

The Race to the South Pole: Lessons in Problem Solving, Planning, and Teamwork

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Introduction

Antarctica lies at the bottom of the world encircled by the Southern Ocean and isolated from the shores of South America, Africa, Australia, and New Zealand. The Heroic Age of Antarctic Exploration occurred during the first decades of the 20th century, when humans first ventured onto its ice shelves. Explorers Robert Falcon Scott and Ernest Shackleton mounted expeditions to explore the Antarctic and place the British flag on the geographic South Pole. In January 1909, Shackleton ventured within 100 miles of this objective when he and his crew were forced to retreat just short of their goal (Ponting, 1975; Shackleton, 2010). Expedition members walked a considerable distance after losing their ponies, endured blinding blizzards, and suffered illness from eating tainted pony meat. They also nearly starved to death after cutting rations to stretch their dwindling supplies.

After learning that others had reached the North Pole ahead of him, Norwegian explorer Roald Amundsen focused on the South Pole, while Scott organized another expedition to succeed Shackleton. When each became aware of the other's intentions, it triggered a race between the explorers and the two nations, each vying to be the first to conquer the South Pole. This rivalry prompted each team of explorers to identify the objectives of their mission and to design an expedition in accordance with their aims. Each explorer considered a variety of objectives, such as gaining territory, survival, and national pride. How should success be defined based on what is selected as the primary objective? Based on this objective, what factors must the explorers consider when mounting a journey to the South Pole and returning safely? Indeed, success variously hinged on numerous small decisions. The brave leaders of these expeditions would have to schedule and chart their course as well as select appropriate, food, clothing, shelter, and transportation, not to mention equipment and supplies. What provisions and planning would an expedition need in order to be successful?

Why Venture to the South Pole?

The Antarctic fascinated many adventurers over the years, and they were motivated by a variety of factors. In terms of geographic exploration, Scott and Shackleton discovered that the rocks and structure around the Ross Sea were remarkably like the rock structure of Australia (Taylor, 1930). This, however, did not curb the scientific community's curiosity surrounding the mystery of what awaited inland. With the goal of investigating specialized polar phenomena, Sir James Ross was dispatched in 1840 by the British government to advance scientific knowledge of magnetism. Ross' journey also served to claim honor for his country by claiming the South Magnetic Pole for Britain, just as he did on the North Magnetic Pole. The South Magnetic Pole, however, differs from the geographic South Pole. The geographic distance between the South Geographic Pole and the South Magnetic Pole is approximately 2,858 kilometers (1,775 miles) (Taylor, 1930). However, as of 1912, the geographic pole remained elusive to polar explorers.

The Hostile Continent

Of the seven continents, Antarctica is the most inhospitable, with the coldest, windiest, and driest climate in the world. Antarctica is located 950 kilometers away from the nearest neighboring land, Cape Horn, Chile (Brewster, 1982). Continental Antarctica covers about 3 million square miles. By comparison Europe spans 3.9 million square miles (Taylor, 1930). The surface area of Antarctica varies with the seasonal pack ice. In late winter and spring, pack ice can extend up to 1,100 kilometers from the coast, isolating the continent from access by ship from mid-March to November. The pack ice can easily crush unwary ships trapped within it (Brewster, 1982). The ice sheet is separated by the Transantarctic Mountains. Some maps express the Transantarctic Mountains as a possible continuance of the Andes Mountain Range (Taylor, 1930).

The temperatures in Antarctica typically range from about -30° F in the day to -60° F at night (Panama Pacific International Exposition, 1915). At these temperatures, steel shatters when dropped and a cup of water explodes into ice when tossed into the air (Brewster, 1982). However, low temperatures are not as much a problem as are the cold winds. According to Brewster (1982), Antarctica is the world's windiest continent. With gales that often exceed 200 kilometers per hour, wind is thought to be a major factor limiting human involvement in Antarctica. Polar explorers of the day often used wool, fur, or animal skins to protect them from the elements; however, not all garments were equally effective. Various types of portable shelters were also useful, but the cost for added protection at camp was paid for in term of extra cargo weight. In addition to the harsh temperatures and severe winds, Antarctic explorers have only about 150 days in which to travel (Panama Pacific International Exposition, 1915). For the remainder of the year, Antarctic has little to no daylight.

The plant life of the continent could almost be dismissed in a sentence, "there are no flowering plants in Antarctica" (Taylor, 1930, p. 200). There are few food sources available on the Antarctic mainland, and accordingly, there are no land animals aside from a few insects. In contrast, the polar waters are free from bacteria, which results in a lush oceanic ecosystem teeming with krill. The orca whales, which often feed on krill, have also been found to attack men and dogs who venture out onto the ice flows (Taylor, 1930). While more benign aquatic species, such as seals, can serve as a food source, the success of an expedition often relied on the party's ability to stay nourished (Panama Pacific International Exposition, 1915).

Traversing the Ice

In addition to man-hauling, there were three means by which to transport heavy sledges across Antarctica's frozen terrain, namely, ponies, dogs, or internal combustion engines (Panama Pacific International Exposition, 1915). Although Shackleton's 1908 journey to South Pole was not successful, he found ponies to be effective for negotiating Antarctica's many crevasses. With some frustration, however, he observed that their hooves often broke through patches of thin ice (Ponting, 1975). Scott's first inland expedition of 1902 was assisted by dogs. Although dogs were great companions, they proved to be practically useless on the return trip and could barely stagger eight miles per day (Taylor, 1930). Accordingly, Scott placed little reliance on dogs and resorted to man-hauling the sledges over the ice and snow. Furthermore, Scott was the first to experiment with balloons and motorized sledges. The challenge with these modes of transportation, however, was fuel evaporation (Panama Pacific International Exposition, 1915). However, designing a successful expedition involved numerous small decisions beyond just transportation, from charting and scheduling a course to selecting appropriate food, clothing, and shelter, not to mention equipment and supplies. The list below provides only a small sample of some of the items that were available to the explorers as options.

Anemometer	Compass	Hydrogen	Portable huts	Sledges
Animal skins	Construction tools	Kerosene	Rifles and pistols	Tins of fruit
Axes	Dogs	Matches	Seal meat and blubber	Woolen sweaters
Biscuits	Fur clothing	Penguins	Sextant	
Coal	Hot air balloons	Ponies	Skis	

Organizing the Expedition

At the dawn of the Heroic Age of Antarctic Exploration, Scott and Amundsen were both poised to launch rival expeditions to be the first to conquer the South Pole. They had the benefit of learning from their previous efforts and those who ventured before them. Decisions for each expedition would need to be based on how the teams defined success. What decisions promised the best chance of success and what were the implications of these decisions?

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