the preface for this book I have again looked over its pages, and though I can see but little not up to usual standard in bookmaking, the printers are not satisfied that it is everything that it ought to be. But the reader will understand better the difficulty of producing such a book quite up to the mark when he is told that, owing to the low temperature in the hut, the only way to keep the printing ink in a fit state to use was to have a candle burning under the inking plate; and so, if some pages are printed more lightly than others it is due to the difficulty of regulating the heat, and consequently the thinning or thickening of the ink. Again the printing office was only six feet by seven and had to accommodate a large sewing machine and bunks for two men, so the lack of room was a disadvantage; but I feel sure that those who see this book will not be captious critics. The printing was entirely done by Joyce and Wild, the lithography and etchings by

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Marston, and the covers made of provision cases were manufactured by Day. It is therefore to these four that the carrying out of the *Aurora Australis* is due; most of us have contributed an article of some sort, and I as Editor feel an interest in the work, as it was a pleasure to see it progressing; and I trust that all who have a copy will think kindly of the first attempt to print a book and illustrate it in the depth of an Antarctic Winter.

E. H. SHACKLETON.



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Under the Shadow of Erebus

THE ASCENT OF MOUNT EREBUS.



THE ASCENT OF MOUNT EREBUS



EREBUS was discovered by Sir James Clarke Ross on January 28th, 1841, and was so named by him after the leading ship of his famous expedition. Rising rapidly from sea level it rears itself aloft, from near the western side of Ross Island, to an altitude of over 13,000 feet.

If Ross Island be likened to a castle, flanking that wall at the world's end, The Great Ice Barrier, Erebus is the castle keep. Its flanks and foothills clothed with spotless snow, patched with the pale blue of glacier ice, its active crater crowned with a spreading smoke cloud, and overlooking the vast white plain of the Barrier to the East and South, the dark waters of Ross Sea and M^cMurdo Sound to the North and West, and still further West, the snowy summits of the extinct volcanoes of Victoria Land, Erebus not only commands a view of incomparable grandeur and interest, but is in itself one of the fairest and most majestic sights that Earth can show.

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Erebus, as seen from our winter quarters, showed distinctly the traces of the three craters, observed from a distance by the British National Antarctic Expedition of 1901 - 04. From sea level up to about 5,500 feet, the lower slopes ascend in a gentle but gradually steepening curve to the base of the first crater. They are largely covered with snow and glacier ice down to the shore, where the ice either breaks off to form a cliff, or, as at Glacier Tongue, spreads out seawards in the form of a narrow blue pier five miles in length: near Cape Royds, however, there are long smooth ridges of brown glacial gravels and moraines mostly bare of snow.

These are interspersed with masses of black volcanic rock, and extend to an altitude of about 1,000ft. Above this, and up to about 5,000 feet above the sea, all is snow and ice, except for an occasional outcrop of dark lava, or a black parasitic cone, sharply silhouetted against the light background of snow or sky.

At a level of about 6,000 feet, and just north of the second, or main crater, rises a huge black fang of rock, the relic of the oldest and lowest crater. Immediately south of this the principal cone sweeps upwards in that graceful double curve, concave below, convex above, so characteristic of volcanoes.

Rugged buttresses of dark volcanic rock, with

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steep snow slopes between, jut out at intervals, and support the rim of this second crater, which reaches an altitude of fully 11,400 feet. From the north edge of this crater the ground seemed to ascend, at first gradually, then somewhat abruptly to the third crater, now active, further south. It is above this last crater that there continually floats a huge steam cloud. At the time of Ross' Expedition this cloud was reddened with the glow of molten lava, and some thought they saw lava streams descending from the crater. The National Antarctic Expedition had also once or twice witnessed a similar glow, and although, during the few weeks we had been at Cape Royds we had not observed a similar phenomenon, we had at times seen the great steam cloud shoot up suddenly, in the space of a minute or so, to a height of fully 2,000 feet above the mountain top. This sudden uprush was obviously the result of a vast steam explosion in the interior of the volcano, and proved that it still possessed considerable activity.

Although several expeditions had been in its neighbourhood, Erebus had never been ascended. For us, living under its shadow, the longing to climb it, and penetrate the mysteries beyond the veil soon became irresistibly strong. But there were difficulties in the

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way. In the first place, the only party who had ascended the foothills of Erebus had found their path barred by heavily crevassed ice. That party consisted of E. E. Joyce, F. Wild, and A. Pillbeam, of the National Antarctic Expedition of 1901 - 04. Starting from Cape Barne, in January 1904, they worked their way inland towards Erebus, for about a mile, and estimated that they climbed to about 3,000 feet above sea level. Joyce and Wild informed us that in this direction the ice, owing to crevasses, was practically impassable for sledges. Then too, the winter was fast approaching, bringing with it blizzards, and temperatures likely to be specially low at high altitudes on Mount Erebus.

