

BULLETIN

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U.S. ANTARCTIC PROJECTS OFFICER

A presentation of activities of the Government of the United States of America pertaining to the logistic support, scientific programs, and current events of interest in Antarctica, published monthly during the austral summer season and distributed to organizations, groups, and individuals interested in United States Antarctic activities.

Rear Admiral James R. Reedy, USN
United States Antarctic Projects Officer

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All photographs in this issue are official Navy photographs. The track chart appearing on page 22 has been reproduced from the Hydrographic Office Technical Report 48.

Greenwich Mean Time is used throughout the Bulletin except where noted otherwise.

No events occurring after 31 January 1965 appear in this issue.

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History

TEN YEARS OF ANTARCTIC EXPERIENCE

On 1 February 1955, the Navy Department activated the United States Naval Support Force, Antarctica, as part of the United States Atlantic Fleet. The primary mission of this force was, and is, to support the United States Antarctic scientific program. Implied in this mission are the construction and maintenance of stations; the transportation of men, equipment, and supplies to Antarctica and their distribution within the area; the support of field parties; the provision of communications, meteorological, and medical services; and insuring the health and safety of military men and civilians alike.

At the time of its activation, the Naval Support Force, Antarctica, was expected to terminate its existence with the end of the International Geophysical Year (IGY), a global scientific effort in which the scientists of more than 60 nations participated, 12 of them in the Antarctic. The IGY was scheduled to run from 1 July 1957 to 31 December 1958. So revealing was the Antarctic phase of the IGY that the scientists of the 12 nations active in the area wished to continue and expand the scientific program, and, with few exceptions, received the backing of their governments to do so. The United States Naval Support Force, Antarctica, therefore, continued to carry out its primary mission and has completed a decade of existence.

For the IGY, the science program was managed by a committee of the National Academy of Sciences. Since 1959, direction has been in the hands of the National Science Foundation. The Naval Support Force has worked closely with both in providing the best support possible to our scientists. Where the Navy was not equipped to meet the requirements of the program, it has requested and obtained the assistance of the Army, Air Force, Coast Guard, Marine Corps, and Public Health Service. It has also been aided by the Royal New Zealand Navy. In fact, cooperation in both logistics and scientific programs between the United States and New Zealand has been outstanding during the entire decade.

The quality of the scientific achievement, which has given the United States a preeminent position in Antarctic affairs, testifies to the efficacy of the support and the ability of the Navy and the other armed services to work with civilian scientists in a program to benefit all mankind. For the IGY, 7 stations were established and maintained, 2 of them on the polar plateau where men had not previously passed the winter. To one of these, Byrd Station at 80° South latitude, 120° West longitude, building materials, supplies, and equipment were transported over 600 miles by tractor train, an operation in which the Army participated. The other, at the geographic South Pole, was supplied by airdrop from Air Force Globemasters (C-124s). Other accomplishments of the IGY period were the first fly-in of cargo aircraft from a Southern Hemisphere land mass to the Antarctic Continent in December 1955, the aerial survey in January 1956 of 1,800,000 square miles of Antarctica of which about 1,000,000 square miles had not previously been seen, and the first aircraft landing at the South Pole on 31 October 1956.

When the Government decided to continue and expand the Antarctic scientific program for an indefinite period, the Navy adjusted its support techniques to the new, unprecedented situation. The number of stations was reduced to 4, and a program of improvement and rehabilitation began to turn what had been temporary into permanent stations. Two outstanding developments in this line were the building of a new Byrd Station and the introduction of a nuclear power plant at McMurdo Sound. The new Byrd Station employed the under-snow construction techniques first developed by the Army at Camp Century in Greenland. Tunnels were dug beneath the surface, then arched over, and the buildings placed under snow. The new Byrd Station was commissioned in February 1962. The greatest need in the Antarctic is for heat and power, both of which require large quantities of fuel that entail heavy costs for transportation. The situation appeared ideal for a nuclear power plant, and one has been installed at McMurdo Station, the principal logistics base in the area, where there have been as many as 1,000 individuals during the summer season. The reactor first went critical on 4 March 1962. It is expected that by the end of the current season, a desalinization plant, using

excess heat from the reactor, will be in operation, thus assuring for the first time an adequate water supply.

Perhaps the most revolutionary development has occurred in the field of aviation. The Air Force, for use in Greenland, developed a heavy cargo aircraft capable of operating on skis, the Hercules LC-130, and in January 1960 demonstrated its adaptability to the Antarctic. The Navy acquired 4 of these aircraft of an improved model and has used them to supply inland stations, gradually phasing out the Globemasters. Airdrop, while effective, proved costly and inefficient in the Antarctic. From their introduction, Hercules have been used to place scientific parties in the field complete with vehicles, shelter, equipment, and supplies, to support them during the season, and to pick them up and return them when their work was done. When the scientists desired to set up a new wintering-over station at the base of the Antarctic Peninsula, about 1,500 miles from McMurdo Sound, a new concept was developed, based on the Hercules aircraft. Vans were designed that could be fitted in the cargo bays of the Hercules. Completely equipped before departure, the vans were flown to the desired location, and a station was established in a matter of days.

Many scientific parties are small, and other types of aircraft may be used to support them in the field. These range from Dakotas (C-47s) to helicopters. Notable has been the use since 1962 of turbine-powered Iroquois helicopters by the Army. Capable of landing at altitudes up to 13,000 feet, the Iroquois have been used to support topographic surveys and geological investigations. Geologists have stated that with helicopter assistance they can accomplish in 2 months what would require 3 or more years using surface transportation.

In a word, the techniques of scientific investigation have been revolutionized. Formerly, a scientist desiring to work in the field had to go to Antarctica one year and pass an entire winter at a station in order to take full advantage of the summer season, and even then he spent much of his precious time in moving slowly across the surface to the place he wished to investigate. Now, the Navy can provide transportation from the United States by air, place the scientist in the field, and at the end of the season pick him up and return him home. He can accomplish more in 3 months than was previously possible in 18.

The Navy has not only supported the projects of civilian scientists, but also has contributed directly to the scientific program. It has been responsible for aerial photography, which is indispensable to accurate mapping. It has also conducted much exploration. In early 1960, 2 Navy icebreakers, GLACIER and BURTON ISLAND, penetrated the Bellingshausen Sea to make the first landings on Thurston Island and the Eights Coast. Aircraft have discovered many mountains and other natural features hitherto unobserved. Outstanding in this respect were flights in February 1963 and during the same month a year later that found previously unseen mountain ranges in Queen Maud Land. The Navy has pioneered flights from South Africa to Antarctica (1963) and Australia to Antarctica (1964). In June 1964, when a seaman was severely injured, the Navy sent a Hercules to McMurdo Station and brought the patient to New Zealand for hospitalization. It thus demonstrated that aircraft can operate in the depth of the Antarctic winter night.

The United States, exclusive of camps and summer weather facilities, now operates 4 year-around stations and 1 summer scientific station, with a sixth under construction. The wintering-over stations are Amundsen-Scott South Pole, Byrd (80°01'S., 119°32'W.), Eights (75°15'S., 77°06'W.), and McMurdo (77°51'S., 166°40'E.). Hallett (72°19'S., 170°13'E.), which has been operated jointly with New Zealand since 1957 as a year-around station, will in the future be occupied only during the summer. A new station to be named for the Connecticut sealer, Nathaniel B. Palmer, is under construction on Anvers Island off the west coast of the Antarctic Peninsula.

Since its activation, the United States Naval Support Force has been commanded by 3 naval officers: Rear Admiral George J. Dufek, 1 February 1955 to 15 April 1959; Rear Admiral David M. Tyree, 15 April 1959 to 26 November 1962; and Rear Admiral James R. Reedy, 26 November 1962 to the present. Rear Admiral Reedy is expected to conclude his tour of duty in the near future. In doing so, he will hand on to his successor a tradition of distinguished accomplishment in the support of United States Antarctic objectives.

Antarctica

SECOND PHASE OF SHIP OPERATIONS AIDED BY NEW DOCKING FACILITIES

As pointed out in an earlier article,¹ United States ship operations in the Ross Sea may be divided into 3 phases. The first, during which icebreakers clear a channel through the fast bay ice of McMurdo Sound, had been completed by 15 December 1964.¹ The second, during which the principal activity is the arrival of supply vessels, was beginning on that date. USNS CHATTAHOOCHEE, a tanker, had just arrived in Winter Quarters Bay and was preparing to off-load fuel. USS GLACIER, largest of United States icebreakers, had sortied from McMurdo Sound to meet HMNZS ENDEAVOUR, a New Zealand tanker, and USNS PRIVATE J. R. TOWLE, an MSTC cargo vessel.

When the ships arrived at McMurdo Station, they found considerably better facilities than had existed in previous years. The icebreakers had succeeded in clearing a channel all the way to Winter Quarters Bay. Seabees had carved out a quay, named after Captain J. B. Elliott, Jr., USN, Commander, Antarctic Support Activities. Here, ships could be off-loaded directly onto the shore, thus avoiding the difficult, time-consuming, and dangerous practice of unloading on bay ice and dragging cargo to the station by sled, or, in the case of fuel, setting up a long pipe line. From the water's edge to the station, a road was under construction to facilitate haulage of cargo to storage areas. The accompanying photograph clearly shows these improvements.

The speeding-up of turn-around times at McMurdo Station was a noticeable feature of this year's operations. CHATTAHOOCHEE, which had arrived on 15 December, had discharged her fuel and was ready to depart the following day. She left McMurdo Station in company with the icebreaker USS STATEN ISLAND. Having reached open water, CHATTAHOOCHEE proceeded independently, while STATEN ISLAND joined GLACIER in escorting TOWLE and ENDEAVOUR. The 4 ships were tied up to Elliott Quay on 18 December. The New Zealand Government, which uses ENDEAVOUR to supply Scott Base, also makes its excess fuel-carrying capacity available to the United States. The ship discharged aviation gasoline for McMurdo on the day of arrival. Off-loading cargo for Scott Base took slightly longer, and she did not depart McMurdo until 21 December. She arrived back in Port Lyttelton on 30 December. TOWLE, on the other hand, required an additional day to complete unloading her cargo, but made the return journey more quickly, arriving in Port Lyttelton on 27 December. This completed TOWLE's Antarctic assignment for the season, and the following day operational control returned to Commander, Military Sea Transportation Service, Pacific.

On the same day that TOWLE arrived in Port Lyttelton from McMurdo Sound, USNS PRIVATE J. F. MERRELL (T-AK), Harold H. Cleaves, Master, arrived in the same port from the United States. While there was a lull in cargo operations, GLACIER had departed the Antarctic on 20 December for a period of rest and resupply in New Zealand. STATEN ISLAND, the sole icebreaker remaining in the McMurdo Sound area, took the opportunity to attempt the rescue of an Air Development Squadron SIX helicopter that had crashed on the ice of Erebus Bay on 8 December. STATEN ISLAND broke a 6-mile channel to within 3 miles of the downed aircraft. From that point, 50 men hauled the helicopter to the ship's side, where it was hoisted aboard.²

Having accomplished this mission on 1 January 1965, STATEN ISLAND next day departed McMurdo for Port Lyttelton by way of Hallett Station. On board was Captain Elliott, Commander, Antarctic Support Activities, who intended to inspect Hallett. He arrived there on the fourth, the same day that EASTWIND put in there. EASTWIND, after a period of rest and resupply at Wellington, had left that place on 28 December, stopped briefly at Port Lyttelton, and reached McMurdo on 3 January. STATEN ISLAND continued from Hallett on her way to Wellington, New Zealand.

¹See "First Phase of Ross Sea Ship Operations Successfully Completed," January 1965, page 1.

²See article on page 5.

Aerial view of Winter Quarters Bay near McMurdo Station, showing road and oil line constructed this year. The ships, from the bottom, are: HMNZS ENDEAVOUR, USS GLACIER, USNS PRIVATE J. R. TOWLE, and USCGC EASTWIND.

EASTWIND, having embarked Captain Elliott, returned to McMurdo, joining MERRELL and CHATTAHOOCHEE en route. The supply vessels had left Port Lyttelton on 30 and 31 December. On 7 January, they moored in Winter Quarters Bay. CHATTAHOOCHEE discharged her load of fuel and left again for New Zealand on 9 January. She passed the period from 16 to 22 January at Port Lyttelton and departed on the latter date for her third trip of the season to McMurdo Station, arriving on the last day of January. MERRELL remained at McMurdo until 11 January, off-loading cargo. She then departed and, after a 1-day stop at Port Lyttelton, left on 17 January for the return trip to the United States.

