Descending Lhotse in cloud, May 2013. *(Kenton Cool)*

down on the summit in 2005, it was touch and go; a rescue above about 6500m is still not possible.

Such a degree of mortal exposure is unique in this day and age; at 8000m climbing still holds that air of perilous remoteness. The dangers that existed back in 1922 still exist; Everest is still a dangerous mountain to climb; one only needs to look at 2012 and the events of 19 May when four people lost their lives.

Yet despite the risks and common misconceptions, the future of Everest is bright and exciting. I believe we will see a shake-up in how people approach climbing on the North side (due to increased peak fees by the Chinese), meanwhile the South will continue to be the focus of the higher end commercial expeditions. Here, though there will be constant refinement of practices, the scene is likely to remain essentially the same as it has for the last 20 years.

Dorje Gylgen summits Everest for the 10th time, May 2013. *(Kenton Cool)*

The allure for climbers seems just as insistent, both for the expert and the relative novice; after all, though the summit has now been reached by thousands, Everest still represents a symbol of ultimate endeavour today very much as it did in the 1920s when Charles Bruce and his team first set foot on the mountain. And the raw mountain, Everest her true self, remains forever undiminished, her outer mantle changed only by the natural forces of geological time. She has stood there for countless millennia and will doubtless still be standing proud in the same glorious way long after human beings have left this Earth.



HARRIET TUCKEY

# Summit Manoeuvres

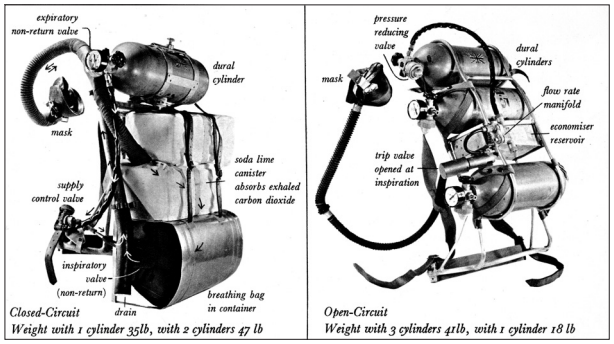
## A Reassessment of John Hunt's Top Camp Tactics

Charles Evans on the South Summit of Everest. *(Tom Bourdillon/Royal Geographical Society)*

Around 1pm on 26 May 1953, Tom Bourdillon and Charles Evans became the first human beings to reach Everest's south summit. There they paused and contemplated the route ahead, tempting and thrilling. 'A wilder and more fantastic ridge than either of us had seen before,' wrote Bourdillon. Bourdillon's photograph of Evans gazing towards the unseen summit is one of the icons of mountaineering, conveying excitement and wonder – but also regret, because they were out of time to reach the

summit. Bourdillon was feeling stronger than Evans, who had been experiencing problems with his oxygen set, but the pair reluctantly concluded that they should abandon their summit hopes and return to the South Col. They embarked on what Bourdillon described as 'a nightmare descent', surviving multiple slips and falls before reaching the col in a state of utter exhaustion. Even so Bourdillon was still murmuring: 'We should have gone on.'

Three days later Edmund Hillary and Tenzing Norgay reached the top of the world. Bourdillon was left full of regret at having turned back, coupled with a further disappointment. He and Evans had been using closed-circuit oxygen equipment that he and his father, a scientist at the Medical Research Council, had designed. Now he had to face the fact that the system had failed its most important test.




Detail of open and closed circuit oxygen equipment. *(Royal Geographical Society)*

Two malfunctioning valves in Evans's oxygen set – one broken and one frozen – had delayed their start from the South Col by an hour and a half. There were no spares so Bourdillon replaced the broken valve with a less suitable one from an open-circuit set. For a while the sets functioned well, but when Evans's set developed another fault he became exhausted trying to keep up with Bourdillon. By the time they reached their highest point – Everest's South Summit at 8750m – it was clear he would not be able to go on. Also they had been climbing more slowly and no longer had sufficient oxygen to reach the summit and return safely.

