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INTD 255-01

Midterm 2

1 Reading: Last Place on Earth, ch. 21-32

1.1 Chapter 21 - Scott Sails On

1. As the Terra Nova sailed to New Zealand and on to Antarctica, how did they find out about the Fram expedition? How did they react?
After the Terra Nova sailed in to Melbourne, Scott and his team discovered through a cable/telegram sent by Leon Amundsen that the Norwegian ship (the Fram) had embarked on an expedition to the South pole, creating a tension and a sense of urgency in what was now a race to the finish line. Scott wanted to be as secretive as possible with this information and avoided discussing it with the press. He completely avoided the idea until a persistent interviewer interrogated him.

2. The Terra Nova expedition had settled on ponies for transport. Where were they obtained? Describe how Meares had to transport them to New Zealand.
The ponies for the Terra Nova expedition were supposed to be a special cold-weather breed obtained from Manchuria but instead they were purchased from Easter Siberia by Cecil Mearis who lacked knowledge on horses but was in charge of purchasing the animals. In order to transport the horses, Meares had to ask Scott for an extra assistant named Anton. The both of them spent five weeks crossing through terrible rains and mud just to come back with ponies that were aged and physically disadvantaged as according to the crewmember Oates (who was more knowledgeable on horses but was not chosen to pick up the animals).

1.2 Chapter 22 - The Base at Framheim

1. List the advantages and disadvantages of setting the main Norwegian base, Framheim, at the Bay of Whales, as opposed to Cape Evans (Ross Island).

- The track to Framheim was planned well in advance while there was no real preparation to mark out a track to Cape Evans
- The Norwegians were used to the concept of setting up tents into ice and putting strong foundations into the bedrock.
- There were plenty of penguins and seals at the Bay of Whales.
- The unstable nature of the ice at Bay of Whales caused them to lose over 30 penguins and seals after they were hunted.
- The Bay of whales was a bit closer to the South Pole than Cape Evans.

2. What are some innovations the Norwegians created at Framheim? For example, their boots had to be altered four times. What else did they make or build?

Originally, the boots the Norwegians had chosen to wear turned out to be too stiff in the cold so they had to have some of the sole leather removed and wedges sewn into the toes. They also ran into the issue of finding an appropriate way to mark their depot. To do this, they placed a line of ten black pennants half a mile away from each other around the depot and numbered them to give the bearing from the depot.

3. On the depot-laying journey, the Norwegians were creating future stores of food for the return journey from the South Pole during the next season. What sort of safety margins did they assume when deciding how much food and supplies to move to the depots?

When determining the resources to move to the depots, the Norwegians considered any possibility of delay to their plan. They were extremely cautious and calculated. They built in very generous safety margins and Amundsen made sure to overstock the depots with more food and fuel than they thought they would need because their environment was unpredictable.

1.3 Chapter 23 - Sledging with the Owner

1. To lay depots, the British team had to get across McMurdo sound (sea ice). Having constructed their winter hut further South than the Terra Nova, they had to move several tonnes of gear across sea ice. In the end, however, they had to put it all back on the ship, and sail it across. Why?

After all the packing and preparing to lay the depot across the McMurdo sound was done, the sea ice suddenly became extremely unstable. The ice began to give away much earlier than expected and there was no question of dragging all the tons of luggage across it. Therefore Scott and his team were forced to put all their gear back on the ship and sail across instead.

2. Discuss the advantages and disadvantages of having a chain of command. For example, when Scott issued orders, they were to be followed literally. Without orders, his men knew not to change plans without consulting the Captain. How did this differ from the Norwegian leadership style?

Having a strict chain of command has its advantages and disadvantages. In the case of Scott, being the leader means that his crew follows his orders no questions asked which makes them loyal and disciplined. However, Antarctica is a highly unpredictable place so it can be dangerous for the crew to have to rely only on Scott to adapt instead of making the call for themselves. The Norwegian way of leadership was much more flexible and his men could think independently to adapt to the circumstances.

1.4 Chapter 24 - The Pole Seeker Prepares

1. Explain the significance of a single point of failure in a complex system. Name several examples from the Norwegian and British expeditions that represented single points of failure.

