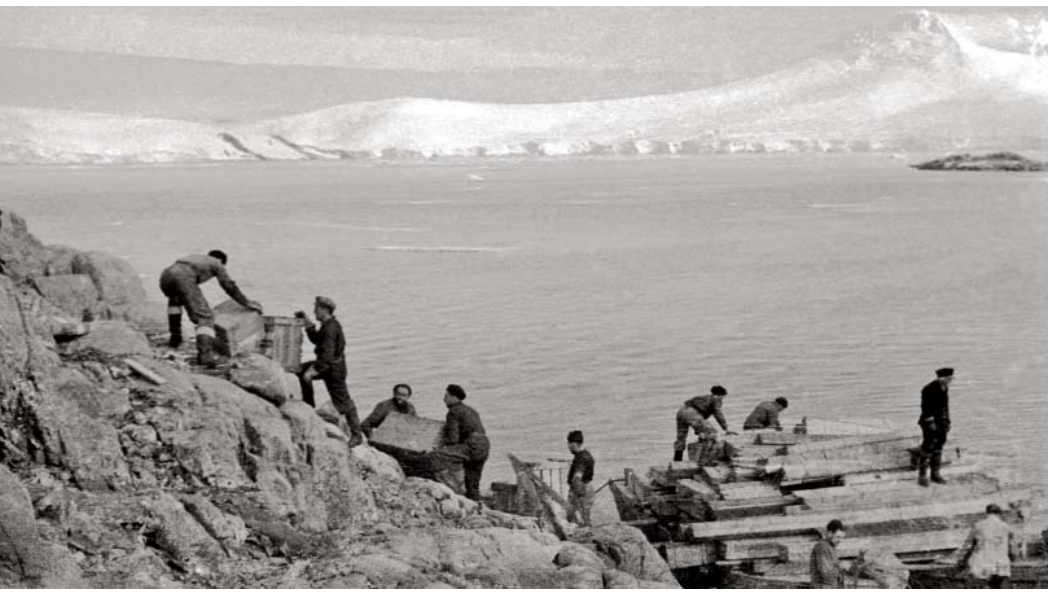
British Antarctic Survey History

British Antarctic Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL



The United Kingdom has a long and distinguished record of scientific exploration in Antarctica. Before the creation of the British Antarctic Survey (BAS), there were many surveying and scientific expeditions that laid the foundations for modern polar science. These ranged from Captain Cook's naval voyages of the 18th century, to the famous expeditions led by Scott and Shackleton, to a secret wartime operation to secure British interests in Antarctica. Today, BAS is a world leader in polar science, maintaining the UK's long history of Antarctic discovery and scientific endeavour.

The early years

Britain's interests in Antarctica started with the first circumnavigation of the Antarctic continent by Captain James Cook during his voyage of 1772-75. Cook sailed his two ships, HMS *Resolution* and HMS *Adventure*, into the pack ice reaching as far as 71°10' south and crossing the Antarctic Circle for the first time. He discovered South Georgia and the South Sandwich Islands although he did not set eyes on the Antarctic continent itself. His reports of fur seals led many sealers from Britain and the United States to head to the Antarctic to begin a long and unsustainable exploitation of the Southern Ocean.

Image: *Unloading cargo for the construction of 'Base A' on Goudier Island, Antarctic Peninsula (1944).*

During the late 18th and early 19th centuries, interest in Antarctica was largely focused on the exploitation of its surrounding waters by sealers and whalers. The discovery of the South Shetland Islands is attributed to Captain William Smith who was blown off course when sailing around Cape Horn in 1819. Large numbers of seals were spotted around the islands and the Royal Navy sent Smith back to investigate. Onboard ship was British naval officer, Edward Bransfield, who explored and charted the region for two months. In 1820, Smith and Bransfield are believed to have been the first people to sight the Antarctic mainland.

Between 1839 and 1843, James Clark Ross led three Royal Navy voyages into the ice. An experienced polar explorer – having endured nine winters in the Arctic – he was exceptionally well qualified and his geographical discoveries were among the greatest achieved by any expedition of the period. Ross made extensive biological collections and scientific observations. He succeeded in penetrating the pack ice to discover the Ross Sea, the mountains of Victoria Land (Transantarctic Mountains) and an active volcano, which he named Mount Erebus after one of his ships. He also encountered what he called the 'Great Ice Barrier' (now known as the Ross Ice Shelf).