Hillary and Tenzing, by contrast, used the more reliable open-circuit equipment and succeeded. Bourdillon's regrets remained unassuaged to the day he died in a fall in the Bernese Oberland in 1956. Evans, originally a surgeon, went on to a distinguished career as an academic, despite suffering from multiple sclerosis. He was knighted in 1969 and died in 1995.

Most of the above is well known. What is also known, at least among mountaineers, is that there was controversy over the way expedition leader John Hunt organised the two summit attempts. Hunt had appeared to hedge his bets: first Bourdillon and Evans would try for the top using closed-circuit equipment, then would come Hillary and Tenzing with open-circuit sets. It also seemed that the odds were stacked against Bourdillon and Evans because they would start their attempt from the South Col, with the aim of summiting and returning to the col in one day; Hillary and Tenzing, however, were to be allowed the apparent luxury of a camp halfway up the south-east ridge – thus requiring them to ascend only half of the distance of Bourdillon and Evans on their summit day.



Griffith Pugh blowing blood samples on to blotting paper for inspection. *(George Lowe/ Royal Geographical Society)*

Two members of the team objected strongly to this plan at the time. Alf Gregory protested that without a high camp the first summit pair would have no realistic prospect of success. Michael Ward, the expedition doctor, strongly agreed with Gregory, regarding Hunt's strategy as both odd and dangerous[1]. Ward revived what became known as the 'high camp controversy' in 1972 and again in 1991. Hunt found Ward's accusations deeply hurtful, although he remained silent in public.

Griffith Pugh in tent with scientific laboratory equipment. *(Alfred Gregory/Royal Geographical Society)*

However, in the course of writing a biography of my father, Dr Griffith Pugh, the expedition's physiologist, I have come across fresh evidence that casts the 'controversy' in a different light, vindicating Hunt and providing crucial detail about the way the expedition was organised. I am delighted to have the opportunity to set out the key issues and evidence in this article for the *Alpine Journal*.

Closed-circuit oxygen was an alternative to the simpler open-circuit system that had been adapted from standard RAF oxygen equipment and was first used on Everest in 1922. Climbers using the open-circuit sets breathed in normal ambient air, supplemented by a small amount of oxygen from the cylinders carried on their backs, and breathed out directly into the atmosphere. This was wasteful because any oxygen not absorbed by their lungs on inhaling was

1. Ward was critical of other aspects of the plan as well. He was particularly concerned that Hunt had allotted to himself a key role of helping to ferry supplies up to the highest camp, arguing that he wasn't sufficiently fit and should leave this job to younger men. He also suggested that it was unsafe to send Bourdillon and Evans up with the somewhat unreliable closed-circuit sets and no high camp within relatively easy reach if they ran into trouble.


Tom Bourdillon prepares a closed circuit oxygen set at Camp IV for his attempt on the summit with Charles Evans. *(Alfred Gregory / Royal Geographical Society)*

lost on breathing out. Also the open-circuit provided only a small amount of supplementary oxygen – usually between two and four litres a minute – to climbers who might be breathing at a rate of, say, 120 litres a minute, or more, so it did not enable them to climb much faster than they could without oxygen, although it did make them feel much better and they had to stop and rest less often. The open-circuit system is still used on Everest today.

In sharp contrast, climbers using the closed-circuit system – first introduced on Everest in 1936 and based on oxygen equipment developed for fire-fighting and mine rescue – breathed virtually 100 percent oxygen entirely from the cylinders on their backs and remained completely cut off from the outside air. Exhaled breath was diverted through a canister of soda lime powder which absorbed the carbon dioxide and released the remaining unused oxygen to be recycled back to the climber, topped up as required by fresh oxygen from their cylinders. The system was so efficient that climbers were able to breathe 100 percent oxygen for several hours without having to carry an impractically large store of the gas on their backs. The result was that they could climb very much faster than with the open-circuit.

However, the closed-circuit sets were plagued by a series of well-known problems. The soda-lime filter increased the resistance to breathing, making climbers feel they were suffocating; the filtering process gave off heat and water which bubbled in the tubes and tended to freeze the valves; channels and gaps sometimes formed in the soda lime allowing carbon dioxide to flow through without being filtered and escape back to the climber. Also the system required a completely airtight mask that had not yet been satisfactorily developed.