EASTWIND stayed for the rest of the month around McMurdo, except for a brief sortie on 14-15 January to pick up an emergency leave case from GLACIER, which was engaged on a survey trip in the Ross Sea. Earlier, GLACIER had, after a week at Port Lyttelton, returned to the Antarctic, stopping at Hallett on 7 January and reaching McMurdo on 9 January. The following day, she left McMurdo with a survey party of United States and New Zealand scientists on board.³ Between 15 January and the end of the month, EASTWIND was at McMurdo and devoted some time to breaking out the fast bay ice on both sides of the ship channel. STATEN ISLAND left New Zealand on 18 January and 6 days later made a rendezvous with GLACIER off Cape Adare. On 25 January, she was at Hallett and a day after that was again at McMurdo Station. On the last day of the month, she commenced a hydrographic survey of Erebus Bay.

Besides the Ross Sea resupply operations, the season's plan called for a new station to be installed on Anvers Island, off the west side of the Antarctic Peninsula. To this aspect of DEEP FREEZE 65 the Navy assigned an icebreaker, USS EDISTO (AGB-2), Commander N. E. Nickerson, Commanding Officer, and a cargo vessel, USNS WYANDOT (T-AK-92), A. Ekblad, Master. Proceeding from her home port, Boston, EDISTO reported to the operational control of Commander, U. S. Naval Support Force, Antarctica, on 11 January 1965 when the ship was nearing Anvers Island. The Antarctic Peninsula Unit, with the task designation of Task Unit 43.5.1, was immediately activated with Commander Nickerson as commanding officer. The other element of the unit was WYANDOT, which departed Davisville, Rhode Island, on 24 December 1964, transited the Panama Canal, stopped briefly at Callao, Peru, to put a sick crew member ashore, and arrived at Punta Arenas, Chile, on 12 January. After taking on last-minute fuel and supplies, WYANDOT left Punta Arenas on 14 January and 2 days later joined EDISTO off Anvers Island. The supplies for the new station were unloaded by 20 January, and WYANDOT left the following day with the remainder of her cargo directly for McMurdo Station, where she arrived on 31 January.⁴

WYANDOT was the last of the cargo vessels to reach McMurdo. CHATTAHOOCHEE, which was also at McMurdo, was on the last of 3 trips carrying fuel to the Antarctic. Only the New Zealand

³GLACIER's survey activities, not complete at the end of the period, will be recorded in a later issue of the Bulletin.

⁴EDISTO carried a Construction Battalion Unit on board. Establishment of Palmer Station and other activities of EDISTO will be reported in a later issue of the Bulletin.



tanker ENDEAVOUR was expected to arrive during February. Phase II of the Ross Sea ship operations (the resupply of McMurdo Station) had been substantially accomplished by the end of the reporting period. The third phase, that of exploratory and survey operations, had begun.

Not a part of the Ross Sea Ship Group (Task Group 43.2) was the Ocean Station Unit (Task Unit 43.5.2) composed of USS MILLS and HMNZS PUKAKI. During the reporting period, 15 December 1964 - 31 January 1965, these vessels served alternately as picket ships stationed at 60° South latitude, 159° East longitude, on the flying route from Christchurch to McMurdo Station. These vessels provided weather observation and radar picket services and were available for search and rescue if needed.

USS STATEN ISLAND ACCOMPLISHED SALVAGE OPERATION ON DOWNED HELICOPTER

The navy icebreaker, USS STATEN ISLAND, has accomplished a unique salvage operation in the Antarctic to retrieve a downed navy helicopter. In what is probably the first such project ever attempted, the icebreaker used 50 members of her crew to haul the helicopter across 3 miles of fast ice to the ship, which returned with the helicopter to Winter Quarters Bay at McMurdo Station.

It began on 7 December when an LH-34D helicopter, of Air Development Squadron SIX, crash-landed on the ice in Erebus Bay, several miles from McMurdo Station.* It was within sight of a scientific field party which it was to pick up. Although the tail section was badly damaged, there were no injuries, and most of the helicopter remained in good condition.

On 28 December, STATEN ISLAND, commanded by Commander J. L. Erickson, began the difficult task of breaking a channel through the fast ice about 7 miles into Erebus Bay to a point 3 miles from the location of the downed helicopter. Early New Year's Day, a party of 50 crew members assembled on the ice for the cross-country hike to the scene of the accident.

The haul itself was accomplished by attaching 3 skis, from the landing gear of a C-47 aircraft, to the 3 landing points of the helicopter, and mounting a rope bridle with two 100-foot lines of 2-inch manila rope to the axle of the forward landing gear. The lines were manned by 2 columns of 25 men each.

In mid-afternoon, the party returned to the icebreaker, and the helicopter was hoisted alongside the ship for the return trip to McMurdo Station. Personally inspecting the operation aboard the icebreaker was Captain Max Holzricher, Chief of Staff and second-in-command to Rear Admiral James R. Reedy, Commander, U. S. Naval Support Force, Antarctica.

The damaged helicopter, which will be shipped to the Naval Air Station, Jacksonville, Florida, could not have been recovered by heavy tractors, because ice conditions between McMurdo Station and the crash scene were such as to prevent safe transport of such vehicles. A spokesman for Air Development Squadron SIX estimated the value of the salvageable parts at approximately \$50,000, but he indicated they may be worth more because of the rarity of this type of aircraft and spare parts for it.

*See "Three Aircraft Involved in Accidents," January 1965, page 2.

FIRST GROUND-CONTROLLED APPROACH LANDING MADE AT SOUTH POLE STATION

Installation of the first ground-controlled approach (GCA) equipment at Amundsen-Scott South Pole Station was officially completed when a U. S. Navy LC-130F aircraft made a successful radar-controlled instrument landing on 31 January 1965. This landing was through necessity rather than by

schedule because of ice fog which restricted visibility to about 2 miles.

The approach was monitored by Rear Admiral James R. Reedy, Commander, U. S. Naval Support Force, Antarctica, and evaluated as meeting all safety criteria. Aboard the aircraft with Admiral Reedy were Senator Ernest Gruening of Alaska and Senator Frank E. Moss of Utah, two of the distinguished visitors in Antarctica by invitation of the U. S. Antarctic Projects Officer.

The pilot, Lieutenant Robert Paty, was "talked down" by Chief Air Controlman R. C. Pedigo, who, along with Chief Electronics Technicians H. C. Loveless and R. D. White, had worked in sub-zero temperatures preparing the equipment.

PALMER STATION CONSTRUCTION COMMENCES

Construction of the sixth United States scientific station in Antarctica began on 16 January 1965, with the arrival of USNS WYANDOT at Anvers Island off the coast of the Antarctic Peninsula. USS EDISTO, transporting men, equipment, and supplies, had arrived on 12 January.

This late in the Antarctic summer season, when the temperatures go above freezing, the sea ice which surrounds the continent begins to break up and melt. Puddles of water form on its surface and the icebreakers have no trouble cutting through it.

The only United States station north of the Antarctic Circle, Palmer Station will also have the warmest climate, with winter temperatures as high as plus 10 degrees—in sharp contrast to other United States Antarctic stations. As the southerly limit of flowering plants—two grasses and an herb—Anvers Island offers biologists an excellent opportunity to study the effect of harsh weather on plant life. Also found in abundance are mosses, lichens, fungi, liverwort, and algae, making the island a veritable jungle compared to the rest of the continent.

Five varieties of penguins are found there, along with other sea birds. The waters around the island and the Antarctic Peninsula abound with life—more fauna to a square acre than any other area on earth.

Five U. S. Antarctic Research Program (USARP) scientists (3 glaciologists and 2 biologists) and 4 Navy men (a hospital corpsman, radioman, cook, and mechanic) will winter-over at the station. During the remainder of this summer season, as the station is being constructed, the complement will number 23: 7 scientists and 16 Navy men.



USS EDISTO

Palmer Station is scheduled to be fully operational by the end of the Antarctic summer season in March. At that time, when USS EDISTO leaves, the 9-man contingent will begin its scientific work in earnest.

SKI-EQUIPPED C-47 CRASHES ON LANDING

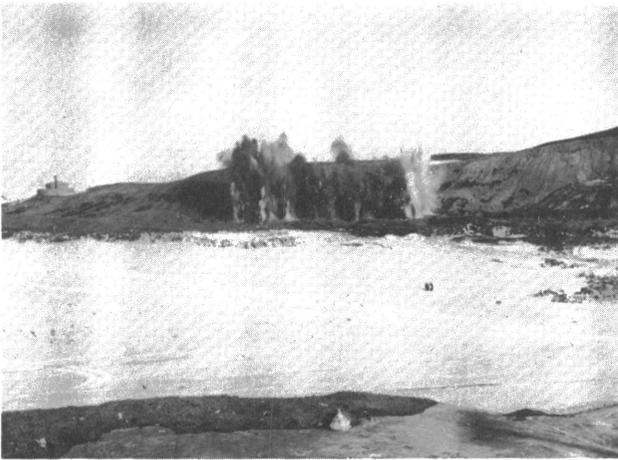
On 11 January, an Air Development Squadron SIX LC-47 aircraft, flying in support of a scientific field party, crashed on landing in the Horlick Mountains near Byrd Station. Commander D.

Balish, Operations Officer for the Squadron, said that, although there were no injuries to the crew or passenger, the aircraft suffered substantial damage. The cause of the accident is unknown.

Flying in support of an Ohio State University geological field party, the ill-fated LC-47 attempted to deliver badly-needed supplies to the isolated party when the left ski sheared on contact with the frozen sastrugi (ice ridges). The crew of 5 and 1 member of Antarctic Support Activities (ASA) immediately abandoned the aircraft and extinguished a small fire which had developed on the left wing.

ANTARCTICA'S FIRST FINISHED ROAD NEARS COMPLETION

The first finished, or crushed rock, road in Antarctica is reported as being 99 per cent completed as of 31 January 1965. The road, which is 1.6 miles long, rises from 20 feet above sea level at the edge of the Ross Ice Shelf, climbs 203 feet as it winds over the side of Observation Hill, and then drops to 20 feet as it enters McMurdo Station from Williams Field.



Mobile Construction Battalion SIX demolition experts blasting the frozen earth of Hut Point on Ross Island during construction of "Antarctica 6."

All cargo brought in by ship to McMurdo to be flown to outlying stations will be transported to the airfield on this road, "Antarctic 6," named in honor of its builders from Mobile Construction Battalion SIX.

When completed early in February, the road will have required 91,000 cubic yards of fill plus the removal of an uncalculable amount of snow before 6,000 cubic yards of crushed rock were set down to form the surface. The entire project included the construction of 3 culverts over drainage ditches, 7 spillways, and the continent's first bridge. This wooden bridge, which is 12 feet long, 25 feet wide, and spans a gulley 7 feet deep, was necessary to prevent running water (from melting snow) from washing away a section of the road.

U-1B OTTER AIRCRAFT SUCCESSFULLY LANDED ON ICE NEAR SKELTON GLACIER AFTER ENGINE FAILURE

A United States Navy single-engine U-1B Otter aircraft was forced to make an emergency landing on the ice near Skelton Glacier on the Ross Ice Shelf, about 77 miles from McMurdo Station, on 6 January.

The small utility aircraft, piloted by Lieutenant Barry B. Barrett, was engaged in escorting a U. S. Navy helicopter, returning from Darwin Glacier, when its engine quit. Lt. Barrett made a dead-stick landing on the ice of the Ross Ice Shelf. None of the personnel aboard received injuries, and the aircraft was not too badly damaged.

McMURDO COOK RECIPIENT OF NAVY'S NEY AWARD

A pleasant surprise will be in store for hungry members of Operation DEEP FREEZE this coming winter. Chief Commissaryman Alton B. LeCroy, former all-Navy "Ney Award" winner for the best shipboard mess, has taken charge of the McMurdo Station galley. The chief won the highly-coveted

award while serving aboard USS COURTNEY (DE-1021).

Many events have been planned for the remainder of the summer support season to keep apathy from affecting the appetites of the men. One, the old-fashioned cookout, will feature sizzling steaks over a charcoal fire.

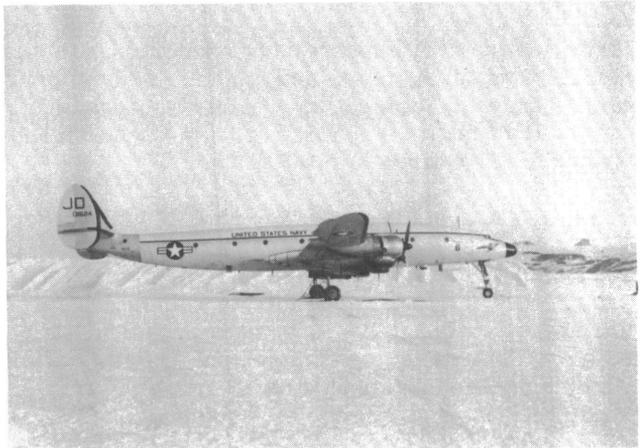
In addition, 6 of the finest cooks in the Navy will feature special nights with traditional meals from many countries. These 6 men, the elite of a service famed for its food, are all volunteers to DEEP FREEZE.

