

Met Office



Pioneers

National Meteorological Library and Archive
British Antarctic Expedition 1910—1913

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In 1914 the archive was established as the official custodian of meteorological related records. It holds historic weather records on behalf of the nation and is an approved place of deposit under the Public Records Act.

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Far left: Met Office crest 1911–1939.
Left: BAE 1910–13 logo.

British Antarctic Expedition 1910–1913

The Met Office would like to mark the 100th anniversary of the death of Robert Falcon Scott and his four companions of the main Polar Party who died variously from mid-February to late March 1912 as they returned from their daring trek to the South Pole.

We would like to highlight our involvement in the expedition, draw attention to the unique archive records that we store on a permanent basis in the National Meteorological Archive at Exeter, and to acknowledge the lasting scientific achievement of the expedition.

Introduction

Many civilizations from the ancient Greeks onwards believed in the existence of a great undiscovered southern land – terra australis incognita. The geographer Marinus of Tyre first coined the name Antarctica in the second century AD, meaning to refer to a large landmass at the southern extremity of the Earth, which he believed was necessary to balance the known lands that exist to the North. The hallmark of the late fifteenth and sixteenth centuries were long distance, speculative sea voyages – the Age of Discovery – and with the rounding of the Cape of Good Hope and Cape Horn it became apparent that if a southern landmass did exist then it must be a continent in its own right.

Between 1773 and 1775 Captain James Cook sailed far south, managing to cross the Antarctic Circle. It is estimated that he was no more than 150 miles from the mainland. In his written account of his journey published shortly afterwards, he mentioned that a great many fur seals were seen in the southern seas.

In an age of growing competitive commercialism, American and British companies were encouraged to investigate the southern oceans, to such an extent that it is likely a good many of them actually set foot on Antarctica and were therefore the first people to do so, although documentary proof gives the official date as 7 February 1821 when American sealer John Davis went ashore at Hughes Bay.

Inevitably, the discovery of the southern continent exerted a powerful hold over adventurous types and the locating of the North Magnetic Pole in 1831, only added to the allure of exploring Antarctica in search of the South Magnetic Pole. One of the first such expeditions was that led by British Naval Officer James Clark Ross who managed to identify its approximate location, but was unable to actually reach it on his trip in 1841.

Commanding the British ships *Erebus* and *Terror*, Ross braved thick pack ice and approached what is now known as the “Ross Ice Shelf”, a massive floating ice shelf over 100 feet (30 m) high. His expedition sailed eastward along the southern Antarctic coast discovering mountains which were later named after his ships. In the National Meteorological Archive we have important archive records from this early expedition including the ship log of the *Erebus*, which was later crushed by ice on an expedition to the Arctic in search of the North West Passage.

The later years of the nineteenth century and early twentieth century witnessed the heroic age of Antarctic exploration as the continent became the scene for some of the greatest triumphs and tragedies of human exploration, most famously the expeditions led by Ernest Shackleton and Robert Falcon Scott.

During the National Antarctic Expedition of 1901–1904, commonly referred to as the Discovery Expedition, Captain Scott and his two companions came to within 463 nautical miles of the South Pole as they became the first people to press into the interior of Antarctica walking most of the way across the Ross Ice Shelf. It was from here that Scott first saw the trans-Antarctic mountains as a barrier to penetration onto the high polar plateau where the South Pole sits.

In the British Antarctic Expedition of 1907–1909, better known as the Nimrod expedition, Shackleton and his team pioneered the Beardmore Glacier route to the South Pole and came to within 112 miles of the South Pole by reaching 88°23'S. The expedition's other achievements were the reaching the location of the South Magnetic Pole and the first ascent of Mount Erebus.



*Sir George Simpson (1878–1965)
in his laboratory in Cape Evans.*

©Royal Geographical Society.

The geographical North Pole was supposedly reached in 1909 by an American explorer Frederick Cook and this inspired several people in Norway, Japan, and Britain to engage in another attempt to reach its southern equivalent. In the ultimately tragic Terra Nova Expedition of 1910–1913, Captain Scott described his chief aim as being “to reach the South Pole, and to secure for The British Empire the honour of this achievement.” But Scott had the twin aim of leading a team of scientists to conduct important investigations into the biology, zoology, geology, glaciology and oceanography of the continent on an unprecedented scale.