Tom Bourdillon and his father, R B Bourdillon, believed they could successfully modify and improve the sets in time for the 1953 expedition and after much concerted lobbying in Everest circles – in the teeth of vehement opposition from some quarters – they won the opportunity to try. Tom was released from his government job as a rocket scientist to work on the modifications with his father. Like the Bourdillons, most of the physiologists on the Medical Research Council's High Altitude Committee (HAC), which was responsible for 'controlling' the 1953 expedition's oxygen policy, were impressed with the closed-circuit. Sir Bryan Matthews, the world renowned altitude expert who headed the HAC, and Griffith Pugh, who had tested the impact of oxygen at high altitude on Cho Oyu in 1952, both suspected that the open-circuit system might prove inadequate, and that a closed-circuit system, like the one the Bourdillons were working on, might ultimately be necessary for a successful ascent of Everest[2].

Doubts about the open-circuit were mainly logistical. In its then state of development, the climbers using it would not be able to ascend fast enough, nor could they carry enough oxygen, to make the full 900m climb from the camp on the South Col to the summit and return the same day. They would need an overnight camp and oxygen store on the way up. But the scientists feared that it would be hard enough to get sufficient oxygen and supplies up onto the South Col for two summit bids, and even more difficult to stock a higher camp far above the col. The advantage of the closed-circuit was that, theoretically at least, climbers using it would be able to ascend so fast that they could get to the summit and back in a single day without the need of an intermediate camp.

Bourdillon and Evans leave Camp IV for the first attempt at the summit. *(George Lowe / Royal Geographical Society)*

Ten days after John Hunt took up his post as leader of the 1953 expedition, Otto Edholm, a member of the HAC, arranged a private meeting between Tom Bourdillon's father and Hunt to discuss the closed-circuit system. 'Valuable as we expect the open-circuit sets to be,' Edholm told Hunt beforehand, 'closed circuit sets, if a proper design could be provided, would be much more useful.'[3]

2. Sir Bryan Matthews, for example, had spoken in favour of the closed circuit system at the RGS in 1937 (*Geographical Journal* Vol.XC 2 August 1937, p143), saying 'It seems to me an enormous advance over all previous apparatus.'
3. RGS EE.75.Reports on apparatus: Letter, Edholm to Hunt, 28 October 1952.

Evans and Bourdillon resting at Swiss Camp V while breathing oxygen from their closed-circuit sets. John Hunt's oxygen set in the foreground. *(John Hunt/ Royal Geographical Society)*

A few weeks earlier, Bourdillon senior had written a hitherto overlooked paper examining the problems of supplying a high camp above the South Col, estimating the weights of the loads, calculating the numbers of Sherpas needed, and the extra equipment and provisions for the Sherpas themselves.[4] He concluded that, without great good luck, the manpower available to the expedition would hardly be adequate to the task. However, compared with a two-day summit bid with the open-circuit, a one-day attempt with the closed-circuit would prove an 'enormous advantage', requiring less oxygen, fewer Sherpas and fewer supplies on the South Col – all the problems would be greatly reduced. Therefore, on the basis that the expedition should have at least two shots at the summit, Bourdillon senior strongly recommended that closed-circuit oxygen be used for the first summit attempt without a high camp. If that failed a high camp could be supplied for a second attempt with open-circuit oxygen. This was the case he put to Hunt.

After the meeting Hunt wrote to Bourdillon and Edholm confirming that he was indeed thinking of using closed-circuit oxygen for one of the expedition's attempts on the summit. He was, he said, persuaded of 'the potential value of the closed-circuit apparatus and the consequent wisdom of having such equipment available for eventual use in the final assault'. If Bourdillon could produce the sets in time, he would 'most readily' experiment with them on the mountain and if they worked well, 'it may well be

4. RGS EE 68.2: unpublished paper entitled 'Oxygen Apparatus for Everest in 1953'.



that the closed-circuit apparatus will be used in the assault'.[5]

