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PRELIMINARY ACCOUNT OF THE UNITED STATES ANTARCTIC EXPEDITION, 1939-1941*

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Executive Secretary, United States Antarctic Service

IN late November, 1939, the U.S.M.S. *North Star* and the U.S.S. *Bear* sailed from Atlantic ports of the United States under the command of Rear Admiral Richard E. Byrd¹ to set up two bases in the Pacific Ocean region of Antarctica. After passing through a narrow belt of loose pack ice in the Ross Sea, the vessels reached the Bay of Whales on January 11, 1940, and unloaded on the fast ice in the bay. A base site was selected on the Ross Shelf Ice about three miles northeast of the old site at Little America, and on January 24, 33 men, under the command of Dr. Paul A. Siple, occupied this camp. On the same day the *North Star* departed northward, and on February 15 it reached Valparaiso, where a Condor airplane and stores destined for the East Base to be established on the coast of Palmer Peninsula were taken aboard.

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The organization of the United States Antarctic Service, under which the expedition was carried out, and the early work of the expedition have been described briefly in the *Geographical Review*, Vol. 30, 1940, pp. 163 and 325-327. The present article and map are intended to give a summary account of the field operations of the expedition from its departure, in November, 1939, to its return, in May, 1941, based mainly on the radio dispatches from the field received at headquarters in Washington, on which dispatches were also based the 70-odd press releases issued and distributed by the Service. All data concerning geographical features, and especially their exact positions, are necessarily preliminary. Final clarification must await the preparation of the results by members of the expedition.—EDIT. NOTE.

¹ The members of the expedition mentioned in this paper are as follows: Rear Admiral Richard E. Byrd, U.S.N. (Ret.), commanding officer of the United States Antarctic Expedition; *East Base*: Richard B. Black, base leader; Arthur J. Carroll, U.S.N., chief photographer; Harry Darlington, 3rd, general service; J. Glenn Dyer, General Land Office, surveyor; Carl Eklund, assistant biologist; Joseph D. Healy, dog driver; Donald C. Hilton, assistant surveyor; Paul H. Knowles, geologist; Lester Lehrke, Chief Boatswain's Mate, First Class, U.S.N., sailmaker; Lytton Musselman, general duty; Robert Palmer, supplies; Earl B. Perce, Radioman First Class (N.A.P.), U.S.N., assistant pilot; Finne Ronne, transportation engineer; Charles Sharbonneau, Corporal, U. S. Army, base carpenter; Lewis S. Sims, M.D., Lieutenant (j.g.), U.S.N. (M.C.); Ashley C. Snow, Aviation Chief Machinist's Mate (N.A.P.), U.S.N., chief aviation pilot; *West Base*: Adam Asman, Sergeant, U. S. Army, tractor driver; Clay W. Bailey, Chief Radioman, U.S.N., communication engineer; Jack Bursey, dog driver; Raymond A. Butler, cartographer; Luis Colombo, supplies; Felix L. Ferranto, Sergeant, U. S. Marine Corps, radio; Roy G. Fitzsimmons, physicist; Walter R. Giles, Master Technical Sergeant, U. S. Marine Corps, aviation pilot; Harold P. Gilmour, recorder; Orville Gray, Aviation Chief Machinist's Mate, U.S.N.; Clyde W. Griffith, Machinist's Mate, Second Class, U.S.N., engineer; Dr. Ernest Lockhart, physiologist; James C. McCoy, Aviation Chief Machinist's Mate, U.S.N., aviation pilot; Richard S. Moulton, dog driver; Charles F. Passel, geologist; Jack E. Perkins, biologist; Theodore A. Petras, Master Technical Sergeant, U. S. Marine Corps, aviation pilot; Harrison H. Richardson, dog driver; Isaac Schlossback, Lieutenant Commander, U.S.N. (Ret.), executive officer; Charles C. Shirley, Photographer First Class, U.S.N., photographer; Dr. Paul A. Siple, base leader; Dr. F. Alton Wade, senior scientist; Lawrence A. Warner, geologist; Loren Wells, Boatswain's Mate, First Class, U.S.N., sailmaker; Murray Wiener, physicist.