Beware volcanoes

There are several active volcanoes in and around Antarctica. The most famous is Mount Erebus which rises above McMurdo Sound on Ross Island. It was named by James Clark Ross after one of his ships. The main US and New Zealand research stations have been built close to its lower slopes. Deception Island, the site of the British 'Base B', is also volcanic – its horseshoe shape results from a central flooded caldera. When it was first occupied it was believed the volcano was no longer active. Unfortunately this turned out not to be the case and it had to be evacuated following an eruption in 1967. After a second eruption in 1969 the research facility was permanently abandoned.

Image: *BAS's Royal Research Ship James Clark Ross is named after the 19th century British naval explorer.*

The heroic age

The most famous British expeditions to Antarctica took place at the beginning of the 20th century – the so-called 'heroic age' of polar exploration.

Captain Robert Falcon Scott's British National Antarctic Expedition (1901-04) aboard the *Discovery* was fundamentally a scientific undertaking. He established a base on Ross Island, McMurdo Sound, where his hut still stands today. As well as achieving a new 'furthest south', he crossed the Ross Ice Shelf and recorded a mass of scientific observations.

Ernest Shackleton's British Antarctic Expedition of 1907-09 was the first to set foot on the Polar Plateau. Shackleton came within 97 miles of the South Pole before deciding that unless he turned for home he would not make it back alive. Members of his party also reached the South Magnetic Pole.

Arguably the most famous British polar expedition was the British Antarctic Expedition of 1910-13, when, in January 1912, Scott reached the Pole a month after Norwegian Roald Amundsen. The tale of the hardships faced by Scott and his men and their tragic demise on the return journey has been told countless times and remains a source of controversy. But while Amundsen was completely focused on being the first to reach the South Pole, Scott's expedition made significant scientific discoveries in biology, meteorology and geology. Measurements, observations and samples obtained by Scott and his men are still used today as a benchmark in Antarctic science.

Image: *Scott's hut, from his 1902-04 expedition, still stands today at McMurdo Sound.*

One of the most dramatic polar adventures was that endured by Shackleton during the Imperial Trans-Antarctic Expedition of 1914-17. Shackleton planned to make the first crossing of the Antarctic continent, but before he reached his proposed landing point in the Weddell Sea, his ship *Endurance* was beset and crushed by sea ice. The crew finally escaped in small boats to Elephant Island where they survived a dreadful winter living under their upturned boats.

Shackleton decided that the only way to ensure rescue was to attempt to reach South Georgia. He made the voyage with five companions across 600 miles of some of the roughest seas in the world in a small, open lifeboat. Landing in South Georgia he and two others then had to cross the mountainous island before seeking help from a whaling station.

The Chilean Government generously loaned Shackleton a small tug called the Yelcho, in which he was able to rescue all 22 comrades from Elephant Island, no easy undertaking in itself. That the entire party survived is a testament to his remarkable leadership. Shackleton attempted a further expedition to Antarctica in 1921 but died suddenly at South Georgia.

Between 1925 and 1949, the British Government supported a series of voyages known as the 'Discovery Investigations'. The voyages were paid for by money from whale oil taxes and made important advances in understanding Antarctic marine biology. Among a host of scientific and oceanographic achievements, the 13 voyages of *Discovery* included the first circumnavigation of the continent in winter and significant charting of large areas of previously unexplored Antarctic waters.

The last British expedition before the Second World War was led by John Rymill to Graham Land. From 1934-37, Rymill carried out a comprehensive and detailed scientific programme covering geology, meteorology, glaciology and biology. It established that the Antarctic Peninsula is part of the Antarctic mainland and set a high scientific standard for later expeditions to follow.

Image: *The Discovery, anchored during one of its 13 scientific voyages in Antarctica between 1925 and 1949.*

A secret operation

BAS itself originates in a secret World War II mission, Operation Tabarin. It was named after a Paris nightclub – Bal Tabarin – as the men would winter in the Antarctic darkness.

