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VOLUME I

NARRATIVE

**COASTAL EXPLORATION OF
KEMP AND ENDERBY LANDS, ANTARCTICA**

by

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(72)

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COASTAL EXPLORATION OF KEMP AND ENDERBY LANDS, ANTARCTICA

by

D. F. STYLES

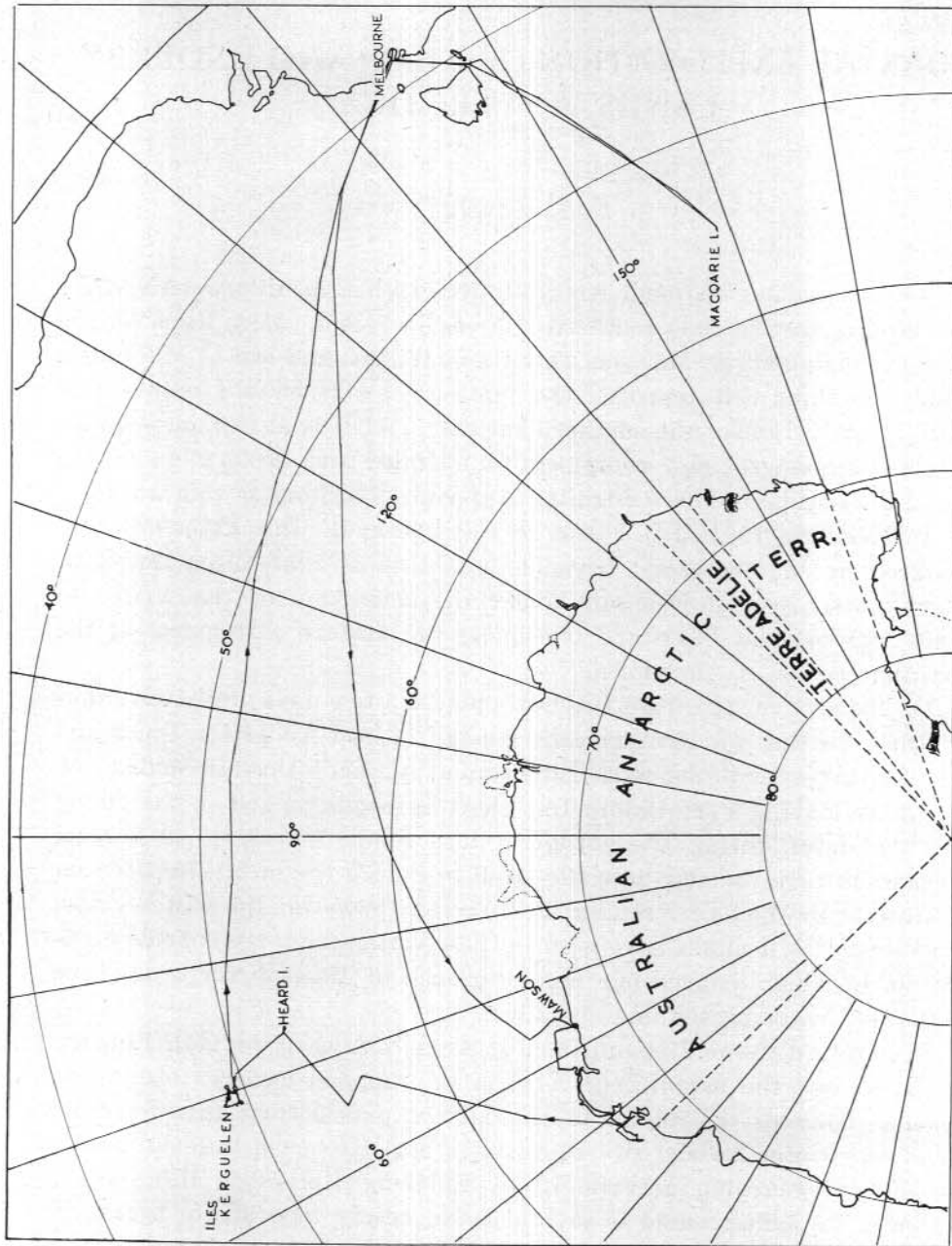
The Australian National Antarctic Research Expeditions (ANARE) have been operating four southern stations in recent years, three on the Antarctic mainland, at Mawson, Davis and Wilkes, and one at Macquarie Island. Ice ships can approach the continental stations for only a few weeks in the height of the southern summer, and it is at this period that the staff is changed, new equipment is installed and exploration of the immense coastline of the Australian Antarctic Territory is continued.

