



Australian Government

Geoscience Australia

Australian Antarctic Division



Cape Denison Historic Site

MAWSON CENTENNIAL 1911–2011, Commonwealth Bay



Mawson and the Australasian Antarctic Expedition

The Australasian Antarctic Expedition (AAE) took place between 1911 and 1914, and was organised and led by the geologist, Dr Douglas Mawson. The expedition was jointly funded by the Australian and British Governments with contributions received from various individuals and scientific societies, including the Australasian Association for the Advancement of Science.

The expedition departed Hobart in early December 1911 on the *Aurora*, under the command of Captain John King Davis. After establishing a support base at Macquarie Island, the expedition continued south to Antarctica to locate a suitable primary base. Mawson entered a wide bay, described by Charles Laserson (expedition taxidermist, biologist and naturalist) that 'stretched in a great semicircle, bordered everywhere by high ice cliffs, with here and there a patch of black rock showing at the base'. Mawson named the bay 'Commonwealth Bay' after the newly federated Australian Commonwealth. Mawson located a small rocky outcrop within Commonwealth Bay, and named it Cape Denison, after Sir Hugh Denison one of the major supporters of the AAE, and decided that this would be the site for the main expedition hut.

Weather conditions at Cape Denison during the initial landing and off-loading of supplies were pleasant with Mawson recording that 'the day had been perfect'. These conditions did not last long and soon the expedition experienced the most ferocious and persistent winds that drained dense cold air from the high polar plateau behind Commonwealth Bay. Cecil Madigan, AAE meteorologist, recorded an average wind-speed of over 71 km/h after nearly two years of recording, figures which far surpassed all previous surface wind records recorded anywhere in the world. Cape Denison is now regarded as one of the windiest places on Earth (Parish 1981).



© Mawson's Hut Foundation, photography by Simon Mossman

Members of the Mawson's Hut Foundation clearing seasonal snow build-up around Mawson's Hut prior to starting restoration work in 2005–06.



© Australian Antarctic Division, photography by Gregory Hoffmann 1980

View of Mawson's Hut with drifting snow during strong winds.

Geological investigations of Cape Denison

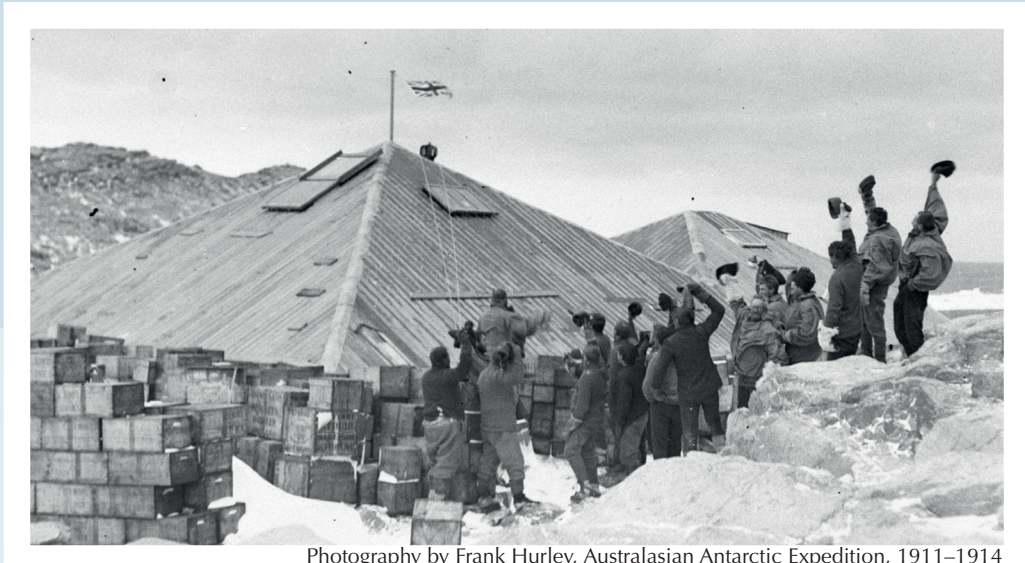
Frank Leslie Stillwell (AAE geologist) made major contributions to the understanding of the geology of the Commonwealth Bay region. Stillwell's report *'The metamorphic rocks of Adélie Land'* was published as part of the AAE scientific reports. Descriptions on the geology, geomorphology, and other physical sciences also appeared in a series of scientific reports published during 1918–1940.

