

1967-1968

In the Transantarctic Mountains, U.S. geologists found a fragment of a fossil jawbone from a labyrinthodont amphibian that inhabited the earth in great profusion during late Paleozoic and Triassic times. This was the first evidence that land vertebrates once inhabited Antarctica.

At Byrd Station drilling initiated in the preceding year was successfully continued until bedrock beneath the ice sheet was reached at 2164 m. Upwelling fresh water filled the drill hole to 60 m, indicating the presence of a layer of water between the ice sheet and the rock. Studies of the ice core recovered were expected to provide clues to the climatic history of the Southern Hemisphere.

Argentina, Norway, West Germany, and the United States participated in the first International Weddell Sea Oceanographic Expedition. The primary purpose of the expedition was to measure deep currents associated with the formation of Antarctic Bottom Water.

Scientists from the Scott Polar Research Institute successfully measured thickness of the Antarctic ice sheet from the air, using a newly developed radio-echo sounding technique. Equipment and personnel were flown from McMurdo Station in U.S. aircraft.

The Soviets set up a new station, Bellingshausen, in the South Shetland Islands. Britain's Directorate of Overseas Surveys completed mapping the South Shetlands at 1:200,000 and revised its outline map of the Antarctic Peninsula at 1:3,100,00, using satellite photographs to check the outline of the Larsen Ice Shelf.

Satellite photographs were used for the first time to provide valuable information about sea-ice conditions to British supply ships en route to stations on the Antarctic Peninsula. Chile continued construction of a new seismological laboratory on Trinity Peninsula.

The U.K. completed construction of a new base at Halley Bay and the old one was closed down. Belgium joined South Africa in glaciological studies

in a region to the south of SANAE. The Japanese made an oversnow traverse from Showa to Plateau Station and thence to 80°S, making glaciological and geophysical observations along the way. The Australians continued their programs in geophysics, geology, geodesy, topography, and upperatmosphere physics at Mawson and Wilkes stations and built a field station on the Amery Ice Shelf for a year-long glaciological study.

At Dumont d'Urville, the French installed a seawater distillation plant and constructed a cosmic-ray laboratory. New Zealand completed the construction of its new base, Vanda, in the Wright Valley, west of McMurdo. The U.S. continued its extensive survey in Marie Byrd Land and carried out the third leg of its traverse in Queen Maud Land.

1968-1969

Research programs continued this year at 34 year-round stations in Antarctica. At most stations synoptic meteorological and ionospheric observations were made and auroral, geomagnetic, and seismic studies were carried out. The large-scale U.S. multidiscipline survey in Marie Byrd Land of the two preceding years was extended this year to exposed areas in Ellsworth Land.

United States aircraft transported Norwegian scientists from McMurdo to the Kraul Mountains in Queen Maud Land for geological and glaciological research. On the same flight, a British party was taken to Shackleton Range to continue ground surveys started earlier.

The second International Weddell Sea Oceanographic Expedition was conducted from mid-February to late March by the U.S. icebreaker Glacier and the Argentine icebreaker General San Martin. Severe ice conditions prevented the recovery of four current-meter arrays set out the previous year. Other research programs were carried out successfully, however.