COASTAL FLIGHTS FROM THE "BEAR"

On January 19, 1940, the *Bear* left the Bay of Whales. Two days later, while the vessel remained in Biscoe Bay, the Barkley-Grow seaplane, manned by Byrd, Snow, and Perce, flew over Sulzberger Bay. On January 24 the same crew flew northeast toward the Chester Mountains and saw much open water off the coast. The *Bear* then followed the open water northeastward and on the following day reached $74^{\circ} 43' \text{ S.}, 143^{\circ} 52' \text{ W.}$ A flight was made from this point eastward along the Ruppert Coast to about 135° W. A coastal range about 4000 feet high, snow-covered but with dark rock exposures, bordered the shore line. Far to the south the peaks of other ranges were seen. In about $74^{\circ} 30' \text{ S.}, 141^{\circ} \text{ W.},$ a rocky, snow-covered island was observed to be separated from the mainland by a sheet of shelf ice, its northern extremity forming a steep bluff about 300 feet high that jutted into the open sea.

On January 30 the *Bear* returned to the Bay of Whales, and on February 1 it took its final departure. First the southern and western shores of the Ross Sea were followed, and then the course was set eastward from about $70^{\circ} \text{ S.}, 179^{\circ} \text{ E.},$ until February 24, when the vessel was in $70^{\circ} 43' \text{ S.}, 108^{\circ} 25' \text{ W.}$ Byrd, with Snow and Perce, took off in the seaplane at 12.58 p. m. local time and set his course southward. When the plane was about 190 miles from the ship, the ice cliffs that form the coast line came into view, with an extensive mountain range, which seemed to be about 7000 feet high, trending east-west at a distance of about 10 miles farther south. East of the flight track and about 80 miles north of the coast a snow-covered island was seen. The plane landed at the ship at 4.10 p. m. local time.

The following day the *Bear* reached $70^{\circ} 58' \text{ S.}, 105^{\circ} 33' \text{ W.},$ and the seaplane again flew southward. When the plane was about 50 miles from the ship, land was raised ahead and to port. The course was changed to southeast, and the coast was observed to trend northeastward as a peninsula, with parallel snow-covered mountain ranges about 4000 feet high stretching east-west between 100° W. and 114° W. Many blue areas, which appeared to be glacier ice, were seen interspersed between the massifs. When the plane had gone about 122 miles from the ship, it turned back, taking a direct course to the vessel.

On February 27 the *Bear* had worked eastward to $70^{\circ} 4' \text{ S.}, 95^{\circ} 19' \text{ W.}$ Byrd, with Snow and Perce, took off at 10.50 a. m. local time, circled to 6000 feet, and then headed south. In 40 minutes the eastern side of the peninsula observed two days before was seen projecting seaward for some 120 miles, with many peaks about 3000 feet high. A mountain some 4000 feet high lay at the southeastern end of the peninsula in about 96° W. In a large, ice-filled bay two

large islands were seen, the easternmost one in about $71^{\circ} 50' \text{ S.}$, 96° W. Ice cliffs formed the southern shore of the bay, beyond which the coast stretched southeast to about 88° W. No rock outcrops were visible in the hinterland, which appeared to rise steeply to the south.

OPERATIONS FROM THE EAST BASE

After the flight of February 27 the *Bear* skirted the edge of the pack ice eastward. A group of six small, low, partly snow-free islands was sighted off the northwestern coast of Alexander I Island. The *North Star*, steaming south from Valparaíso, also sighted four small islands off the entrance to Marguerite Bay and fixed the position as $68^{\circ} 37' \text{ S.}$, $70^{\circ} 50' \text{ W.}$

The two vessels met on March 3 and stood into Marguerite Bay, anchoring in a small bay between Neny Island and the mainland. Various sites for the base were investigated by the ships, and, as none of these was found suitable, two flights were made in the seaplane along Fallières Coast. The second aerial reconnaissance, made by Byrd, Black, Snow, and Perce, indicated that the most suitable site was a small islet fronting the quiescent glacier in the vicinity of Neny Island. This site, about a mile from the anchorage, was chosen as the base (approximate position, $68^{\circ} 10' \text{ S.}$, 67° W.), and unloading began at once. Winds of great velocity descending from the plateau made this anchorage untenable for the *Bear*, however, and it moved to a more protected refuge in the lee of Horseshoe Island, about 20 miles farther north.