After careful consideration, Lieutenant Shackleton decided a reconnaissance in the direction of Erebus might be made, and that, if the risk did not appear to be too great, an attempt might be made to reach the summit of the mountain. He fixed the date for starting for the following morning, March 5th, and selected the first part of the route to be followed. After this every one bustled and hustled, and our winter quarters literally rang with the clang of preparation. Provisions, cooking utensils with primus lamps, cooking pots and snow melters and paraffin oil, deer skin sleeping bags,

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tents and poles, ice axes, alpine rope, ski-boots, finneskoes and sennegraes, and crampons were all got ready in hot haste. The crampons had to be specially made for the occasion. They are stout leather soles, each furnished with seven iron spikes, and provided with loops, so that they can be strapped on to the finneskoes, to prevent the wearer slipping on hard snow or ice. It was past midnight before the last spike was riveted.

On March 5th, after breakfast at 6 a. m., the packing of the 11 ft. sledge was completed; its total weight, with its load, being about five hundredweights.

The sledging party, arrayed in their antarctic costumes, including Burberry suits, then got into their sledging harness, and were photographed by Lieutenant Shackleton. The sledgers, six in number, were divided into parties of three each. The party for the ascent consisted of Dr. A. F. Mackay, D. Mawson, and Professor David, and was provisioned for eleven days.

The supporting party was formed of Lieut. J. B. Adams, Dr. E. S. Marshall and Sir Phillip Brocklehurst, and was provisioned for six days. The arrangement was that the supporting party were to assist the main party, until the ground became impracticable for a sledge. The former were then to return to winter quarters, unless they saw that it was practicable for

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them to continue the ascent with the main party, without lessening the latter's chances of reaching the summit.

A start was made at a quarter to nine a. m. All hands accompanied the sledging party across the rocky ridge at the back of our hut, and along the slopes of Backdoor Bay to the Blue Lake, half a mile distant. There we bade farewell to our comrades.

We steered first straight up a snow slope, then skirted closely some rocky ridges and moraines, in order to avoid crevassed glaciers.

About a mile out, and 400 feet above sea level, a glacial moraine barred our path, and we had to portage the sledge over it by slipping our ice-axes under the load between the runners and the 'bearers' of the sledge, and lifting it bodily over the obstruction. On the further side of the moraine was a sloping surface of ice and névé, on which the sledge soon capsized, but was quickly righted. Light snow was falling, and there was a slight wind.

Pulling the sledge proved fairly heavy work in places; at one spot, on the steep slope of a small glacier, we were struggling for some time, mostly on our hands and knees, in our efforts to drag the sledge up the surface of smooth blue ice thinly coated with loose

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snow. This difficulty surmounted, we made the acquaintance of some obstructive 'sastrugi', which impeded our progress not a little. Occasionally we came to blows, but these were dealt accidentally by a long armed finneskoe-shod cramponless sledge, who whirled his arms like a windmill in his desperate efforts to keep his balance after slipping. On such occasions the silence of our march was broken by a few words, more crisp than courteous, from the smitten one, and then once more nothing was to be heard but the soft pad of the finneskoes, the scrunch of the ski-boots, and the gentle sawing sound of the sledge-runners on the hard snow.

Soon after six p. m. we reached a small nunatak of black rock, 2,750 feet above sea level, and about seven miles distant from our winter quarters, and decided to camp there for the night. Our little green tents were quickly set up on their bamboo poles, and their skirts were speedily loaded with snow shovelled on them in place of pegs, to hold them down against the wind. The two primus lamps were soon singing merrily, snow was melted down, and in a few minutes we were each furnished, for the first time in our lives, with brimming bowls of hot 'hoosh', that is, pemmican boiled up with snow water, with chips of plasmon bis-

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cuit, or some emergency rations, or both, added. We had all developed a sledging appetite, and found the 'hoosh' delicious. By mistake, as he subsequently asserted, a knowing one put three times the maximum allowance of pemmican into the 'hoosh' of the three dwellers in one of the tents. He declared that this amount contained the irreducible minimum of food fuel needed to keep the lamp of life alight within us, so we ate earnestly that we might live; one of us, however, utterly failed to consume his treble ration, but the knowing one, after finishing the whole of his own allowance, came to the assistance of his distressed tent-fellow, and finished all his 'hoosh' for him, down to the fatty end. A man after such a meal, in any but a polar climate, would have seen in his sleep 'more devils than vast hell can hold,' but it speaks volumes for the climate, as well as for the strength of the quintuple-whacker's digestion, that on this occasion he slept soundly till dawn, and that too, with a volume of *Paradise Lost* in his pocket, without once seeing a vision of the swart hero of Milton's epic.