Not least among Scott's scientific objectives was to conduct regular meteorological observations for the entire duration of the expedition. For this purpose he appointed a select team of meteorologists, chief amongst whom was George Simpson. He was known by the rest of the team as “Sunny Jim” and later served as the Director of the Met Office from 1920 to 1938; he was knighted in 1935, and is commemorated with the Simpson Glacier 71° 17'S, 168° 38'E, the Simpson Glacier Tongue 71° 15'S, 168° 45'E and Simpson Peak (1,720 metres) in the Scott Mountains 67° 43'S, 50° 07'E. The comprehensive scientific programme is what makes this expedition so distinctive and is why it represents the benchmark in the establishment of interdisciplinary science in Antarctica.

Captain Scott's Terra Nova expedition

The ship *Terra Nova* began its long voyage from Cardiff to Antarctica on 15 June 1910. Upon arriving in Melbourne, Australia, Captain Scott left the ship to continue much needed fund-raising, while *Terra Nova* proceeded to New Zealand. Waiting for Scott in Melbourne was a telegram from the Norwegian Roald Amundsen, informing Scott that the Norwegian was "proceeding south"; the telegram was the first indication that Scott faced an additional challenge to achieving his ambition of being the first to reach the South Pole. When asked by the press for a reaction, Scott replied that his plans would not change and that he would not sacrifice the expedition's scientific goals to win the race to the Pole.

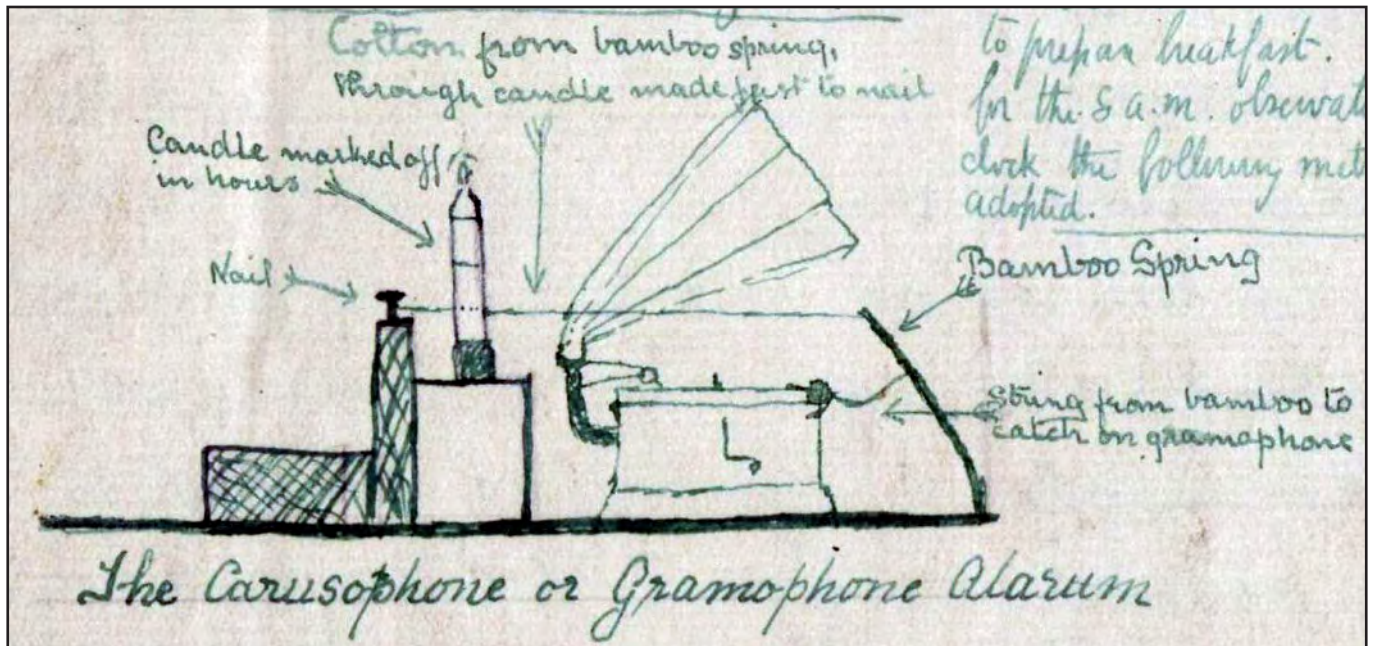
Scott rejoined the ship in New Zealand, where additional supplies were taken aboard, including 34 dogs, 19 Siberian ponies and three motorised sledges. A few days after leaving Port Chalmers on 29 November 1910, the *Terra Nova* was struck by a terrific storm producing 35 foot waves. At one point, the pumps having failed, the crew had to bail her out with buckets. The episode resulted in the loss of two ponies, a dog, 10 tons (10,200 kg) of coal and 65 gallons (300 L) of petrol. On 10 December *Terra Nova* met the southern pack ice and was halted, remaining for twenty days before breaking clear and continuing southward. It was an ominous start to the trip all of which is dramatically captured in the actual ship logs which are stored in the National Meteorological Archive for members of the public to see.