While they could see the potential advantages of the closed-circuit, Bryan Matthews and Griffith Pugh were less hopeful than the Bourdillons that the technical difficulties could be ironed out in time. They therefore insisted that 'firm priority' be given to the tried and tested open-circuit, while remaining strongly in favour of taking both systems to Everest.[6] As Pugh put it: 'It would be highly desirable to have closed-circuit sets available for trial on the next Everest expedition, but quite unsafe to rely on them as the sole method of applying oxygen.'[7]

The Everest preparations were conducted in an atmosphere of secrecy. The background debates and fears were not shared with most of the team, even less the general public. However speaking to an audience at the Royal Geographical Society a few weeks later, in December 1952, Griffith Pugh spilled the beans about the doubts about the oxygen. 'We shall be putting our faith in an old-fashioned open-circuit system because we know that it will work,' he told the assembled company. But it did not guarantee success:

> *The unfortunate part is that because nine-tenths of the oxygen is wasted it is necessary to take with us a large number of oxygen cylinders and it is doubtful whether it is possible to take enough up to the South Col to supply the climbers with sufficient oxygen.*[8]

Pugh also let slip that he doubted whether the Bourdillons' closed-circuit could be made to work in time. Behind the scenes Pugh's remarks caused quite a stir and provoked John Hunt to write warning him not to be so open for fear of undermining the confidence of the climbers.[9]

When the expedition arrived in the Everest area, the testing of the redesigned closed-circuit oxygen sets commenced and they appeared to perform well. On 4 May, just three days before Hunt announced his summit plan, Tom Bourdillon sent an enthusiastic letter from base camp to an oxygen colleague back in England re-affirming his belief that 'an attempt direct from the [South] Col to the top with the closed-circuit' would give the best chance of success.[10]

As the expedition moved towards its climax, it rapidly became clear that the scientists had been right to worry that the process of transporting stores up to the 'assault base camp' on the 7900m South Col would prove a severe test. At one point it looked as if the whole expedition might founder when both teams of Sherpas carrying to the South Col stopped at camp VII half way up the Lhotse Face and refused to continue, saying they were too

5. RGS EE 75.Reports on Apparatus.
6. A letter from the Medical Research Council reporting on the work of the High Altitude Committee concluded, 'none of the physiologists on the committee are satisfied that the present equipment is really adequate. I think it unlikely that the present expedition will succeed in getting to the top of Everest unless weather conditions are perfect.' Edholm to Himsworth, 27 February 1953, TNA FD1/8096
7. Cho Oyu report p33.
8. Shipton, Eric, 'The Expedition to Cho Oyu', *Geographical Journal*, Vol. CX1X.2 2 June 1953 pp129-39.
9. Pugh's personal papers 35.10: letter dated 30 December 1952.
10. Alpine Club Archive E 27: letter Bourdillon to Alf Bridge.

sick. Only after Hillary and Tenzing – whom Hunt had planned to keep fresh for their imminent summit attempt – went up to stiffen the Sherpas' resolve, did they relent and carry on. A crumpled, handwritten letter sent by Hunt at advanced base camp to Griff Pugh down at camp III, pleading for help, reveals the extreme tension he was under. Full of dramatic underlining, the letter begins, 'Dear Griff, Most Important. I am sending you the following two men who have failed us in our vital carry to the South Col.' He implores Griff 'most urgently to send up replacements'. 'Please do not fail us.'[11]

Ferrying oxygen and supplies to the high camp above the col proved even more difficult. John Hunt had selected a group of elite Sherpas to undertake this job. All but two dropped out. While Bourdillon and Evans were making the first summit attempt, Hunt and Da Namgyal, the one Sherpa willing to accompany him, took up as much as they could of the first tranche of supplies for the high camp but failed to get as high as planned. Dumping their loads below the allotted target, they returned to the South Col, utterly exhausted, Hunt gasping, 'fighting for life' and losing control of his bowels before collapsing near the col.