The following morning the temperature was -10° Fahr., and when we untoggled our sleeping bags, miniature showers of ice-crystals, formed from the freezing of the moisture of our breath on the rein-

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deer hair, fell on our faces. After a hearty breakfast of 'hoosh', plasmon biscuits, chocolate and tea, we struck the tents, repacked the sledges, and started again on our journey. The gradient increased now, as we toiled upwards, to 1 in 5, and we found it very hard work dragging the heavy sledge, especially as numerous large 'sastrugi' ran obliquely to our course. Frequently these 'sastrugi' caused our sledge to capsize, and several times it had not only to be righted, but repacked. Though the temperature at 3 p. m. was -8° Fahr., we found the pulling such warm work that we perspired freely.

Late in the evening we reached a spot a little over half a mile distant from the base of the second, or main cone, and camped this night at an altitude of about 5,630 feet. We had only travelled about three miles during the day, but had ascended over 2,800 feet above our previous camp.

Some of us when we turned into our sleeping bags after tea, found our socks firmly frozen to our ski-boots, and sock and boot had to be taken off in one piece: the temperature that night was -28° Fahr..

We were camped on a zone of less steep slope than that up which we had just travelled; this zone was continuous to the north east with the lowest and

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oldest crater of Erebus, and no doubt, marked the position of its old rim, partly buried at this spot under the material produced by later eruptions. We noticed at this second camp, and for over a mile before reaching it, small black fragments of very fresh volcanic slag lying on the surface of what appeared to be this year's snow. Here the fragments were as big as a cricket ball, and about a mile nearer to Erebus an occasional piece might be seen as large as a football: these were obviously volcanic bombs, and are evidence that Erebus has probably been producing a little lava within its crater either this year, or at all events only a very short time ago.

On the following morning Lieutenant Adams decided that the supporting party might accompany the main party in the final attempt to reach the summit. We accordingly made a depôt of our sledge and of part of the provisions, as well as of the tent poles, floor cloths of the tents, and part of the cooking utensils, and marked the spot with a black flag on a bamboo pole. We each had to carry a weight of about forty pounds, consisting chiefly of sleeping bags, two tents, and rations for three days. Dr. Marshall having photographed us, we filed off in a procession more bizarre than beautiful. Some of us with our sleeping bags

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hanging straight down our backs, with the foot of the bag curled upwards and outwards, resembled the scorpion men of the Assyrian sculptures: others marched with their household gods done up in the form of huge sausages; yet another presented Sindbad, with the place of the 'Old Man of the Sea' taken by a huge brown bag, stuffed with all our cooking utensils; this bag had a knack of suddenly slipping off his shoulders, and bow-stringing him around his neck.

There were not enough crampons for the whole party, and when we arrived at the steep hard snow slopes of the main cone, many were the slips, and nautical and naughty the expletives. At one of these snow slopes Mackay, who was in the van, and was cutting steps in the hard snow with his ice axe, slipped suddenly and glissaded with his heavy load for about a hundred feet, when fortunately his downward career was checked by a projecting ledge of snow. It was hard going, but borne up by 'hoosh', hope, and chocolate, we succeeded in reaching in the evening a small recess in a rocky arête, 8,750 feet above sea level.

When we turned into our sleeping bags, directly after tea at 8-30 p. m., the temperature was -20° Fahr.; the sunset had been clear and glorious, but an ominous cloud was creeping down upon us from the

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top of Erebus. Between nine and ten p. m., it began to blow hard, and when we awoke the following morning, we found a strong blizzard rushing over us from the south east. It increased in fury as the day wore on, and swept with terrible force down the rocky ravine where we were camped. So dense was the whirling snow, and so loud the roaring of the wind, that although our two parties were only about ten yards apart we could neither see nor hear each other. Neither of the two tents were set up, as we had no poles with us, but they were just doubled over the top ends of our sleeping bags, so as to protect their closely toggled slits from the drifting snow. Nevertheless a great deal of fine snow found its way into the bags.

In the afternoon Brocklehurst emerged from the three-man sleeping-bag, and instantly a fierce gust whirled away his wolf-skin mit; he dashed after it, and the force of the wind swept him some way down the ravine. Adams, who had left the bag at the same time as Brocklehurst, saw the latter vanish suddenly, and in endeavouring to return to the bag to fetch Marshall to help him to find Brocklehurst, was blown down by the force of the wind. Meanwhile Marshall, the only remaining occupant of the bag, had much ado to keep himself from being blown, sleeping-bag and

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all, down the ravine. Adams had just succeeded in reaching the sleeping bag, on his hands and knees. when Brocklehurst appeared, also on his hands and knees, having just succeeded by desperate efforts in pulling himself back, over the rocks: it was a close call. He was all but completely gone, so biting was the cold, before he reached the haven of the sleeping-bag. He and Adams crawled in, and then, as the bag had been much twisted up, and drifted with snow while Marshall had been holding it down, Adams and Marshall got out to try and straighten it up; a moment later the violent wind doubled the bag right over, and they had become so benumbed by the cold that they were unable to turn it over again. Providentially, just when they too were beginning to feel gone with the cold, the wind blew the bag right way up again, and opened it for them; they lost no time in slipping in.

