BIO 367 Antarctic Ecology
Exam IV study guide
Fall 2021

Lecture XVIII: The Race to the Pole (Part II)

Robert Falcon Scott and the *Terra Nova* expedition
Roald Amundsen and why he switched going from north to south
Differences between Scott and Amundsen for polar travel and objectives
Edward 'Bill' Wilson and Apsley Cherry-Garrard
Worst journey in the world, objectives and results
Herbert Ponting and photography
Journeys to the pole by Amundsen and Scott, timing, differences
Depots for polar travel
Reasons for Scott's death and aftermaths in England
Scott's Northern Party and Inexpressible Island
Cape Evans
Shackleton and the Trans-Antarctic Expedition
Frank Worsley
The *Endurance* and fate in the ice
Elephant Island and the boat journey, rogue waves
South Georgia Island and trek across mountains
Shackleton's Ross Sea party and losses
Shackleton's new expedition in 1921 and death at Grytviken

Lecture XIX: The International Geophysical Year and science in Antarctica

End of the Heroic Age
Richard Byrd and naval flight
Little America and Byrd's first expedition to Antarctica
Laurence Gould and Paul Siple
Flight to the pole and back
Byrd's second expedition and Little America II
Scientific discoveries and advances at Little America II
Territorial claims in Antarctica
Ross and Falkland Islands Dependencies
Lincoln Ellsworth and first trans-Antarctic flight
Little America III and first color photographs
Operation Highjump and Little America IV
First use of icebreakers and helicopters
Genesis of the IGY and previous International Polar Years
International Council of Scientific Unions (ICSU)
Lloyd Berkner and Sidney Chapman
Focus of the IGY 1957-1958, sun spot activity
U.S.S.R. and *Sputnik* I
Cold war and space race
U.S. concerns in Antarctica
Operation Deepfreeze and Little America V

Establishment of IGY research stations, U.S. stations
Formation of SCAR by ICSU and effectiveness for science
Scientific accomplishments in IGY and genesis of Antarctic Treaty

Lecture XX: The Antarctic Treaty

William Bruce and the Scottish National Antarctic Expedition
Longest continuous occupation in Antarctica by Argentina
1908 territorial claim by Britain
Territorial claims, 1940s
Overlapping claims and problems
Agreement between Chile and Argentina
U.S. position and attempt for peace with United Nations Trusteeship
Claimant vs non-claimant nations
President Eisenhower and secret treaty meetings 1959
Why Eisenhower never claimed territory for U.S.
Signing of the Antarctic Treaty 1 Dec 1959
Herman Phleger
Treaty statement of purpose
Consultative versus non-consultative countries in treaty
Who votes on treaty amendments and need for consensus
Major agreements in treaty on military presence, territorial claims, research, data sharing
Treaty enforcement as a 'gentleman's agreement'
Agreements added to treaty, know main points for each and which were ratified:
  Agreed Measures 1964
  Seals Convention 1972
  CCAMLR 1980
  CRAMRA 1988
  Environmental Protocol 1991
United Nations Convention on the Law of the Sea and importance for Antarctica
Definition of the 'high seas' and exclusive economic zones
Role of Greenpeace in establishing the Environmental Protocol
CCAMLR and ecosystem management, CEMP
CCAMLR indicator species
CCAMLR and Marine Protected Areas
Environmental Protocol and regulations on sewage, wastes, spills, burning
Antarctic Specially Protected Areas (ASPAs) and Antarctic Conservation Act
Wilkes Station
U.S. Antarctic Service, U.S. Antarctic Program (USAP)
National Science Foundation (NSF) Polar Program and Antarctic funding, budget
Ratio of science to logistic costs, personnel
IPY 2007-2008 and focus
Antarctic Treaty summit meeting on 50th anniversary, 2009

Lecture XXI: Research stations and dealing with the cold

Three challenges for having research stations in Antarctica
First station on Laurie Island (William Bruce)

Early prefabricated huts in Heroic Age and problems
Little America advances in station organization and comfort
Problems with Little America on ice shelf
Halley Station and stages of development I-VI, design changes, problems
Amundsen-Scott Base at South Pole stages, design changes, and problems
Research stations and carbon 'footprint'
Waste disposal and problems
Greenpeace and changes in waste disposal
Development of wind and solar power at stations
Princess Elisabeth Station (Belgium) and design for zero-emissions
King George Island stations and international community
Casey Station (Australia) and design
'Apple' huts and ease of placement as field huts
McMurdo Station design, operations
Field camps, clothing issue, and field training, risk assessment
Scott Polar tents

Lecture XXII: Anthropogenic impacts

Three categories of impacts
External impacts to Antarctic environments
Tourism and first proposed tour visits to Antarctica
Ingrid Christensen, first woman to step on continent
Ronne Antarctic Research Expedition, 1947-1948
Edith 'Jackie' Ronne
Air tourism by Chile 1956
Pan American flight to McMurdo 1957
Chile and Argentina tourism
Lars-Eric Lindblad and the MS *Lindblad Explorer*, 1969
Risks to tourists, risks to Antarctic wildlife
Bahia Paraiso sinking and impacts
Air New Zealand and Qantas flights 1977-1979
Mt Erebus crash of Air New Zealand flight in 1979 and end of air tourism
Growth and trends of ship-based tourism 1990s to 2000s
Establishment of IAATO and purpose
Major nationalities of tourists in Antarctica
Sinking of *Explorer* 2007
Antarctic Treaty guidelines for tourism 2009
Impacts of tourist visits on penguin colonies, vegetation
Extreme tourism and impacts
Introduced species in Antarctica, success on subantarctic islands versus Antarctic
Why few invasive species survive in Antarctica, marine and terrestrial
Invasive decapods, copepods
Ship ballast and introductions of marine species
Seeds carried by tourists versus scientists and impacts
Areas of greatest risk for establishment of invasive species
Poa annua bluegrass on King George Island and spread

Lecture XXIII: Marine fisheries and illegal fishing

Beginnings of fisheries in the Southern Ocean
Krill fishery and peak in 1982
Concerns by treaty countries and CCAMLR
Establishment of CEMP and ecosystem monitoring
Patagonian and Antarctic toothfish distribution and exploitation
CCAMLR sectors for monitoring fish and krill stocks
History of toothfish fishery, Chile to subantarctic islands and Southern Ocean
CCAMLR and total allowable catch (TAC)
Fishery population models
Rise of illegal fishing and unreported catches
Trends in IUU catches 1990s to 2000s
Catch Documentation Scheme (CDS)
Reasons for reduction in illegal fishing
The Ross Sea MPA, why it's the 'last ocean', and why MPA is a 'pyrrhic' victory
Other MPAs proposed for Antarctica
Krill fishery and krill uses
Growth of fishery and major countries involved
Krill as an underexploited stock, catch methods and problems
Continuous pumping method
CCAMLR, acoustic surveys, and TAC for krill
Trends in krill patents