Ice-free bedrock along the George V Land coastline is limited to small rocky capes, small off-shore islands and isolated inland peaks of bedrock surrounded by ice, commonly known as nunataks. George V Land, which includes Cape Denison and Commonwealth Bay, is a region named after King George V of the United Kingdom by Mawson during the AAE and lies roughly between longitudes of 142–153° E. Geological investigations studied rocks collected from the moraine fields. Moraines are geological 'rubble piles' of rocks transported and deposited as a result of glacial and icesheet movement. These rocks may have been transported many kilometres from their source. A particularly unusual sample, collected during the expedition by the western sledging party on the ice plateau, was the first described meteorite found in Antarctica (Bayly & Stillwell, 1923).



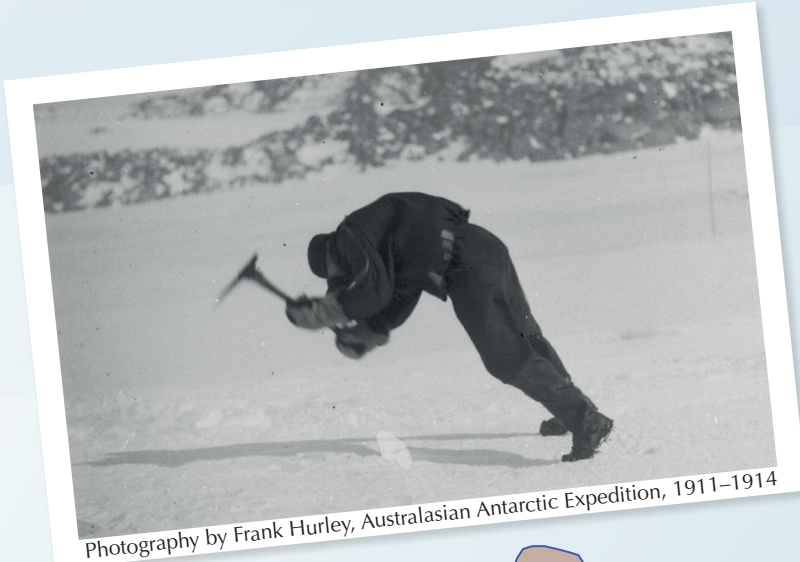
Photography by Chris Carson

Nesting Adélie penguins at Penguin Knob.



Photography by Frank Hurley, Australasian Antarctic Expedition, 1911–1914

Expeditioners of the AAE celebrating the completion of the hut.



Photography by Frank Hurley, Australasian Antarctic Expedition, 1911–1914

Geology of Cape Denison

The two dominant rock-types found at Cape Denison are orthogneiss and amphibolite. There are also minor occurrences of coarse grained felsic pegmatites.

The Cape Denison Orthogneiss was described by Stillwell (1918) as coarse-grained grey quartz-feldspar layered granitic gneiss. These rock types are normally formed by metamorphism (changed by extreme heat and pressure) of granites. The Cape Denison Orthogneiss is found around Cape Denison, the nearby offshore Mackellar Islands, and nearby outcrops at Point Alden and Port Martin to the west. Crystallisation of the Cape Denison Orthogneiss has been dated to around 2440 million years old.

