Week 2: Exploration of Antarctica

“Polar exploration is at once the cleanest and most isolated way of having a bad time which has been devised.” ~ Apsley Cherry-Garrard

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Antarctica was discovered fairly recently but it existed as a philosophical concept long before any real evidence of it existing

- No one set eyes on Antarctica until 1819 – it was the last continent to be discovered. Before then, no one knew for sure that it existed. But a belief in the existence of a large southern landmass was commonly held as far back as the ancient Greeks.
- In fact, the name Antarctica comes from early Greek geographers and philosophers. They named the Arctic after ‘Arktos,’ the bear constellation in the northern sky. They also knew of the extent of the continents in the northern hemisphere and reasoned—because of their philosophy of symmetry and balance Aristotle posited -- that there should be an equally extensive mass in the southern hemisphere so ‘Antarktos’ was the opposite of the ‘Arktos’. Antarctica is the Latinised version that came into use.
- The term Terra Australis Incognita was adopted by medieval map makers to designate the location of the still unknown land. Man maps of the day picture continents of various shapes and sizes. As exploration expanded, the explorers consistently failed to find this southern land. Each exploration pushed the imagined coastline farther south, from the tropics to the temperate regions to the pack ice and beyond.

The Beginnings (1492–1800)

The end of the 15th Century was the beginning of the Golden Age of Exploration

- Christopher Columbus, in trying to reach the Spice Islands of the East Indies, discovered the New World in 1492. First with Bartholomeu Dias (Portugal) in 1488 who sailed around the southern tip of Africa, then Vasco De Gama (Portugal) sailed from Europe all the way to India around Africa in 1497, the Portuguese pushed the idea of Terra Australis Incognita to be well south of Africa.

1520: Discovery of Tierra del Fuego

- Twenty three years later, in 1520, another Portuguese navigator, Ferdinand Magellan, explored the coastline of South America and discovered a long, winding

channel at the foot of the continent which led from the Atlantic Ocean to the Pacific Ocean—the Straits of Magellan. The land they saw to the south was thought to be the coastline of Terra Australis for a time, but in 1578 Sir Francis Drake (England) proved that it only separated an island, Tierra del Fuego, from the mainland of South America.

1599: Possible first sighting of Antarctica

- It was the tempestuous weather of the southern ocean that can be credited with many of the early discoveries regarding Antarctica. The first sighting of Antarctica is clouded in doubt. In 1599, a Dutchman, Dirk Gerritsz, was blown off course by a storm after passing through the Straits of Magellan. He reported seeing snow-covered mountains some 500 kilometers from South America, in latitude 64˚ South, which may very well have been the South Shetland Islands. But other accounts of the voyage do not mention the sighting. Perhaps it was large icebergs.

1675: First sighting of South Georgia

- South Georgia was originally sighted a century before that by an English merchant, Anthony de la Roché. Blown off course in 1675 he discovered and took shelter in South Georgia but did not go ashore.

1772 - 1775: James Cook proves where Antarctica is not

- James Cook was one of the most important early explorers with regard to Antarctica, because he essentially proved where it was not. During his first voyage of discovery (1768–1772) he proved New Zealand to be a pair of islands, and finally pushed the supposed boundary of Antarctica out of tropical and temperate latitudes.
- Then, during his second voyage (1772–1775), Cook circumnavigated the globe in high southern latitudes, without seeing land, casting doubt on the existence of the still unknown Antarctic continent. He became the first person to cross the Antarctic Circle (south of Kerguelen) and went on to explore the south-western Pacific Ocean at a high latitude, crossing the Circle again near Thurston Island (off Lesser Antarctica). Here he entered pack ice and continued south to latitude 71°10’S in what is now the Bellingshausen Sea. Cook was unlucky, for this was the only region where he could have sailed so far south and yet remain too far away from the continent to discover it. Cook wrote that no one would probably ever go farther south than he had just been, but he also felt the world would never derive any benefit from a continent that far south.
- During this voyage Cook discovered the South Sandwich Islands and landed on South Georgia Island. In Cook’s voyage, one of his most important reports was of the wealth of fur seals in the Southern Hemisphere. His reports of huge populations of these valuable fur-bearing animals led directly to the next era of exploration in the Antarctic.