There was nothing for it, while the blizzard lasted, but to lie low in our sleeping-bags. At intervals we munched a plasmon biscuit, or a piece of bovril chocolate. We had nothing to drink all that day and the following night, as of course, under the circumstances, it was impossible to keep a primus alight in order to thaw the snow for water. We got some sleep that night, in spite of the raging of the storm.

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When we awoke at 4 a. m. the following morning, we found that the blizzard was over, for which we were devoutly thankful. The primus was soon got going under the shelter of a rock, and we all turned out at 4 - 30 a. m.. After a good breakfast we repacked our loads, and started again about 5 - 30 a. m..

The angle of ascent was now steeper than ever, being 34° , that is a rise of 1 in $1\frac{1}{2}$. As the hard snow slopes were mostly much too steep to climb, without resorting to the tedious expedient of cutting steps with an ice-axe, we kept as much as possible to the rocky arêtes. Occasionally, however, the arête would terminate upwards in a large snow slope, and in such cases we cut steps across the névé to any arête which seemed to persist for some length in an upward direction. Often this second arête would end upwards in a névé field, and then we had to cut steps as before.

Burdened as we were with our forty pound loads, and more or less stiff after thirty continuous hours in our sleeping-bags, and beginning besides to find respiration more difficult as the altitude increased, we felt exhausted, while we were still 800 feet below the rim of the main crater. Accordingly we halted at noon, thawed some snow with the primus, and were soon revelling in cups of delicious tea, hot and strong, which

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at once reinvigorated us. Once more we tackled the ascent. When close to the top Mackay, who had become separated from the rest of the party, started cutting steps with his ice-axe up a long and very steep névé slope. The task was almost impossible for one so heavily loaded as he was, but nevertheless, he won his way unaided to the summit.

By this time we had reached the rim of the main crater. Often, while toiling up its slopes, we had tried to picture to ourselves the probable scenery at the summit, and had imagined an even plain of névé, or glacier ice, filling the extinct crater to the brim, and sloping up gradually to the active cone at its southern end: but we now found ourselves on the very brink of a massive precipice of black rock, forming the inner edge of the vast crater. This wall of dark lava is mostly vertical, while in places it overhangs: it is from 80 to 100 feet in height. The base of this cliff was separated from the snow plain beyond by a deep ditch, like a huge dry moat. The ditch was evidently not a 'bergschrand', but was due chiefly to the action of the blizzards. These winds blowing fiercely from the south-east, and striking against the great inner wall of the old crater, give rise to a powerful back eddy at the base of the cliff, and it is this eddy which has scooped

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out the deep trench in the hard snow; the trench was from thirty to forty feet deep, and was bounded by more or less vertical sides.

Beyond the wall and trench was an extensive snowfield, with the active cone and crater at its south end, the latter emitting great volumes of steam; but what surprised us most were the extraordinary structures which rose every here and there above the surface of this snowfield. These were in the form of mounds and pinnacles of the most varied and fantastic appearance. Some resembled bee-hives, others were like huge ventilating cowls, others like isolated turrets, or bits of battlemented walls; others again in shape resembled various animals. We were wholly unable at first sight, to divine the origin of these remarkable objects, and the need for rest and refreshment cut short contemplation for the time. We hurried along the rampart of the old crater wall, in search of a suitable camping ground. It was at this time that our figures, thrown up against the skyline, were seen through a telescope by Armytage from our winter quarters at Cape Royds, over twelve miles distant. We selected for our camp, a little rocky gully on the north-west slope of the main cone, and fifty feet below the rim of the old crater. Here we had the satisfaction of being

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able to ease our shoulders at last from their burdens.

While some cooked the meal, Dr. Marshall examined Brocklehurst's feet, as the latter stated that for some time past he had lost all feeling in them. We were all surprised and shocked, when his ski-boots and socks were taken off, to see that both his big toes were black, and had evidently been 'gone' for several hours, and that four more toes, though less severely affected, were also frost-bitten. It must have required great pluck and determination on his part to have climbed almost continuously for nine hours, up the steep and difficult track we had followed, with his feet so badly frost-bitten. Doctors Marshall and Mackay at once set to work with a will to restore circulation in the feet, by warming and chafing them. Their efforts were, under the circumstances, eminently successful, but it was clear that recovery from so severe a frost-bite would be slow and tedious. Brocklehurst's feet having been thoroughly warmed were put into dry socks, and finneskoes stuffed with sennegraes; and then we all had lunch at about 3-30 p. m..