On March 21 the ships completed the unloading and proceeded northward to American ports.

Flight operations were begun on May 20, when a flight was made southward along the coast as far as Cape Jeremy, at the eastern entrance to King George the Sixth Sound, and photographs of prospective sledging routes were obtained. The next day a cache was set up on the Wordie Shelf Ice by using the plane as a transport. In July and August sledge parties led by Black ascended the plateau and searched out a safe route to Bowman Coast. On September 10 a depot-laying party crossed Palmer Peninsula and laid a cache at the head of one of the valley glaciers on the Weddell Sea coast opposite the base.

On September 21 the flight crew, consisting of Black (base leader), Snow (pilot), Perce (second pilot and radio operator), and Carroll (photographer), made a flight in the Condor plane across the peninsula, first east from the base, then south from 68° S. to 69° S. mapping Bowman Coast,² and then west and north on the return. On

² W. L. G. Joerg: The Topographical Results of Ellsworth's Trans-Antarctic Flight of 1935. *Geogr. Rev.*, Vol. 26, 1936, pp. 454-462; *idem*: The Cartographical Results of Ellsworth's Trans-Antarctic Flight of 1935, *ibid.*, Vol. 27, 1937, pp. 430-444.

September 28 Black, Snow, Perce, Carroll, Ronne, and Dyer flew to the Wordie cache area, thence east to Weddell coast, north to Mobiloil Bay, and across the peninsula to the base. During the early part of October a second depot-laying party trekked to the eastern side of the peninsula and deposited stores at the cache set up the previous month.

A meteorological outpost was established on the plateau at an elevation of 5500 feet above sea level. This outpost, located at $68^{\circ} 8' \text{ S.}$, $66^{\circ} 32' \text{ W.}$, was occupied by Lehrke and Palmer on October 26, and meteorological reports were sent twice daily to the base until the outpost was abandoned on December 30. Not only did the outpost party serve as a valuable adjunct to the aviation personnel by forecasting flying weather, but the outpost observations were correlated with base observations and transmitted daily to the weather bureaus of Argentina, Chile, and Uruguay.

On November 4 the first aerial thrust southward was made, by Black, Snow, Perce, Carroll, and Ronne. After the take-off from the fast ice, a course was laid to skirt the northern end of Alexander I Island. Beyond Rothschild, which was found to be an island and not a cape, a southeasterly course permitted the photographing of much of the west coast of Alexander I Island. The fault trough, King George the Sixth Sound, was entered and was observed here to trend westward, with high land and numerous mountains forming the southern shore.

Sledging operations began on November 7. Bad weather had prevented any flying from September 28 to November 4 and a plan to carry stores for caches, and later, parties with dogs had to be abandoned and a start made on foot. The Southwestern Party, consisting of Ronne and Eklund supported by Knowles and Hilton, proceeded southward to the Wordie Shelf Ice cache. This party was accompanied by the Survey Party, made up of Dyer, Healy, and Musselman, with Ronne in charge until separation of the parties.

On the 12th a depot-laying flight was carried out to King George the Sixth Sound, where a landing was made near the Batterbee Mountains and a cache set up on the floor of the sound in $71^{\circ} 45' \text{ S.}$, $67^{\circ} 50' \text{ W.}$ The elevation here was 125 feet above sea level. On the return flight the Ronne party was sighted laboring in the crevassed area south of the Wordie Shelf Ice, and a description of the cache was dropped from the plane to the sledge party. Knowles and Hilton returned to the base on the 15th, having traveled over the sea ice from Cape Berteaux. On the 16th Black, Snow, Perce, Sims, and Sharbonneau made a flight to the Wordie cache to replenish the supplies there.