In 1960 and 1961 M.V. *Thala Dan* (Captain H. Chr. Petersen) was chartered by the Antarctic Division of the Australian Department of External Affairs, and was sent under the leadership of the writer to relieve Mawson and Davis and to explore the western extremities of the Australian sector of Antarctica.

On the first voyage, departure was delayed a few days until 10th January, 1960, waiting for weather calm enough to load ANARE's D.C.3 aircraft with safety onto the deck of the ship at Appleton Dock in Melbourne. Soon after leaving Port Phillip Bay the ship began to roll in the rising swell and later during the voyage it was found necessary on several occasions to turn the ship into the swell to reduce the strain imposed on the aircraft by the heavy rolling. Fortunately, however, the weather was not as severe as it might have been in those waters and, apart from a 58-knot storm which delayed our final approach to Mawson for a day, the 3,600 mile voyage passed uneventfully.

We crossed the continental shelf of Antarctica early on 25th January and sailed into the magnificent corridor of stranded icebergs leading to Mawson. Towards the middle of the day we passed through a five-mile belt of old winter ice and two hours later began to push into the rotten fast ice still guarding Mawson itself. Entering Horseshoe Harbour at 3.00 p.m., we sailed round it several times before mooring to break up the fast ice, hoping that the winds and tides would float it out of the harbour and leave it free for our operations.

Our first concern was to unload the aircraft which, with its crated wings and several hundred drums of highly volatile aviation fuel, completely sealed off the main deck and the three hatch covers of the *Thala*



MAP 1
Chart showing the track of ANARE ship *Thala Dan* from
December, 1959 to March, 1960.

Dan. Without a wharf, and with ice cluttering the harbour, this was in fact our major preoccupation and we spent five days on it. It was rather a heavy aircraft for a small group of men to handle with the limited facilities available, and the risk of losing it was considerable.

Mawson is built on a horseshoe-shaped rocky promontory lying between the ice cap and the sea. The rocky arms of the horseshoe rise to a height of a little over 100 feet and are nowhere more than 250 yards wide. The terrain is much too steep and rough to permit an aircraft to be towed safely over its surface. But the icecap rising steeply behind Mawson spills over the rocky slopes to terminate in a small ice foot in the southwest corner of the harbour, and after considering several alternatives I decided to land the D.C.3 aircraft there.

In the first three days the ice remaining in the harbour prevented any move to unload the aircraft. We spent the time in making what preparations we could—providing a tiedown facility by chopping large holes in the solid ice slopes of West Valley in which to bury anchorages, strengthening sledges on which to drag the aircraft over the snow-covered ridge separating the landing point from the tie-down point, preparing a snow road with bulldozers up over the ridge past the dog-lines and down beside the meltwater lake, strengthening the lip of the icefoot with balks of timber, and so on.

When these preparations were well advanced we began to look impatiently for some means of accelerating the movement of the ice out of the harbour. The Captain had noticed that a large floe, nearly a quarter mile square, was jamming the narrow straight between West Arm and Entrance Island during the daily ebb tide, and it was this which was holding the ice in the harbour. Three of us set out to dislodge it, taking some plastic explosive and a dinghy. We knew that the charges would only blow pot-holes in the flat sheet of ice, but we hoped to produce a series of holes along an apparent line of weakness which would have the same effect on the ice as perforations have in a sheet of paper and would allow the rocky West Arm to tear the floe as the tide pushed it. We set the first five charges across the vulnerable corner for a trial, and were hurrying back to the dinghy over the large floe when all our surroundings appeared to be adrift. We piled into the dinghy as the charges exploded, but by that time the floe was moving through the bottleneck, and the ice at last began to leave the harbour. Although a good deal of ice drifted in again with each incoming tide the katabatic winds which plague Mawson gradually cleared it and it was no longer a serious problem.

In the next two days we built a wooden platform sixty feet long and thirty feet wide on four large rubber pontoons to float the aircraft ashore. It was equipped with two heavy ramps which were to be let down onto the

ice-shelf. We plotted the movements of the tides, studied wind and weather, and at last entrusted the aircraft to its floating platform and towed it to the ice foot at 10 a.m. on Friday, 29th January. By midnight the tide was nearly at its peak and had lifted the aircraft high alongside the ice foot; the katabatic wind had not yet begun to rise. We lowered the ramps, but I had them raised again immediately (quite a heavy and exhausting job) as they did not appear to be well seated. We moved the reinforcing timbers and chipped the ice to give the ramps a better seating, tightened the mooring lines and tried again. This time the ramps sat much more securely.