Leaving Brocklehurst safely tucked up in the three man sleeping bag, the remaining five of us started off to explore the floor of the old crater. Ascending to the crater rim we climbed along it, until we came to a

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spot where there was a practicable breach in the crater wall, and where a narrow tongue of snow bridged the névé trench at its base. As soon as we arrived on the hard snow on the far side, Mackay joined us all up with the alpine rope, and with him in the lead we advanced cautiously over the snow plain, keeping a sharp lookout for crevasses. We steered for one of the remarkable mounds which had so interested us at a distance; when we reached the nearest of them, and cursorily examined it, we were as far as ever from understanding how it had formed: we noticed some curious hollows, like large drains partly roofed in, running towards the mound, and at the time we supposed these to be ordinary crevasses. Pushing on slowly we reached eventually a small parasitic cone, about 1,000 feet above the level of our camp, and over a mile distant.

Here peeped from under the snow brown masses of earthy looking material, which we found to consist of lumps of lava, large felspar crystals, from one to three inches in length, and fragments of pumice; both felspar and pumice were, in many cases, coated with sulphur. We now started to return to our camp; we were no longer roped together, as we had not met with any definite crevasses on our way up. We directed our steps towards one of the ice mounds, which

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resembled a lion couchant. To our surprise the lion appeared now to be blowing smoke out of his mouth.

The origin of the mounds was no longer a mystery; they were the outward and visible signs of fumaroles. In ordinary climates, a fumarole, or volcanic vapour well, may be detected by the thin cloud of steam above it, like breath exhaled on a frosty day, and usually one can at once feel the warmth, by passing one's hand into the vapour column; but, in the rigour of the Antarctic climate, the fumaroles of Erebus have their vapour turned into ice as soon as it reaches the surface of the snow plain. Thus ice mounds, somewhat similar in shape to the sinter mounds formed by the geysers of New Zealand, of Iceland, and of Yellowstone Park, are built up around the orifices of the fumaroles of Erebus. When exploring one of these fumaroles, Mackay fell suddenly up to his thighs into one of its concealed conduits; he saved himself however, from falling in deeper still, with his ice axe. Marshall had a nearly similar experience at about the same time. Eventually we all arrived safely at our camp soon after 6 p. m., and found Brocklehurst progressing as well as could be expected.

As we sat on the rocks at tea, we had a glorious view to the west. While the foothills of Erebus flush-

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ed rosy red in the sunset, a vast rolling sea of cumulus cloud covered all the land from Cape Bird to Cape Royds. McMurdo Sound, now rapidly freezing over, showed warm ochreous tints, where the floe ice had formed, with dark purplish gray streaks marking the leads of open water between. Far away the Western Mountains glowed with the purest tints of greenish purple and amethyst. That night we had nothing but hard rock rubble under our sleeping-bags, and quite anticipated another blizzard; nevertheless, 'weariness can snore upon the flint,' and thus we slept soundly couched on Kenyte lava.

The following morning had two surprises for us; first, when we arose at 4 a.m. there was no sign of a blizzard, and next, while we were preparing breakfast, some one exclaimed, "Look at the great shadow of Erebus," and a truly wonderful sight it was. All the land below the base of the main cone, and for forty miles to the west of it, across McMurdo Sound, was a rolling sea of dense cumulus cloud. Projected obliquely on this, as on a vast magic lantern screen, was the huge bulk of the giant volcano. The sun had just risen, and flung the shadow of Erebus right across the Sound, and against the foothills of the Western Mountains. Every detail of the profile of Erebus, as outlined

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on the clouds, could be readily recognized. There to the right was the great black fang, the relic of the first crater; far above and beyond that was to be seen the rim of the main crater, near our camp; then further to the left, and still higher, rose the active crater with its canopy of steam faithfully portrayed on the cloud screen. Still further to the left the dark shadow dipped rapidly down into the shining fields of cloud below. All within the shadow of Erebus was a soft bluish grey; all without was warm, bright and golden. Words fail to describe a scene of such transcendent majesty and beauty.

After breakfast while Marshall was attending to Brocklehurst's feet, the hypsometer which had become frozen on the way up, was thawed out with the heat of the primus, and a boiling point determination was made. This when reduced, and combined with the mean of our aneroid levels, made the altitude of the old crater rim, just above our camp, 11,400 feet. The highest point reached by us on the preceding evening, according to our aneroid, was about 1,000 feet above the preceding level, and thus was 12,400 feet above the sea.