Operation Tabarin was mounted by the British Government in 1943 to secure Antarctic waters against enemy raiders and to strengthen British claims to the sovereignty of the Falkland Islands Dependencies (now South Georgia, South Sandwich Islands and British Antarctic Territory).

The original intention was to establish two bases – one to guard Deception Island anchorage and the other to occupy a position on the Antarctic Peninsula. Even though the primary mission was a political one, it was also appreciated that the bases could provide a platform for scientific research. In fact, science became the primary focus of the operation, which lasted two years, and in which three bases were eventually set up.

James Marr, who had served with Shackleton on his last expedition and as a zoologist on the Discovery Investigations, was appointed to lead the mission. Within just a few months Marr had gathered the men, supplies, huts and equipment required. In February 1944 the party, in their two ships *Fitzroy* and *William Scoresby*, reached Deception Island where 'Base B' was to be established in one of the buildings of an old Norweigan whaling station.

Base A

The base at Port Lockroy was built on Goudier Island in February 1944. It housed a nine-man wintering team. The hut was erected from prefabricated sections and some timber used in the construction was salvaged from an abandoned whaling station on Deception Island. The building contained a mess room where the men ate, relaxed and slept, a work room, kitchen, store room and generator room. There was even a bathroom. However, because water was rationed, only the person whose turn it was to gather and melt the ice or snow was allowed to bathe. This meant up to nine days between baths!

Image: *The men of Operation Tabarin pose on the deck of SS Eagle off the Antarctic Peninsula coast (1945).*

Poor ice conditions prevented Fitzroy from reaching the Antarctic mainland so instead Marr opted to set up 'Base A' on Goudier Island in the sheltered harbour of Port Lockroy. After reclaiming the territories for the UK, the huts were constructed and radio communication (using coded messages) was established with the Falkland Islands. Operation Tabarin remained secret until April 1944.

Once settled in, the parties carried out daily weather and sea-ice observations. Surveys were carried out of the local geology and glaciology and improved maps were made of the area. As James Marr was also a biologist, he carried out studies and made collections of marine animals, while botanist Mackenzie Lamb collected lichens.

Short man-hauling expeditions were made in the local area for surveys and to collect rock samples. As the bases became more established, and with the arrival of Husky dogs from Labrador, Canada, the following season, the science became more ambitious. Thanks to the dog teams at Hope Bay, fieldwork was undertaken over a much wider area, increasing the quantity and scope of the scientific data being recorded.

Image: *Dog teams were brought in by Operation Tabarin in 1945 to increase surveying capabilities at Hope Bay, Trinity Peninsula.*

Civilian science

On 8th May 1945 the end of the war was announced over the radio by the Governor of the Falkland Islands to much celebration in the British bases.

In July 1945, Antarctic operations were taken over by the Colonial Office and renamed the Falkland Islands Dependencies Survey (FIDS), with its headquarters remaining in the Falkland Islands under the control of the Governor. After two years in the Antarctic, original members of Operation Tabarin returned to the UK. By now there were four bases (after 1967 the name 'bases' was replaced by 'research stations').

By 1946 many areas of the continent were still unexplored. The immediate post-war years saw considerable reorganisation of the UK's Antarctic interests with increasing emphasis on science and discovery. However, conflicting sovereignty claims and political disputes over territory were frequent occurrences.

Despite this there were many examples of international co-operation. A Norwegian-Swedish-British expedition to Dronning Maud Land in 1949-52 carried out important scientific studies in glaciology, meteorology and geology. The UK and USA also co-operated on a series of expeditions from bases at Stonington Island. Accounts from this time give an insight into the pioneering spirit required to work in Antarctica. Communication was poor, supplies were limited and the hazards all too real. In 1946, for example, the main hut on Deception Island was burnt to the ground taking almost all the food with it. The men had to survive on meagre rations in a nearby derelict building before they were rescued.

