

## Nutrition and trans-Antarctic trekking

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In 1911 Robert Scott and his four companions died in a heroic but failed attempt to be the first people to reach the South Pole. At the same time, Roald Amundsen's group trekked to and from the Pole, beating Scott comfortably and returning without mishap. Although there were differences between the groups in equipment and modes of transport, contrasting approaches to meeting nutritional requirements also contributed to the vastly different outcomes. Stroud (1) reported that a re-enactment of Scott's trek (the 'Footsteps of Scott' expedition, 1985/86) involved a mean daily energy expenditure (EE) in the range 25–29 MJ. This is approximately four times BMR, a power output that has been described as representing the 'ceiling for performance in humans' (2). Yet the members of the 'Footsteps of Scott' expedition used skis, while Scott's group trekked mostly on foot (a less efficient means of locomotion), implying that the rate of EE by Scott's group may have been even greater than four times BMR. Stroud (1) concludes that lack of total food may have played a greater role than previously realised in the demise of Scott and the other members of his expedition.

In addition to providing inadequate energy, the poor nutritional quality of Scott's rations very likely also contributed to the failure of his group to survive. Apart from a small quantity of lime juice, his rations did not include a significant source of vitamin C. The ascorbic acid status of his men would also not have been improved by the 35,000 cigars he took to Antarctica for the overwintering period prior to the attempt on the South Pole.

Other early expeditions have illustrated different nutritional problems. For example, Douglas Mawson and his companion ate their huskies, including the livers, when the third member of their group and most of their supplies fell down a crevasse. Husky liver is very rich in vitamin A. Hypervitaminosis A killed Mawson's companion, and very nearly killed Mawson too.

Recent expeditions have thrown more light on the nutritional requirements and physiological effects of trans-Antarctic trekking. They also indicate that it is virtually impossible to maintain weight, even when the diet provides for a daily intake of more than 20 MJ per day, with greater than 50% of energy derived from fat. For example, Stroud (3) reported on the effects of an unsupported trek by two men, involving man-hauling a 220 kg (initial weight) sledge across Antarctica. Mean daily energy intake was 21.3 MJ, with ~57% of energy intake derived from fat and ~36% from carbohydrate. Despite this, both men lost more than 25% of their initial body weights. Mean EE for the two men varied widely, depending on the nature of the terrain being crossed. During the climb up the slopes of the Antarctic Plateau (10 days), EE averaged more than 40 MJ/day (6–7 times BMR) – the highest EE ever reported for such a prolonged period.

1. Stroud MA. Nutrition and energy balance on the 'Footsteps of Scott' expedition 1984-86. *Hum Nutr: Appl Nutr* 1987; 41A: 426–433.
2. Westerterp KR, Saris WHM, van Es M, ten Hoor F. Use of doubly labeled water technique in humans during heavy sustained exercise. *J Appl Physiol*; 61: 2162–2167.
3. Stroud MA. The nutritional demands of very prolonged exercise in man. *Proc Nutr Soc* 1998; 57: 55–61.