At 6 a. m. we left our camp, and made all speed to reach the crater summit. As soon as we had crossed

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the snow trench, at the foot of the cliff, we roped ourselves together in the same order as before, and stood over towards a conspicuous fumarole. This was the one which bore some resemblance to a lion; it was about 20 feet in height; Mawson photographed this from here, and also took a view of the active crater, about one and a half miles distant. There was considerable difficulty in taking photographs on Erebus, owing to the focal plane of the camera having become frozen. Near the furthest point reached by us on the preceding afternoon, we observed that there were several patches of ice of a lemon-yellow colour, the yellow being due to sulphur. We next ascended several rather steep slopes, formed of alternating beds of hard snow and vast quantities of large and perfect felspar crystals, mixed with pumice; all these beds dipped away from the active crater. A little further on we reached the foot of the recent cone of the active crater; here we unroped, as there was no possibility of any crevasses ahead of us.

Our progress was now painfully slow, as the altitude and cold combined to make respiration difficult.

The cone was built up chiefly of blocks of pumice, from a few inches up to three feet in diameter. Externally these were grey, or often yellow, owing to



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incrustations of sulphur, but internally they were of a resinous brown colour. A shout of joy and surprise broke from the leading files, when a little after 10 a. m., the edge of the active crater was at last reached. We had travelled only about two and a half miles from our camp, and had ascended just 2,000 feet, and yet this had taken us, with a few short halts, just four hours.

The scene that now suddenly burst upon us was magnificent and awe-inspiring. We stood on the verge of a vast abyss, and at first could neither see to the bottom, nor across it, on account of the huge mass of steam filling the crater, and soaring aloft in a column 500 to 1,000 feet high. After a continuous loud hissing sound, lasting for some minutes, there would come from below a big dull boom, and immediately afterwards a great globular mass of steam would rush upwards to swell the volume of the snow-white cloud which ever sways over the crater. These phenomena recurred at intervals of a few minutes during the whole of our stay at the crater. Meanwhile the whole of the air around us was extremely redolent of burning sulphur.

Presently a gentle northerly breeze fanned away the steam cloud and at once the whole crater stood

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revealed to us in all its vast extent and depth.

Mawson's measurements made the depth 900 feet, and the greatest width about half a mile. There were evidently at least three well-like openings at the bottom of the caldron, and it was from these that the steam explosions proceeded. Near the south-west portion of the crater, there was an immense rift in the rim perhaps 300 to 400 feet deep. The crater wall opposite to the one at the top of which we were standing, presented features of special interest. Beds of dark pumiceous lava, or pumice alternated with white zones of snow; there was no direct evidence that the snow was interbedded with the lava, though it is possible that such may have been the case. From the top of one of the thickest of the lava, or pumice beds, just where it touched a belt of snow, there rose scores of small steam jets, all in a row; they were too numerous and too close together to have been each an independent fumarole. The appearance was rather suggestive of the snow being converted into steam by the heat of the layer of rock immediately below it. While at the crater's edge we made a boiling point determination with the hypsometer, but the result was not so satisfactory as that made earlier in the morning at our camp. As the result of averaging aneroid levels, to-

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gether with the hypsometer determination at our camp at the top of the old crater, calculations made by us show that the summit of Erebus is probably about 13,370 feet above sea-level.

As soon as our measurements had been made, and some photographs had been taken by Mawson, we hurried back towards our camp, as it was imperatively necessary to get Brocklehurst down to the base of the main cone that day, and this meant a descent in all, of nearly 8,000 feet. On the way back a traverse was made of the main crater, and levels taken for constructing a geological section; we also collected numerous specimens of the unique felspar crystals, and of the pumice and sulphur.

On arrival in camp we had a hasty meal, and having hurriedly packed up, shouldered our burdens once more, and started down the steep mountain slope. Brocklehurst insisted on carrying his heavy load, in spite of his frost-bitten feet. We followed a course a little to the west of the one we took when ascending. The rock was rubbly and kept slipping under our feet, so that falls were frequent. After descending a few hundreds of feet, we found that the rubbly spur of rock, down which we were floundering, ended abruptly in a long and steep *névé* slope.