AIR DEVELOPMENT SQUADRON SIX SUPER CONSTELLATION HITS CENTURY MARK IN ROUND TRIPS FROM NEW ZEALAND TO ANTARCTICA

The Air Development Squadron SIX Super Constellation (C-121J) has just completed 100 round trips from the Operation DEEP FREEZE advance headquarters in Christchurch, New Zealand, to McMurdo Station, Antarctica.

Since 1958, the current pilots of the aircraft, LT. Don Dietz, LT. Andy Borcik, and LT. Robert Naftali, and others before them, have been leaving New Zealand and crossing the Antarctic Ocean to fly navymen, scientists, and cargo into Williams Field.

During this time they have flown over one-half million miles supporting the many facets of the United States Antarctic Research Program. These miles, equalling 20 trips around the world, are an enviable record for the silver and orange plane named the "Phoenix Firebird." The Connie has made more round trips to the Antarctic than any other aircraft in the world. In DEEP FREEZE 63 she made the trip in 8 hours and 18 minutes—a record for piston-driven aircraft.



C-121J Super Constellation

SECOND GROUP OF DISTINGUISHED VISITORS ARRIVES IN ANTARCTICA

The second group of distinguished persons invited by the United States Antarctic Projects Officer to visit Antarctica during DEEP FREEZE 65 departed Washington on 23 January. The first group for this season had departed on 28 November 1964.

The group leaving Washington on 23 January aboard the Air Development Squadron SIX Super Constellation (C-121J) was joined in Christchurch, New Zealand, by several other distinguished persons for the trip to Antarctica. The C-121J arrived in Christchurch on 26 January and at McMurdo Station on 29 January 1965.

Aboard the flight to Antarctica with Rear Admiral James R. Reedy, U. S. Antarctic Projects Officer, were Senator Ernest Gruening of Alaska; Senator Frank Moss of Utah; Rear Admiral Richard Black, USNR (Ret.); Captain Charles Kessler, USNR, State Director, Virginia Selective Service; Captain Vernon Howland, Royal Canadian Navy; Mr. George L. Wallace, former Chairman, Fitchburg Paper Company; Dr. Bernard D. Burbank, Medical Director of McGraw-Hill Publishing Company; and Colonel Marshall Sanders, USAF, Office of the Secretary of Defense, International Security Affairs.

VITAL SERVICE IN ANTARCTICA PROVIDED
BY SMALL BUT EXPERIENCED CREW

In the Antarctic, where the best weather is always cold and unpredictable, weather forecasting is the job of a small force of Navy Meteorologists who have against them all the forces and unpredictability of the driest, coldest, and windiest continent on earth. The winds sometimes go above 200 miles an hour and blizzards rage for days with temperatures that dip to minus 125 degrees Fahrenheit. Predictions depend upon knowledge, but there are only 17 weather stations on the continent, which contains 5-1/2 million square miles, while the United States, which is about half this size, has over 1000. Forecasts depend upon past trends. Like history, weather often repeats itself, but there are only 9 years of weather records to draw from.

The weather office at McMurdo Sound, under the command of Lieutenant Commander C. H. Zilch, numbers only 28 men. Winds at McMurdo gust past 85 miles an hour and the temperature sometimes drops to minus 60 degrees. Farther inland, at Eights, Byrd, and Amundsen-Scott South Pole Stations, the winds are stronger and the temperatures even lower.

During the summer support season (1 October through 1 March) flying is the only quick and practical means of supplying the inland stations, and, of course, flying depends on the weather. During the summer season, 2 temporary weather stations, Little Jeana and Little Rockford, are set up to cover main flight routes from McMurdo.* Each is manned by 3 Navy aerographers who broadcast weather conditions hourly.

Weather data are gathered at McMurdo from broadcasting stations throughout the Antarctic, including those of several foreign countries. U. S. Weather Bureau meteorologists are stationed the year around at Amundsen-Scott South Pole, Byrd, and Eights Stations. Their primary concern is the collection of data for long-range meteorological research, but their observations and expert knowledge are also available to the Navy weather forecasters at McMurdo Station. A small group of Navy aerologists is included in the complement of Hallett Station. The information gathered from all sources is correlated and placed on charts in McMurdo's Weather Central and the charts are updated continually to keep pace with the ever-changing conditions.

Once all the information is placed on the charts, high and low pressure areas plotted, temperature readings noted, and winds and humidity determined, the McMurdo forecaster makes his predictions. On the strength of his forecasts, plans are made to fly, or not fly essential supplies and men to other stations.

Three separate groups of aerographers work at McMurdo. Strip Weather at Williams Field keeps check on weather conditions on the skiway and ice runway. Ground Meteorological Detection at McMurdo is concerned mainly with upper air observations, and 2 times a day they launch rawinsonde balloons and process the temperature, pressure, relative humidity and wind information. Weather Central at McMurdo makes hourly ground weather checks and, with information gathered elsewhere, forecasts for the area.

An important part of Antarctic weather reporting is ice observation. Periodically, Navy aerographers, specially trained in ice observation, make low-level flights over the ice, spotting areas of possible weakness, and determining thickness and size of floes. Their observations sometimes influence the decision to send the cargo ships in behind the icebreakers.

Almost all the weather of the Southern Hemisphere emanates from the Antarctic. The Continent's massive ice reserves hold 90 per cent of all the world's ice.

The weather knowledge being gathered today by the navymen in Antarctica is proving valuable to mankind now, and may be even more valuable at a later date when long-range forecasts can be made on the strength of basic research conducted in the Antarctic.

* See "Summer Weather Stations Reestablished," December 1964, pages 1-2.

International

NAVY HELICOPTERS RESCUE INJURED AUSTRALIAN MOUNTAIN CLIMBERS IN NEW ZEALAND ALPS

Two United States Navy helicopters of Helicopter Utility Squadron FOUR, assigned to USS GLACIER, made possible the rescue of 2 badly-injured mountain climbers from the icy and wind-swept side of Mount Arrowsmith in New Zealand's Southern Alps on 30 December 1964. Eric Saxby, an Englishman living in Australia, was seriously injured early in the morning when he was swept over a 200-foot cliff by an avalanche. A fellow climber, Robert John Ryan of Sydney, Australia, was also injured, but managed to make his way down from the 8,700-foot level—500 feet below the mountain's summit—to Cameron Hut, where 2 other members of the party were staying. One of them then made the 5-hour hike over rough terrain down the mountain to Lake Heron—approximately 10 miles away—for assistance, while the other went back with blankets to stay with the injured man on the icy cliff.

When asked to lend the use of the DEEP FREEZE helicopters to lift the semiconscious man from the mountain, Rear Admiral James R. Reedy, Commander, U. S. Naval Support Force, Antarctica, at his Advance Headquarters in Christchurch, authorized full support for the rescue team.

The badly-battered Saxby, who was lying on the leeward side of the mountain, had to be carried down from the 8,700-foot level to Cameron Hut—the farthest point to which the helicopters could penetrate because of wind and hazardous flying conditions. The 16-man team was in constant danger of rock slides and snow avalanches as they worked in relays to carry the injured man down the treacherous mountain terrain. The helicopters, one piloted by Lieutenant (junior grade) Frank Lobb and Lieutenant (junior grade) Fred Riddle, and the other by Lieutenant Myron Meier and Lieutenant (junior grade) Ken Kleiben, were utilized primarily to shuttle the rescuers from Lake Heron to Cameron Hut, established as an advance staging area for the rescue. The 2 helicopters made 13 trips between the Lake Heron site and the hut. The climbers who brought Saxby to the hut left there at approximately 0700 hours and reached him about 1030 hours. By 1600 hours, he was back at the hut and on his way to Christchurch.

The helicopter, piloted by LT. Meier and LTJG. Kleiben, landed with Saxby aboard at Christchurch International Airport at 1830 hours, and he was immediately taken to Christchurch Hospital by a U. S. Navy ambulance. Dr. H. Guy, the New Zealand physician who accompanied him in the helicopter and thence to the hospital, stated that his condition was fairly satisfactory.

Mr. Willy Huber, now of New Zealand, but formerly of Salzburg, Austria, a professional mountain guide who accompanied the climbing party, stated that the men who helped rescue Saxby were the finest climbers in New Zealand. Police authorities also stated that through the use of the helicopters, at least 16 hours of rescue time were saved and that this was to be considered a large factor in the saving of Saxby's life.

USS MILLS SINKS HULK OF NEW ZEALAND TUG

The radar picket destroyer, USS MILLS, sank the hulk of the derelict New Zealand tug DUNEDIN on 20 December, with volleys of 50-caliber armor-piercing projectiles. The sinking, which took place about 20 miles southeast of Taiaroa Head, at the mouth of Otago Harbor, presented unusual training opportunities for MILLS, commanded by Lieutenant Commander Henry C. Morris.

First, it served as a test of seamanship, when MILLS picked up the hulk at Port Chalmers in Otago Harbor and secured it astern for the 28-mile trip out of the harbor to the firing area, and, second, as a gunnery target to be fired on until sunk. When MILLS arrived at the designated firing area, the hulk was cast loose and the gunnery exercise commenced.

MILLS has been operating as Ocean Station Ship during Operation DEEP FREEZE 65, sharing the duty with HMNZS PUKAKI.

Stateside

ANTARCTICAN SOCIETY ENJOYS SECOND ANNUAL INTERNATIONAL NIGHT IN JANUARY

The Antarctic Society held its second annual International Night on 14 January 1965. The Embassy of the United Kingdom graciously offered to provide the program. The speaker of the evening was Captain Robert H. Graham, RN, the Assistant Naval Attaché. In addition to the talk, the Embassy had a display of photographs showing the activities of the British Antarctic Survey.

Captain Graham, who had been for 2 years Commanding Officer of HMS PROTECTOR, took his audience on a typical tour of that ship to the Antarctic. He emphasized the logistics and nautical aspects of British operations. With many beautiful slides and much wry humor, he visited the various British stations in the South Shetland and South Orkney Islands and along the Antarctic Peninsula, with stops in Montevideo, the Falklands, South Georgia, and Tristan da Cunha. To many in the audience, and even to those well acquainted with United States areas of operation, the spectacular scenery and abundant bird life of the Peninsula were something of a surprise.

Representatives of many of the embassies of governments interested in the Antarctic were in the audience of over 100 persons who attended the meeting.

CWO GEORGE W. FOWLER RETIRES AFTER EVENTFUL POLAR CAREER

At the end of November 1964, Chief Warrant Officer George W. Fowler, USA, retired from the United States Army after nearly 22 years of service. He had been in the Southwest Pacific during World War II and later participated in the Korean Conflict.

Beginning about 1956, he became identified with polar work in both the Arctic and Antarctic and continued in this line until his retirement. He wintered over at Thule, Greenland, in 1956-1957 and, as a result of the knowledge he acquired, he was asked to establish a course in polar navigation at Fort Eustis. He participated as navigator or technical observer on many heavy tractor swings on the Greenland Ice Cap.

Because of his extensive experience, he was assigned by the Army to assist the operations of the Navy in the Antarctic in 1959. He participated in Operation DEEP FREEZE 60, 61, and 62 as Chief Navigator (Surface) to the U. S. Naval Support Force, Antarctica. On DEEP FREEZE 61, he was navigator for a heavy tractor swing from Byrd Station to the South Pole, thus being a member of the first United States party to reach that remote spot overland. For his successful conduct of this traverse, he received a Navy Commendation Medal. The following season, he acted in the same capacity on a journey from Little America to Byrd Station.

At the conclusion of DEEP FREEZE 62, he reported to the United States Antarctic Projects Officer for duty. While on the staff of this office, he performed many functions, but perhaps most important, he had an opportunity to set down in writing some of the lessons he had learned over many years of polar activity. He was loaned in the autumn of 1962 once again to the U. S. Naval Support Force, Antarctica, and conducted, as leader and navigator, a notable traverse from Byrd Station to Eights Station.

Because of the sureness with which he directed operations and guided tractors through treacherous terrain, he was known as "Featherfoot" Fowler. Perhaps he received no more sincere tribute than the comment of a young sailor who, after the Byrd-to-Eights traverse, said, "I would go anywhere with Mr. Fowler." This probably did not include retirement.

He has returned to his native California and has settled near San Francisco, where he plans to spend some time writing of his experiences.

Science

SCIENTISTS PERFECT NEW METHOD FOR MEASURING POLAR ICE THICKNESS

The determination of the contours of the Arctic and Antarctic land masses that lie beneath the great continental ice sheets has been a challenge to scientists and explorers since they first gazed on the polar areas.

Captain Malcolm Ross, of England, sailed to the Antarctic over a hundred years ago, discovered the largest floating cake of ice in the world, which is now named the Ross Ice Shelf, and measured its thickness by breaking off pieces, floating them in sea water, and comparing the amounts submerged to those still visible above the surface.