On the 22nd the two parties on the plateau separated. The Survey Party struck southeastward over the axis of Palmer Peninsula,

which was found to be 7000 feet above sea level. Three days later the Eternity Mountains were reached. This range, 12,000 feet in height, is cut transversely by the major depression or rift that crosses the peninsula, which has been described by Rymill.³ Survey investigations were carried out in these mountains as far as $70^{\circ} 53' \text{ S.}$, $63^{\circ} 38' \text{ W.}$ The party returned via the Wordie cache and reached the base on December 12, after a march of 36 miles over the sea ice on the last day.

After separating from the Survey Party on November 22, the Southwestern Party, with 15 dogs, continued southward until the Batterbee Mountains were reached, where a pass was descended to King George the Sixth Sound. The cache set up there was visited. The party then headed southwestward and on December 6, in $72^{\circ} 9' \text{ S.}$, $69^{\circ} 15' \text{ W.}$, crossed a pressure crack containing salt water. A 400-foot escarpment that rose to the west and extended due south was then climbed. Following the edge of this scarp, the party descended gradually and met pressure ice. On December 10 the southern shore of the sound was reached in about $73^{\circ} 5' \text{ S.}$, 70° W. It was followed westward for a week to $73^{\circ} 6' \text{ S.}$, $73^{\circ} 18' \text{ W.}$, where it was found that the shore began to trend northwestward. Skirting the coast, the party soon came upon open leads in the sea ice and found tabular icebergs in great numbers. On the 21st Ronne and Eklund reached $72^{\circ} 32' \text{ S.}$, $76^{\circ} 42' \text{ W.}$, where they camped on the northwestern extremity of the shelf ice which fringes the coast line. Open sea was visible to the limit of vision from northwest through north to east-southeast. The magnetic variation at this camp was determined to be $32^{\circ} 26' \text{ E.}$ The return journey was made on the floor of the sound to the Batterbee cache, beyond which the party's movements are referred to below (p. 472).

On December 22 a flight was made southwestward from the base, skirting the northern extremity of Alexander I Island and passing southwestward over Charcot Island and thence southward to the mountainous western coast of Alexander I Island until the open water reported by Ronne was sighted. From the northwestern extremity of the shelf ice the coast line was traced westward to 85° W. , and photographs were taken of mountainous capes and vast parallel depressions that extended southwestward toward a high, mountainous hinterland.

On December 28 another flight was made southwestward. Following King George the Sixth Sound, the plane traced the southern coast of Alexander I Island to verify its insularity and photograph the mountain ranges on the southern shore of the sound. The western mouth of the sound was observed to have rift features similar to those near Cape Jeremy, and two large ice tongues were seen to

³ John Rymill: *Southern Lights*, London, 1938, p. 234.

project west-northwest from a mountainous cape of the mainland in about 77° W. A rocky island was observed, about half a mile long and a thousand feet high, lying in a bight of open water opening westward between the coastal escarpment and the nearest ice tongue. Large mountain masses were visible on the west-southwest horizon. Altering the course to easterly, Black observed the inland mountain features until clouds forced a northeasterly course. After a landing at the Batterbee cache, a direct flight was made to the base.

The Weddell Coast Party, consisting of Knowles, Hilton, and Darlington, headed eastward from the base November 18. After surveying Bowman Coast, they sledged southward over the coastal piedmont, fixed at $70^{\circ} 30' \text{ S.}$, $61^{\circ} 34' \text{ W.}$, the position of the cape interpreted as Cape Eielson on United States Hydrographic Office Chart No. 5411, and then followed the mountainous coast to $71^{\circ} 51' \text{ S.}$, $60^{\circ} 47' \text{ W.}$ It was determined that the Larsen Shelf Ice does not extend south of $69^{\circ} 40' \text{ S.}$ Return was made by the route followed on the outward trip.