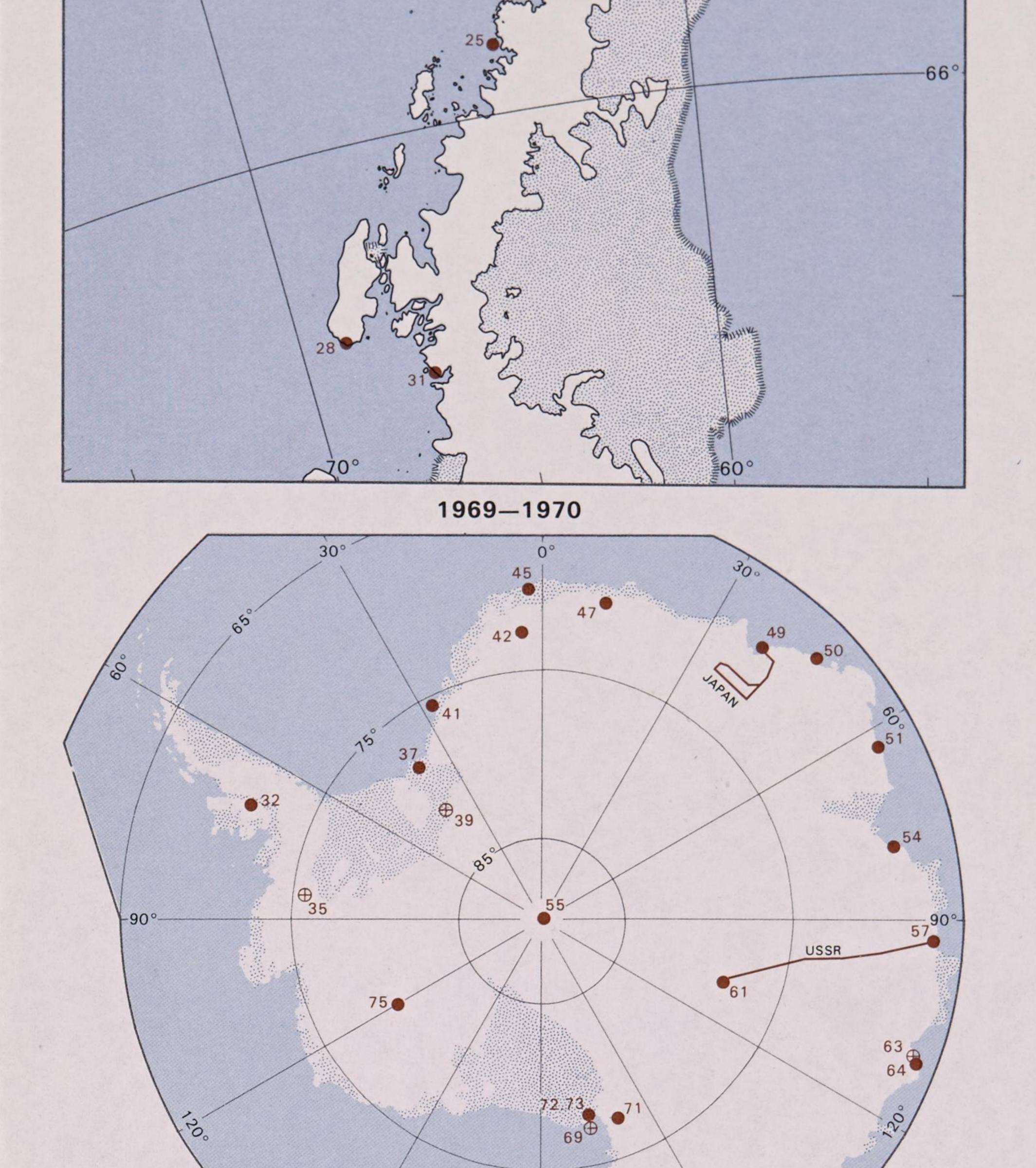
A Japanese traverse party traveled from Showa to the South Pole, obtaining valuable glaciological data. The Soviets transferred their headquarters from Mirnyy to Molodezhnaya. A launching facility capable of firing meteorological rockets at 40°C in high winds was installed at Molodezhnaya.