In 1948, a fire at Hope Bay had more tragic consequences. The base doctor, Bill Sladen, was observing penguins in a nearby colony when he saw a dense cloud of smoke coming from the north end of the hut. Knowing that his two companions were inside, he ran over and tried to push his way in. Despite a valiant effort he was unable to get through the heat, flames and suffocating fumes. The base was completely burned to the ground, claiming two lives.

Image: © English Heritage. NMR

Image: *The first major aerial survey of the Antarctic Peninsula took place between 1955 and 1957. Based at Deception Island, the Falkland Island Dependencies Aerial Survey Expedition (FIDASE) used two Canso flying-boats and several helicopters.*

International science

By 1950, a FIDS Scientific Bureau had been set up, aimed at pulling together the vast amount of scientific data now being generated by the organisation. It arranged for results to be worked up at scientific units attached to a number of UK universities. Vivian Fuchs, an experienced Field Commander of six Antarctic bases, was appointed its first Principal Scientific Officer. He later became Director of the Bureau, Director of FIDS and finally Director of the British Antarctic Survey, a position he held until 1973.

The 1950s was a key decade in the development of modern Antarctic science. During the International Geophysical Year (IGY) of 1957-58, the 12 nations with scientific bases in Antarctica put aside their political differences to co-operate on an international scientific programme unprecedented in Antarctic history. Underlying this was improved radio communication and free exchange of information that resulted in a step-change increase in Antarctic research and scientific understanding. Forty-four bases were occupied in and around Antarctica during that time, including the American Amundsen-Scott base at the South Pole and a Soviet base at Vostok, high on the East Antarctic plateau. The principal goals of IGY included the examination of the Earth, its atmosphere and the influences of the Sun. Studies were made of atmospheric physics, gravity and cosmic rays. For the first time, with so many research stations, a detailed picture could be built up of Antarctic weather and climate and the connections between Antarctic phenomena and the rest of the world. The global effort of the IGY showed the way forward for Antarctic science.

Dogs in Antarctica

Getting around in Antarctica remains a challenge to this day. Scott used dog teams during his first expedition although much of his work was carried out on foot. Shackleton was the first to attempt motorised transport but his converted car proved useless on all but the flattest sea ice. Despite Scott's limited success with motorised tractors and ponies, dogs remained the primary mode of transport until the 1960s, when modern skidoos took over. Huskies were well adapted to the extreme conditions, could cross difficult terrain and provided companionship to the men they accompanied. They were actively used in Antarctica until 1994, but due to concerns that they might spread diseases to local wildlife (particularly seals) they were banned from the continent under the terms of the Environmental Protocol to the Antarctic Treaty. This marked the end of 50 years of British dog teams in Antarctica.

Image: *Field communications during International Geophysical Year 1957-58. IGY laid the foundations for modern Antarctic science.*

Crossing Antarctica

Vivian Fuchs was one of the leaders of the Commonwealth Trans-Antarctic Expedition of 1957-58. A land crossing of Antarctica remained one of the last great quests in polar exploration. Starting from a base on the Filchner Ice Shelf in November 1957, Fuchs' team of 12 men set off on a hazardous journey across uncharted territory with tracked vehicles, sledges and dogs.

Meanwhile, on the other side of the continent, the explorer Edmund Hillary (who with Tenzing Norgay had conquered Mount Everest in 1953) left from the New Zealand Scott Base to lay down depots towards the Pole. Hillary reached the South Pole on 4th January 1958 – the first to get there by land since Captain Scott. He was joined by Fuchs a few days later. Fuchs then continued the crossing of Antarctica following the depots laid down by Hillary's team.

Not only did the crossing rank as an impressive achievement in itself, it also achieved some scientific firsts. The area between the Weddell Sea and the Pole was explored for the first time and seismic sounding across the continent revealed the landscape under the ice in previously unknown detail.

Antarctica calling

Communication with Antarctica has always been difficult and even today can be affected by adverse weather or atmospheric conditions. Neither Scott nor Amundsen had radio communication with the world although Scott did install a telephone between two huts. Wireless telegraphy was in use from 1944 (transmitting Morse Code) but it was often unreliable. The men could, however, listen to radio stations – notably the BBC World Service, which until the 1960s produced a special 'Calling Antarctica' programme.