The other major rock type found at Cape Denison is amphibolite. This is a metamorphic rock consisting of a mineral called hornblende which gives this rock a characteristic dark green colour. The amphibolite rocks are found as narrow dark coloured bands within the orthogneiss between 0.2 to 2 metres wide. These rocks are metamorphosed dykes, which originally were planar intrusions of a rock that is rich in magnesium and iron. The intrusion of the dykes was recently dated to have occurred at around 1810 million years ago.



Photography by Chris Carson

The Cape Denison Orthogneiss.

Landforms of Cape Denison

Cape Denison is a small ice-free rocky outcrop covering less than one square kilometre, which emerges from beneath the continental ice sheet. Stillwell (1918) reported that the continental ice sheet rises steeply behind Cape Denison reaching an altitude of '1000 ft in three miles and 1500 ft in five and a half miles' (approximately 300 metres to 450 metres over 8.9 kilometres).

Cape Denison is characterised by four parallel broad-bottomed shallow valleys, with intervening rocky ridges, 'steep rock faces and sharp ledges'. These valleys run parallel to the dominant layering present in the bedrock (NNW-SSE). The keen observer will note that the rock surface is covered in numerous shallow grooves or 'striations'. This characteristic feature is formed from the scouring action of glacial ice moving across the rock surface.

Stillwell (1918) thought that glacial action was the main agent responsible for the geomorphological features at Cape Denison, with abundant evidence of polished and striated rock surfaces, elongated and smoothed outcrops of bedrock called 'whalebacks', sculptured by the movement of ice flow and abundant exotic glacial erratics.

Stillwell also concluded that 'freeze-thaw' processes were active erosive agents at Cape Denison especially during the summer months. This process involves water finding its way into cracks and joints in the rock surface and on refreezing results in mechanical fracturing of the rock.



Photography by Chris Carson

During the Australasian Antarctic Expedition the Magnetograph House contained equipment used to measure variations of the Earth's magnetic field. The rocks piled up around the hut were placed there by AAE expeditioners to protect the small hut from the high winds.

Position of Cape Denison in Gondwana

Around 270 Million years ago the continents that we know today were part of a single ancient supercontinent called Pangea. Later, Pangea split into two smaller supercontinents, Laurasia and Gondwana, and Antarctica formed part of Gondwana.

In current reconstructions of the supercontinent Gondwana, the Cape Denison–Commonwealth Bay region was located adjacent to the coast of South Australia. This reconstruction has been supported by evidence linking rocks found in the Commonwealth Bay region with rocks on the Eyre Peninsula in South Australia.

The supercontinent Gondwana first started to break up in the Jurassic Period around 185 million years ago. However, Antarctica only began to drift apart from the Australian continent sometime between 85 and 80 million years ago during the late Cretaceous Period, a dynamic tectonic process that continues to this day.



The separation of Australia from Antarctica was the last major geological event in the breakup of the supercontinent of Gondwana. It began about 85 to 80 million years ago when a deep rift valley formed along the southern edge of Australia and widened some 40 million years ago to form the present Southern Ocean. Since that time Australia has been moving steadily north at the rate of around 6–7 centimetres per year.