Progressing considerably by 1934, scientists of the Second Byrd Antarctic Expedition approached the problem by introducing seismic techniques. These required that several microphones be laid out on the surface at wide intervals, that thousands of feet of cable be unrolled and rolled up again, and that quantities of gunpowder be exploded for each point to be measured. Analysis was also tedious, but results were good after in-ice sound wave velocities had been established, and the technique has been accepted as the standard since then.

Beginning in 1963, personnel of the U. S. Army Electronics Laboratory began testing, in the Arctic, radio propagation techniques for determining ice measurements. This method of using radio signals really began when bare antenna feed wires operated without apparent loss for long periods when buried in the Ross Ice Shelf at Little America II in 1934. This was probably the first time that anyone thought of the radio-wave transparency of ice, but it led to a series of Signal Corps experiments on Arctic lakes and permafrost in the latter half of the nineteen-forties that proved that radio waves would travel almost twice as far over ice and frozen terrain as they would under normal temperate zone conditions.

Operation HIGHJUMP, in 1946, reopened the opportunity for the Army to work in large, almost homogenous masses of ice, and transmissions through large ice hills were accomplished with little apparent loss at that time. The cruise of USS ATKA (1954-1955) provided the next opportunity in Antarctica for trials of the techniques and equipment of radio transmission for ice measurements.

From that time to the present, radio wave propagation studies have been carried out by the Signal Corps Arctic and Antarctic Research Teams on polar expeditions.

With a grant from the National Science Foundation, University of Wisconsin geophysicists, under the direction of Dr. Charles R. Bentley, have just completed 2 months of experiments in Antarctica using the techniques and equipment designed and developed by Mr. Amory H. Waite of the U. S. Army Electronics Laboratories.

The group successfully tested radio sounding at Amundsen-Scott South Pole Station, where ice depth is known from seismic soundings to be 9,100 feet, about average for a large part of the continent. The deepest known spot is more than 3 miles down.

The scientists' primary purposes during this season were to study effects that complicate interpretation of radio soundings (such as high-temperature ice that absorbs radio waves) and to see how much information could be derived from the soundings (such as orientation of ice crystals in the ice-cap).

They obtained a wealth of data from tests in areas with varying ice and bottom conditions that had been studied seismically in the past. Analysis of these data, together with laboratory tests, should complete the experimental stage.

Preliminary testing of radio sounding from aircraft has been accomplished by Mr. Waite. This

summer's program was supported by aircraft of Air Development Squadron SIX. In the future, the ice of the Arctic and Antarctic may be scanned as rapidly as aircraft can fly.

PENGUINS WITH RADIO TRANSMITTERS BROADCAST THEIR ROUTES AND ARE FOLLOWED BY VX-6 AIRCRAFT

Air Development Squadron SIX (VX-6) has been busily occupied this season supporting unusual experiments of a scientist of The Johns Hopkins University whose primary interest in the Antarctic is penguins.

The scientist, Dr. Richard L. Penney, has designed a special radio broadcasting set to attach on the flippers of penguins that are taken from their normal nesting homes and released hundreds of miles away. Radio messages from each penguin are received at a central station enabling Dr. Penney to track the travel pattern of each penguin.



Dr. Penney and a Soviet scientist collecting Adelie penguins near Mirny Station for use in the long-distance navigation experiments.

(5 November 1964.)

west of his shoreline rookery, he will walk due north instead of straight for home, and eventually reach the sea.

Dr. Penney now wants to know how and why the penguin is able to find his way home when he finally reaches the shoreline of the sea. His first experiment with navigating penguins was in 1959, when he released 5 penguins at McMurdo Sound, 2,400 miles from their home. Three of them arrived in 8 months. Since they do not travel at night, the 3 had walked and swum about 8 miles each day.

His present investigation, supported by a National Science Foundation grant, started at the beginning of the DEEP FREEZE 65 summer support season. His team removed groups of penguins from several colonies, released them thousands of miles from home, and is currently following them by radio during their long treks.

Each penguin has a small radio transmitter slung in a harness under one flipper. From a VX-6 aircraft, investigators are following them by radio reception. They map their progress as the birds plod their way across the continent.

*See "Penguin Navigation," Bulletin of the U. S. Antarctic Projects Officer, Volume IV, Number 5, February 1963, pages 9-10.

Dr. Penney's interest is in determining if the penguins, taken from their home areas, will orient themselves and follow a homing pattern when they waddle off across the snows of Antarctica. Much can be learned about their ability to find their way home, and the secrets of their navigational techniques.

In 1963, Dr. Penney performed an experiment with Adelie penguins, an Antarctic species weighing about 15 pounds.* He found that they consistently started in a direction with a definite relationship to their coastal homes. This study indicated that nature gives the non-flying penguin an ability to find the sea and his rookery.

The penguin has a built-in biological mechanism which, when used together with the position of the sun, allows him to navigate home again. If he is lost southeast or southwest of his shoreline rookery, he will walk due north instead of straight for home, and eventually reach the sea.

Exploration

VOYAGE OF USS ATKA (1954 - 1955)

Henry M. Dater

On 1 December 1954,* USS ATKA, an icebreaker, departed Boston for Antarctica. After a short stay in Wellington, New Zealand, the ship proceeded toward the Antarctic and encountered her first ice in the vicinity of Scott Island on 12 January 1955. The departure date was over 2 years before the beginning of the International Geophysical Year and 2 months before the designation DEEP FREEZE became the trade mark of United States Antarctic operations. With the conclusion of the 1963-1964 season, the Navy had completed its tenth consecutive year in the Antarctic area; so, for that matter, had United States scientific activities.

As early as 1950, the world's scientists began talking about a global, cooperative check on geophysical problems. They timed this effort for 1957-1958, when sunspot activity would reach a maximum. It was, in fact, a United States scientist, Dr. Lloyd Berkner, who had first suggested the idea, and he and his colleagues had played an active part in planning on the international level. By early 1954, it was obvious that the United States Government was prepared to give massive support to the program, by this time named the International Geophysical Year. On 25 June 1954, President Eisenhower publicly declared his personal interest in the undertaking as "a unique opportunity to advance science" and "a striking example of the opportunities which exist for cooperative action among the peoples of the world."



USS ATKA (AGB-3)

No network of geophysical observatories would be complete without stations in the Antarctic. Indeed, in certain fields, the Antarctic possesses advantages for study to be found nowhere else. Operating in the area, however, presented logistic problems that only the armed forces were equipped to handle. For that reason, the President designated the Secretary of Defense as executive agent for the logistic support of the United States scientific program in the Antarctic. The Secretary delegated this responsibility to the Navy as the military department best qualified to do the job, with the provision that the other services would assist as requested.

The Navy immediately set about assembling a planning staff, which ultimately formed the nucleus of the U. S. Naval Support Force, Antarctica, activated on 1 February 1955. A reconnaissance of the area also appeared to be in order. In mid-1954, the United States plans called for 3 scientific stations. The first was to be at the Bay of Whales, the site of 4 previous Little Americas, the second in Marie Byrd Land at approximately 80° South latitude, 120° West longitude, and the third at the geographic South Pole. The Little America site could be reached by ship, but the other 2 were far inland. It was planned to establish the Marie Byrd Land Station by tractor train from the coast and the one at the South Pole by an air operation.

On Operation HIGHJUMP (1946-1947), the Navy had operated aircraft from Little America and

*All times local.

had left 6 C-47s behind at the end of the season. One of the first objectives of the reconnaissance was to reexamine Little America to determine whether the existing camps were still habitable and whether the aircraft and other equipment could be rehabilitated. There was implied in this a search for other sites if Little America was no longer usable, or if it was decided that the contemplated air operations would be impossible.

Also, thousands of aerial photographs had been taken on HIGHJUMP, but their usefulness was limited by lack of ground control.* Some steps to remedy this situation had occurred during Operation "Windmill" (1947-1948), but the area east of Cape Colbeck, along the shores of the Amundsen and Bellingshausen Seas, remained uncovered. As maps were important for planning scientific activities, it was desirable to obtain the ground control, if at all possible.

As secondary missions, the Navy hoped to further the training of personnel and to test material under polar conditions. The fact of reconnaissance also interested the scientists who came up with certain requests, and a number of special projects were approved for the voyage.

To carry out these multiple tasks, the Navy assigned the icebreaker USS ATKA (AGB-3), a unit of Service Squadron 4, United States Atlantic Fleet. During the entire cruise, ATKA remained under the operational control of her parent unit, even though the Navy activated the United States Naval Support Force, Antarctica, while the ship was still in the Antarctic area, and it was to the Commander, Service Squadron, that the report of the voyage was submitted for forwarding and comment.

The commanding officer, Commander Glen Jacobsen, USN, received his instructions just 10 weeks before the sailing date of 1 December, and additional requirements kept being received, the last arriving just 2 weeks before the day of departure. The Bureau of Ships made available a separate allotment of \$150,000 to defray the direct expenses of the voyage, and everyone went into a flurry of activity which, according to the official report, "disrupted the normal routine of several divisions of the Boston Shipyard Supply Department." It was nip and tuck whether the ship would be ready on time, and a delay of 2 hours occurred on the day of sailing while 41 drums of cold-weather gasoline were loaded aboard, and a few items still had to be purchased at ports along the way.

A crowd of well-wishers, including Rear Admiral Richard E. Byrd, USNR (Ret.), assembled to wish ATKA bon voyage. A parade of the 270 expedition personnel was held, final good-byes were said, and ATKA cast off. As she dropped down the harbor, a chorus of whistles arose from the shipping present, and fire boats played their hoses in silent tribute. Soon land passed from sight, and the weather appropriately provided snow squalls.

On board were an augmented crew and a number of military and civilian observers and scientists. Additions to both groups were made in Panama, and another civilian scientist and a newspaperman joined at Wellington, New Zealand. The crew consisted of 241 enlisted men and 19 officers, and there were 4 military observers, representing the Army, Air Force, and Marine Corps. The majority of the 12 civilians were employees of various government agencies—3 from the Hydrographic Office, 2 from the Weather Bureau, and 1 each from the Army Signal Corps, the Navy Bureau of Yards and Docks, the Geological Survey, and the Air Force. Non-government civilians, besides the newspaperman, were a cosmic ray expert from the University of Chicago and a seismologist from Boston College. This number strained the ship's accommodations to the limit. At the end of the trip, Commander Jacobsen, without naming individuals, questioned whether some of the observers could not have accomplished as much by a thorough reading of the final report.

The augmented crew included an aviation unit of 3 officers and 8 men, equipped with 3 two-passenger Bell helicopters. There was also a bathythermograph team, additional aerographers, photographers, 2 construction drivers, and a journalist. The construction drivers were added to operate 2 Weasels that had been assigned to the expedition. Finally, to care for the large number

*Ground control is the determination of the exact location of sufficient points on the surface so that the data from the photographs may be accurately plotted.

of persons on board, the steward's department was increased by 3.

Of 10 special projects approved for the voyage, 3 were requested by the Navy, and the remainder by various scientific agencies. The Navy was interested in the evaluation of a new vinyl-coated canvas cover for gun mounts and in testing the relative merits of ice anchors and "dead men" when mooring a ship. The third Navy request came from the hydrographer and had nothing to do with the Antarctic. He wished to take advantage of the personnel from his office who were on board and asked that the ship, on its return voyage, visit St. Paul's Rocks off the coast of Brazil and obtain rock samples from the islets and bottom samples and soundings from the adjacent sea.

The scientific projects were all related to the IGY program, and in that sense constitute a preamble to current scientific effort. ATKA sailed with a small shack hastily constructed on the port side, forward, to house a neutron monitor and a Geiger-Müller counter telescope. Sponsored by the Institute of Nuclear Studies of the University of Chicago and the National Research Council of Canada, this project had for its object the determination of latitude effects on cosmic rays, especially in the Southern Hemisphere, about which little was known. Dr. Keith B. Fenton of the University of Chicago operated the equipment during the voyage.



Commander Glen Jacobsen, Commanding Officer of USS ATKA (AGB-3) and Commander Task Unit 48.2.1. (29 December 1954.)

The Bureau of Standards and the Signal Corps Engineering Laboratories at Fort Monmouth, New Jersey, initiated 2 projects. The first was to study radio wave propagation by monitoring time signals from 8 stations scattered about the world. The other involved monitoring "whistlers," at that time a little-understood radio phenomenon about which scientists held conflicting theories. This project also necessitated a special installation. For this project, the Signal Corps furnished a civilian electronics engineer, Mr. Amory H. Waite, who had participated in the Second Byrd Antarctic Expedition. Mr. Waite was assisted by ATKA's communications officer, LT. Leo H. Grove, USN.

The Weather Bureau assigned 2 men to the expedition: Mr. George R. Toney, Jr., an Arctic Operations expert, and Mr. Paul A. Humphrey, a meteorologist. It, too, had initiated 2 shipboard scientific projects. One called for carbon dioxide sampling and was done by filling empty helium cylinders with an air compressor. The second also involved sampling, this time of dust. For this purpose, a piece of gummed film was exposed daily on an antenna mount forward of the bridge.