Meteorological Log kept on board													
"Terra Nova" R.N.S.													
DATE	Latitude	Longitude	Course and Distance	Wind	Barometer	Thermometer							
Time	Observed	Dead Reckoning	Observed	Direction	Force	At Sea	On Deck	At Sea	On Deck	At Sea	On Deck	At Sea	On Deck
10 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
11 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
12 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
13 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
14 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
15 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
16 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
17 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
18 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
19 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
20 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
21 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
22 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
23 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
24 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
25 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
26 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
27 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
28 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
29 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
30 Nov	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
1 Dec	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
2 Dec	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
3 Dec	41° 30' S	174° 00' W	100	SE	10	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0

Terra Nova, meteorological ship log, 30 November–3 December 1910, Gale Force 10 recorded on 2 December 1910.

Shortly after arriving at Ross Island, Antarctica, in early January 1911, chief meteorologist George Simpson constructed one of the continent's first weather stations at Cape Evans (77° 38'S, 166° 24'E) in McMurdo Sound from which regular weather observations were made and recorded in notebook registers. In addition to the main site, three outlying screens were erected to help record the micro-climate of the area during the Antarctic winter.

Further to these base observations, still more were made on the "sledging" journeys away from base to either explore specific geographic areas or when in depots in support of the main trek to the South Pole. Finally, observations were conducted by the main polar party led by Captain Scott. All of these weather notebooks constitute an important source of baseline weather data and are among the most historically significant meteorological records we have in our whole collection.



'Carusophone' diagram from the meteorological register kept by the 'Northern Party' at Cape Adare.

Simpson also conducted a range of other meteorological observations at the base camp at Cape Evans and the corresponding records are stored here at the Archive, including barograms (continuous atmospheric pressure recordings); thermograms (continuous temperature recordings); anemograms (continuous wind recordings); aerological data obtained from radiosonde balloon ascents; and sunshine cards – a rather unusual aspect of the records for the Antarctic – notably a very long mid-summer record displaying 112 hours and 10 minutes of continuous sunshine.

Most of the instruments used to conduct these observations were supplied to the expedition by the Met Office. We also have numerous miscellaneous records connected with the expedition, including letters, occasional photographs, and even diagrams of "marvellous and beautiful auroras observed by the indefatigable explorers".

While the scientific research was one of Scott's chief goals, by far the most memorable event of the expedition was the arduous and ultimately tragic trek to the South Pole. Captain Scott decided to use the route pioneered by Shackleton during the Nimrod expedition via the Beardmore Glacier and onto the Polar plateaux, whereas his rival, the Norwegian explorer Roald Amundsen, elected to use a shorter albeit uncharted route from the Bay of Whales and up the Axel Heiberg Glacier.