There was still some doubt as to whether the front pontoon would burst when jammed against the ice by the drag on the aircraft—but it seemed unlikely as the air pressure was not very high. We were reassured also by the fact that there was another inflated pontoon only four feet behind it. The ice foot itself might break off under the seven ton weight of the aircraft, but its weakest point appeared to be about ten feet from the edge so that if it did break it would merely serve as an extra pontoon, held in place by the mooring ropes which were made fast to some rocks further inshore from the ice edge. There was also some suggestion that the ramps might spring up into the belly of the aircraft as the two sledges carrying the bulk of the weight of the front axles passed off the end of the ramps onto the ice. This, too, seemed unlikely because the pontoon itself would rise as the weight left it and the sledges moved up the ramps towards the ice. Nevertheless we built a stop of planks and snow in front of the ramps to block any forward movement which might increase such hazards.

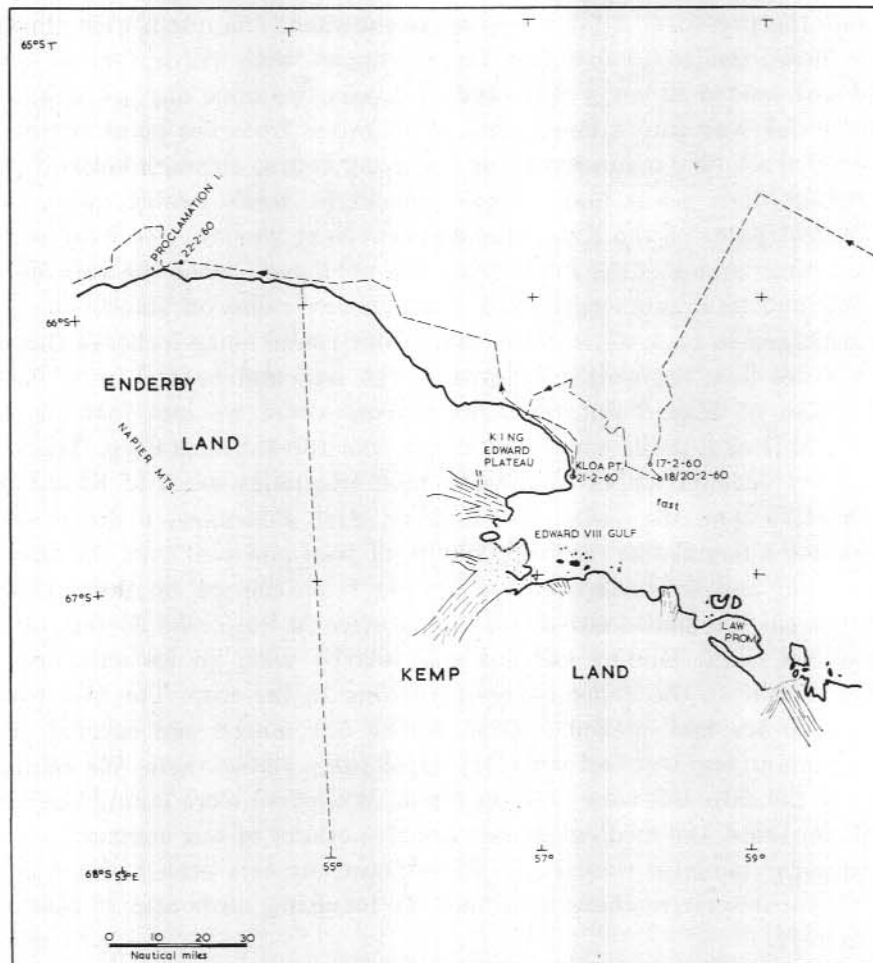
At 1.30 a.m. all was ready. The tractors began to haul, the aircraft went up the greased ramps and landed safely and smoothly on the ice. For the next nine hours we juggled the three tractors and straightened the sledges under the aircraft to haul it up to the crest of the slope, turned it around between the dog-lines, lowered it down the steep pinch to the lake side and hauled it along past the shore of the lake to the tie-down area in West Valley. From this position it was to be taken to the ice air-field 12 miles away at an elevation of 1,600 feet so that it could fly in autumn and summer when the sea-ice could not carry it.