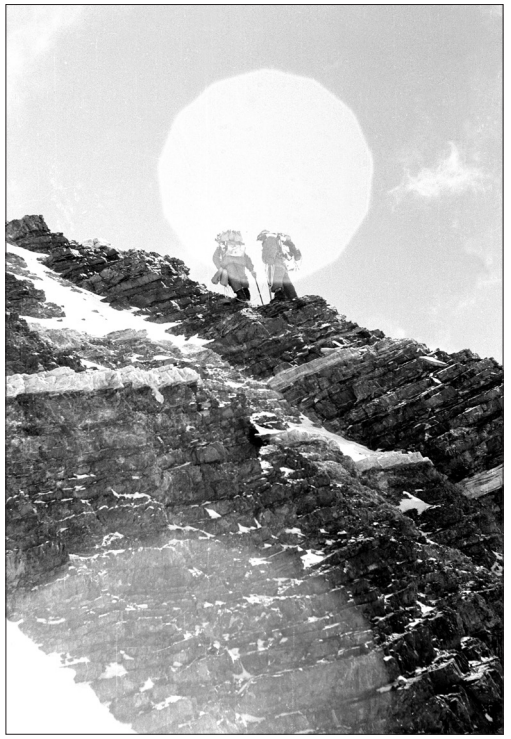
Two days later Hillary and Tenzing set out from the South Col. It had been planned that they would be accompanied by three Sherpas and Alf Gregory carrying further oxygen and supplies for their high camp. But only one Sherpa, Ang Nyima, had agreed to join the carry. George Lowe substituted for one of the missing men but they were still a man short. Consequently all had to carry heavier loads than planned. When they picked up the additional loads left by Hunt and Da Namgyal they turned up their oxygen flow to help cope with the extra weight, using up part of the supply intended for the following day's summit bid. There was no spare capacity.

Having criticised Hunt's plans at the time, Michael Ward reignited the high camp controversy 19 years later in his autobiography, *In This Short Span*, published in 1972. Why, Ward asked, had Hunt adopted such an 'odd plan'. Why had he denied Evans and Bourdillon the advantage of a high camp? 'I felt immeasurably sad and annoyed that they were not being given a proper chance,' he wrote. 'It seemed such a useless waste to start from the South Col – an attempt doomed to failure – when all that was needed was a night at a high camp.'[12]

Later he would go further, accusing Hunt of not having intended the first pair – the Englishmen – to get to the top – inevitably inviting the question, why not?

Hunt was hurt by this outright criticism of his leadership, yet chose not to defend or explain himself, hoping the issue would simply die down. Instead speculation flourished. 'Surely the correct sequence would have been to establish [the high camp] … and send both teams off from it in turn?' opined the Everest historian Walt Unsworth in 1981, and accused Hunt of a 'most unconvincing ambivalence towards the closed-circuit

11. Pugh PP 35.9.
12. Ward M. *In This Short Span* (1972) p134.



Evans and Bourdillon on rocks approaching the south-east ridge at 27,200ft. *(John Hunt/ Royal Geographical Society)*

oxygen'.[13] Other commentators suggested that, following 'military logic', Hunt's intention had been to use Evans and Bourdillon as a reconnaissance team to 'probe the enemy's defenses for strengths and weaknesses' before sending in his crack team. One recent history of Himalayan climbing has postulated that Hunt chose Bourdillon and Evans for the first attempt merely to satisfy the requirements of 'British national prestige', clearing the way for the two strongest climbers on the expedition (who were not Englishmen) to make the real attempt.[14] Few writers have been willing to give credence to the idea that Hunt might have actually done his absolute best to give both summit parties – indeed, the expedition as a whole – the maximum possible chance of success.

Charles Evans's unpublished diary of the 1953 expedition makes clear, however, that there was no hidden agenda.[15] The diary shows that the question of whether high camps could be provided for two summit attempts was much debated by the 'O group' (consisting of Hunt, Evans and Hillary) before the final plan was announced. They concluded – with regret – that only one high camp could be managed and this would have to be given to the open-circuit pair. They had therefore fallen back on the strategy Bourdillon senior had first suggested to Hunt the previous October. In a 1954 AJ article Evans explained:

> *We had always hoped to put in two oxygen attempts on the mountain from a very high camp on the south-east ridge but when we worked out the weights we must carry to the highest camp, it was clear that even with the man-power available we could only take enough gear for one pair of climbers to try for the summit. We must either give up the idea of two attempts, or make the first attempt a scouting one from the South Col.*[16]