The Age of Discovery (1800–1900)

Sealers become the new explorers of the far south

- Within a few years, American, European, and Russian sealers had become the new explorers of the far south. By 1802, only 27 years after Cook's second voyage, the sealers had seriously depleted the fur seals of South Georgia, Kerguelen, and Heard Islands.
- Searching ever farther south from their bases in New Zealand, sealers discovered and started exploiting the fur seals of the Antipodes Islands in 1800, the Auckland Islands in 1806, and Campbell and Macquarie Islands in 1810.

1819: Discovery of The South Shetland Islands

- The South Shetland Islands, may have been discovered in 1819, when the 644 crew of Spanish frigate San Telmo wrecked on the shores of a small islet near Livingstone Island. The San Telmo set sail from Cadiz in 1819 for Callao, Peru but were blown off course. She vanished without a trace of her 644 crew, but remains discovered on Telmo Island suggest they spent time on shore before dying without reporting the new discovery to the world.
- The first confirmed discovery of the South Shetland Islands was by William Smith (who was blown off course by a storm) in 1819. At first he had difficulty convincing the British Admiralty in Santiago that he had found new land, but the news of his discovery brought more than 40 ships to harvest fur seal skins and oil from those islands during the next season of 1820–21. In the following season, 1821–22, more than 90 ships were working the islands. By the end of the third year after the islands' discovery more than 320,000 fur seal skins and 940 tons of oil had been taken in the South Shetland Islands, and for all practical purposes the resource had been destroyed.

1820: Discovery of the Antarctic Continent

- The Antarctic Continent was finally discovered in 1820. The honor of who first sighted the continent, however, is still disputed. Ironically, none of the three men involved in the controversy realized at the time that he may have actually sighted the continent. In that momentous year, Thaddeus von Bellingshausen, during a Russian expedition, records sighting the coast of Queen Maud Land on 27 January 1820. If correct, this is clearly the first sighting. Bellingshausen greatly admired Cook and he was driven to equal Cook's accomplishments in the Antarctic. Over the course of two summers he became the second man to circumnavigate Antarctica, and did so considerably farther south than Cook's route.

- In response to William Smith's report, Edward Bransfield, of Britain's Royal Navy, was sent to examine the South Shetland Islands in 1819, and he sighted land (most probably the Danco coast of the Antarctic Peninsula) on 30 January 1820. Later in the same year, Nathaniel Palmer, a young sealing captain from Stonington, Connecticut, sailed from the South Shetlands aboard the 47- foot sloop Hero, and on 16 November sighted what was probably the coast of the Antarctic Peninsula, from a distance of about three miles.
- At this time there may have been numerous sealing boats exploring the region of the South Shetlands and the Antarctic Peninsula, but it was common for captains to keep their finds secret in order to protect their commercial interests. Many discoveries must have been made during these years that were never publicized.

1821: First person to set foot on the Antarctic continent

- On 7 February 1821, the American sealer John Davis became the first person to set foot upon the Antarctic continent when he landed at Hughes Bay on the Antarctic Peninsula. At the time of his achievement he said he believed the southern shore he landed on was a continent. But it was not until the following decade that geographers and scientists concluded that the long-sought Southern Continent had indeed been found.

1823: Reaching 74°15'S in the Weddell Sea

- British sealer James Weddell had completed a few successful seasons sealing around the South Shetland Islands and the South Orkney Islands, but in 1823 their results were disappointing. With unusually little ice and calm conditions they decided to sail south. They reached 74°15'S in the Weddell Sea, the farthest south that any man had ever been. Weddell found no new sealing grounds, but he did discover a new species of seal which was later named after him and no one reached so far south by ship for some time.

1838: Discovery of Balleny Islands and the Sabrina Coast

- The last major search for new sealing grounds was made in 1838 by John Balleny. Although he discovered the islands that bear his name, and the Sabrina Coast of Antarctica, he returned from the expedition with only 178 seal skins. The sealing bonanza was over. But by then the collection of oil had become very profitable, and the ships' crews rendered elephant seals, several species of whales, and even penguins into valuable oil. This new industry continued until well into the twentieth century.