On December 30 the last extended flight was undertaken. The regular crew was augmented by Dyer, since the plan included an extension of operations by the surface party under his leadership. The plane proceeded southward along King George the Sixth Sound and then turned southeastward over a pass in the eastern wall to $71^{\circ} 20' \text{ S.}$, 65° W. The Eternity Range was photographed, and the plane was then headed southward to photograph two peaks, about 13,700 feet high, in $71^{\circ} 31' \text{ S.}$, $63^{\circ} 34' \text{ W.}$ After the divide had been crossed, an extensive range of mountains was sighted trending southward and a large depression running southeastward. By following this rift, the plane reached the Weddell coast in $72^{\circ} 32' \text{ S.}$, $60^{\circ} 23' \text{ W.}$, and thence skirted along the piedmont of the coastal range to $74^{\circ} 37' \text{ S.}$, $61^{\circ} 15' \text{ W.}$ From an altitude of 8400 feet this south-trending coastal range was viewed as far as 77° S. , where the summits appeared to thin out and decrease in altitude to about 7000 feet. Southeast and east of the turning point many patches of open water and leads were seen to the limit of vision, indicating that the Filchner Shelf Ice is restricted to the southern shore of the Weddell Sea. On the return leg of this flight the plane followed two of the valley troughs that radiate from the so-called "traffic circle" described below—the trough that connects the major transverse depression in latitude $69^{\circ} 30' \text{ S.}$ with the "traffic circle" and the trough that links the "circle" to Neny Fiord, on the western coast of the peninsula.

On January 7, on the return sledge journey on the floor of King George the Sixth Sound, the radio transmitter of the Southwestern Party failed. After reaching the Batterbee cache, the party remained in camp for a week to rest the seven remaining sledge dogs. From the Wordie Shelf Ice, Ronne and Eklund followed an inland route,

previously viewed by Black from the plane. This route entered a glacier valley to the north of the Wordie cache and thence followed a trough trending generally eastward into the "traffic circle." Upon reaching the "traffic circle" in $68^{\circ} 40' \text{ S.}$, 66° W. , the party sledged northwestward through Neny trough, where, on January 27, they met a relief sledge party coming southward to make contact with them.

This "traffic circle" is a basin at an elevation of about 2850 feet above sea level from which five smooth, glacier-filled valley troughs radiate like the spokes of a wheel. One descends westward to Windy Valley, another trends northwestward to Neny Fiord, a third, gradually widening, trends eastward to Bowman Coast, bordering the Weddell Sea, and a fourth extends southeastward, merging into the head of Lurabee Glacier near the major transverse rift in about $69^{\circ} 30' \text{ S.}$ The fifth glacier was ascended by Ronne and Eklund in the vicinity of Cape Berteaux to the "circle."

OPERATIONS FROM THE WEST BASE

On February 8, 1940, the first flight from the West Base was undertaken—in the Condor plane northeastward to the Edsel Ford Range and Ruppert Coast, which had been reached the previous month by seaplane from the *Bear*. The flight crew consisted of Siple (base leader), McCoy (pilot), Giles (second pilot and radio operator), Shirley (photographer), and Warner (observer).

Four days later, in the Beechcraft plane, Siple, with Petras and Wade, flew southwestward over the Ross Shelf Ice to $81^{\circ} 8' \text{ S.}$, $176^{\circ} 15' \text{ W.}$ At three places along the line of flight the surface of the shelf ice was broken by wide fractures, indicating that the ice was aground.

On February 29 the Condor made an extended mapping flight to the Queen Maud Mountains. The flight crew consisted of Siple, McCoy, Giles, Shirley, and Wade. From the West Base a course 203° was taken over the shelf ice, heading for the northern portal of Beardmore Glacier. A widely crevassed area was observed en route in $82^{\circ} 20' \text{ S.}$, 170° W. Near Mt. Hope, at the entrance to Beardmore Glacier, the plane circled to 9500 feet and then steered 134° along the northern escarpment of the Queen Maud Range. Many massive peaks and glaciers were mapped as far as Liv Glacier. In about $84^{\circ} 30' \text{ S.}$, 175° W. , a massive glacier nearly as large as the Beardmore was seen extending southward to the polar plateau. At $84^{\circ} 10' \text{ S.}$, 147° W. , the plane turned northward toward the base. On the homeward flight a large, snow-covered island, about 30 miles long, was observed lying southeast of Roosevelt Island in the approximate position 81° S. , 158° W.