Seismic and magnetic investigations, under the direction of the Reverend Daniel Linehan, head of Boston College's Weston Observatory, were also a part of the scientific agenda. A primary reason for these investigations was to test new portable equipment and accessories under Antarctic conditions. Finally, Mr. William E. Davies of the United States Geological Survey accompanied ATKA to conduct rock studies. As the ship did not approach any exposed areas, Mr. Davies had no opportunity to exercise his specialty. His knowledge and interest in glaciology did, however, prove useful.

The Navy Hydrographic Office sent along a 3-man team composed of Dr. Willis L. Tressler and Mr. Charles M. Williams, oceanographers, and Mr. Charles W. Culkin, photogrammetrist. ATKA, of course, was equipped with an echo sounder and had a bathythermograph team aboard to record

water temperatures. The oceanographers were to make ice observation and take ocean stations on a "not-to-interfere" basis with the ship's priority operations. The photogrammetrist was expected to establish geodetic control as the opportunity offered. He would also assist in the survey of base sites, which after all was the main reason for the voyage.

Those attached to the various scientific projects, as well as the other military and civilian representatives on board, all had qualifications and experience that would aid Commander Jacobsen and the ship's company in carrying out their primary mission. In addition to the individuals mentioned above, there were Lieutenant Colonel Eugene H. Strayhorn, U. S. Marine Corps, Major Murray A. Wiener, U. S. Air Force, and Captain Paul D. Neftstead and Master Sergeant Herbert H. Stoltenberg, both U. S. Army. Other civilian experts were Mr. Norman Bright of the Air Force and Mr. Earl H. Moser of the Navy's Bureau of Yards and Docks.

As ATKA disappeared into the snow squalls off Boston Harbor and the crew stowed last-minute items below deck or lashed deck cargo firmly in place, Dr. Fenton turned on the cosmic ray counters. The U. S. Navy had embarked upon an enterprise in support of science that would continue year after year. A decade later, the end was not in sight.

On 8 December 1954, ATKA passed through the Panama Canal and tied up at Rodman Naval Station. A few last-minute supplies were acquired, and a couple of additional civilians and a few ratings came aboard, before the ship cast off on 11 December for the voyage across the Pacific. On the way to New Zealand, plans were discussed, equipment checked, the dust and carbon dioxide sampling begun, trail flags fabricated, the Equator crossed with attendant ceremonies, Christmas celebrated, and a day lost as the ship entered the Eastern Hemisphere. Radar picked up the shoreline of New Zealand's North Island at 1037 on the morning of 30 December, and an hour later the starboard lookout yelled, "Land Ho!" Preparatory to entering port at Wellington, ATKA anchored in Hawke Bay, where all hands turned to for cleaning ship. Anchor was weighed at 1500 the next afternoon, and Wellington's harbor entered the following morning, 1 January 1955. Commander Jacobsen wryly remarked, "Having spent a quiet New Year's Eve, ATKA's crew never felt better the morning after."

In New Zealand, the ship took on 340,000 gallons of fuel. The food lockers were filled to capacity with enough supplies to last a year even with the crew being allowed a 50 per cent ration supplement while in Antarctic waters. Material airmailed from the United States was tracked down, and it was found that for some mysterious reason a pair of engine liners had been left off in Fiji. Other items were obtained locally. The crew enjoyed the abundant hospitality of the New Zealanders. In return, it held open house, an opportunity of which 11,000 persons took advantage.

Such pleasures could not long endure. On 7 January, lines were cast off and ATKA nosed slowly into the stream as an estimated 1,000 New Zealanders waved and cheered. While ATKA was passing Dunedin, last-minute mail was put ashore by helicopter. Shortly thereafter, the southern seas began to exhibit their usual unstable characteristics. ATKA revealed her true nature as an icebreaker by rolling between 30° and 35° and, on one occasion, 45°. It is this sort of thing that makes the most intrepid mariner welcome the sight of ice with its calming effect upon the sea.

On 12 January, as ATKA crossed the Antarctic Convergence, between 62° and 63° South, the oceanographers noted that the water temperature dropped half of a degree an hour, and shortly thereafter the radar picked up an iceberg. The next morning, which, because of the international date line, was also 12 January, the first berg was sighted 6 miles off Scott Island, and at 1344 the first pack ice was encountered. Actually, the pack proved surprisingly light, especially when contrasted with what the ships of Operation HIGHJUMP had encountered 7 years previously.

At about this time, some practical joker concocted a bogus message from a mythical Japanese whaler indicating that the ice had broken out of the Bay of Whales clear back to Roosevelt Island. The conscientious correspondent of the New York Times, Mr. Walter Sullivan, dashed below to prepare a dispatch for his paper, but was interrupted by the ship's executive officer, who quietly informed him not to take the message seriously. Perhaps Mr. Sullivan would have done just as well to have kept on writing. On 14 January, the ice shelf came in sight, and those on the bridge believed they were in

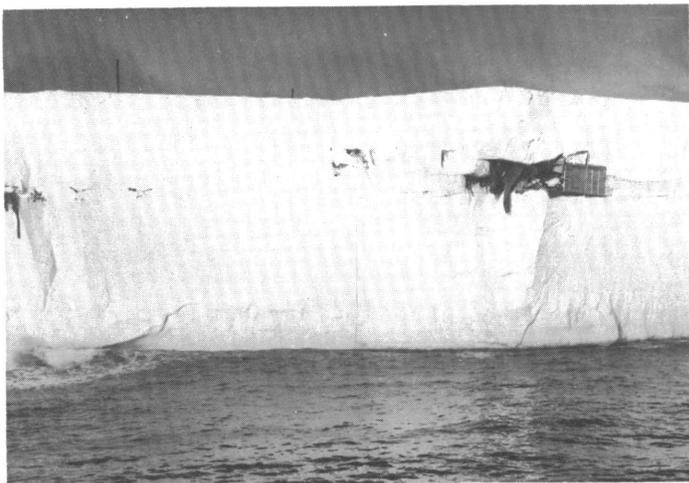
the vicinity of Discovery Inlet, which had been a stable feature since the days of Scott, but they could not find the embayment. Shortly, the overcast lifted long enough for the navigator to take some sun lines and determine more accurately his position. He rather embarrassingly reached the conclusion that ATKA was 10 miles into the Ross Ice Shelf, or at least that distance inside the plotted position of the ice front. As the ship proceeded westward, it rapidly became evident that a breakout of catastrophic proportions had occurred sometime since 1948, when BURTON ISLAND and EDISTO visited the area.

At 0855 a sharp-eyed lookout spied the wind-driven generator atop the radio mast of Little America II, much to the joy of Amory Waite, who had originally placed it there. No Bay of Whales, however, was in evidence. Within an hour Commander Jacobsen went ashore to survey what had happened. About two-thirds of Little America IV had gone to sea, taking along with it the 6 aircraft and most of the equipment left by Operation HIGHJUMP. From the ship, it could be seen that no bay, no fast ice, no snow ramp existed. The site used by 4 earlier United States expeditions was eliminated as a base site.

Further reconnaissance revealed a series of rifts and pressure ridges curling around behind Little America II. It appeared to the observers that another breakout could occur at any time. Commander Jacobsen, therefore, decided to salvage what he could, particularly from the emergency hut and radio shack of Little America IV, which had been built a considerable distance from the main camp and was still intact. All during 15 and 16 January the helicopters shuttled back and forth, and, although their load capacity was small, they managed to bring out more than a ton of equipment, including a much-needed generator to operate one of the ship's radios.

The scientists and survey parties went ashore, not to carry out the extensive investigation that had been planned if the site were found usable, but rather to determine what had occurred. Position was replotted and found to be in substantial agreement with that of ATKA's navigator. Snow densities were measured. The emergency radio shack was carefully examined to study the effects of snow and ice pressure, and the tunnel leading from the shack to the earlier Little America III, built in 1940, was inspected.

As the parties worked ashore, helicopters photographed the scene, and the ship steamed back and forth plotting the new ice front by the use of radar. Among the discoveries was a part of a tent hanging crazily from the edge of the shelf, an oil drum embedded in its face, and a dark line that clearly showed where men had tramped 7 years before. Summing up their observations, the experts estimated that at least 80 miles of the shelf had calved back to a distance of 10 to 20 miles. One can only wonder at the spectacle witnessed alone by birds and seals.



Side view of cross section of Little America III and IV. Buried building can be seen on right with shredded tent material hanging down. More shredded tent material can be seen on left. (February 1963.)

Commander Jacobsen, convinced that Little America had but a short time to live, closed it down on 17 January, leaving behind a note that had the tone of an obituary. The end was not quite so imminent as those on ATKA believed, for, during the IGY, others mined the old camps for food and supplies. A survey group was put ashore early in 1962 and reported nothing amiss. In January 1963, however, a University of Michigan glaciological party was stopped between Roosevelt Island and Little America by impassable crevasses. On 24 February of that same year, USS EDISTO spotted an iceberg in the side of which could be seen a building neatly sheared in two, some shredded



USS ATKA (AGB-3) breaking ice in Kainan Bay.

tent material hanging from the iceberg's face, a series of poles projecting from its surface. Undeniably, part of Little America III and probably of Little America IV had broken out. When seen, the iceberg was 300 miles west of its point of origin.

The unavailability of Little America made it imperative that other base sites be found and investigated. Commander Jacobsen headed eastward with the hope of rounding Cape Colbeck and entering Sulzberger Bay. A station in this area would be much closer than Little America to the proposed station in Marie Byrd Land and would thus shorten the distance that tractor trains would have to cover with equipment and supplies. In passing, he noted that Kainan Bay seemed a good possibility for a camp, but that Okuma Bay did not. Off Cape Colbeck, on 18 January, ATKA encountered heavy ice and the following morning lost a blade from the starboard propeller when maneuvering among heavy floes. Her farthest east was 159° West at $76^{\circ}45'$ South, considerably short of the $142^{\circ}52'$ West, $75^{\circ}43'$ South that Admiral Byrd reached in Bear in 1940. In fact Bear's record stood until GLACIER surpassed it on 28 January 1962.

Having found Kainan Bay to be the only possibility along the Ross Ice Shelf eastward of Little America, ATKA circled back to give that site more detailed consideration. When the ship arrived, the entrance to the bay was closed by pack ice. During the day, a southerly wind blew the ice out to sea, and at 0340 on 21 January, ATKA was moored to the edge of the fast ice. In the course of the next several hours, a shore party under Major Wiener determined that the snow ramps, instead of leading directly to the top of the ice shelf, ended in a crevasse that would have to be filled or bridged before the site was usable. Although not an insurmountable obstacle to a large, fully-equipped party, the crevasse did make it impossible for ATKA to use her Weasels. The scientists and engineers

were thus forced to depend for transportation upon the helicopters with their inadequate carrying capacity.

The following morning, Father Linehan, assisted by Lieutenant (junior grade) Robert H. Loreaux, Jr., and Gunner's Mate Joseph L. Taveres, was scheduled to do some seismic work. Loreaux was already ashore, when Lieutenant (junior grade) John P. Moore brought in Father Linehan. Visibility was none too good and was rapidly deteriorating into a whiteout. Moore took off and instead of leveling off flew the helicopter into the ice shelf at full power. The machine tumbled for 75 yards and came to rest upside down. Luckily, Chief Aviation Pilot Albert P. Metrolis, bringing in Taveres, was close behind, spotted the wreckage, and landed beside it. Metrolis and Taveres, along with Father Linehan and Loreaux, extricated Moore from the helicopter and placed him in a banana sled that Father Linehan used to drag his instruments about. They lashed the sled to a pontoon on Metrolis' machine, and the latter took off. He, too, experienced difficulty in orienting himself. Once, the helicopter bounced off the surface, but he made it back to the ship. Moore was still alive on arrival, although badly injured. Despite the best efforts of the doctor and his corpsman, he died 3 hours later.



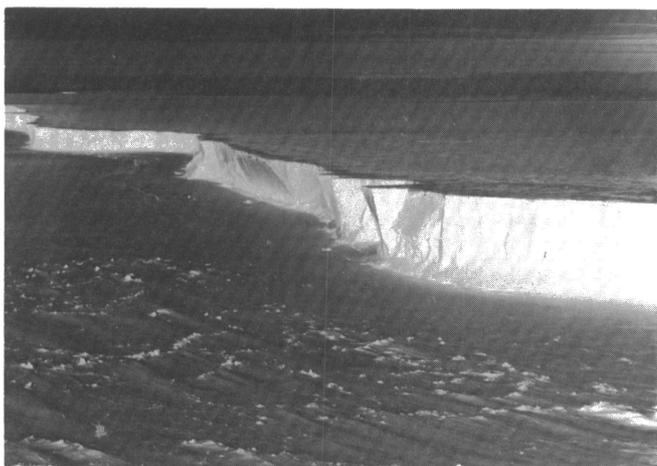
Father Linehan operating a portable seismograph.