Scientific Expeditions

- During the sealing era, in the mid-nineteenth century, expeditions for scientific discovery became important. Expeditions and surveys were organized, primarily by the British, Americans, and French.

1840: Remapping the South Shetland Islands and some sections of the Antarctic Peninsula

- Jules Dumont d'Urville discovered a bare, rocky shore directly south from Australia and named it Adélie Land after his wife. He also made important measurements of the Earth's magnetic field in these southern waters, and he remapped the South Shetland Islands and some sections of the Antarctic Peninsula.

1840: Proof of Antarctic being a continent

- U.S. Navy Lieutenant Charles Wilkes led the first American scientific expedition to the Antarctic, and was the first important investigator to insist that Antarctica was a continent rather than endless ice packs and scattered islands. His initial exploration of the Weddell Sea in 1839 had to be cancelled because of leaking ships. Returning in 1840, he sailed deep into the pack ice in a search for the South Magnetic Pole. He did not reach it, but he did discover a very long coastline south of India and Australia which he followed for 2,400 kilometers (1,500 miles). This proved the existence, beyond any doubt, of the Antarctic continent.
- Wilkes originally set off with six ships, most of questionable sea-worthiness, and returned with only two. He also had continuing disputes and personal conflicts with some of his officers. He was court martialled, but was eventually cleared of any wrongdoing and spent the next 12 years writing official reports of the expedition. The information and collections made during this voyage were some of the earliest collections held by the recently founded Smithsonian Institution in Washington, D.C.

1841: Discovery of the Ross Ice Shelf and Mount Erebus

- In 1841 James Clark Ross was appointed to lead an official British expedition to Antarctica. Already famous for his exploits in the Arctic, having located the North Magnetic Pole in 1831, he set out to find the South Magnetic Pole. At the time, the South Magnetic Pole was well inland so he was unable to record its position, but Ross did discover the Ross Ice Shelf and Mount Erebus, the most active volcano in Antarctica. His expedition made many scientific discoveries, and he was knighted on his return to England. He also reported on the vast numbers of whales encountered during his voyage, which created great interest in certain quarters.

1897 - 1899: Charting new lands along the western side of the Antarctic Peninsula

- After a 50 year hiatus, the next important voyage to Antarctica was the Belgian expedition of 1897–1899 to chart new lands along the western side of the Antarctic Peninsula. Led by Baron Adrian de Gerlache, with first mate, Roald Amundsen and ship's doctor, Frederick Cook, it was the first fully scientific expedition as well as the first to spend a full winter in Antarctica when their ship, the Belgica, was trapped in the ice in the Bellingshausen Sea. They would have failed completely, as they were all suffering from scurvy by late in the winter, except that Amundsen and Cook had considerable experience with native people in the Arctic and were able to stem the disease by having them eat fresh seal meat.

1809: The first men to winter over on the Antarctic continent

- In 1898, Carsten Borchgrevink and his small party became the first men to winter over on the Antarctic continent itself. They built a hut at Cape Adare for their base, and made the first sledge journey on the Ross Ice Shelf. These two important expeditions led to the next period of exploration by having shown that it was possible to winter through the Antarctic night.

The Heroic Age (1901–1916)

Britain, Germany, Sweden and France compete for glory in Antarctica

- The Heroic Age period (1901 - 1916) was characterized by great triumphs and tragedies, and was the beginning of the privately funded scientific investigations in Antarctica.
- In 1895 the Sixth International Geographical Congress identified Antarctica as the last major geographical research to be undertaken. The Seventh Congress met in Berlin and essentially divided up the continent for different expeditions to visit.
- Britain, Germany and Sweden all embarked on voyages of exploration in 1901. The French sent their own expedition in 1904 and many more followed in the first two decades of the twentieth century. These expeditions had research as their stated goal, but there was implicit competition among the countries involved.

1901: Robert Falcon Scott (British) makes attempt for South Pole but fails

- In 1901 Robert Falcon Scott, an officer in the Royal Navy, led the Discovery expedition to Victoria Land in the Ross Sea. They built a hut at the southern tip of Ross Island in McMurdo Sound, and spent the winter doing scientific research. The following summer, Scott, with two companions, Edward Wilson and Ernest Shackleton, made a trek towards the South Pole using dogs to pull their sledges. They reached 82°S before having to turn back.