Until 1965, most communication between research stations and the UK was via the Falkland Islands. Except in emergencies, almost all personal messages were sent by post – a service only available during the summer and dependent on ship and aircraft movements. By 1966, a radio teleprinter link had been established between London and BAS research stations via the Falklands. This was used to communicate reports and send bi-monthly newsletters to Antarctica. Regular phone calls to and from the continent weren't possible until the adoption of satellite communications technology in the early 1980s. Today, research stations have email, Internet and telephone communication with BAS Cambridge and the wider world.

Image: *Sir Vivian Fuchs played a huge role in the development of the British Antarctic Survey and was its first Director.*

Base Z

The International Geophysical Year saw the setting up of one of the world's most unusual research stations. Originally constructed as a traditional wooden hut with pitched roof, the British base at Halley Bay (named after the famous astronomer Edmund Halley) was established by the Royal Society on the 150m thick, continually moving, Brunt Ice Shelf.

The base filled an important gap in the IGY Antarctic network with studies in meteorology, glaciology, seismology, radio astronomy, ionospheric physics and geomagnetism. Many of these studies have continued uninterrupted ever since, providing invaluable long-term data sets.

Studies at Halley have provided vital information for a global understanding of ozone depletion (data from Halley helped BAS scientists discover the 'ozone hole' in 1985), atmospheric and space interactions and climate change. The flatness of the floating ice shelf provides one of the best natural laboratories in the world to study atmospheric changes close to the ground.

FIDS took over the operation of the base on 14th January 1959 as 'Base Z' and a new main hut and dog kennels were built close to the original buildings. By 1961 the complex was completely buried with snow – turning it into an underground research station. It even had its own London Underground sign! Halley II was built in 1967 and designed with a pitched roof reinforced with steel supports. It lasted until 1973. Halley III was built of prefabricated huts housed inside corrugated steel conduits and survived until 1984 when it was replaced by Halley IV.

Construction of Halley V began in January 1989 and the station was fully operational from February 1992. To avoid destruction by accumulating snow, the buildings of Halley V were positioned on platforms which were raised every year to keep them above the ice surface. However, with the relentless movement of the ice shelf towards the Weddell Sea, this was replaced in early 2012 with the state-of-the-art Halley VI, whose modular design and ski-fitted, hydraulic legs mean it can be separated and towed to a new location.

Image: *BAS's new state-of-the-art Halley VI Research Station opened in 2012.*

The Antarctic Treaty

A major international agreement was signed following the IGY. The Antarctic Treaty had, and continues to have, far reaching implications for Antarctica and for those nations with interests there. On 1st December 1959, the 12 leading nations that had been participating in the IGY signed up to the 14 articles of the Antarctic Treaty in Washington, USA. The Treaty came into force on 23rd June 1961.

The Antarctic Treaty's objectives ensure peaceful exploration, the banning of nuclear weapons testing, international scientific co-operation and the suspension of all territorial claims.

The Antarctic Treaty remains in force indefinitely and is recognised as one of the world's most successful international agreements. Since it was first proposed, the number of countries that have signed up to the Treaty has risen to 49. Representatives from all signatories meet annually at the Antarctic Treaty Consultative Meeting. BAS science plays a major role in informing the UK Government position at Treaty meetings.

The Treaty nations have also agreed to protect the plants and wildlife that live on and around Antarctica through a series of separate international agreements, such as the Convention for the Conservation of Antarctic Marine Living Resources. Other provisions outlaw mining, require prior Environmental Impact Assessment for all activities and govern the management of pollution, waste and protected areas.

British Antarctic Survey

The Antarctic Treaty covers the area south of 60°S, and as a result, the British Government decided to divide up the Falkland Islands Dependencies, renaming the Antarctic Peninsula area 'British Antarctic Territory'. To reflect this change, on 1st January 1962, FIDS was renamed the British Antarctic Survey and its headquarters were formally transferred to London.

In 1965, the Government established the Natural Environment Research Council (NERC). Two years later, responsibility for BAS was transferred from the Colonial Office to NERC, although the Government continued to appoint magistrates from BAS over-wintering personnel.