On March 9 Petras and Griffith ascended in the Beechcraft plane to an altitude of 21,050 feet to make cosmic-ray observations.

On July 9 a midwinter party, consisting of Fitzsimmons, Wiener, and Ferranto, set up a camp about 15 miles east of the West Base for the purpose of taking auroral observations and photographs. The equipment was hauled to the site by the army tank, the crew of which included Asman, Griffith, and Passel. This camp was occupied for one week. Temperatures of -71° F. were encountered.

The first spring aviation activity was a test flight made in the Beechcraft plane on August 29 by the three aviation pilots, Petras, McCoy, and Giles. The temperature was then -52° F.

Spring sledge operations began in early October, when the army tank and tractor set up a cache of aviation gasoline in the Rockefeller Mountains, about 110 miles east of the West Base.

Three trail parties with dog teams set out in mid-October. The first of these, the Biological Party, consisting of Perkins, Lockhart, Colombo and Richardson, headed for the Fosdick Mountains and the eastern shore of the Ross Sea bordering Marie Byrd Land. The Pacific Coast Survey Party, consisting of Berlin, Bursey, and Moulton, left the next day to establish ground control as far as Mt. Hal Flood along the Ruppert Coast. Simultaneously two teams forming the Geological Party of Warner, Passel, Gilmour, and Wells headed for the central exposures of the Edsel Ford Range south of latitude 76° S.

The army tank, manned by Asman and Griffith, again returned to the Rockefeller Mountains, hauling the seismic equipment to that site, where it was operated by Schlossback, Fitzsimmons, and Butler. The tractor, driven by Boyd and Ferranto, then hauled aviation gasoline and trail provisions to Mt. Grace McKinley, about 90 miles east of the Rockefeller Mountains.

Both planes now undertook a series of flights and established distant aviation-gasoline caches. One cache was laid about 200 miles southeast of the West Base on the Ross Shelf Ice, in about $80^{\circ} 45'$ S., 147° W., another at Mt. Rea in the Edsel Ford Range.

In early December a series of local flights was undertaken to map the area in the vicinity of the base, and on December 9 the summer aerial-survey flights began. On that date Siple and Petras took off in the Beechcraft plane, heading eastward. They landed and refueled at the Rockefeller Mountains and at Mt. Rea. Again taking off, they set a course for Mt. Hal Flood, at the base of which the plateau surface stood at an altitude of not less than 5400 feet. Mt. Hal Flood, a conspicuous peak over 10,000 feet high at $76^{\circ} 4'$ S., $135^{\circ} 50'$ W., was seen to be the highest elevation of a long, snow-capped range that ran in an east-west direction. This range, broken by many glacier passes, was followed for about 50 miles and was observed to stretch eastward to the horizon. At the 134th meridian the plane turned northward at 8000 feet over one of the glacier passes

to $75^{\circ} 45'$ S. Along the 75th parallel the coast, with open water to the north, was seen to be bordered by numerous nearly bare coastal mountains, toward which the plateau drops from the main range near the 76th parallel. To the west this main range appeared to trend toward a high, snow-covered ridge lying north of Balchen Valley and terminating in Ruppert Cape. The main range, which runs in a straight line for about 250 miles, is marked by snow-covered peaks about 7000 feet high and an abrupt, partly buried, north-facing escarpment. The coastal mountains, with many rock exposures, extended from 75° S., 133° W., northeastward and eastward to the horizon. One unusually large mountain was observed on the horizon in the approximate position $76^{\circ} 10'$ S., 130° W., and other mountains were noted on the northern side of the main range east of 135° W., though in general the area between the main range and the coastal range was an uneven, snow-covered plateau surface.