1901: Swedish expeditions

- In the same year, Otto von Nordenskjold led a Swedish expedition to the Weddell Sea. They constructed a hut on Snow Hill Island and conducted a successful expedition despite, considerable and remarkable hardship. After their first winter, Nordenskjold and his men spent a productive summer conducting research around the northern Weddell Sea.
- Unknown to them, their ship, the Antarctic, had trouble reaching them to retrieve the scientific team. First they unloaded a team of three men at Hope Bay to try to reach Nordenskjold over the land and sea ice, then the ship headed for another route to find their way south to Snow Hill. The three men were unable to travel to Snow Hill so they returned to Hope Bay to await pickup by the ship.
- Meanwhile a ship, under Captain Carl Anton Larsen, was crushed in the ice and sank—foreshadowing Shackleton's expedition in another ten years. Larsen and his men escaped to Paulet Island and built a hut there to spend the winter. After a series of adventures and extraordinary hardship involving small groups of men stranded at different places, the whole party was rescued in November 1903 by the Argentine corvette, Uruguay led by Commander, Julian Irizar. The scientific results of this expedition proved to be very important, including the first fossil penguins from Antarctica.

1901: German expedition discovers new areas

- Erich von Drygalski, led a German expedition to Kerguelen Islands, Heard Island, and East Antarctica and successfully discovered and charted large areas of previously unknown coasts.

1903: French expedition charts large parts of the Antarctic Peninsula

- Slightly later, Jean-Baptiste Charcot organized a French national expedition in 1903 on the Française which charted large parts of the Antarctic Peninsula region. This work was to be of great importance to navigators in the years to come. Charcot returned in 1908 in the most modern polar ship to date, the Pourquoi Pas. Besides exploring and charting further coasts and islands, he tested a lot of new equipment such as electric lamps, anti-snow blindness goggles, a petrol-engine motor boat, and different clothing. Charcot was a, known as 'the polar gentleman,' and was one of the

first to point out the dangers of over-harvesting the whales. He conducted considerable research in hydrography, geology, botany, and zoology.

1907: Edgeworth David (Australian), part of a Ernest Shackleton expedition, reaches the South Magnetic Pole

- The two great quests of Antarctica, to reach the South Pole and the South Magnetic Pole, had still not been achieved. Ernest Shackleton returned in 1907, this time in command of his own expedition aboard the Nimrod. He hoped to take both prizes. He decided to use Siberian ponies, instead of dogs, to haul sledges across the Ross Ice Shelf and up to the polar plateau. But the ponies did not last long and Shackleton's polar party was reduced to manhauling the sledges. Despite appalling conditions, they reached a point within 180 kilometers (97 miles) of the pole before Shackleton decided to turn back. Meanwhile, the other aim of the expedition had been achieved by Shackleton's second-incommand, the Australian Edgeworth David, who led a successful trek to the South Magnetic Pole with Douglas Mawson and Alistair Mackay.

1911: Roald Amundsen (Norwegian) reaches the South Pole

- Roald Amundsen, a Norwegian explorer and the lately first man to sail the northwest passage (1903-1906), had long dreamed of being the first man to the North Pole. But some months before he was due to set out in 1910, news came that both Robert Peary and his good friend Frederick Cook claimed to have already reached it. Undaunted, Amundsen changed his plans and decided to go to the South Pole instead. This put him in direct competition with Captain Robert Scott, who had already announced that he was making another attempt to reach the South Pole. Amundsen established his Antarctic camp on the Ross Ice Shelf at the Bay of Whales, which put his starting point a vital 96 kilometers (60 miles) nearer the pole than Scott's base at McMurdo Sound. He used dog teams, which had proved themselves time and again on his journeys in the Arctic. The trip to the pole was carefully and methodically planned to the last detail. He reached the pole on 14 December 1911, and to his relief, there was no sign of Scott. The entire round trip to the South Pole and back went like clockwork, and took 99 days.