Changeover at Mawson then proceeded normally, though not without incident, and was completed on Monday, 15th February, 1960.

We sailed for the far west of the Australian Antarctic Territory next day with John Béchervaise and his 1959 Mawson party and three of the 33-man 1960 party—Kirkby, the surveyor, Ruker, the geologist and Bennett, a radio operator. We planned to establish a depot for these three men on the coast of Kemp Land, 140 miles west of Mawson, and

then to drop them in Enderby Land, 100 miles west again. From the latter point they were to spend the autumn trekking back to the depot in Kemp Land with dog teams, surveying the mountains of northern Enderby Land on the way. Mawson was to send an aircraft for them when they arrived at the depot. In an emergency they were to continue on foot over the sea ice to Mawson.

We headed in towards Edward VIII Gulf in Kemp Land at 7.30 a.m. on 17th February to find it choked with ice. The pack became heavier and denser as we advanced into it, and soon showed signs of having recently been under pressure. After working the ice for more than a day



MAP 2

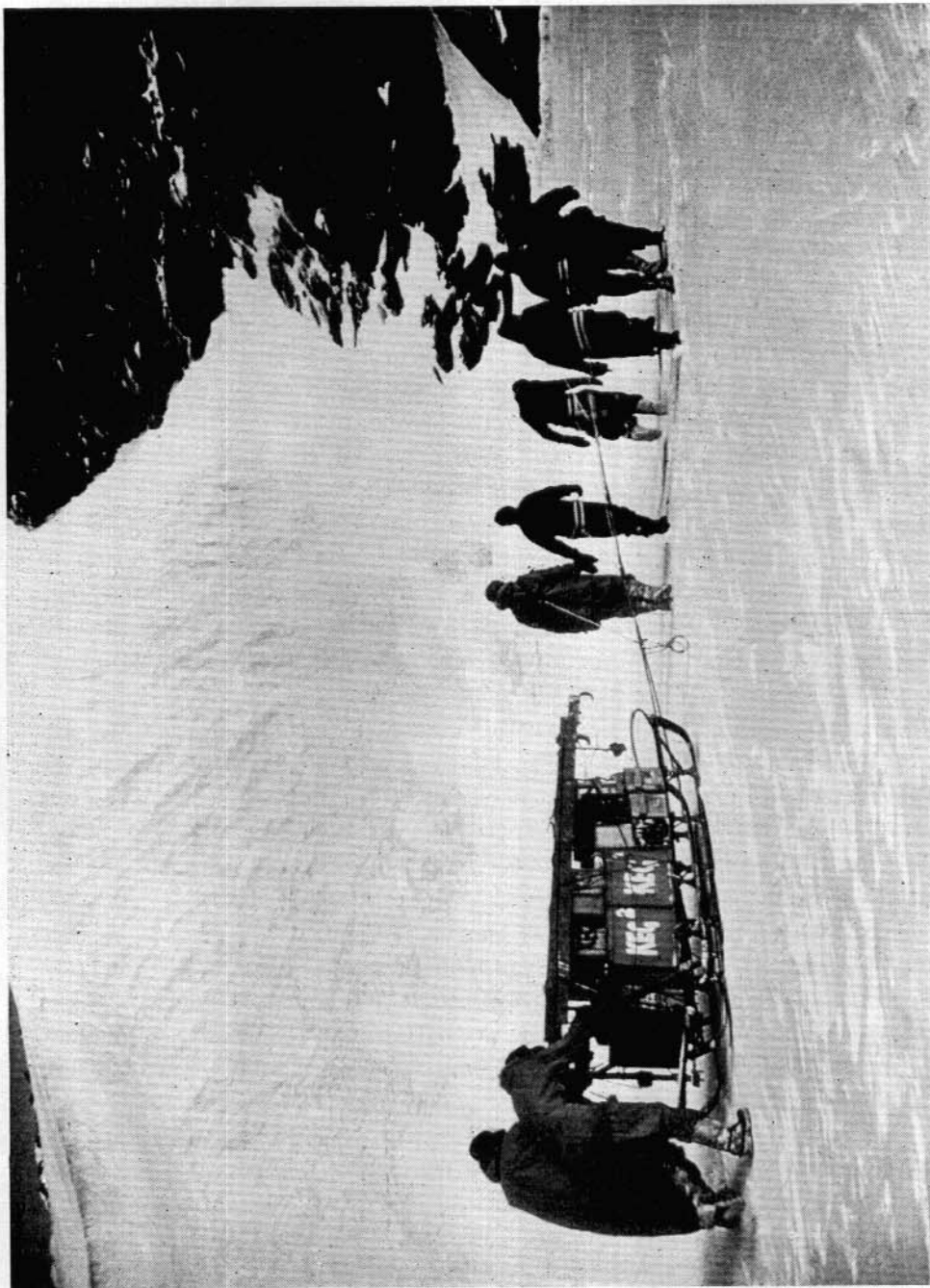
Chart showing the track of ANARE ship *Thala Dan* from 17 February to 22 February, 1960.