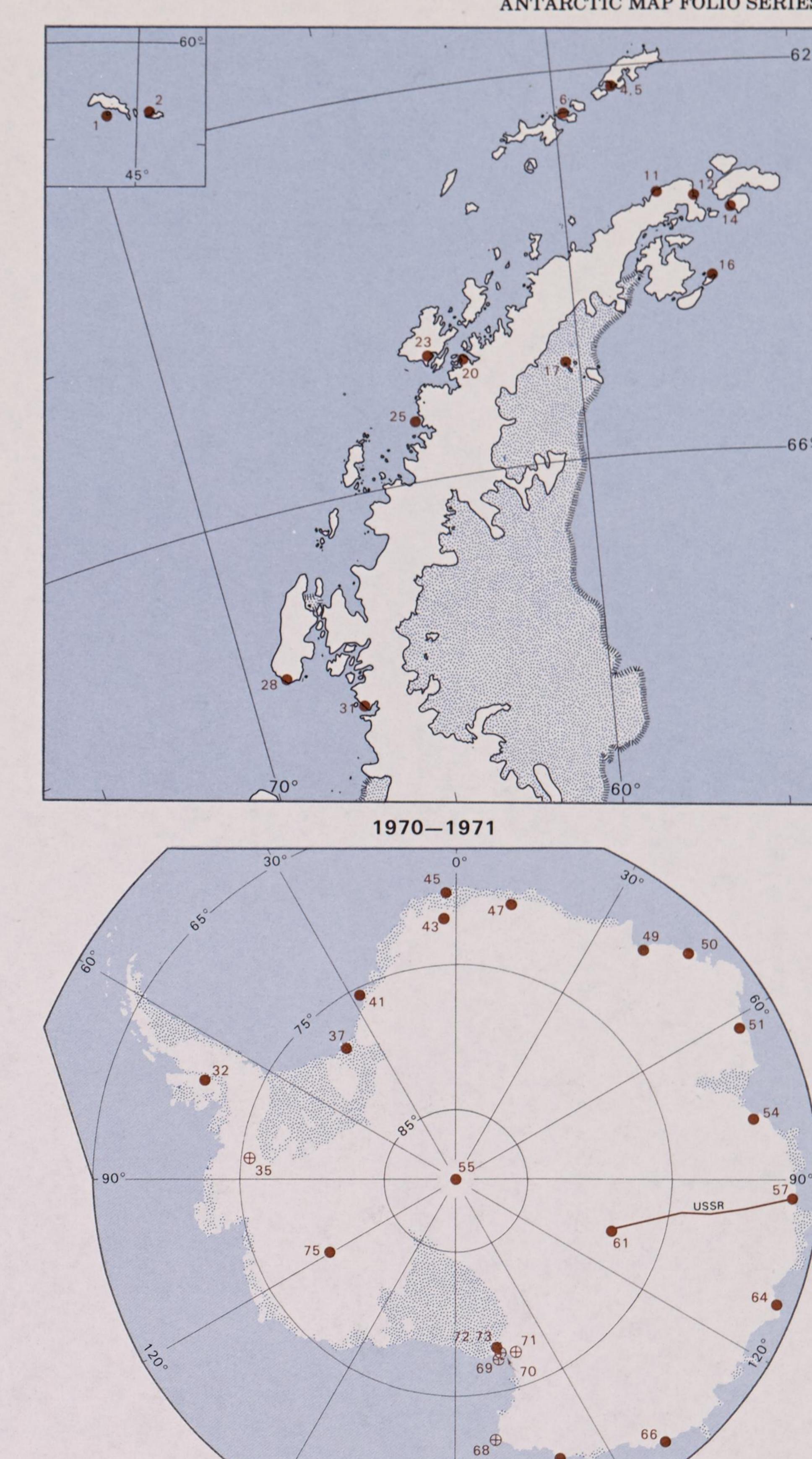
On February 19, 1969, Australia officially opened its new Casey Station across the bay from the Old Wilkes Station. Davis Station was reopened in February after being closed since 1965. Chile established a new station on King George Island and named it Presidente Eduardo Frei. The Belgians and South Africans carried out a joint program at SANAE. The U.S. Plateau Station was closed after operating since 1965.

The new United States research vessel, *Hero*, reached Antarctic waters this year. She is a diesel-driven, but sail equipped, wooden, trawler-type ship. Her first activities included trawling in coastal waters off the Antarctic Peninsula and transporting geologists and biologists from Palmer Station to collection sites in the Palmer Archipelago.

A volcanic eruption occurred at Deception Island on February 21, 1969. The only occupants, five men of the British Antarctic Survey, were rescued by helicopters of the Chilean ship *Piloto Pardo*.

In May 1969 representatives from Australia, France, the U.S., and the U.S.S.R. met in Paris to plan the International Antarctic Glaciological Project (IAGP), to be carried out over the following decade on an area of the ice sheet bounded by 60°E, 160°E, 80°S, and the coast. The objectives as outlined at the Paris meeting were "to clarify the relationships among the size, shape, and glaciological regime of the ice sheet; to reconstruct various stages of its development, their causes, and their effects on the atmosphere and the world ocean; to assess the relationships between the ice sheet and changes in climatic conditions; to determine any changes in size and regime taking place at the present time, and to trace events of human and natural origin recorded in the ice." (Polar Record, 1971, Vol. 15, No. 98, p. 830.)





A year is taken to be a summer and the winter following; for example, 1954–1955 designates summer 1954–1955 and winter 1955.

1969-1970

The joint U.S.-U.K. program for determining the thickness of the ice sheet by radio-echo sounding was expanded this year. A U.S. LC-130 airplane flew a party of Scott Polar Research Institute scientists on a dense network of flight paths out of McMurdo Station and on several flights originating at Byrd Station. Soundings were successful in most

Because the 1967 discovery of a fragment of the jaw of a land vertebrate had created interest, the U.S. sent paleontologists and other geologists to search for fossil bones in the Transantarctic Mountains. The party discovered a concentration of bones not far from its camp on the Beardmore Glacier. Particularly significant was the find of a skull bone of a land reptile associated with dry-land reptiles in Africa and India. The find strengthened the theory that Antarctica was once part of a larger continent contiguous with Africa.

