

Midterm 2

- (1.1)
 - 1. The Terra Nova crew found out about the Fram expedition in Melbourne, Australia when Amundsen revealed he was headed to the South Pole. They were surprised & concerned, but Scott publicly downplayed it, emphasizing science over competition.
 - 2. The ponies were bought in Siberia for their cold-weather toughness. Meares transported them by rail and sea to New Zealand, facing rough travel and quarantine delays. Some ponies arrived in poor condition.
- (1.2)
 - 1. Advantages: Bay of Whales was closer to the pole & had flatter terrain, saving time and energy.
 - Disadvantages: It was more exposed to storms & ice movement, making it riskier for a base.
 - 2. The Norwegians built insulated huts, customized sledges, and modified clothing like boots. They also created windproof gear & improved ski equipment to suit Antarctica's conditions.
 - 3. They added large safety margins, often doubling rations and supplies at depots to ensure enough for both the trip to and from the pole, even in case of delays or emergencies.
- (1.3)
 - 1. The sea ice became too unstable & dangerous to cross safely, so the team had to reload the gear onto the Terra Nova & sail it across instead.
 - 2. British chain of command: clear but rigid; orders were followed strictly, even when adaptation might have helped.
 - Norwegian style: more flexible - team members could adjust plans when needed, encouraging quicker decisions & efficiency.
- (1.4)
 - 1. A single point of failure means if one thing goes wrong, the whole system fails.
 - Examples:
 - British: Ponies, if they died there was no transport
 - Norwegian: Dogs have the same risk
 - Both relied on stoves for cooking so if it broke, there was no food.
 - 2a. Lindstrom boosted morale with good food & a warm, cheerful presence.
 - 2b. Amundsen kept spirits up with celebrations, routines, games, & encouraging a positive atmosphere.

Midterm 2 cont'd

(1.5)

1. Scott chose man-hauling, ponies, & motorized sledges. Man-hauling was ultimately used to reach the South Pole. The decision to rely on man-hauling despite its inefficiency highlighted a lack of adaptability & overconfidence in human strength.

2. The leadership at Cape Evans was strict & hierarchical, with Navy officers leading & enlisted sailors following orders. This created tension & stifled initiative. At Framheim, Amundsen's leadership was more democratic, allowing flexibility.

If I were in charge, I would have fostered more open communication & allowed for adaptability in decision-making.

(1.6)

1. Amundsen's major error was starting too early in September 1911, before conditions were stable. The extreme cold forced the team to retreat. As a result, Johansen & Prestrud were cut from the final South Pole team because of tensions that arose during the failed attempt.

(1.7)

1. Early signs of Scott's leadership errors included over-reliance on untested transport methods, ignoring expert advice, & insufficient planning for food & fuel. For example, motors broke down early, ponies died, & dogs weren't prioritized. Addressing these errors was difficult, due to rigid hierarchy, lack of feedback, & a culture of obedience, which prevented open critique or adaptation.

(1.8)

1. Norwegians found the Trans-Antarctic Mountains beautiful but harsh. They faced steep glaciers, deep crevasses, & high altitudes. They overcame this using strong dogs, careful route finding, & teamwork.

2. Near the Pole, the Sun stays in almost the same position, making it hard to fix latitude. Longitude was also tricky due to small angular differences, but they still calculated it to confirm their exact position that was helpful for proving they reached the Pole.

(1.9)

1. Scott's men found man-hauling exhausting & dangerous, especially uphill, but they rarely voiced concerns due to the strict hierarchy & loyalty to Scott. Honesty about the risks was limited.

2. The Beardmore Glacier, used by the British, was longer but had a gentler slope & fewer crevasses than the Axel Heiberg & Devil's Glacier. It was safer but slower compared to the Norwegians' tougher but faster route.

Midterm 2 (cont'd)

- (1.10) ▶ 1. Amundsen's team took multiple sun sightings over several days & cross-checked coordinates to be certain they were at the exact South Pole. This was crucial to avoid disputes, like those around Cook & Peary's contested North Pole claims.
- (1.11) ▶ 1. The Norwegians beat the British by 34 days to the South Pole.
2. On the return, the British began showing signs of scurvy, due to a lack of Vitamin C in their diet. This worsened their condition & slowed progress.
- (2.1) ▶ 1. The climbers ignored worsening weather & signs of danger due to overconfidence & commitment to their plan, leading to a fatal lightning strike.
2(a) Cotton retains moisture & loses insulation when wet, increasing hypothermia risk.
(b) St. Elmo's fire is a luminous plasma caused by electrical discharge indicating nearby lightning.
- (2.2) ▶ 1. A power-law effect describes how small, steady inputs can lead to sudden, unpredictable collapses.
2. "Normal accidents" are inevitable failures in complex systems, such as regular climbing accidents on Mt. Hood, despite precautions.
- (2.3) ▶ 1. The reluctance to challenge authority, as seen in co-pilots or doctors, mirrors the British South Pole expedition, where strict hierarchy hindered critical feedback, contributing to their failure.
- (2.4) ▶ 1. Safe surfing requires deep knowledge, experience, & respect for the ocean's power, as exemplified by the Hawaiian lifeguard's cautious approach.
2. The CEO survived due to resilience & adaptability but could have avoided danger with better preparation & awareness of conditions.
- (3) ▶ 1. Life was discovered 260 km beneath the Ross Ice Shelf, including sponges & other organisms, found by drilling through 900 meters of ice.
2. Antarctic orcas exhibit cooperative hunting, using tactics like wave-washing seals off ice-floes, demonstrating complex social behavior.

Midterm 2 (cont'd)

3.

4. Experiments like IceCube in Antarctica & RNO-G in Greenland are located there due to the clear ice, ideal form for detecting high-energy neutrinos.

5. IceCube has detected cosmic neutrinos, traced one to a blazar 4 billion light-years away & contributed to multi-messenger astronomy.

6.

7. Ice cores measure past temperatures by analyzing trapped gases like CO₂ & methane. These measurements are calibrated against modern data.

BONUS:

- (a) True leadership involves independent thinking, not just excelling in structured tasks.
- (b) General Petraeus exemplifies this by making thoughtful decisions beyond standard protocols.
- (c) Effective leaders filter out noise to focus on critical information, such as ethical considerations & long-term impacts.