Morale aboard ATKA fell low. Not only had a shipmate been killed, but also 5 men, with inadequate survival gear, were stranded ashore until visibility improved. They passed 20 hours, largely in skiing somewhat aimlessly about to keep warm. At the first break in the weather, the 2 remaining helicopters hurried them back to the ship, not even allowing time to recover their instruments. Continued improvement, however, permitted the aviators to retrieve the scientific gear and to make a thorough photographic reconnaissance of the bay. As soon as they had finished, the ship hastened away from that dreadful place with its melancholy memories.

Putting together their findings and impressions, the experts decided that a base could be built and maintained at Kainan Bay. Ships could be unloaded on bay ice, and supplies hauled to the top of the shelf, after some road building. Beyond the crevasse and other disturbances near the shelf edge, the way to the interior stretched forth in an unbroken plain, where a compacted snow runway for aircraft could easily be installed. They even expressed an opinion that airplanes could land on the bay ice, a proposal that was never adopted, and it was just as well that way. Weather would not materially differ from that at the Bay of Whales. As to location, it was, if anything, slightly better than the Bay of Whales, being about 35 miles closer to Marie Byrd Land. Kainan Bay, the experts decided, while far from ideal, would do for want of a better site.

They were correct. The Navy placed Little America V at Kainan Bay during DEEP FREEZE I (1956-1957) and continued to operate it until January 1959. Ships, with some difficulty, did unload. Ski-equipped, if not wheeled, aircraft could take off and land on the shelf, and tractor trains departed for Byrd Station.

ATKA had accomplished the first objective of finding a station site on the southern margin of the Ross Sea. Commander Jacobsen had not, however, surrendered hope of reaching the shore of the Amundsen Sea, much nearer the proposed site of Byrd Station, and along which the geodesist wished to establish control points to exploit the photography from Operation HIGHJUMP. Having failed to



Ice shelf in the Ross Sea where Little America V was situated.

is located at the junction of the Amundsen and Bellingshausen Seas. If the ice in those waters followed the circular pattern known to exist in the Weddell Sea, it might be possible to slip between them and reach the coast. Once that had been accomplished, there was a good chance to slip along the shore where katabatic winds flowing down from the plateau often created leads during the summer season.

At 0130 on the morning of 3 February, ATKA was making steady progress through seven-tenths pack when a message arrived from the Chief of Naval Operations directing the ship to desist and ordering it to look for station sites off the South Atlantic. Those on board ATKA, including the commanding officer, continued to feel that their chance of reaching Thurston Peninsula had been good. Many also felt that it was possible with sufficient time to penetrate the Amundsen Sea to Mount Siple.

This message was the first intimation those on board ATKA had that the United States was interested in a station on the Atlantic side of Antarctica. For some reason, they decided that the principal purpose for this station would be to serve as an alternate landing field and concentrated on that aspect of the problem.

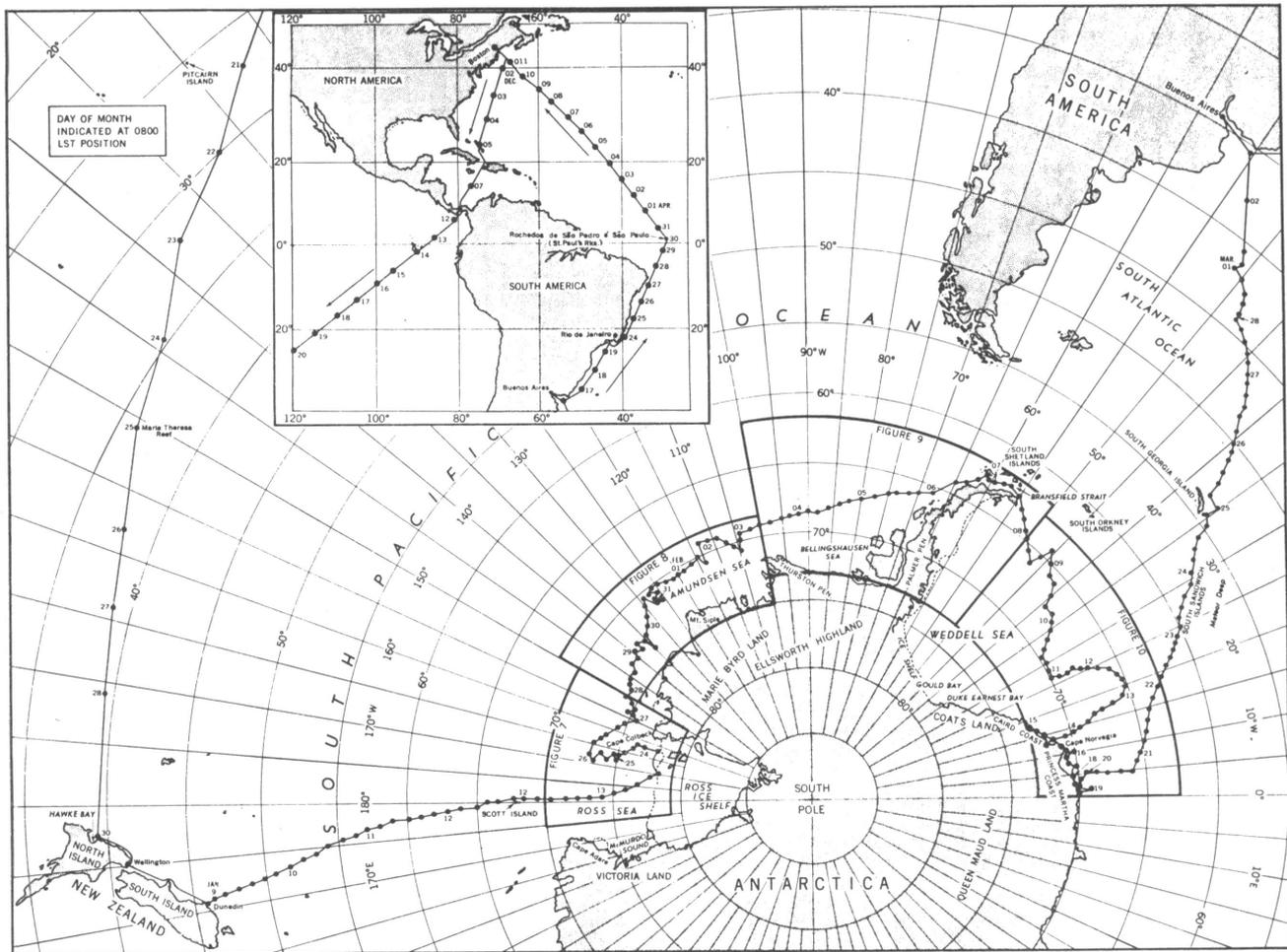
As soon as he had read the message, Commander Jacobsen turned the ship northward to clear the ice and then set course eastward for Bransfield Strait. On the way past, the oceanographers observed that Peter I Island was surrounded by pack on its eastern and southern sides and halfway up the western shoreline. To the north there was open water. ATKA launched her 2 remaining helicopters to photograph the island. The ship resumed course, and at 0714 on 6 February the radar picked up Adelaide Island. Three oceanographic stations were taken while transiting the strait.

Late on 7 February, ATKA rounded the tip of the Antarctic Peninsula, going outside Joinville Island, and entered the Weddell Sea. The ship set a southeasterly course straight for Cape Norvegia. According to available records, she should have encountered ice farther to the north, but, except for occasional small detours to avoid patches of pack, very little ice was seen until about 365 miles from the cape, where an unbroken sea of pack was encountered. ATKA ran north and east until she rounded the corner, and then headed directly south for Cape Norvegia through what proved to be 455 miles of open waters.

The expedition, having reached the coast, resumed its task of looking for base sites. It first turned westward and headed for Seal Bay, reported by a Norwegian whaler as a good landing place. ATKA found it to be a broad indentation in the shelf and filled with drifting ice. She therefore pushed on to the west, where, at 72°23' South, 17°40' West, 2 narrow coves appeared, each about 1,500 feet wide and a mile deep. The more northerly of the two had a stretch of 1,000 feet of shelf ice that was

reach Sulzberger Bay from the west, he determined to attack the ice pack from the north. On 27 and 28 January, ATKA repeatedly tried to break through the pack on a number of southerly headings, but her maximum penetration was 75°25' South at 154°47' West, where consolidated pack, much rafted and hummocked, was encountered. Jacobsen then shifted his attention eastward, hoping to find some point where he could penetrate to the coast and follow a westward shore lead to Sulzberger Bay. He headed first for Cruzen Island, then Shepard Island, and finally Mount Siple. Each time the story was the same. At first the ship made good progress, but gradually the ice began to thicken, and, ultimately, heavy consolidated pack barred the way.

One more try was made, considerably farther east. Jacobsen aimed for Thurston Peninsula (now known to be an island), which



Track Chart USS ATKA - Navy Antarctic Expedition 1954-1955.

only 15 to 20 feet high and from which the surface sloped gently upward. The other contained some thin bay ice and steep ramps to the top of the shelf.

Commander Jacobsen rejected these coves partly because of local conditions, but largely because of their position in the Weddell Sea. As far as he was aware, the only ships that ever proceeded west of this location had been beset. He feared that the coves would be inaccessible to cargo vessels. Unknown to Commander Jacobsen—and this is significant of the lack of exchange of information at the time—the Argentine icebreaker, GENERAL SAN MARTIN, had followed this same route into the Weddell Sea and gone westward as far as $77^{\circ}58'$ South, $38^{\circ}48'$ West, where, a few weeks earlier, General Belgrano Base was established. The following year, of course, the United States set up Ellsworth Station even farther west.

Before turning back to the east, ATKA lowered a Jacob's ladder and sent several sailors over the side to capture Emperor penguins for the Washington Zoo. Using football tactics, the seamen captured 6 of the big birds that were lifted aboard feet foremost. Together with another Emperor and 4 Adelies picked up a few days later, the penguins were brought back to Buenos Aires and flown to the United States. Feeding them turned out to be a major chore requiring the combined efforts of 4 sailors for each bird. The penguins, however, won the hearts of the crew, and according to ATKA's report, their care was a significant morale factor on the return trip. At least, it presents a rare case of sailors willingly giving up their favorite dessert, so that the ice cream machine could turn out frozen water for the penguins' comfort.

ATKA next visited Norsel Bay, from which the Norwegian-British-Swedish Expedition had operated during the years 1950 to 1952. The bay, however, was found too restricted to maneuver ships, and the sides showed evidence of recent calving. An effort to photograph the area from helicopters failed when weather closed in a few minutes after launching.

Continuing eastward, the ship spied a bay at 70°35' South, 08°06' West. Some 20 miles wide and 7 deep, the bay had a low shoreline and, what was remarkable for the Antarctic, shallow enough water to permit anchoring. The experts went ashore by helicopter and commenced their studies of ice thickness, texture, and topography. Ships could moor to the shelf edge in many spots. While some rifts existed, routes for tracked vehicles were available and had gentle slopes. About 6 miles inland, Father Linehan calculated from his seismic gear that the ice was 1,200 feet thick and rested on rock. It was certainly the best site so far discovered, and the expedition gave it the tentative name of "Atka Bay," later changed to Atka Iceport.

On 18 February, ATKA came up against a gigantic ice tongue which projected 30 miles out to sea. Pack ice drifted up against its eastern side so that it was impossible to round it. Commander Jacobsen, even though time was running short, decided to return down the west side and examine a bay that the ship had passed earlier. This bay, the head of which was determined to be at 69°34' South, 00°41' West, was about 2-3/4 miles wide at the entrance and extended into the tongue a distance of 5-3/4 miles. The bay ice, except for a half mile in the far reaches, had recently gone out. Examination of this remnant showed that it could be used to unload ships, and ATKA tied up to it. At many points, the shelves on either side of the bay were also low enough, about 20 feet, so that cargo could be off-loaded directly onto them. There were ample ramps to the top of the tongue, which was about 130 feet above sea level. As far as observers could see, the tongue ran imperceptibly into the ice shelf behind it without sign of serious access problems.