On December 12, Siple, McCoy, Giles, and Shirley in the Condor attempted a flight southward but encountered fog 50 miles south of the base near the glacier saddle that crosses Roosevelt Island. They turned westward and continued to 178° E., where a large area of disturbed ice was seen about 30 miles to the southwest near the point where Royds turned back on his sledge journey on the shelf ice in 1903. An apparent rise in the surface of the ice suggested the existence in that locality of a low but large island. As Minna Bluff and Mt. Erebus came into view, the plane was turned northward to the barrier, where an eastward course was taken. At Discovery Inlet and Lindbergh Bay evidence was seen indicating that the seaward edge of the Ross Shelf Ice was aground there.

On December 13 Siple and Petras again took off in the Beechcraft, refueled at Mt. Grace McKinley and Mt. Rea, and then followed the coastal mountains to 135° W., where clouds forced a southward course to the main range, the northern side of which was photographed on the return flight. Landings were again made to refuel at Mt. Grace McKinley and Mt. Rea, and the base was reached after an absence of 13 hours.

The next day Petras and photographer Shirley took off in the Beechcraft for the purpose of mapping Ruppert Coast. They refueled at Mt. Grace McKinley, but in landing at Mt. Rea the plane ski was damaged. They made emergency repairs but were recalled to the base by radio because of clouds descending over the base.

On December 16 Petras and Siple again flew northeastward in the Beechcraft plane. They took off from the base at 10.51 p. m. and made stops at Mt. Grace McKinley and Mt. Rea for fuel. Leaving Mt. Rea at 2.52 a. m., they laid a course midway between Mt. Hal Flood and Mt. Maybelle Sidley. The latter peak, in about $77^{\circ} 25'$ S., $129^{\circ} 45'$ W., is more than 12,000 feet high, the highest summit of a

prominent range trending northeast-southwest. The surrounding plateau rises to 7000 feet. From Mt. Maybelle Sidley they steered northeastward to $76^{\circ} 45' \text{ S.}$, 129° W. , the limit of the operating range of the plane. At this position a massive peak rises, about 12,000 feet high, beyond which the surface drops to the northeast. This peak is about 30 miles south of the eastern extremity of the range seen on the 76th parallel on December 9. The easternmost peak of the new range was plotted in $76^{\circ} 30' \text{ S.}$, 127° W. After refueling at the mountain caches, the plane returned to the base at 11.40 a. m.

Two days later the big Condor plane took off at 7.02 a. m. with Siple, McCoy, Giles, and Shirley. Flying direct to Ruppert Coast, the plane turned east-northeast along the coast overlooked by the Edsel Ford Range. Near $75^{\circ} 35' \text{ S.}$, 142° W. , open water was observed close to a rock-and-glacial embayment extending to a large mountain group about 15 miles farther south. Another large group of mountains flanks each side of an active blue-ice glacier that projects into the sea near 75° S. , 137° W. , with a small, bare island near the glacier face. This glacier drains a large basin that extends to the high mountain range along the 76th parallel. From the tongue of the glacier the rock exposures increase in size and number eastward, filling the area between the coast and the high mountains to the south. A narrow skirt of shelf ice bordered the coast line, with ice-free water to its edge. A small island, to which the shelf ice is attached, lies in $74^{\circ} 30' \text{ S.}$, 133° W. After completing a photographing circle in $74^{\circ} 45' \text{ S.}$, $134^{\circ} 30' \text{ W.}$, the plane held the easterly course for 20 more minutes to examine several distinctive features ahead. The first of these was a glacial tongue extending northward for some distance to a visible termination. Many bergs indicated calving. Beyond the ice tongue an ice-free embayment extended southeastward for many miles. Ahead of the plane, in about $73^{\circ} 15' \text{ S.}$, a massive conical mountain was seen, estimated to be 15,000 feet high. This enormous mountain was flanked by open water to seaward. To the southwest toward the escarpment observed on December 16 several peaks were observed trending northeast from Mt. Maybelle Sidley. On the return westward the southern side of the coastal mountains was photographed, then a landing was made for fuel at the Rockefeller Mountains, and the base was reached at 6.25 p. m. on December 19.