13. Unsworth, W 1981, 3rd edition, p322. Unsworth suggested that Ward's views were 'coloured by chagrin' at having been relegated to the role of doctor rather than full climber on the expedition, and at being condemned to the role of reserve in the summit assault. On the other hand most commentators have admitted that Ward's criticisms of the role Hunt had accorded himself in the summit attempt were valid.
14. Isserman M. and Weaver S. *Fallen Giants* (2008) p286.
15. Dame Denise Evans kindly allowed me to read Charles Evans's 1953 Everest diary.
16. *AJ* 59, 173 (1953-54).

Exhausted: Evans and Bourdillon back at Camp VII on the South Col after their ascent of the south summit of Everest. *(Alfred Gregory/Royal Geographical Society)*

Tom Bourdillon, in the same AJ, wrote: 'We were not likely to be able to carry to the top camp supplies for more than one summit party, and thus the other [closed-circuit] party had to start from the Col.'[17]

Neither Ward nor Alf Gregory had been part of the inner-circle 'O group' and were seemingly unaware of the detail of its discussions. Nor, apparently, did either of them know that the Bourdillons themselves had been trying to persuade Hunt to adopt this plan for months. On their earlier Himalayan expeditions both Ward and Gregory had been accustomed to the ways of Eric Shipton who liked to reach decisions through open discussion with his entire party. But Hunt was a more traditional military leader. He later admitted, unrepentantly, that he had not 'explained, let alone discussed the plan with everyone' – only with his confidants in the ops group. 'I did not see fit to engage in a debate with everyone before making the difficult decisions.'

17. Ibid. p. 254





Lack of information may partly explain the objections voiced by Ward and Gregory, who both claimed it would have been perfectly possible to provide two high camps. Ward asserted in 1972: 'the extra loads of oxygen could be carried by more Sherpas.' He does not appear to have realised at the time, or afterwards, that only two Sherpas had been willing to go above the South Col and both were exhausted after carrying loads for the single high camp provided for the open-circuit pair. Ward, however, did acknowledge he was aware at the time that Bourdillon and Evans 'were both convinced' that it would be possible get to the top without a high camp, 'and no doubt had persuaded John [Hunt] before he made his final plan.'[18] Later he would also admit that providing for two summit parties to spend a night at the high camp 'might have involved logistical difficulties', though he never seriously addressed this issue.[19]

Griffith Pugh at London Airport with his daughter Harriet. *(Keystone Press Agency Ltd /Royal Geographical Society)*

Having refused to engage in the debate either on Everest at the time, or with Ward in 1972, Hunt was hurt and upset when he found out in 1991 that Ward was about to reignite the controversy – once more accusing Hunt of having messed up the first summit pair's chances. Still Hunt chose not to explain his reasons. However, privately, in a previously unseen handwritten letter to the then editor of the *Alpine Journal*, he protested:

> *The plan for 1st Assault was based on Tom Bourdillon's own wish to prove that 'his' closed circuit equipment had the great potential of enabling its users to climb to the summit and back directly from the South Col. This, he believed was its great advantage (i.e. speed of movement and endurance) over the Open Circuit System. Tom wanted to try it … Tom wanted to make the attempt directly from the South Col.*[20] [Hunt's underlining.]

As Hunt pointed out in the same letter, the arguments were, in any case, probably academic, for on the afternoon of Bourdillon and Evans's summit attempt, as the pair struggled back to the South Col, the weather took a severe turn for the worse. So bad was it the next morning, with winds gusting up to 70mph, that Hillary and Tenzing had to delay the second attempt and wait anxiously on the col for another 24 hours. If Bourdillon and Evans had had a high camp, they would have spent a terrible, wind-battered night at 8000m and in such dreadful weather it is highly unlikely that they could have set out for the summit next morning.

18. Ward M. 1972, p134.
19. Ward M. *Everest: A Thousand Years of Exploration* (2003) p260.
20. Letter Hunt to Johanna Merz, 21 Oct 1991; Alpine Club Archive, Lord John Hunt Papers P11.