Image: *BAS science and operations are all planned and managed from the site in Cambridge, UK.*

Sir Vivian Fuchs retired from BAS in 1973, having overseen its evolution from a few isolated Antarctic bases to a major scientific organisation. His retirement coincided with a decision to move BAS's operational headquarters to new buildings in Cambridge, consolidating the organisation on a single site. These purpose-built facilities with offices, laboratories, vehicle garage, cold-water aquarium and expansive stores, were completed in 1976.

In 1982, the Falklands War took place between Britain and Argentina and BAS personnel were deported from South Georgia by the Argentine military. During the invasion of the Falkland Islands, communications with Antarctica were severely affected. From the mid-1980s, the Government increased the BAS budget, allowing BAS to expand its infrastructure, launch a new ship, rebuild Halley Research Station and significantly improve its communications. In turn, this meant that scientific programmes could become increasingly ambitious.

The discovery of the ozone hole in 1985, from data gathered at Halley Research Station, led to the signing of the Montreal Protocol in 1987. Governments of many countries agreed to ban the use of CFCs and other ozone-damaging chemicals. This international agreement and resulting global awareness of the impact of human activity on the planet raised BAS's profile, helping to maintain the increase in investment in BAS science and the Survey's expansion and development.

In 1989, BAS extended its offices in Cambridge to include specialist laboratories and a new aquarium. A cold-room for cutting and storing ice cores, and state-of-the-art laboratories for ice-core analysis were added to the site in 1992. In 2003, the ANGEL Laboratory was completed. This purpose-built molecular biology facility allows BAS biologists to conduct cutting-edge genomics research, helping to understand better the evolution and biodiversity of the Antarctic environment.

Image: *The Bonner Laboratory at Rothera Research Station, Adelaide Island, Antarctic Peninsula.*

Since 1989, there has been a major redevelopment and expansion of activities at Rothera Research Station on Adelaide Island, Antarctic Peninsula. A comprehensive Environmental Impact Assessment (EIA) was undertaken before commissioning, in 1991, a 900m gravel runway, aircraft parking area, hangar and fuel storage tanks. The EIA was approved by the UK Foreign and Commonwealth Office. The station, opened during the 1975-76 season, originally used a skiway 300m above the station on a glacier, on which ski-equipped Twin Otter aircraft could take-off and land.

The new runway allowed BAS's larger aircraft, a de Havilland Canada Dash-7, to fly directly from the Falkland Islands to Rothera, transforming BAS's logistical capabilities and cementing Rothera as BAS's centre of Antarctic operations. This increased capability to transport both people and cargo resulted in a significant expansion and enhancement of the BAS science programme, at its research stations and in the field.

Improved accommodation in 1996 and 2001, construction of the operations tower in 1999, sewage treatment plant in 2003 and a waste incinerator in 2007 have seen activity at Rothera increase considerably. The opening of the Bonner Laboratory in 1996 saw BAS's main biological research capability transfer to Rothera. The station is currently undergoing a further eight-stage redevelopment, scheduled for completion in 2015. This will provide enhanced living, working and storage areas. The redeveloped station will cater for up to 124 personnel and will include a host of energy-efficient technologies.

Fossil Bluff and Sky-Blu

BAS operates two field stations at Fossil Bluff and Sky-Blu on the Antarctic Peninsula. These act as 'logistics facilities' for field parties, and are depots for food, fuel and other supplies. Fossil Bluff lies at the base of a scree-covered ridge overlooking George VI Sound and can house up to four people. Sky-Blu, established in 1993, is a flat area of blue ice and can be used by the larger Dash-7 aircraft, meaning fewer flights are required to deliver supplies.

Image: *One of BAS's four Twin Otter aircraft lands at a remote field camp on Berkner Island, Antarctica.*

BAS also operates two further research stations at Bird Island, South Georgia, and Signy, in the South Orkney Islands. Although first established in 1958 and 1947 respectively, both underwent major renovations; Bird Island in 1981 and 2005-06 and Signy was rebuilt in 1995-96 as a summer-only station, when marine research transferred to Rothera.