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Three courses were now open to us; either to retrace our steps to the point above us, where our rocky spur had deviated from the main arête; or to cut steps across the névé slope to this arête; or to glissade down some 500 to 600 feet to the rocky ledge below. Naturally, in our then tired state, we preferred to move in the path of least resistance offered by the glissade; accordingly we all dumped our burdens, and rearranged such as needed to be altered, so that they might all well and truly roll. We were now very thirsty, and some of us quenched our thirst, satisfactorily for the time, by gathering a little snow, squeezing it into a ball in the palm of one's hand, and then placing it on the surface of a piece of rock. Although the shade temperature was then considerably below zero, Fahr., the black rock had absorbed so much heat from the direct rays of the sun, that the snowball, when placed on it, commenced to melt almost immediately, and the thaw water started to trickle over the surface of the rock. The chill having been taken off the snowball in this way, the remainder could be safely transferred to one's mouth, and yielded a refreshing drink.

Our loads having now been modelled into the shape of sausages, we launched them down the slope, and watched them intently, as, like animated things,

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they bumped and bounded over the wavy ridges of the névé slope. Brocklehurst's load, consisting largely of all our cooking utensils, done up in a large bag, if not the most erratic, was certainly the noisiest, and recalled, on a small scale, Kipling's Bolivar, 'clanging like a smithy shop after every roll'. The battered remains of the aluminium vessels fetched up with a final big bang against the rocks below. Mackay now led the glissade, and firmly grasping his ice-axe, slid to the bottom in less than a minute; we all followed suit.

As we gathered speed on our downward course, and the chisel edge of the ice-axe bit deeper into the hard névé, it sprayed our faces and necks with a miniature shower of ice. The temperature was low, and whenever the steel of the ice-axe touched one's bare skin, it seemed to burn it like a hot iron. We all reached the bottom of the slope safely, and fired with the success of our first glissade, and finding an almost endless succession of snow slopes below us, we let ourselves go again and again, in a series of wild rushes towards the foot of the main cone. Here and there we bumped heavily against the opposing edges of hard 'sastrugi', or tore our nether garments on projecting points of sharp rock. Unfortunately it was not only clothes and cookers which suffered in our wild career:

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a valuable aneroid was lost, and one of the hypsometer thermometers broken. It seemed as though we should never reach the bottom of the cone, but at last the slope flattened out to the gently inclined terrace, where our depôt lay; altogether we had dropped down 5,000 feet in level by glissading.

Adams and Marshall were the first to reach the depôt, the rest of the party, with the exception of Brocklehurst, having made a detour to their left, in consequence of having to pursue some lost luggage in that direction. At the depôt, the blizzard of Sunday the 8th, had made sad havoc of our gear; the sledge had been overturned, and some of our belongings blown right away, while the remainder had been scattered to some distance, and were now partly or wholly covered by drift snow. After setting up the tent, Adams and Marshall returned over half a mile to re-join Brocklehurst. Meanwhile a slight blizzard had sprung up, which completely blotted out the depôt from view; fortunately the wind soon died down, and Adams, Marshall, and Brocklehurst were able to regain the camp. Tea was soon brewed with the help of the primus. The remainder of the party arrived at the depôt at about 10 p. m..

It was suggested that, as a blizzard seemed to be

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impending, we had better abandon our gear, and push on for winter quarters that night, but as it was somewhat dark, and we had already had a very hard day, having been going since 4 a. m., we decided to rest there that night, and to make an early start the next morning; so we camped that night at our depôt, and at 3 a. m. Adams stirred us out, and made ready the breakfast. After breakfast there was much ado about hunting after missing articles, which had been flung about by the blizzard. The quarter-plate camera was found by Marshall in a small snow drift, some little distance from our sledge. At last most of our belongings were recovered, the sledge packed, and we resumed our march at 5-30 a. m..

We now found the 'sastrugi', which were from four to five feet in height, and oblique to our course, very troublesome. We put rope brakes on the sledge-runners, and while two of us pulled in front, and two steadied the sledge, two pulled back behind; but the sledge either refused to move, or suddenly took charge, and kept overrunning those who were dragging it, and capsizes occurred every few minutes.

Marshall devised the best means of making progress: he let the sledge take charge, then, before it had got up much speed, he jumped on behind, and steered

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it with his legs, as it bumped and jolted over the 'sastrugi'; but frequently the muscular ex-captain of the Bartholemew's Hospital Rugby Union Football Team, found that not all his thirteen stone weight could save him from being bucked right over the sledge, and flung on the névé on the other side. Fortunately no bones were broken, and we reached the nunatak at our first camp, six miles distant from Winter Quarters at Cape Royds, at about 7-30 a. m..

By this time there was every symptom of the approach of a blizzard, and already the snow was beginning to drift before a gusty south-easterly wind. This threatened soon to cut us off from all view of our winter quarters. We were beginning to feel dog tired: one of our tents had a large hole burnt in it, the oil supply was almost done, one of our primus stoves had been put out of action, as the result of our glissade; so we didn't relish the prospect, under the circumstances, of weathering another blizzard in our tents. We decided therefore to make a dash for Cape Royds.