A single point of failure can collapse an entire complex system if given the chance. Not accounting for points of failure can be particularly dangerous in a place like the Arctic where you are highly vulnerable. A point of failure in the Norwegian expedition was the belief that the sled dogs would be able to survive the trip. Fortunately, Amundsen came adequately prepared to handle the dogs and shelter and feed them so that they could perform efficiently. A point of failure in the British expedition would be the choice to use ponies and motor sledges. When their original plan failed they had no other good solutions.

2. (a) Describe the effect that the cook, Lindstrom, had on the company morale. (b) What other leadership tricks did Roald Amundsen use to boost morale during the Antarctic night?
Lindstrom

a) At the Framheim, Lindstrom was an important part of uplifting morale. He consistently cooked tasty food and overall was a charismatic person. Having good food to look forward to everyday encouraged the crew to keep working and persevering.

b) One leadership trick that Ammundsen incorporated was hosting various competitions (like a game to guess the temperature for example) with prizes for the winners every month. This helped his team to keep their spirits uplifted and stay motivated for the journey.

1.5 Chapter 25 - Wintering at Cape Evans

1. What forms of polar travel had Captain Scott selected for the journey South? Which was to be the one used ultimately to arrive at the South Pole? What is the significance of this decision?

Captain Scott intended to rely on man-hauling, motor sledges, ponies, and dogs to use for polar travel. In the end he ultimately decided to use just ponies until the foot of the glacier and then man power for the next 1,000 miles. This decision showed his choice to ignore what was more efficient and reasonable just because he believed ponies were more noble and reliable.

2. What is your impression of the leadership structure at Cape Evans, given the presence of Navy officers and enlisted Navy sailors? What would you have done differently? What winter tensions existed at Framheim?

At Cape Evans, the officers made all the decisions, and the enlisted men were expected to follow without question. This sort of leadership created an environment where people were hesitant to speak up and challenge any poor decisions. If I were in command I would have promoted more individual thinking that encouraged open communication from the lower ranks. Even at Framheim, there was tension. Naturally being stuck among the same people for considerable time can’t start to create frustration with one another.

1.6 Chapter 26 - False Start

1. What major error on the part of Roald Amundsen gives this chapter its title? As a result of this error, who had to forgo the South Pole trek, and why?

This chapter was given the title “False Start” because Amundsen made the error of choosing to leave too early in the dangerous weather conditions. The cold wound up being so intense that his team was forced to turn back around. The journey back was rushed and unorganized and some men even fell behind for a while. This hold event caused a rift between Amundsen and Johansen, who didn’t agree with his leadership decisions. Eventually, this lead to Johansen not being included in the continued trek to the South Pole.

1.7 Chapter 27 - Scott’s Caravan

1. During this chapter, there are signs of self-delusion in the leadership of Captain Scott. However, in the end, his party does reach the South Pole and travels almost all the way back. How does one recognize the early signs of leadership error? What makes addressing such errors difficult? (Give examples as necessary from the chapter).

Early signs of leadership error in Captain Scott include overconfidence in strategies like man-hauling, poor planning, and a rigid chain of command that discouraged input from his team. These mistakes were hard to address because Scott’s leadership style didn’t allow room for questioning, and his strong patriotism blinded him to more effective strategies. Even though they got to reach the South Pole, these errors ultimately led to the tragic deaths of Scott and his men on the return journey just miles away from safety.

1.8 Chapter 28 - The Devil's Ballroom

1. What impressions of the Trans-Antarctic mountains do you recall from this part of the Norwegian journey? What kinds of terrain did they face, and how did they overcome it?

The Trans-Antarctic Mountains are described as intimidating and full of dangers like crevasses and steep glacier slopes. The Norwegians faced harsh terrain, including the Axel Heiberg Glacier, which was steep and filled with deep snow and ice. They overcame these challenges through careful route-finding, teamwork, and the use of strong, well-trained dog teams that could handle the difficult climbs. Their thorough preparation and flexible approach allowed them to navigate the mountains more efficiently than the British**.**

2. What made fixing the latitude and longitude difficult this close to the pole? Was calculating the longitude worthwhile?

Finding the latitude and longitude was difficult as they neared the pole because the sun remains positioned at the horizon, making it hard to determine your latitude, and the fact that all longitude lines meet at the pole which made it very easy to make errors.

1.9 Chapter 29 - Man-Hauling Begins

1. How did Scott's men feel about man-hauling gear up the mountains? Were they able to be honest with the Captain about the risks?