The applied fisheries research station at King Edward Point, South Georgia, opened in 2001. BAS manages the station as part of its commissioned research for the Government of South Georgia and the South Sandwich Islands, undertaking biological and ecological research to ensure the conservation of Southern Ocean fish stocks. This marked the return of biological research to King Edward Point after an absence of nearly 20 years.

The longest continuous occupation of any British station came to an end in 1996 with the hand-over to the Ukraine of Faraday Research Station in the Argentine Islands, Antarctic Peninsula. It had been used since 1947 for geophysics, meteorology and atmospheric research. However, it remains in constant use by the Ukrainians and has been renamed Vernadsky.

Image: *Atmospheric studies at BAS's Halley Research Station led to the discovery of the ozone hole in 1985.*

Preserving the past

In order to comply with the Protocol on Environmental Protection to the Antarctic Treaty (adopted in 1991), BAS undertook a survey of its closed stations. As a result, five were designated as Historic Sites and Monuments and the remainder of the sites have been cleaned up and removed or transferred to other countries. Much of this work has been in conjunction with the UK Antarctic Heritage Trust (AHT) and the Foreign and Commonwealth Office. The five preserved bases are: Deception Island, Port Lockroy, Stonington Island, Wordie House and Horseshoe Island.

Port Lockroy – the original 'Base A' – underwent a major renovation in 1996. A BAS conservation team repaired and restored the station to its 1962 condition. It is now a popular destination for Antarctic tourists. It is staffed throughout the summer by the UK Antarctic Heritage Trust and can see up to 17,000 visitors each year. Profits from a small gift shop and a proportion of postal revenues mean that the operation is self-financing. Inside, visitors can see the cramped living quarters, a variety of authentic artefacts, including an operational radio from 1944 (which can still receive the BBC World Service) and the kitchen is stocked with foodstuffs from the 1950s.

One of the more unusual preservation projects has been the Reclus Hut. The hut was used as a small refuge during the first crossing of the Antarctic Peninsula, from Hope Bay to Stonington Island, in 1957. Little bigger than a garden shed, it was home to a wintering party of three. The following season they back-packed and man-hauled a sledge over difficult terrain to lay depots for a surveying team travelling from the opposite side of the Peninsula. Of the 50 days in the field the team was confined to its tent for 39 due to severe blizzards. The eventual crossing through extreme weather took 54 days. The Reclus hut was dismantled from Portal Point in 1997 and has now been rebuilt as an exhibit at the Stanley Museum in the Falkland Islands.

Image: *The fully restored 'Base A' building at Port Lockroy, Goudier Island, Antarctic Peninsula.*

Modern BAS

Today, the British Antarctic Survey is a world leader in polar science for planet Earth. In a changing world, studies carried out in Antarctica are proving vital to our understanding of our planet and its future.

BAS has over 450 staff and operates three research stations in the Antarctic: Rothera, Halley and Signy. It also carries out biological research at Bird Island, South Georgia, and commissioned fisheries science at King Edward Point on behalf of the Government of South Georgia and the South Sandwich Islands. BAS also manages and runs the NERC Arctic research station at Ny Ålesund, Svalbard.

Operations and science programmes are executed and managed from Cambridge, and rely on a wide-ranging team of professional staff and expert logistics and operational planning. BAS has two ice-strengthened ships – Royal Research Ships *James Clark Ross* and *Ernest Shackleton* – and five aircraft.

In the 21st century international co-operation is more important than ever. BAS undertakes research projects with more than 40 UK universities and has joint research programmes with most of the Antarctic Treaty nations.

From its secret wartime beginnings, BAS has become a leader in the polar science arena, securing invaluable data for the UK Government to address issues such as climate change, ozone depletion and changing biodiversity. As the world focuses on predicting the impacts of climate change, BAS will play an ever more important role in helping to understand Antarctica's place in the global climate system and the effects of a changing climate on global sea level and Antarctica's ecosystems.

Further information

More information about BAS history and operations can be found on our website, www.antarctica.ac.uk, and in leaflets 'British Antarctic Survey Research Stations', 'British Antarctic Survey Ships' and 'British Antarctic Survey Aircraft'.