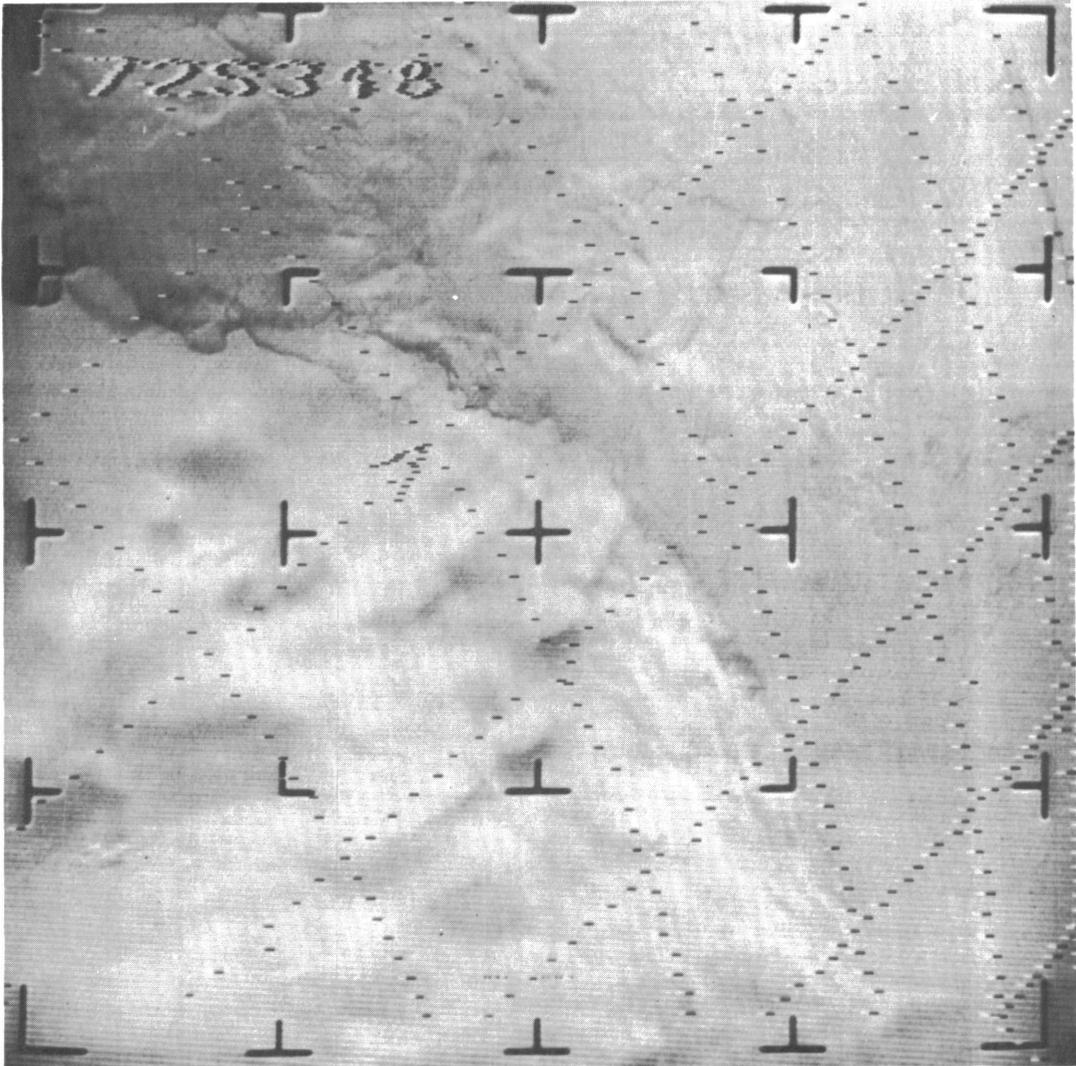
As at Kainan Bay, Major Wiener's ski-patrol went out and soon reported a safe route to the top of the tongue. This happy discovery permitted the scientists and surveyors to take off by Weasel with their equipment. By the time Major Wiener and his companions returned, a beer party was in full swing, with all hands glad to be ashore at last. It was here that the additional penguins were captured for return to the zoo. While festivities were at their height, a great boom was heard from the top of the tongue. Father Linehan and his assistants, having finished their work, had set off their remaining explosives in one final, farewell salute.

With their investigations completed, the scientists returned to the ship, the crew was recalled from the ice, and, at 2218 on 19 February, ATKA turned toward home. Those on board felt that the last discovery had justified the entire trip. In their exuberance, they gave it the most important name they could think of: "Admiral Richard E. Byrd Bay." The ice tongue, for which they could find no designation on their maps, they named "Observers Shelf Ice Tongue." Neither name has received official approval.

The voyage home proved uneventful. Following in reverse the course that it had taken on the way in, ATKA encountered no ice. When 66° South was reached, the ship set a great-circle route for Buenos Aires. The only deviation was caused by a 50-mile-long iceberg which was encountered a few miles north of South Georgia. The ship reached Buenos Aires on 7 March, 2 months to the day after leaving Wellington. The ship stopped briefly at Rio de Janeiro, where the crew's Christmas mail caught up with them, carried out the survey of St. Paul's Rocks, and arrived in Boston on 12 April.

If the primary objective of the voyage was to survey and discover base sites, it was only a qualified success. Importantly, ATKA discovered that the Bay of Whales, Discovery Inlet, and other historic features along the Ross Ice Shelf had disappeared. Of the possible sites in this area, Kainan Bay was found to be usable, while Okuma Bay was not. The efforts to penetrate the Amundsen Sea showed that, while an icebreaker might with difficulty reach the coast, it was no area in which to risk cargo vessels. Atka Iceport and "Admiral Richard E. Byrd Bay," in the discovery of which the expedition members took such pride, were never used by the United States or any other nation.

Whether ATKA should have pushed farther west along the Caird Coast is certainly arguable, even



Princess Martha Coast in East Antarctica, the area visited a decade ago by USS ATKA, as photographed on 17 September 1964 by the Nimbus Satellite. The arrow at the center of the picture indicates the position of 72° South, 12° West. The photograph covers the area from approximately 64° to 76° South, 12° East to 18° West. (NASA Photograph.)

though GENERAL SAN MARTIN had demonstrated that it could be done. When ATKA reached the area, it was late in the season, the ship had a damaged screw, and the historical precedents, as far as Commander Jacobsen knew them, were not good. He was certainly justified in being hesitant and probably well advised not to take the risk.

Of the scientific projects, the most productive were those in oceanography and the study of cosmic rays. Complete bathythermograph records, water samples, and soundings were obtained, some of them in waters where no ship had previously ventured. Thirteen ocean stations were taken in Antarctic waters. The results of this oceanographic work were summarized in Hydrographic Office Technical Report-48, "Oceanographic Observations, U. S. Navy Antarctic Expedition, 1954-1955, USS ATKA (AGB-3)," March 1956.

Dr. Fenton, from the investigation of cosmic rays, made recommendations concerning the equipment and its use and had several suggestions of value for planning the IGY program. The results of the observations were significant, but tentative, and depended upon further investigation for confirmation. The project was continued the next year aboard USS ARNEB and led to important discoveries, including fixing the location of the cosmic ray equator.

For the two projects sponsored by the National Bureau of Standards and the Army Signal Corps, results were disappointing. Both time-signal monitoring and whistler investigation suffered from the proximity of the ship's transmitters and the fact that an icebreaker, by reason of its function, rarely maintains a constant heading when in the ice. On pioneer ventures, of course, information on the difficulties encountered and deficiencies of equipment is of significance for the future.

The two Weather Bureau sampling projects were also successfully carried on, and the material submitted for expert analysis. The air samples disproved an hypothesis advanced during the Byrd expeditions that Antarctic air had a lower oxygen content than found elsewhere. The dust samples were analyzed for radiation content, and it was revealed that there was relatively little radiation effect from nuclear explosions in the Southern Hemisphere. Snow samples were also collected as a part of a worldwide study of the distribution of deuterium.

Finally, Father Linehan learned that, on the whole, his equipment was satisfactory. Because of the limited transportation available, he was not able to carry out as much actual investigation as he would have liked. The results, however, were sufficient to demonstrate the value of field seismology and magnetic observation for geophysical research in the Antarctic.

As for the Navy's projects, the vinyl-coated gun cover was found superior to the standard canvas type. Having investigated ice anchors versus "deadmen," ATKA came to the conclusion that both were useful. Additionally, of course, the ship returned with information about changed ice fronts and also with much other information that found its way onto Hydrographic Office charts. This was certainly one of the more important contributions to our knowledge of the Antarctic.

The report submitted by Commander Jacobsen contained a long list of recommendations, most of which were favorably received and many of which were later adopted. They included everything from light gloves for photographers operating cameras in cold weather to air conditioning for icebreakers forced to transit the tropics. As is customary with such reports, a great many items related to discrepancies in equipment and recommended replacement or modification. Two of a more general nature should be noted. The first recommended that instead of 3 light reconnaissance helicopters, icebreakers should be fitted with 1 reconnaissance type and 1 utility type, capable of transporting people and equipment. This recommendation was adopted, and the complement suggested is still standard for Wind-class ships. The second advised that, if only one station was to be established in the Ross Sea, McMurdo Sound, which ATKA did not visit, should be carefully surveyed before deciding on Kainan Bay.

When ATKA returned to Boston, Admiral Byrd was on the pier to greet her. He referred to the expedition's "spectacular achievement." Commander Jacobsen contented himself with the thought that the voyage would go down in history "as the vanguard of the greatest South Polar exploration yet attempted." He was correct, of course, but he might also have reflected that ATKA's trip was the last of an era. Occasionally, in the years since 1955, Antarctic ships, after they have completed logistics missions, have gone off exploring, but ATKA's was the last purely exploratory voyage on which all activities were conducted from on shipboard. It had more in common with the great voyages of Cook and Bellingshausen, of Wilkes, Ross, and d'Urville, and going even farther back, to those of Columbus, Magellan, and Vasco da Gama, than it did with the operations of the years ahead.

Sources: Commanding Officer, USS ATKA (AGB-3), Report of U. S. Navy Antarctic Expedition, 21 April 1955. W. Sullivan, Quest for a Continent, New York, 1957. A. Howard, ed., The Polar Times, No. 40, June 1955. P. A. Humphrey, "The Voyage of the ATKA," Scientific American, September 1955, pp. 50-55. Commander, U. S. Naval Support Force, Antarctica, Report of Operation DEEP FREEZE I, 1 October 1956.

Library

ADDITIONS TO THE ANTARCTIC MAP COLLECTION

Japan

(The following maps were received from the United States
Department of the Interior, Geological Survey.)

Lutzow-Holm Bay. Compiled from vertical and oblique photography of 1957, 1959, and 1962. Controlled by astronomical points and trigonometrical points established by Japanese Antarctic Research Expeditions of 1957 and 1960-1962. Edited by Geographical Survey Institute, Japan. Scale 1:250,000. 1963.

Prince Olav Coast. Compiled from vertical and oblique photography of 1957, 1959, and 1962. Controlled by astronomical points and trigonometrical points established by Japanese Antarctic Research Expeditions of 1957 and 1960-1962. Edited by Geographical Survey Institute, Japan. Scale 1:250,000. 1963.

New Zealand

(The following maps were received from the New Zealand
Department of Lands and Survey.)

Buckley Island, Shackleton Coast, Australian Antarctic Territory, Ross Dependency. NZMS 166, sheet SV 51-60, 3. Polar stereographic projection with scale 1:250,000 at 71°S. latitude. First edition, June 1964.

Geologists Range, Shackleton Coast, Australian Antarctic Territory. NZMS 166, sheet SU 56-60, 9. Polar stereographic projection with scale 1:250,000 at 71°S. latitude. First edition, September 1964.

Mt. Rabot, Shackleton Coast, Australian Antarctic Territory, Ross Dependency. NZMS 166, sheet SU 56-60, 14. Polar stereographic projection with scale 1:250,000 at 71°S. latitude. First edition, June 1964.

Nimrod Glacier, Shackleton Coast, Australian Antarctic Territory, Ross Dependency. NZMS 166, sheet SU 56-60, 10. Polar stereographic projection with scale 1:250,000 at 71°S. latitude. First edition, May 1964.

United States

(The following maps were received from the United States
Department of the Interior, Geological Survey.)

Northern Victoria Land, Antarctica. Sketch map. Polar stereographic projection, standard parallel 71°S. latitude. Scale 1:500,000. 1963.

Union of Soviet Socialist Republics

(The following maps were received from the
Academy of Sciences of the USSR.)

Ministry of the Navy of the USSR, scale 1:200,000. Contour lines given at every 50 meters. Elevations given from the surface of the Indian Ocean. Map sheets compiled in 1960 and 1961 on the basis of materials provided by the Soviet Antarctic expeditions of 1956-1959. Prepared for publication in

1960 and 1961. Printed in 1963. (All sheets dated 28. IX. 1963.) Measurements of altitudes and depths are given in meters.