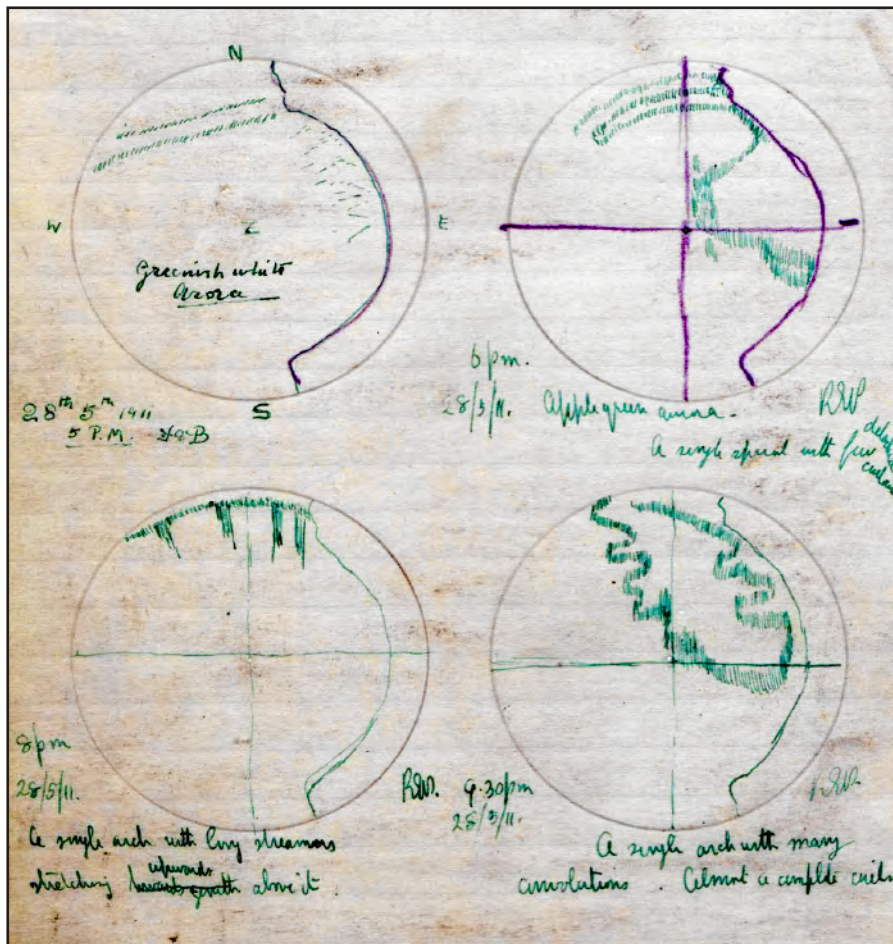


Diagram of aurora observed by Raymond Priestley on the beach at Cape Adare, 28 May 1911.

Among the most telling differences between the two attempts is that Amundsen set off sooner with a smaller team and utilised dog-pulled sledges throughout his journey, whereas Scott decided to use pony-pulled sledges – which proved a poor decision as the ponies were ill-suited to the extreme environment – and covered the bulk of the distance on foot. Despite the difficulties and set backs they faced, Scott and his four companions – Lawrence Oates, Edgar Evans, Henry Bowers, and Edward Wilson – did reach the pole on 18 January 1912, only to find that Amundsen had preceded them by 33 days. This must have been a bitter disappointment after all their hard efforts, and the team was now faced with an equally treacherous return journey.

All the men were by this stage suffering from starvation, hypothermia and scurvy. Edgar Evans, who had long since been trailing behind the rest of the team slipped into a coma and died on 17 February 1912. A month later on 17 March, Lawrence Oates, crippled with frostbite, walked out of the party's tent and was never seen again; a few days later, the three remaining men were lying in their tent, trapped by howling blizzards, waiting for death; by 29 March 1912 all were dead.

The unusually cold temperatures that prevailed over an extended period of several weeks substantially contributed to the suffering endured by Scott and his team during the final stages of their battle for survival. In the weather notebooks the men continued to record their observations. These show that they encountered sustained minimum temperatures more than 10°C lower than the average that can now be derived from multiple years of automated measurements made in the region where they perished. These particularly severe conditions doubtless contributed to the frostbite and extreme fatigue of the men and to their eventual deaths – the victims of a rare set of meteorological conditions and other factors.

The search party set out on 29 October 1912, accompanied by a team of mules. On 12 November the party found the tent containing the frozen bodies of Scott, Wilson and Bowers just 11 miles from their supply depot. After diaries, personal effects and records had been collected, the tent was collapsed over the bodies and a cairn of snow erected, topped by a cross.

Legacy of the expedition

As the news of their deaths filtered through in early 1913 and the country mourned the loss of one of its heroes, Simpson began work on his account of the weather and climate using the data he and his colleagues had gathered over the course of the expedition. The onset of the First World War delayed publication of the results, but eventually in 1919 his pioneering three volume treatise on Antarctic meteorology was published to great acclaim.



In this, Simpson concludes that Captain Scott met with exceptionally low temperatures on his return from the pole; it was also clear from the data that the transition from Antarctic summer to winter is much more rapid than was previously thought.

In memory of Captain Scott and as a tribute to what he and his colleagues achieved scientifically, a grateful country founded the Scott Polar Research Institute at the University of Cambridge in 1920. Its primary goal was to provide a single point at which material of polar interest might be collected and made accessible for future research.