Scott's team was not in favour of using man power to haul all the gear up the steep and dangerous ice mountains. They were already exhausted and unmotivated. However, because of their respect for Scott's authority, they did not argue with him or bring up their concerns.

2. What were the advantages of going up the Beardmore Glacier, as opposed to the Axel Heilberg and Devil's Glacier for the Norwegians?

The Axel Heilberg and the Devil's Glacier were risky, steep, and narrow. The Beardmore Glacier, however, was not nearly as steep or high and had less risks, it was just longer.

1.10 Chapter 30 - The Race Won

1. Describe the meticulous calculations Roald Amundsen and team made to establish the location of the geographic South Pole. For reference, recall the story of Cook and Peary, and the uncertainty of their North Pole navigation.

Amundsen and his team were very careful with their calculations to establish the right location of the geographic South Pole. Amundsen wanted to be certain about his success so he took multiple sun readings over several days. Then he skied in a grid pattern around the estimated Pole location, and put a flag in each direction to make sure they had physically covered the true Pole.

1.11 Chapter 31 - The Race Lost

1. After years of planning, 1200 miles of exploration on foot, ski, and sledges, and vastly different start times, what was the final difference in time between the Norwegian and British arrival at the South Pole?

After all the planning, effort, and hardship, the final difference in arrival time between the Norwegian and British teams at the South Pole was just 34 days. Despite their vastly different strategies the race was still quite close.

2. How did scurvy begin to play a role in the trip home for the British? What vitamins did they lack?

Scurvy is caused by a lack of vitamin C and nutrition and it can leave victims feeling fatigue, bruised, and their wounds unable to heal correctly. During the voyage back, Scott’s group lacked severely in Vitamin C because of the long nights and it hid the team tragically hard.

2 Reading: Deep Survival, ch. 5-8

2.1 Chapter 5 - The Anatomy of an Act of God

1. In this chapter, two brothers and a friend set out to climb a rock face in Yosemite. With regard to the plan, what begins to go wrong? Why is the group unable to act on the information indicating the plan is becoming 2 increasingly dangerous?

The morning that the hikers begin to leave, someone steals their food which sets them back about two hours. Then, at the end of their third pitch, they began to notice that a storm was coming on, but they chose to just keep going. The group is unable to act on the logical events in front of them because their excitement and emotions attached to the idea of driving all this way to climb keeps pushing them to continue.

2. For example: (a) why is cotton called “death fabric” by park rangers? (b) What is St. Elmo’s fire?

a) Park rangers refer to cotton as death fabric because it isn’t water proof and does not dry quickly at all, which can lead to hypothermia in the event of rain.

b) St. Elmos fire is a purple like hew that forms around objects with electrical charge during a thunderstorm when lightning is around.

2.2 Chapter 6 - The Sand Pile Effect

1. In general terms, describe what a power-law effect is in nature. Why does a sand pile with a steady rate of new sand on top collapse regularly, even though basic physics does not predict when it will collapse?

The power-law effect means that small changes in a complex system, like adding grains of sand to a sand pile, can eventually lead to unpredictable, and massive events, like when the hill collapses. Even though each grain adds just a tiny bit of impact, the system becomes increasingly unstable over time.

2. What is meant by the term “normal accidents?” On mountains like Mt. Hood, for example, there are accidents that occur predictable, despite safety preparations. How does the sand pile effect explain this?

“Normal accidents” refers to failures that happen not because of one big mistake, but because of a chain of small problems in complex systems which can make accidents unavoidable, even with safety measures taken. On mountains like Mt. Hood, this means that despite training and preparation, climbers still face accidents due to unpredictable combinations of weather and fatigue. The sand pile effect explains this by showing how small actions can build up until a tipping point is reached.

2.3 Chapter 7 - The Rules of Life

1. Consider this quote from the chapter: “It is well documented that co-pilots aren’t likely to challenge pilots in aircraft cockpits and sailors aren’t likely to challenge captains, sometimes with fatal consequences. Experienced climbers may be reluctant to challenge others with experience ... doctors won’t challenge doctors.” How do the documented accidents in this chapter connect to the results of the South Pole expeditions?

The idea of not speaking up in order to respect the authority above you connects to the voyage of Scott. His team never questioned his decisions even when they observed an error themselves. This kind of behavior can be dangerous and it is better to take input from multiple perspectives, especially when completing something as risky as polar travel.