we had only advanced 26 miles, and were still 25 miles from the nearest land. As the pressure in the pack around the ship was increasing I agreed to turn back at 11.30 a.m. on 18th February. Half an hour after turning we became stuck and remained in the same small gap between large floes for 41 hours, unable to move except with the floes as they drifted. Our position when we stopped was $66^{\circ} 40' S.$ $58^{\circ} 11' E.$ The view across the field of ice was blocked in every direction by huge icebergs up to 10 miles long which, together with the pressure ridges, displayed some very beautiful colour effects when the sun was low. The ice was being held under pressure against the coastline west of us by an easterly wind.

At length the wind dropped and at 5.20 a.m. on Saturday, 20th February, we were able to escape from the floes which had been protecting us from the pressure. All day we worked towards the north-west through heavy floes, ten to twelve feet thick, topped with three feet of snow cover and welded to bergy bits, and at 6 p.m. the same day we were able to make our way into a large pool, eight miles from the point where we had been stuck. We manoeuvred on a zig-zag course through belts of pack separating open pools and stopped overnight some twelve miles from the nearest point of the Kemp Land coast. Next morning we were at last approaching land at Kloa Point from the northeast, when we very nearly ran aground on a submerged rock pinnacle two miles off shore. The Captain managed to back off in time, moved out round some icebergs through the new ice now beginning to form on the sea, and headed in to land a little south of Kloa Point. Two miles from shore we met fast ice, and moored to it at a point where the water was 130 fathoms deep. There we decided to place our depot on a rocky bluff two miles south of Kloa Point.

At 1.15 p.m. the same day, Sunday, 21st February, a dozen of us manhauled a dog sledge carrying 800 lb. of food and fuel over the fast ice to the bluff and so made the first landing from the sea on the mainland in this area. We placed our depot in a crevice in the rocks 30 feet up the face of the bluff. Kirkby killed a seal nearby with an ice axe, and we hauled it over to the depot before returning to the ship. The tide cracks in the fast ice had opened a little during our march and several of us slipped in and had wet feet when trying to jump across them. We returned safely to the ship, but very tired, at 5 p.m. Whilst we were laying the depot Dr. G. M. Budd, the medical officer, and five others of our company visited the emperor penguin rookery at Kloa Point. At this season the rookery was almost deserted—there were only 40 moulting birds and 20 others in the vicinity.

We were now free to land the survey party at any likely point on the coast of Enderby Land which would give access to the Napier Mountains 50 miles inland, their first objective. It was known that the plateau ended



ANARE photo 7923

D. F. Styles

PLATE 1

Landing on the coast of Kemp Land, February, 1960.

in high ice cliffs above the sea almost all the way round the 150-mile coast on the bulge of northern Enderby Land, so that landing points would be scarce. We therefore first tried the coast near Proclamation Island, on Monday, 22nd February, and were lucky to find a low-lying rock shelf on the mainland four miles east of it. It was about two acres in extent, 30 to 40 feet above sea-level, and was not only accessible from the sea but also gave access to the plateau, though up a rather steep slope. We landed the three men, sixteen dogs and 2,200 lb of supplies and equipment without difficulty and helped them set up their first camp on a flat area of hard-packed snow on the rock shelf. We were not finished until 9 p.m., by which time the Captain was on tenterhooks in case darkness overtook us before he could move the ship away from its dangerous anchorage to the lee of a large iceberg ten miles away which was to shelter us overnight.

Next day we sailed west and south around the bulge of Enderby Land towards Amundsen Bay, hoping to see the unexplored coast beyond it between 50°E. and 45°E. if ice conditions allowed. In particular we wanted to check whether the so-called "White Island" shown dotted in different positions on various maps really existed, (the Russians had apparently flown there by helicopter and taken an astrofix, but we had no account of it) and we hoped to obtain an astrofix near the western boundary of Australian Antarctic Territory.