A few more ambitious expeditions that went on to become epic feats of survival took place after the death of Scott, notably the Imperial Trans-Antarctic Expedition of 1914 led by Shackleton, ultimately brought an end to the heroic age of Antarctic exploration. With the spectacular exception of polar explorer Admiral Richard Bird who made flights to Antarctica in 1929 and 1934, the continent remained virtually unvisited until after the Second World War when an American team of scientists flew to the South Pole with the intention of setting up a permanent scientific base there. The original scientific station, named in honour of Amundsen and Scott, was constructed during November 1956 to carry out part of the International Geophysical Year of scientific observations during 1957 through 1958.

Fears over the possible exploitation of the continent for commercial and military gain resulted in the Antarctic Treaty of 1959 and related agreements, collectively called the Antarctic Treaty System, designed to regulate international relations with respect to Antarctica. The Treaty, which entered into force in 1961 and currently has 49 signatory nations, maintains Antarctica as a scientific preserve, protects it from territorial claims, establishes freedom of scientific investigation, and prohibits all military activity on the continent. This marks a seminal moment in international relations and represents the first arms control agreement of the Cold War era.

The Amundsen–Scott South Pole Scientific Station has been continuously inhabited by a community of international scientists since its foundation. The unique position of the base and the advantages this affords has resulted in a long and distinguished history of scientific research, not least in terms of the discovery by the British Antarctic Survey (BAS) of the depletion of the ozone layer and its corresponding impact on global temperatures. The Met Office has a close working relationship with BAS and some of our forecasters are seconded to their main base at Rothera on the Antarctic Peninsula every summer to engage in collaborative meteorological research.

Conclusion

While the story of Captain Scott's extraordinary adventure and tragic death is a story that still compels, fascinates and inspires, the real legacy of the expedition lies in Scott's recognition of Antarctica as a place of special scientific interest. The *Terra Nova* expedition established a long tradition of detailed scientific research on the continent, which continues to this day, and has enabled a greater understanding of the climate and world around us.



Polar Party at South Pole 18 January 1912.

Left to right: Edward Wilson, Captain R.F. Scott, Edgar Evans, Lawrence Oates, Henry Bowers. Amundsen's tent is pictured behind them. ©Royal Geographical Society.

Items on display

Terra Nova ship meteorological log

Port Chalmers, New Zealand to McMurdo Sound, Antarctica, Nov–Dec 1910.

The *Terra Nova* (which is Latin for 'new land') was originally built in 1884 for the Dundee whaling and sealing fleet. The ship was first used for scientific purposes during a British led expedition to the arctic in 1894–1897. The ship was purchased by Scott's British Antarctic Expedition in 1909 for the sum of £12,500 and was reinforced from bow to stern with seven feet of oak in order to protect against the Antarctic pack ice. The *Terra Nova's* crew conducted valuable meteorological observations during the long voyage from Cardiff to Antarctica, which they carefully recorded in this log. After returning to Britain in 1913, *Terra Nova* resumed its work in the Newfoundland seal fishery. In 1943 the ship was damaged by ice and sank off the south-western tip of Greenland.

Balloon ascents notebook

This provides the results derived from balloon ascents with recording instruments attached capable of measuring temperature and pressure. It includes tabulated data together with graphs showing the maximum height attained. Scott's expedition was the first to make regular use of weather balloons and represents the first ever successful attempt to measure the structure of the troposphere in Antarctica. Currently there are 17 upper-air stations in the Antarctic, operated by nine different countries.

Simpson's Meteorological diary

This is the diary that chief meteorologist George Simpson kept and maintained throughout his time in Antarctica. He records the experiments he conducted and the problems he encountered and also makes general remarks about the weather experienced during the expedition.

Letter from Raymond Priestley

This letter, from 2 July 1911, was written by Raymond Priestley, a member of Campbell's Northern Party, at Cape Adare. He writes about his experiences and asks Simpson to accept these notes of observations from "an 'umble neophyte in meteorological science'!"

General meteorological diary

This was kept by the team at Cape Adare. As well as general observations on the weather it also includes occasional photographs and pencil drawings. It runs from 1 June to 23 September 1911.

Cape Adare meteorological register

The role of the Northern Party at Cape Adare was to explore, map and collect geological samples and meteorological observations, for which purpose they completed a notebook register. It was during this period that the men invented the ingenious 'Carusophone' alarm clock to help them make night time observations without the inconvenience of staying awake.