Sheet Numbers

Titles

Q-44-XV, XVI	m. Pingvin [mys]
Q-44-XVII, XVIII	p-ov Chelyuskintsev [poluostrov]
Q-44-XXI, XXII	p-ov Chelyuskintsev [poluostrov]
Q-44-XXIII, XXIV	bukh. Nikolayeva [bukhta]
Q-44-XXVII, XXVIII	Zapadnyy Shel'fovyy Lednik
Q-44-XXIX, XXX	Ledolom Taymyrskiy
Q-44-XXXIII, XXXIV	m. Bugepyuntent [mys]
Q-45-XV, XVI	m. Maksimova [mys]
Q-45-XVII, XVIII	Zapadnyy Shel'fovyy Lednik
Q-45-XIX, XX	o. Leskova (ledn. kupol) [ostrov/lednikovyy]
Q-45-XXI, XXII	Zapadnyy Shel'fovyy Lednik
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Q-46-XI, XII	m. Vize [mys]
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Q-47-XVII, XVIII	o. Mill (ledn. kupol) [ostrov/lednikovyy]
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Q-48-XIII, XIV	m. Elliott [mys]
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Q-48-XXI, XXII	m. Peremennyy [mys]
Q-48-XXIII, XXIV	Skaly Snayder
Q-49-XIX, XX	m. Natt [mys]
Q-49-XXI, XXII	Uilks
Q-49-XXV, XXVI	m. Mallori [mys]
R-44-I, II	Oazis Vestfoll'
R-44-III, IV	Zaliv Pryuds

Note

The above list of maps received in the office of the U. S. Antarctic Projects Officer is published only for the information of our readers. This office maintains a file of maps for in-office use by any interested persons, but it does not have copies for redistribution.

Chronology

- 16 Dec 64 - USNS WYANDOT reported for Antarctic duty to Commander, U. S. Naval Support Force, Antarctica.
- USS GLACIER commenced escorting USNS PVT. J. R. TOWLE and HMNZS ENDEAVOUR through the ice of McMurdo Sound.
- Rear Admiral James R. Reedy arrived in Christchurch from McMurdo.
- USNS CHATTAHOOCHEE completed off-loading cargo and departed McMurdo, under escort of USS STATEN ISLAND, for Port Lyttelton.
- MATS DEEP FREEZE 65 Task Unit final C-130E mission arrived at McMurdo.
- 17 Dec 64 - Three Army UH-1B helicopters ferried from Shackleton Glacier to begin Horlick Mountains Program.
- Pensacola Mountains high-altitude photographic program completed.
- USS STATEN ISLAND and USS GLACIER escorting USNS PVT. J. R. TOWLE and HMNZS ENDEAVOUR into McMurdo Sound.
- USS MILLS departed Ocean Station for Dunedin.
- 18 Dec 64 - University of Minnesota party returned to Byrd Station from Whitmore Mountains, having completed its program.
- HMNZS ENDEAVOUR completed off-loading aviation gasoline at McMurdo.
- USNS PVT. J. R. TOWLE berthed at Winter Quarters Bay and commenced off-loading cargo.
- USS STATEN ISLAND moored at McMurdo.
- 18 Dec 64 - United States Air Force DEEP FREEZE 65 Task Unit departed Christchurch for Travis Air Force Base, California.
- 19 Dec 64 - Camp Gould Reconnaissance party returned to Byrd Station, having completed its mission.
- USS GLACIER departed for Erebus Bay to attempt to recover crashed VX-6 helicopter.
- U. S. Army helicopter group commenced operations in the Horlick Mountains.
- 20 Dec 64 - Camp Neptune Weather Reconnaissance party returned to Byrd Station.
- USS STATEN ISLAND commenced patrolling channel in McMurdo Sound.
- USS MILLS arrived in Dunedin.
- USS GLACIER departed for Port Lyttelton.
- Old Dominion College party placed at Marble Point.
- Ohio State University party at Lake Vanda.
- 21 Dec 64 - HMNZS ENDEAVOUR departed McMurdo for Port Lyttelton.
- South Pole-Queen Maud Land Traverse I immobilized at 86°47.5' South, 47°36' East because of equipment trouble.
- 22 Dec 64 - USNS PVT. J. R. TOWLE completed off-loading cargo at McMurdo and departed for Port Lyttelton under the escort of USS STATEN ISLAND through the pack ice.
- USCGC EASTWIND arrived in Wellington from McMurdo for approximately six days before returning to McMurdo Station.

- 22 Dec 64 - South Pole-Queen Maud Land Traverse I equipment repaired and party now under way again.
- 23 Dec 64 - USS STATEN ISLAND moored at Winter Quarters Bay, McMurdo Sound.
- LC-130F flight from McMurdo Station to Vostok Station to pick up United States personnel installing the new VLF/ELF equipment, and to return Dr. V. S. Ignatov, the 1963-1964 Soviet Exchange Scientist, to join the Soviet Antarctic Expedition after he had spent a year at Byrd Station.
- 24 Dec 64 - USNS WYANDOT departed Davisville, Rhode Island, with DEEP FREEZE cargo for Anvers Island via Valparaiso.
- USNS CHATTAHOOCHEE arrived in Port Lyttelton.
- NCEL compacted snow runway successfully tested by LC-130F with a gross weight of 102,000 pounds.
- 25 Dec 64 - Christmas services were conducted by Catholic and Protestant chaplains at the United States Antarctic stations.
- 26 Dec 64 - USS GLACIER arrived in Port Lyttelton.
- 27 Dec 64 - USNS PVT. J. F. MERRELL arrived in Port Lyttelton from the United States.
- USNS PVT. J. R. TOWLE arrived in Port Lyttelton.
- 28 Dec 64 - USS STATEN ISLAND commenced breaking channel en route to site of VX-6 helicopter crash. (See article on page 5.)
- USNS PVT. J. R. TOWLE departed Port Lyttelton and reported to Commander, Military Sea Transportation Service, Pacific, having completed her Antarctic duty for DEEP FREEZE 65.
- 28 Dec 64 - USCGC EASTWIND departed Wellington and arrived in Port Lyttelton for fueling.
- 29 Dec 64 - USCGC EASTWIND departed Port Lyttelton for McMurdo via Hallett Station.
- 30 Dec 64 - Commander, Antarctic Support Activities, visited Amundsen-Scott South Pole Station.
- HMNZS ENDEAVOUR arrived in Port Lyttelton.
- USNS WYANDOT arrived in the Panama Canal Zone.
- USNS PVT. J. F. MERRELL departed Port Lyttelton for McMurdo.
- HMNZS PUKAKI arrived in Dunedin and reported to operational control of the New Zealand Naval Board.
- 31 Dec 64 - USNS CHATTAHOOCHEE departed Port Lyttelton for McMurdo.
- USNS PVT. J. F. MERRELL en route to McMurdo in company of USCGC EASTWIND.
- USNS WYANDOT departed the Canal Zone en route to Punta Arenas, Chile.
- 1 Jan 65 - U. S. Geological Survey Ice Strain survey field party completed field operations and returned to Byrd Station.
- USS STATEN ISLAND recovered crashed LH-34D helicopter after cutting 6-mile channel and man-hauling the aircraft 3 miles to shipside with 50 men. (See article on page 5.)
- USS MILLS departed Dunedin for Ocean Station via Campbell Island.
- 2 Jan 65 - Recovery of Byrd Aurora Substation completed.
- USS GLACIER departed Port Lyttelton for McMurdo via Hallett.

- 2 Jan 65 - Commander, Antarctic Support Activities, Captain Elliott, embarked on USS STATEN ISLAND at McMurdo for inspection trip at Hallett Station.
- USS STATEN ISLAND departed McMurdo Station for Wellington via Hallett Station.
- 3 Jan 65 - South Pole-Queen Maud Land Traverse I temporarily immobilized at 85°10.2' South, 01°36' East.
- Texas Technological College geological and seismological program at Shackleton Glacier completed.
- USCGC EASTWIND arrived in McMurdo Sound and departed for Hallett Station.
- 4 Jan 65 - USS STATEN ISLAND arrived at Hallett Station with Captain Elliott aboard. After inspecting the station, Captain Elliott departed aboard USCGC EASTWIND, also at the station, for McMurdo.
- USS STATEN ISLAND departed Hallett Station for Wellington.
- LC-47 evacuation of Texas Technological College personnel at Mt. Cole on Shackleton Glacier commenced.
- USS MILLS arrived on Ocean Station.
- USNS WYANDOT, en route to Anvers Island via Punta Arenas, Chile, diverted to Callao, Peru, to transfer sick crew member.
- 5 Jan 65 - USNS WYANDOT arrived at Callao, Peru, transferred sick crew member to shore, and departed for Anvers Island via Punta Arenas, Chile.
- MCB-6 personnel arrived at Eights Station and prepared to commence Wonder Arch construction.
- 6 Jan 65 - Air Development Squadron SIX U-1B (Otter) aircraft successfully completed emergency landing on the ice near Skelton Glacier. (See article on page 7.)
- 6 Jan 65 - Final scheduled LC-130F logistic support flight to South Pole-Queen Maud Land Traverse I completed.
- 7 Jan 65 - USCGC EASTWIND, USNS PVT. J. F. MERRELL, and USNS CHATTAHOOCHEE arrived at McMurdo in convoy.
- USS GLACIER arrived at Hallett Station and departed for a survey via McMurdo Station.
- 9 Jan 65 - USS GLACIER arrived at McMurdo.
- USNS CHATTAHOOCHEE departed McMurdo for Port Lyttelton.
- HMNZS PUKAKI departed New Zealand for Ocean Station.
- 10 Jan 65 - Rear Admiral James R. Reedy departed Christchurch for McMurdo.
- USS GLACIER departed McMurdo for Beaufort Island survey cruise.
- 11 Jan 65 - Rear Admiral Reedy arrived at McMurdo Station.
- USNS PVT. J. F. MERRELL departed McMurdo for Port Lyttelton.
- LC-47 crashed on landing in the Horlick Mountains. No personnel injuries. (See article on page 6.)
- USS EDISTO reported to operational control of Commander, U. S. Naval Support Force, Antarctica, and activated Task Unit 43.5.1.
- 12 Jan 65 - USNS WYANDOT arrived in Punta Arenas, Chile.
- USS MILLS departed Ocean Station.
- USS EDISTO arrived at Anvers Island and commenced off-loading cargo at station site.
- USS STATEN ISLAND arrived in Wellington.
- VX-6 LC-130F air-dropped supplies to South Pole-Queen Maud Land Traverse I.

13 Jan 65 - HMNZS PUKAKI arrived on Ocean Station.

USNS WYANDOT completed loading cargo and supplies in Punta Arenas.

14 Jan 65 - USCGC EASTWIND departed McMurdo to rendezvous with USS GLACIER and pick up emergency leave case and transport him to McMurdo.

Arch erection commenced at Eights Station.

USS GLACIER completed Franklin Island survey.

USNS WYANDOT departed Punta Arenas for Anvers Island.

15 Jan 65 - USS MILLS arrived at Port Lyttelton from Ocean Station.

USCGC EASTWIND arrived and moored in Winter Quarters Bay, after having rendezvoused with GLACIER.

The Ohio State University geology party completed studies in the Horlick Mountains.

All MCB-6 personnel departed Byrd Station for McMurdo.

16 Jan 65 - Rear Admiral James R. Reedy arrived in Christchurch from McMurdo.

Construction of Palmer Station commenced.

USS MILLS departed Port Lyttelton and arrived in Dunedin.

USNS WYANDOT arrived at Anvers Island.

USNS MERRELL arrived at Port Lyttelton from McMurdo, having completed her Antarctic duty for DEEP FREEZE 65.

The Soviet Exchange Scientist for this year, Dr. Igor A. Zotikov, arrived in Christchurch. He will winter-over at McMurdo Station.

16 Jan 65 - First DEEP FREEZE 65 redeployment aircraft departed Christchurch for the United States.

Mr. John Jacobs, U. S. Exchange Scientist last winter, departed the Soviet Vostok Station for the Soviet Mirnyy Station.

USNS CHATTAHOOCHEE arrived in Port Lyttelton.

17 Jan 65 - USNS MERRELL departed Port Lyttelton for San Francisco, California. (FINAL REPORT.)

USS GLACIER completed her first circumnavigation of Coulman Island and remapped the coastline, picked up supplies, and landed a party at Hallett Station, then proceeded to Moubray Bay to conduct a marine survey.

USNS WYANDOT commenced off-loading cargo at Anvers Island.

18 Jan 65 - USS STATEN ISLAND departed Wellington, arrived at Port Lyttelton, and then departed there to rendezvous with USS GLACIER in the vicinity of Cape Adare, en route to McMurdo Station.

U. S. Army aviation detachment ferried 3 UH-1B helicopters from the Horlick Mountains to McMurdo via Shackleton and Nimrod Glaciers.

Amundsen-Scott South Pole Station resupply completed.

The University of Wisconsin group completed program and now awaiting evacuation from field.

19 Jan 65 - USS MILLS departed Dunedin and arrived in Port Chalmers for dry-docking for repairs to her port screw.

The University of Wisconsin group evacuated from Roosevelt Island.

20 Jan 65 - USCGC EASTWIND commenced breaking out fast ice east of McMurdo channel to Erebus Glacier Tongue.