From Proclamation Island to the mouth of Amundsen Bay we followed the coast for 110 miles at a distance of four to ten miles from the ice cliffs and saw only one other place where a landing might have been attempted—at Mt. Biscoe, where there was an exposure to rather heavy swell. As we approached latitude $66^{\circ}30'\text{S.}$ again, a line of pack ice appeared to starboard converging with the coast ahead, so that we were forced towards the ice cliffs of the continent until we finally entered the pack at 6 p.m. within sight of a large mountain peak bearing 137°T. from the ship. This we identified as the 6,000-foot Mt. Riiser Larsen. It looked mysterious and somehow satisfying with the cloud base lowering about its serrated top. We stopped at 9.20 p.m. when we found the ice closing in around us and some pressure developing, and remained in the ice for the next day and a half, driven six miles south by the wind until we were only five miles from Adams Fjord. We could only see four to five miles at best all day because of the snowstorms, so there was no water sky to tempt us to move vigorously in any direction. Widdows, the meteorologist, heard on the radio of a widening of the depression from as far west as Roi Baudouin, so that we expected the winds would continue to blow from the north to northeast for some time and to increase the pressure in the pack along this section of coast. At 8.30 a.m. next day the Captain and I

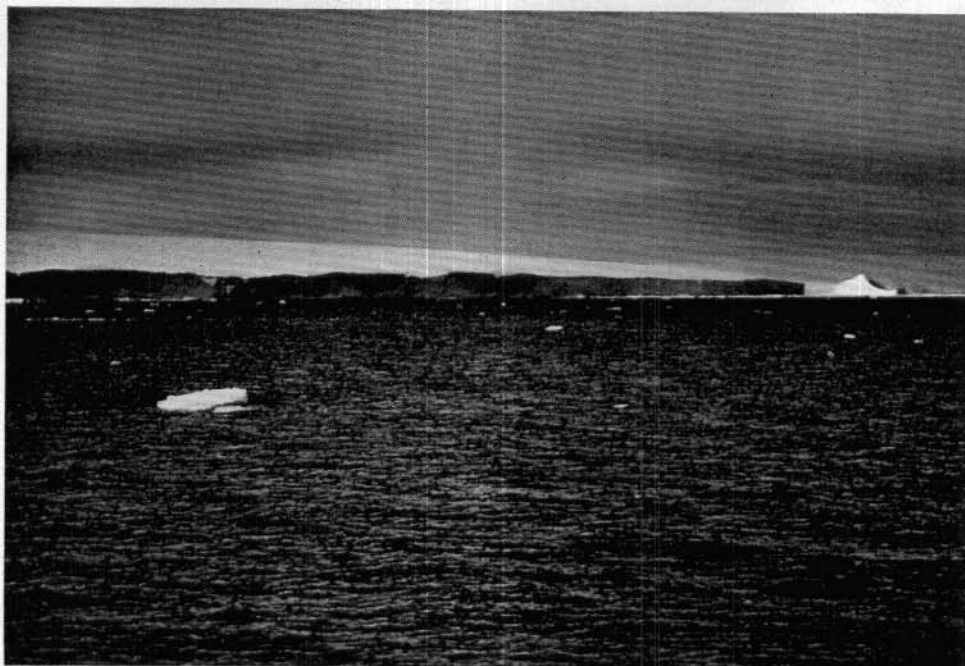
discussed the position and concluded that we would probably become stuck if we tried to head directly west along the coast from Amundsen Bay, so we turned and pushed our way north and then northwest to the edge of the pack and into the open sea, which we reached in three hours. Shortly afterwards we headed SSW towards where we believed we might find White Island, but were disappointed at soon meeting heavy pressure pack which forced us to go west.

Nevertheless at 4.45 p.m. on 25th February, shortly after passing a group of massed icebergs, we realized we were looking at the northern coastline of White Island, nine miles away to the south. We knew our ship's position fairly accurately from our noon position line and from Mt. Riiser Larsen's bearing of 108° T. fifteen minutes earlier, and from these data calculated that the northern coastline of White Island lay approximately along $66^{\circ} 41'S.$ at longitude $48^{\circ} 40'E.$ The ice-covered, domed top of the island was outlined against Dingle Dome on the mainland and as we cleared the western end of it we could see Mt. Christensen 90 miles south, beyond Casey Bay. The island appeared to be about 12 miles long but at that stage we could not check that it was in fact separated from the mainland because the heavy pressurised pack ice surrounding it prevented our approach.