Cape Crozier meteorological register

This is the register used by Dr Edward Wilson, Apsley Cherry-Gerrard and Henry Bowers to record the weather encountered on their extraordinary winter journey to collect Emperor penguin eggs for scientific study from a large nesting area in Cape Crozier. It took the men 19 days to travel just 60 miles under conditions of complete darkness with gear, clothes and sleeping bags constantly iced up in extreme temperatures. On Thursday 6 July 1911 the lowest recorded reading was -77.5°F (-60°C) at 5.15pm, which is the coldest recorded temperature in our whole collection. The notebook is written in pencil because ink will not work in such cold temperatures, and is also fitted with a ribbon which enabled the men to open the register without needing to remove their gloves. All three men survived but returned to base at Cape Evans barely alive. Cherry-Gerrard later described this as "the worst journey in the world" and published a best-selling account of it in 1922.

Polar Party meteorological register

This is a fair copy of the weather log that the main Polar Party led by Scott took with them to the South Pole. The original log was recovered from the tent in which the dead bodies of Bowers, Wilson and Scott lay and is now housed in the Scott Polar Research Institute at the University of Cambridge.

The search party made this 'fair' copy shortly after returning to main base at Cape Evans. It was then sent, with numerous other meteorological records, to George Simpson who by that time had returned to work for the meteorological service in India. It was during his time in India that Simpson analysed all the records with a view to publishing a detailed account of what the whole expedition had discovered about the meteorology of the Antarctic.

Aurora notebook

While the Northern Party was stationed at Cape Adare the men were often captivated by the aurora displays and made every effort to record them in this note book.

Notice to let

The Northern Party had a very hard time while at Cape Adare because of the extreme winds and low temperature – made worst still by meagre food rations. Among the team was Geroge Murray Levick who was by profession a Royal Navy doctor and a fun character to have in such difficult times. He composed several light hearted poems during his time there and this is a note he wrote just before the team abandoned their main hut in January 1912.

The team was rescued by the Terra Nova and dropped off at another part of the coast to camp in tents to do further exploring, expecting to be collected again a few weeks later. However, the ship could not reach the team because of heavy pack ice and as a result the team had the difficult task of facing yet another Antarctic winter without adequate housing and very little food and fuel. In order to survive they dug themselves an ice cave and ate seals and blubber. Despite suffering from frostbite, hunger and dysentery all the Northern Party survived and reached base camp at Cape Evans on 7 November 1912 after a perilous trek battling extreme conditions.

Anemogram

This is a continuous wind record produced by the Dines Pressure Tube Anemometer that Simpson had in his laboratory at Cape Evans. It indicates a max speed of 66 mph just after 3am on 20 March 1911.

Thermogram

This is a continuous temperature record covering Tuesday 27 June to Monday 3 July 1911. Over this period it indicates that the maximum recorded temperature was -24.8°F (-31.5°C); and the minimum was -38.1°F (-38.9°C).

BAE 1910–13: Meteorology

George Simpson began work on his three volume account of the weather and climate using the data he and his colleagues had gathered over the course of the expedition. The onset of the First World War delayed publication of the results, but in 1919 his pioneering treatise on Antarctic meteorology was finally published using money raised by public subscription in memory of Captain Scott and his companions. In this, Simpson concluded that Captain Scott met with exceptionally low temperatures on his return from the pole; it was also clear from the data that the transition from Antarctic summer to winter is much more rapid than was previously thought. Simpson became director of the Met Office in 1920 and was knighted in 1935 for his services to meteorology; he died on 1 January 1965. He is commemorated with the Simpson Glacier $71^{\circ} 17'S$, $168^{\circ} 38'E$, the Simpson Glacier Tongue $71^{\circ} 15'S$, $168^{\circ} 45'E$ and Simpson Peak (1,720 metres) in the Scott Mountains $67^{\circ} 43'S$, $50^{\circ} 07'E$.

Letter from Lyons to Simpson

This letter dates from 21 October 1919. H.G. Lyons was the Chair of the Committee for the Publication of the Scientific Results. He thanks and commends Simpson for his treatise on the expedition meteorology and asks about whether anything had been arranged with regards to the permanent storage of the original weather observation books. Lyons recommends that they be deposited with the Met Office. All the meteorological records have been held by the Met Office ever since.

Front cover image. Dr Simpson taking meteorological observations at the station on Vane Hill, Cape Evans.
Background image on pages 10 and 11. Cirrus clouds over the Barne Glacier.
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