U.S. biological investigations included observations associated with pollution patterns and dispersal mechanisms of pesticides in Antarctica. Also carried out were aerial surveys of seal colonies in the Antarctic Peninsula region. Elephant and fur seal populations were found to have increased.

Two over-snow traverses were made. The Soviets journeyed from Mirnyy to Vostok and obtained new data on rock structure under the ice sheet. A ten-man Japanese team, with aircraft support, laid a glaciological grid for ice-strain measurements between Showa and the Queen Fabiola (Yamato) Mountains and made numerous glaciological measurements.

The third International Weddell Sea Oceanographic Expedition accomplished many of its objectives, though its activities were limited because of damage to the Argentine icebreaker *General San Martin*. All participants were carried aboard the U.S. icebreaker *Glacier*. A disappointment was the failure, once more, to retrieve current meters emplaced in 1967–1968.

Argentina deactivated its Sobral Base, con-

structed an atmospherics laboratory near General Belgrano Station, and established a new station for Teniente Matienzo. Chile refurbished and expanded the meteorological facility at Presidente Frei Base. In November 1969 the U.S. established a new station, Siple, at 75°55′S, 83°55′W. Research in upper atmosphere physics was done there throughout the summer.

At Molodezhnaya, the Soviets launched weekly meteorological rockets to an altitude of 97 km. At Byrd Station, a U.S. group launched ionospheric rockets to obtain information on particle bombardment, geomagnetic effects, and ionospheric structure. At McMurdo Station, snowfall exceeded any known to have occurred there since 1915.

Two anniversaries were observed. On November 29, 1969, the 40th anniversary of Admiral Byrd's first Antarctic Expedition, a U.S. Navy Hercules plane reenacted the historic first flight over the South Pole. At Scott Base, representatives of several nations gathered to commemorate the tenth anniversary of the signing of the Antarctic Treaty.

For the first time, a group of women scientists participated in the U.S. Antarctic program. They camped in an ice-free valley 112 km west of McMurdo Sound and conducted geological studies.

On January 19, 1970 two private planes landed at the South Pole, the first to do so. The flights were not related and the almost simultaneous arrival was coincidental. The first to arrive was a two-engine Piper Aztec flown by Max Conrad of the United States. The second was a twin-engine Cessna 421 piloted by Thor Tjontreit with Einer Pedersen as navigator, both Norwegians. Both flights had originated in Invercargill, New Zealand and had stopped at McMurdo en route.

1970-1971

When it was learned that the Deception Island volcano had erupted on August 12, 1970, an

expedition was quickly organized and was in the field by December 8. Scientists of Argentina, Chile, the U.K., the U.S., and the U.S.S.R. collaborated in studying the changes brought about by this latest and most violent eruption.

The U.S. research ship *Eltanin* continued its year-round activities in Antarctic waters, while scientists aboard the *Hero* studied the structure of the Scotia Ridge north of the Antarctic Peninsula. Two research vessels of the Scripps Institution of Oceanography visited the Antarctic. The *Alpha Helix* anchored in a number of locations among the islands along the Antarctic Pennisula. Here, scientists from several institutions conducted studies of animal physiology in the ship's excellent laboratories. The second Scripps vessel, *Thomas Washington*, operated north of the Ross Sea studying circulation of waters, as Leg 2 of the Aries Expedition.

A team of U.S. geologists continued investigations in the Transantarctic Mountains, with the participation of a South African paleontologist whose knowledge of South African Triassic faunas contributed greatly. The year's greatest fossil find was a nearly complete skeletal impression of the mammal-like reptile *Thrinaxodon*.

The Soviets opened a new station, Leningradskaya, on Oates Coast. This brought to six the number of Soviet stations operating year-round.

International Antarctic Glaciological Project activities included a resurvey of snow stakes along a 1400-km traverse from Mirnyy to Vostok and core drilling with a thermal device to a depth of 625 m at Vostok Station.

On April 16, 1971, a Ross Ice Shelf Project steering group met to discuss objectives and plans. An earlier ad hoc planning group, which met in March 1970, had proposed that "physical, chemical, biological, and geological conditions within and beneath the Ross Ice Shelf be investigated to determine how they relate to the ice itself, the water mass, the ocean floor, and the subsea sediments." (J. H. Zumberge, 1971: Antarctic Journal, Vol. 6, No. 6, p. 258).