In the next three days we followed the irregular edge of the pack to 45° E. and back, riding out a 64-knot storm on the second day which, despite our hopes, did not free the pressure in the ice protecting the mainland in that area. We had a promising lead south along the 45th meridian for a time, but it petered out 45 miles from the coast at the western boundary of Australian Antarctic Territory. Since we had no helicopter there was little we could do about it.

Turning about, we decided to try and see if we could find out anything more definite about White Island. We found we could enter the pack seven miles north-west of it and spent three hours pushing through a four-mile belt into a large open pool which led us on a course 160° T., close to the western tip of the island. As we approached we found the coast everywhere terminated in ice cliffs 80 to 100 feet high, with no rock visible anywhere. We measured the height of the crest of the island roughly with sextant and radar and found it to be at least 600 feet above sea-level. Passing the western extremity at a distance of half a mile, the depth of water under the ship was 90 fathoms. As the southern coast of the island came in sight (with a channel several miles wide separating it from the mainland) we observed it to be concave opposite Dingle Dome, and so described the island as "bean-shaped".

We continued along the edge of the heavy pack on the west side of the pool for several miles south into Casey Bay until stopped by fast



ANARE photo 12575

PLATE 2

D. F. Styles

Western tip of White Island, looking ESE, February, 1960.

ice at $67^{\circ} 12'S.$, $48^{\circ} 00'E.$ at 6.30 p.m. on Sunday, 28th February. On the way back to the open sea that evening we went three miles east into the channel between White Island and Dingle Dome until blocked by the freshly-cracked fast ice which formed the eastern boundary of our pool. There we measured the width of the channel by radar and found it to be eight miles and the depth near the centre 200 fathoms.

We spent the night in the pack and during the evening used the ship's radio to relay Kirkby's messages to Mawson, and so had last minute news of his party's progress.

Next day we headed for Heard Island, 1,100 miles away, reaching it on Saturday, 5th March, after sailing through a 68-knot storm. The 9,000-foot volcano, Big Ben, appeared and vanished among the clouds as we sailed towards Atlas Cove, where we dropped anchor uneasily because of the shifting wind which threatened us with a lee shore. The tall, gloomy cliffs, with the glaciers dropping out of the mist, made the danger very real to us all. Kirton, the geophysicist, reoccupied the old magnetic station, Dr. Budd visited the penguin rookery at South West Beach (but found little of interest) while others inspected the deserted Australian station and visited the nearby Baudissen Glacier. A few hours later we were on our way to Kerguelen.

The French at Kerguelen made us feel very welcome indeed, and M. Jean Heurgon kindly offered us the means of visiting their largest king penguin and wandering albatross rookeries. Six of us set out from Port aux Français in weasels on a most spectacular drive through the dawn over swamps and the outflows of lakes, and along the beaches of this strange island to the north-east coast, 20 miles away. Groups of seals and penguins were distributed thickly along the strand, for all the world like family parties along an Australian surfbeach in summer. The magnificent albatrosses surveyed the scene calmly from pedestal nests raised above the swampy ground and spaced at discreet intervals of 50 yards or so. Mixed parties of seal pups and penguins were bathing in a small lake. It was a day we will always remember.