1912: Robert Scott (British) reaches the South Pole but dies on the way back

- Meanwhile, Captain Robert Scott returned to Antarctica early in 1911, and constructed a base at Cape Evans on Ross Island. He then spent the next nine months conducting scientific research and preparing for his forthcoming trek to the pole. On 23 October, one week before his planned departure, Scott received word that Amundsen had left his base camp for his attempt to reach the pole.
- The main details of Scott's heroic, but doomed, expedition are well known, but he and four companions reached the South Pole on 17 January 1912, 33 days after

Amundsen. It was a bitter disappointment that their Norwegian rival had got there first. On their return journey, the five men were plagued by ferociously bad weather. Evans and Oates died first, and finally Scott, Wilson, and Henry 'Birdie' Bowers died in their tent in a blizzard on 29 March 1912, only 18 kilometers (11 miles) from a supply depot. Their bodies were found eight months later and were buried where they lay on the Ross Ice Shelf.

- Ironically, it was Scott's tragic journey that captured the world's attention, while Amundsen's achievement of being the first man to reach the South Pole brought him relatively little glory outside his native Norway. Another, but perhaps understandable irony is that the tragic end of Scott's polar journey overshadowed the many valuable scientific discoveries of his expedition.

1912: Douglas Mawson (Australian): A remarkable tale of survival

- Douglas Mawson, an intrepid Australian who had accompanied Edgeworth David to the South Magnetic Pole and achieved the first ascent of Mount erebus on Shackleton's 1907 expedition, landed his own party at Cape Denison in Commonwealth Bay at about the same time that Scott reached the South Pole in January 1912. His expedition turned into another tale of hardship and courage.
- Dubbed the windiest place on earth, Cape Denison created special conditions for their stay. The nearly constant gale-force winds caused considerable problems with almost every project Mawson's team attempted, but in November (10 months after they had arrived) the weather relented enough to allow some geographical and scientific work. Mawson's team divided into several sledging journeys to explore the surrounding territory. Mawson led a trek which was to become one of the great survival stories of Antarctica. Ultimately, his two companions, Belgrave Ninnis and Xaviar Mertz, died on the journey leaving Mawson alone and 160 kilometers from base with almost no food. Mawson did manage to return to base, but he arrived a couple weeks after he had ordered the ship to leave. The ship waited as long as they thought possible then remarkably everyone had such faith in their companions eventual return, that six men stayed behind for a second winter to await Mawson. Mawson did arrive in dreadful condition, and without Ninnis and Mertz. The men nursed Mawson back to health over the winter months and they returned to Australia the following year.
- Mawson went on to have an illustrious career and to champion Australia's role in Antarctic.

1914 - 1917: Ernest Shackleton (British): Another remarkable tale of survival

- Ernest Shackleton had failed in his own attempt to be the first man to reach the South Pole, but still craving Antarctic achievements and fame, he conceived another, audacious goal in trying to be the first man to lead an expedition across the continent. The plan was that two parties in two ships would land on opposite sides of the continent. Shackleton would land in the Weddell Sea and lead six men on a walk 2,900 kilometers across the continent, via the South Pole. The other group would

land in the Ross Sea and lay food depots all the way to the top of the Beardmore Glacier to resupply Shackleton's team for their final distance to the Ross Sea base.

- Things did not go well, almost from the start. Against the advice from whalers on South Georgia, Shackleton took the Endurance into the Weddell Sea in early December 1914 and found ice conditions especially difficult. By 19 January 1915 they were hopelessly trapped in pack ice. As the ship began to be crushed, they abandoned the Endurance and set up a camp on the ice nearby on 27 October 1915. The Weddell Sea ice was so rough that they abandoned their attempt to drag their lifeboats toward open water and they waited on the ice for months. By early April 1916 they had ridden the moving sea ice platform to the north edge of the Weddell Sea and the ice finally released them. In their three lifeboats, they reached Elephant Island, after 6 days of difficult sailing and rowing. There were no good campsites, but they did find shelter at Point Wild where they found seals and penguins which provided them with plenty of food. Shackleton decided to set off in the largest boat with five companions to seek help from a Norwegian whaling station on South Georgia. Departing on 24 April, the six men crossed 1,280 kilometers (794 miles) of rough seas in 16 days in the open boat to reach South Georgia.
- Unfortunately, they landed on the wrong side of the island and were forced to climb over an unknown mountain range with very little equipment in order to reach the whaling station. After their near-miraculous trek over South Georgia, Shackleton set about rescuing the rest of his men who stayed behind on Elephant Island. On 30 August 1916, after four months and three unsuccessful rescue attempts, Shackleton returned on board the Chilean vessel Yelcho to rescue the men left behind at Elephant Island. All of them had survived their ordeal. He then set out to retrieve the men from the Ross Sea. Their's was another dramatic tale of deprivation and heroic efforts. They did manage to set out the depots, but in the end lost 3 men in the ordeal.