In the uncertain grey light of a windy sky, the 'sastrugi' did not show up in relief, and literally at about every twenty yards some member of the party stumbled, and fell sprawling over the snow.

At last we were gladdened by the sight of the

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shining ice surface of the Blue Lake, only half a mile from our winter quarters. Now that the haven was at hand, and the strain and stress over, (for it had proved a pretty severe strain for most of us,) we suddenly felt our limbs grow heavy and leaden, just as they sometimes seem to in a nightmare, when one imagines oneself pursued by wild beasts.

When close to the hut, we formed in line, and saw Lieutenant Shackleton and the rest of our comrades rush out to meet us; he hailed us with the cry, "Did you get to the top"? At first there was no response, presumably because each one of us was waiting for the other to speak, and what's everybody's business is, of course, nobody's business. Then Adams sung out "Yes", and they all gave us a hearty cheer.

Many were the hand-shakings, and warm the welcome. How cosy and luxurious were our winter quarters after the wind-swept slopes of Erebus! and how delightful it was to pour our travellers' tales into the ears of willing listeners! These tales probably lost nothing in the telling, from the fact that the doctor administered to each of us, just as an antidote to collapse, of course, a small dose of champagne. Fearing that our listeners might suffer from collapse through excess of strain upon their credulity, the doctor pre-

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scribed for all of them a similar treatment.

Never shall we forget the delicious hot porridge and milk which our good friend "Bobs" produced for us, at a moment's notice, as if by magic, and the prime boiled ham and sweet home-made bread and the fresh butter which followed. The way we made those victuals vanish must have astounded all but the old hands among our comrades; they had evidently been there before. After the meal came more talk and more congratulations, which filled the cup of our happiness to overflowing. Then followed rest, and the long sound sleep that comes to weary travellers.

The rest of the story is soon told. After some delay, on account of unfavourable weather, a party consisting of Adams, Armytage, David, Joyce, Wild and Marshall, started with a 7 ft. sledge, tent, and provisions, to fetch in the 11 ft. sledge, left near the nunatak at our first camp. After a fairly heavy pull over the soft new fallen snow, in cloudy weather, with the temperature at mid-day -20° , and the wind blowing from the south-east, we just managed to sight the nunatak, recovered the 11 ft. sledge, placed the 7 ft. sledge on top of it, and pulled them both back together as far as the Blue Lake. The following morning two of the Manchurian ponies were harnessed to the

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sledges, and dragged them up the rocky ridge which bounds the Blue Lake on the west, and then took them on to our winter quarters. Our specimens collected on Erebus all arrived safely.

The scientific results of the ascent of Erebus will, it is hoped, prove of considerable interest. Probably there is no more important spot in the world for studying the movements of the upper atmosphere. The place for scientific results is not here, but rather in the contemplated meteorological, geological, and mineralogical memoirs of this expedition.

On looking back at our trip to Erebus, one cannot but be impressed with the wonder of the sights and scenes that had unfolded themselves to us during our brief journey. The glorious sunsets, the magic of the sunrise seen from our camp above the clouds, when the great shadow of Erebus swept across McMurdo Sound, and touched the far-off Western Mountains, the weird shapes of the green and white ice mounds built around the fumaroles of the old crater, its pavement of sparkling felspar crystals interspersed with snow and pumice; the hissing and booming caldron of the modern crater, with its long lines of steam jets, and its snow-white pillar of steam, will never fade from the memory.

One cannot but be impressed with the fact that

MIDWINTER NIGHT.



MIDWINTER NIGHT.

The acetylene splutters and flickers,
The night comes into its own.
Outside Ambrose and Terror
Are snarling over a bone.

And this is the tale the watchman,
Awake in the dead of night,
Tells of the fourteen sleepers
Whose snoring gives him the blight.

The revels of Eros and Bacchus
Are mingled in some of their dreams,
For the songs they gustily gurgle
Are allied to bibulous themes.

And subjects re barmaids and bottles,
Whisky and barrels of beer,
Are mixed with amorous pleadings
That sound decidedly queer.

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Darling you really love me?
Stutters one dreaming swain;
The watchman whispers "Never,"
And the dreamer writhes in pain.

From the corner cabin a mutter,
The listener kens not what;
It sounds like "yon pale moon,"
Or some other poetic rot.

Murder is done in another's dream
And falls from shuddering heights;
Erebus rises to dance on the sea
And the dreamer flees south in tights.

Another sails north on the broken ice
Just dressed in Nature's clothes,
Whilst seals and penguins grin in delight
And the frost plays hell with his toes.

And some see tailors they knew of yore,
Stalk in with their mile-long bills;
And everyone when morning broke
Made a rush for calomel pills.

VERITAS.

NIGHT WATCHMAN.