2.4 Chapter 8 - Danger Zones

1. Consider the following paradox: surfing can be a beautiful and joyful experience, but also extremely dangerous, depending on the conditions. What kind of experiences are necessary to do it safely? Recall, for example, how the Hawaiian lifeguard and his family interacts with the author.

The paradox of surfing being both joyful and dangerous is explained by the importance of experience, intuition, and respect for nature. To surf safely, you must be deeply familiar with the ocean through repeated, firsthand experiences. The Hawaiian lifeguard and his family show the author that true skill comes not just from having a physical ability, but from a lifetime of learning and observation. This kind of sixth sense is what helps them stay safe.

2. Compare the experience of the lifeguard to that of the CEO who survives winter blizzards for three days in Squaw valley, California. What characteristics helped him survive? How could he have avoided the experience in the first place?

The lifeguard survives by relying on his familiarity with his environment, which he gained over the years, while the CEO survives through determination, and mental willpower even though he lacked wilderness survival experience. His ability to focus on his needs, and stay put and conserve energy helped him stay alive for three days. However, he could have avoided the experience by checking the weather snd staying on marked trails. The CEO entered a dangerous situation without fully understanding the potential risks of the environment.

3. Neutrino Physics in Antarctica and Greenland

4. List some of the astrophysics experiments located in Antarctica and Greenland. Why are they located there, and for what are they searching?

Some of the current astrophysics experiments include the IceCube Neutrino Observatory, the South Pole Telescope, and the Antarctic Impulsive Transient Antenna. These are located in Antarctica and Greenland because of the extreme cold and dry air, and low pollution, which makes the most ideal conditions for observations. The ice acts as a giant detector for particles like neutrinos, which are important because they can provide unique clues about the most distant events in the universe.

5. What achievements are attributed to the IceCube Neutrino Observatory in the last 10 years?

Over the past 10 years, the IceCube Neutrino Observatory has made major accomplishments. It was the first to detect high-energy neutrinos from deep space in 2013 and, in 2018, it traced one of them back to its origin, a blazar. In 2020, it also observed the Glashow resonance. In 2023, IceCube mapped neutrino emissions from the Milky Way. These discoveries have advanced our understanding of the universe's most extreme environments**.**

6. Paleo-climatology with Antarctic Ice Cores

7. Describe the process for measuring global average temperature using ice cores from deep boreholes in Antarctica. What gases or elements are used to make the measurements? How is this temperature measurement calibrated, using contemporary data?

To measure global average temperature from ice cores in Antarctica, scientists drill deep boreholes and take out long cylinders of ice that have been building up over thousands of years. The ice layers in these cylinders trap tiny air bubbles that preserve ancient atmospheres. Scientists analyze the concentrations of greenhouse gases, especially carbon dioxide and methane. They also observe isotopes of oxygen or hydrogen in the ice. Scientists then compare the isotope ratios in recent ice layers with temperature records from modern day. This helps create a connection between isotope data and actual temperature, which then lets scientists understand climate changes many many years ago.

4. Bonus: Solitude and Leadership

1. Reflection on Leadership. What makes a good leader, according to the essay "Solitude and Leadership?" (a) Reflect on one's ability to pass exams, versus think independently. (b) How does the example of Gen. David Patreus play a role in this reflection? (c) What advantage to leadership decisions is afforded to those who filter out information that is ultimately unimportant? What forms of information do you think are the most important?

a) While exams can test your ability to absorb and repeat information, passing them doesn't make you a leader. True leadership requires the ability to think beyond the conventional answers and to challenge what you know. Independent thinking is crucial because leaders must often navigate situations where there is no clear answer, which is completely different from exams that already have a correct answer.

b) When Deresiewicz uses the example of Gen. David Petraeus, it plays a significant role in illustrating the idea of leadership. Petraeus was a leader in Iraq and he understood the importance of not just executing strategies but also taking the time to understand the complexities of warfare and how it affects relationships. He took time to

make well-considered decisions rather than reacting impulsively, and he focused on self reflection.

(c) Leaders who can filter out irrelevant information and focus on what matters are more capable of making decisions that are logical and strategic. This ability helps them avoid getting too caught up in small details that might distract them from the overall purpose. The most important forms of information for leadership are human behavior (knowing how to read others), communication, and studying observations and experiences. Having knowledge on the people they are leading and on the environment they are in is very essential for making correct leadership decisions.