Image: *The international AGAP project surveyed the subglacial Gamburtsev Mountains in East Antarctica.*

Principal British voyages and expeditions to the Antarctic

Date	Captain or Leader	Vessel	Purpose or Title
1772-75	James Cook	*Resolution* *Adventure*	Exploration
1819	William Smith	*Williams*	Mercantile
1819-20	William Smith Edward Bransfield	*Williams*	Exploration
1820-21	Robert Fildes	*Cora*	Sealing
1821-22	George Powell	*Dove* *Eliza*	Sealing
1822-24	James Weddell	*Jane* *Beaufoy*	Sealing
1828-31	Henry Foster	*Chanticleer*	Magnetic observations
1830-32	John Biscoe	*Tula* *Lively*	Sealing and exploration
1833-34	Peter Kemp	*Magnet*	Sealing
1838-39	John Balleny	*Eliza Scott* *Sabrina*	Sealing
1839-43	James Clark Ross	*Erebus* *Terror*	British Antarctic Expedition
1844-45	Thomas Moore	*Pagoda*	Magnetic observations
1872-76	C.Wyville Thomson	*Challenger*	Marine biology and oceanography
1892-93	Thomas Robertson Alexander Fairweather Robert Davidson James Davidson	*Active* *Balaena* *Diana* *Polar Star*	Dundee Whaling Expedition
1898-1900	Carsten Borchgrevink	*Southern Cross*	Exploration
1901-04	Robert Falcon Scott	*Discovery*	British National Antarctic Expedition
1902-04	William Bruce	*Scotia*	Scottish National Antarctic Expedition
1907-09	Ernest Shackleton	*Nimrod*	British Antarctic Expedition
1910-13	Robert Falcon Scott	*Terra Nova*	British Antarctic Expedition
1914-16	Ernest Shackleton	*Endurance* *Aurora*	British Imperial Trans-Antarctic Expedition

Principal British voyages and expeditions to the Antarctic
continued

Date	Captain or Leader	Vessel	Purpose or Title
1920-22	Thomas Bagshawe	unknown	Scientific investigations
1921-22	Ernest Shackleton Frank Wild	*Quest*	Shackleton-Rowett Antarctic Expedition
1925-49	Neil Mackintosh	*Discovery* *William Scoresby* *Discovery II*	Discovery Investigations
1929-31	Douglas Mawson	*Discovery*	British-Australian-New Zealand Antarctic Research Expedition
1934-37	John Rymill	*Penola*	British Graham Land Expedition
1943-45	James Marr Andrew Taylor	*Fitzroy* *William Scoresby* *Eagle*	Operation Tabarin
1946-61	Edward Bingham Vivian Fuchs	*Fitzroy* *William Scoresby* *Trepassey* *John Biscoe* *Shackleton*	Falkland Islands Dependencies Survey
1949-52	John Giaever	*Norsel*	Norweigan-British Swedish Antarctic Expedition
1951-57	Duncan Carse	unknown	South Georgia Survey
1955-57	Peter Mott	*Oluf Sven*	Falkland Island Dependencies Aerial Survey Expedition
1955-58	Vivian Fuchs	*Theron* *Magga Dan*	Commonwealth Trans-Antarctic Expedition
1955-present	Royal Navy	*Protector* *Endurance* *Protector*	Hydrography and logistics support
1962-present	Vivian Fuchs Dick Laws David Drewry Barry Haywood Chris Rapley Nick Owens	*Shackleton* *John Biscoe II* *Bransfield* *James Clark Ross* *Ernest Shackleton*	British Antarctic Survey

British Antarctic Survey (BAS), a component of the Natural Environment Research Council, delivers and enables world-leading interdisciplinary research in the Polar Regions. Its skilled science and support staff based in Cambridge, Antarctica and the Arctic, work together to deliver research that uses the Polar Regions to advance our understanding of Earth as a sustainable planet. Through its extensive logistic capability and know-how BAS facilitates access for the British and international science community to the UK polar research operation. Numerous national and international collaborations, combined with an excellent infrastructure help sustain a world-leading position for the UK in Antarctic affairs.

www.antarctica.ac.uk

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