The Aviation Age

1928 - 1929: First flight in Antarctica by Sir Hubert Wilkins (Australian)

- Many people had talked of using aircraft to explore Antarctica, including Mawson in 1912, but the first to do so was an Australian adventurer, Sir Hubert Wilkins, who was backed by William Randolph Hearst. He organized two expeditions to Deception Island in the South Shetland Islands in 1928 and 1929. After initial difficulties, Wilkins succeeded with the first flight in Antarctica on 16 November 1928. That season he explored nearly 2,100 kilometers (1,300 miles) of the Antarctic Peninsula by air. Much of this terrain had never been seen before, and Wilkins obtained many photographs and a wealth of information. Much of his information was incorrectly interpreted.

1928: First flight to The South Pole by Richard Evelyn Byrd (American)

- Even after Wilkins' success, few people believed aircraft could be flown to the South Pole. The American Richard Evelyn Byrd was already an accomplished polar pilot, he made the first attempt at the North Pole in 1926 (that flight is tainted with controversy as to whether or not Byrd achieved the pole). He was determined to do the same at the South Pole, and discussed the project with Roald Amundsen, who had plenty of advice to give.
- Byrd arrived in Antarctica at the Bay of Whales on Christmas Day in 1928 with three aircraft (a Ford Trimotor, a Fokker Universal, and a Fairchild monoplane with folding wings), 95 dogs, and more than 50 men. His base was built at the Bay of Whales on the Ross Ice Shelf 14 kilometers (9 miles) from the edge of the ice (near where Framheim was sited for Amundsen's South Pole expedition), and was named Little America.
- Several test flights were made in the ensuing months resulting in numerous discoveries. Other groups undertook geological studies and charting missions. In November 1929 a geological party made the startling discovery that the interior mountains consisted of sandstone with coal deposits, and were therefore part of the Earth's buckled crust rather than volcanic extrusions.
- On 29 November four men, with Byrd navigating, took off from Little America in the Ford Trimotor, the Floyd Bennet, and flew non-stop to a position over the South Pole, and then returned via a fuel dump. The total time for the round trip was 18 hours 41 minutes, of which the flight time was 15 hours 51 minutes. The same trip had taken Amundsen three months to complete 18 years earlier.
- Byrd returned in 1934 with sledges, tracked vehicles, and aircraft to continue his work in Antarctica, making sledge trips and aerial surveys from Little America. This expedition added a great deal to man's scientific knowledge of the Antarctic. Scientists measured the depth of the continental ice cap, discovered and mapped vast new land areas, made in-depth weather studies, found and catalogued new life forms, and much more.
- Byrd himself spent the winter alone, 200 kilometers (124 miles) away from Little America in a small hut sunk in the ice, making meteorological observations. He stayed there for four months, but nearly died when from carbon monoxide fumes from the radio generator and faulty stove. His judgement was seriously affected and could have proved fatal, but his peculiar radio messages alerted the men at the main base who came and rescued him.
- Byrd returned again in 1939 with the U.S. Antarctic Service Expedition, the largest Antarctic expedition to date, which accomplished further extensive exploration and important mapping work. He brought with him this time an experimental vehicle called the Snow Cruiser. It was 17 meters (55 feet) long, and the wheels were 3 meters (10 feet) in diameter. It was diesel powered, with living quarters, a laboratory, machine shop, and a darkroom, and had a small aircraft perched on top. Unfortunately, the tires provided too little traction and the motors were too weak to move the vehicle in snow. The farthest it travelled was 5 kilometers (3 miles) from the landing site to Little America.