Acknowledgements

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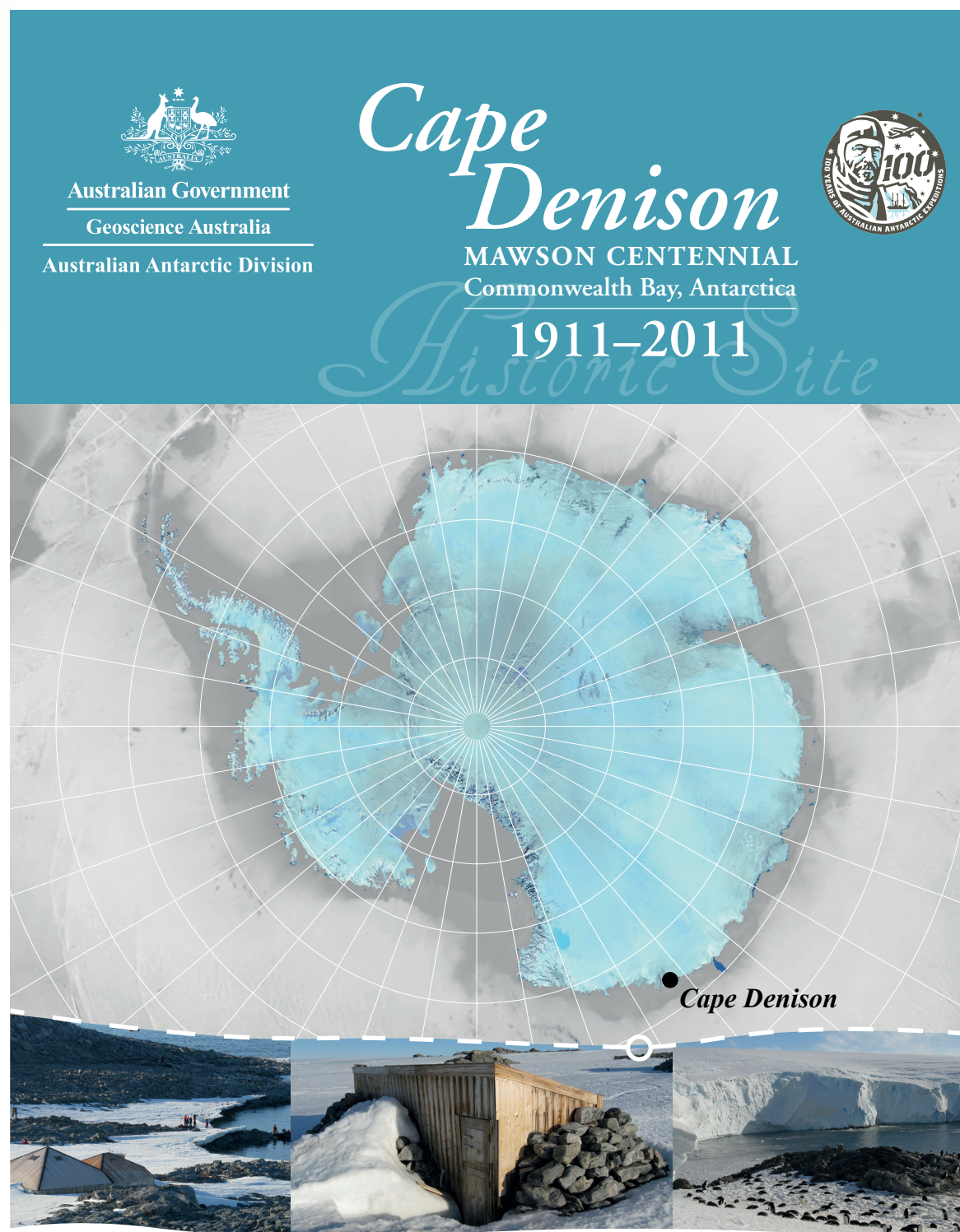
Access conditions to Cape Denison

Cape Denison is listed as an Antarctic Specially Managed Area (ASMA 3) and areas around historical huts are listed as an Antarctic Specially Protected Area (ASPA 162) under the Protocols on Environmental Protection under the Antarctic Treaty System. Current environmental management plans for the Cape Denison ASMA and Mawson's Huts ASPA are available from the Antarctic Treaty Secretariat's website (http://www.ats.aq/index_e.html). Visitors are reminded that, under the *Antarctic Treaty (Environment Protection) Act (1980)*, it is prohibited to collect or remove rocks or other material without a permit issued by the Australian Antarctic Division.

References

Bayly P.G.W. & Stillwell F.L., 1923. The Adélie Land meteorite. *Australasian Antarctic Expedition. Scientific Reports, Series A*, vol 4, part 1.
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