On January 2, 1941, the Condor with Siple, McCoy, and Giles flew eastward to the 92-mile depot, where rendezvous was made with the returning sledge parties. Shortly after the take-off from the depot and about 80 miles from the base, the starboard engine of the huge biplane burst into flames. The fire was quickly extinguished, and the plane glided to a landing. Bailey, who maintained a continuous radio contact with all flights from the base, alertly picked up

the hurried distress signals flashed out by Giles as the plane descended to the surface. Investigation disclosed derangement of the master connecting rod. Petras and Gray took off from the base in the Beechcraft plane with spare parts for the damaged engine, but it was found that the repairs were too extensive to be undertaken on the exposed shelf ice. The Condor plane was then abandoned and the Beechcraft used to ferry the Condor crew to the base.

EVACUATION OF BASES

On October 13, 1940, the *Bear* sailed from Philadelphia for the Antarctic regions, followed on December 11 by the *North Star* from Seattle.

The evacuation of the West Base began on January 11, 1941, when the *Bear* reached the Bay of Whales after a nine-day voyage from Dunedin, New Zealand. The *North Star* arrived at the West Base on January 24. Both vessels had encountered a narrow belt of loose drift ice in the Ross Sea. The ships left the Bay of Whales on February 1, retired northward to the vicinity of Scott Island, and then headed eastward toward Palmer Peninsula. Peter I Island was sighted on February 15, and on the 24th the vessels rendezvoused off Adelaide Island. As dense pack ice in this region prevented entry into Marguerite Bay, the ships proceeded northward to Dallman Bay, where anchorage was taken pending favorable ice reports from the East Base.

On February 15 the East Base Condor plane made a flight over Marguerite Bay to examine local ice conditions; many leads and large pools of open water were found, but the sea ice was too dense to permit passage by a vessel.

Light northerly winds and temperatures as high as 52° F. were recorded for the next month. The sea ice in Marguerite Bay became honeycombed, but the northerly winds held the ice locked in the bay. Water sky was observed in the northern part of the bay by base personnel ascending Millerand Island, but the waters that caused it were inaccessible to the ships. In late February the *Bear* examined the northern edge of the pack near Adelaide Island but found no open-water areas that would permit transit. In the middle of March the *Bear* again investigated the pack, skirting the edge from the western coast of Adelaide Island to longitude 73° 8' W. without finding a safe passage to Marguerite Bay.

Owing to the unseasonable weather, the unusual pack-ice conditions, and the lateness of the season, emergency evacuation was then decided upon. The *Bear* proceeded northeastward to Mikkelsen Island, a small, snow-covered island about 25 miles northeast of Adelaide Island. A survey party was put ashore, a suitable area for aircraft operations located, and a landing field prepared.

At 5.30 a. m. on March 22 the East Base Condor plane took off from the quiescent glacier near the East Base. With pilots Snow and Perce at the controls, twelve men with their records and scientific specimens were crowded into the plane. After circling to gain altitude, Snow flew northward along the shore of Marguerite Bay as far as Pourquoi Pas Island, thence westward along the northern shore of the bay and over the high peaks of Adelaide Island to the coastal piedmont, and finally northward to Mikkelsen Island. A safe landing was made at 7.15 a. m., and the plane was unloaded. Snow and Perce returned to the base, and at 12.15 p. m. took off again with the twelve remaining members of the base party. The second flight to Mikkelsen Island, 112 miles north of the base, retraced the first flight, and a safe landing was made after an hour and forty minutes in the air. The *Bear* embarked the East Base personnel at once and sailed for Magallanes, Chile, where the *North Star* was met on March 29.

The two vessels sailed from Magallanes on April 2. The *North Star* reached Boston on May 5 and the *Bear* on May 18.