1935: First flight across the continent by Lincoln Ellsworth (American)

- Another noteworthy milestone in the history of Antarctic exploration was the first flight across the continent made in 1935 by Lincoln Ellsworth, an American millionaire. He had already flown over the North Pole in 1926 in an airship with Roald Amundsen, after Byrd's flight, and had been beaten again by Byrd in flying to the South Pole. This new project, like so many other Antarctic expeditions before it, faced bad weather and numerous setbacks.
- Ellsworth, a rather shy man who habitually carried for good luck an ammunition belt that belonged to his hero, Wyatt Earp, arrived at the Bay of Whales in January 1934 and set up camp on the ice. He planned to fly from the Ross Sea to the Weddell Sea, and back – a distance of nearly 5,500 kilometers (3,400 miles). Just before he took off, severe ice movements destroyed the camp and nearly destroyed the aircraft, which fell between two ice floes. He was forced to postpone his epic flight.
- Returning later the same year, Ellsworth planned to fly the route in the opposite direction. But bad weather conditions and a contrary pilot prevented the flight on this occasion as well. His ship became trapped by ice and he had to remain at Snow Hill Island in the Weddell Sea for several months before the ship could get free.
- Ellsworth returned to Antarctica for a third time in November 1935 and set up camp at Dundee Island off the tip of the Antarctic Peninsula. On 23 November, he and his new pilot, Herbert Hollick-Kenyon, finally took off on what was to be an eventful flight in a single-engined Northrop monoplane to Little America in the Ross Sea. The total flying time was 14 hours, but they had to make four stops along the way, and on one occasion were trapped in their tent for eight days by a blizzard. They ran out of fuel just short of their goal and were forced to walk the final 26 kilometers (16 miles) to Little America. Nevertheless, their 3,200-kilometer (2,000-mile) journey was a great achievement and showed supreme courage.

1946: United States navy uses icebreakers and helicopters for the first time to charter Antarctica

- In 1946 the United States Navy mounted Operation Highjump, the largest Antarctic expedition ever attempted, using 13 ships (including an aircraft carrier and a submarine), 23 aircraft, and more than 4,700 men. Admiral Byrd was placed in charge of the operations. The main group set up a base on the Ross Ice Shelf in the Bay of Whales. Icebreakers and helicopters were used for the first time in Antarctica, and nearly four million square kilometers (1.6 million square miles) of the continent were charted. Some 70,000 aerial photographs were taken, covering 60 percent of the coastline.
- Byrd himself was on board one of two aircraft which together made a flight to the pole on 15 February 1947. A follow-up expedition named Operation Windmill used shipborne helicopters to place survey markers to accurately fix the position of landmarks shown on the photographs taken during Operation Highjump. This enabled accurate maps to be drawn. In 1947–48, Finn Ronne led a privately financed expedition to Marguerite Bay, reoccupying Admiral Byrd's 1939 East Base. During this expedition, Ronne showed that the Antarctic Peninsula was connected to the rest of Antarctica, solving one of the last great mysteries of the continent.

The International Era

- The first International Polar Year was held in 1882–83, when 12 nations established 14 bases in the Arctic to observe and study the earth's climate and magnetism. Such international cooperation was not common, but in 1895 and again in 19899 the 6th and 7th International Geographical Congresses were models of scientific cooperation. In those early congresses, the cooperation was to decide where in the polar regions each country should focus, and what kinds of information was the most valuable to the international scientific community.
- The first polar year in 1882-1883 was such a success that it was decided to repeat the exercise every 50 years. The second International Polar Year was held in 1932–33, for the first time focused on Antarctica. But scientific techniques were advancing so rapidly that many felt 50-year intervals were too long.
- In 1950, Dr. Lloyd Berkner, an American scientist, suggested that the next collaboration should be an International Geophysical Year. The idea was enthusiastically received, and some 50 countries offered to take part. This would be the first time the primary emphasis would be on the Antarctic. The original idea was for various countries to set up scientific stations for one year so that a broad range of scientific information could be collected over the entire continent. Twelve countries (Argentina, Australia, Belgium, Chile, France, Great Britain, Japan, New Zealand, Norway, South Africa, the United States, and the Soviet Union) agreed to set up stations in Antarctica.
- The period June 1957–December 1958 was chosen for IGY because solar activity would be at a maximum. Forty scientific stations were established on the continent and another twenty were set up on various Antarctic islands. The United States established the Amundsen–Scott Base at the Geographic South Pole (as part of Operation Deep-Freeze), and the Soviet Union established Vostok base at the Geomagnetic Pole. The year was considered an unqualified success. Most of the countries involved, decided to make Antarctic research a permanent feature of their government programs so much of the research that was undertaken became long-term in nature, and continues today.
- It was not until 1958 that the first overland trans-continental expedition was made. The Commonwealth Trans-Antarctic Expedition, led by Vivian Fuchs and Sir Edmund Hillary (the New Zealander of Mount Everest fame), was designed along the same lines as Shackleton's unsuccessful expedition of 1914. Hillary's team was to leave from Scott Base on Ross Island with four Massey-Ferguson tractors with track fitted to them and four sledges to lay fuel and food depots up onto the polar plateau. Meanwhile, Fuchs's group left the Ronne Ice Shelf in the Weddell Sea with eight vehicles and two dog sledges. They had many problems with glacial crevasses and bad weather, and had to abandon three of the vehicles. Contrary to his orders, Hillary's team decided at their farthest south depot to carry on to the pole so they became the next people after Scott to travel overland to the South Pole. Fuchs' expedition team arrived shortly after 19 January 1958, and proceeded to Scott Base via Hillary's route.

The Antarctic Treaty

- Many countries have made territorial claims to Antarctica over the years, based upon discovery, occupation, and geographical contiguity. Today, seven countries still maintain official claims upon parts of Antarctica: Argentina (claim dated 1943), Australia (1933), Chile (1940), France (1924), New Zealand (1923), Norway (1939), and the United Kingdom (1908). The claims are in accordance with the sector principle established in the Arctic which delineates wedge-shaped pieces extending to the Pole (though Norway's claim does not reach the South Pole).
- The British, Argentine, and Chilean claims overlap, and have been the cause of some disputes over the years. The United States and Russia do not make any claims of their own in Antarctica (though they reserve the right to do so in the future), and do not recognize the claims of any other nation.
- In 1948 the USA proposed to the seven claimant nations that Antarctica be made an international trust territory, though nothing came of that early initiative. But during the International Geophysical Year of 1957– 58 the USSR established a presence in Australian Antarctica, and the USA built stations in New Zealand's territory and Marie Byrd Land. The fact that both the USSR and the USA intended to stay in Antarctica after the finish of the IGY helped convince the nations involved to continue their cooperation. The IGY was therefore followed by the Year of International Geophysical Cooperation, from January to December 1959.
- In April 1958 U.S. President Eisenhower convened a conference to discuss the future of Antarctica. It was proposed that the continent should be open to all nations for the pursuit of scientific and other peaceful activities. On 1 December 1959 the Antarctic Treaty was signed by the 12 nations which had operated scientific stations in the area during IGY. The treaty was ratified on 23 June 1961, and has grown to more than 40 signatory states.
- One of the most important aspects of the Treaty is that the claimant nations have, in effect, frozen or shelved their claims indefinitely. They do, however, maintain the underlying existence of these territorial claims by issuing national legislation for such entities as the British Antarctic Territory, the Ross Dependency (New Zealand), and the Provincia de Tierra del Fuego, Antartida e Islas del Atlantico Sur (Argentina). The latter includes the Falklands, South Georgia, and the South Sandwich Islands.
- In fact, there are two categories of 'membership' of the Antarctic Treaty. While any country can sign the treaty and thus adhere to its principles ('Acceding State'), only those that conduct significant scientific research in the region may participate in consultative meetings, and thus take part in the decision-making process ('Consultative Party').
- The Antarctic Treaty System includes the Scientific Committee on Antarctic Research (SCAR); the 1972 Convention for the Conservation of Antarctic Seals (CCAS); the 1980 Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR); and the 1991 Protocol on Environmental Protection to the Antarctic Treaty (often called the Madrid Protocols).
- The Protocol followed two years of intense negotiations which finally resulted in a 50-year ban on all mineral exploitation. This is reflected in the briefest of all the Articles in the Protocol, comprising just 13 words: 'Any activity relating to mineral resources, other than scientific research, shall be prohibited.' But the Protocol contains a number of other important measures. All human activities must now be

planned on the basis of prior environmental impact assessments, and regulations on waste disposal and marine pollution have been introduced.