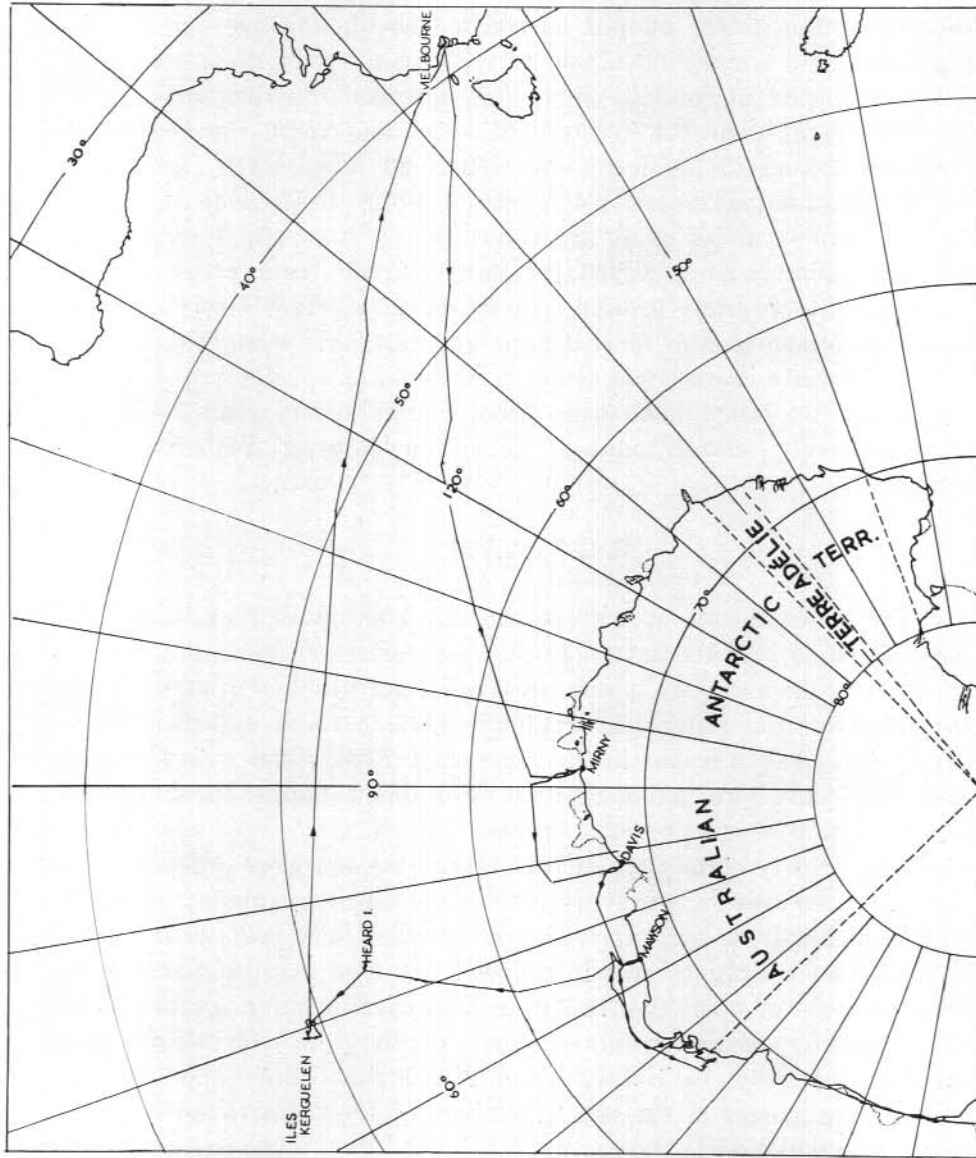
Next day we sailed down wind for a change and reached Melbourne after a relatively smooth passage of eleven days on Saturday, 19th March, 1960.

1961 VOYAGE

As the ice conditions had prevented our landing on rock in western Enderby Land to take the astronomical observations so necessary to control the aerial photography, plans were made for another attempt in the same area after the following summer's western relief expedition. The writer again sailed as leader in the same ship, *Thala Dan*, with the same master, Hans Chr. Petersen, so that we were able to regard the expedition as a continuation of the previous summer's work.

The first thirty-eight days of this second voyage were occupied with the relief of the stations. Leaving Melbourne on 5th January, 1961, we called first at Mirny on our way to Davis, and were very hospitably treated by our Russian colleagues. We introduced our new expeditioners to the Russian methods of operating in Antarctica, carried out a series of sub-standard gravity measurements as part of the inter-comparison programme arranged by the University of Wisconsin, U.S.A., and paid our respects at the graves of the eight members of the meteorological group at Mirny who had died in the recent disastrous fire.

Sailing from Mirny we passed through 140 miles of heavy but loose pack ice in calm weather, without any difficulty, to reach the open sea and commenced the approach to Davis three days later through a highly congested area of icebergs which almost barred Davis from the open sea. The skyline of bergs was quite spectacularly rugged and completely blocked our view of Davis until we caught a glimpse of it through a cleft in a large iceberg when we were only four miles from the station. We threaded our way through the bergs and anchored off Davis at 10.15 p.m.



MAP 3

Chart showing the track of ANARE ship *Thala Dan* from January, 1961 to March, 1961.

on Saturday, 21st January, in clear light and calm weather. Commencing a vigorous programme at 6.30 a.m. Sunday, we were able to complete our work at Davis by 25th January, and sailed for Mawson next day. In addition to the routine changeover duties in those five days we found time to make an appreciation of a potential rock airstrip nearby. Gale, the hydrographer, head of the Antarctic Mapping Branch, charted the anchorage area as far out as the edge of the iceberg belt which enclosed it, and Strickholm obtained another set of gravity readings.

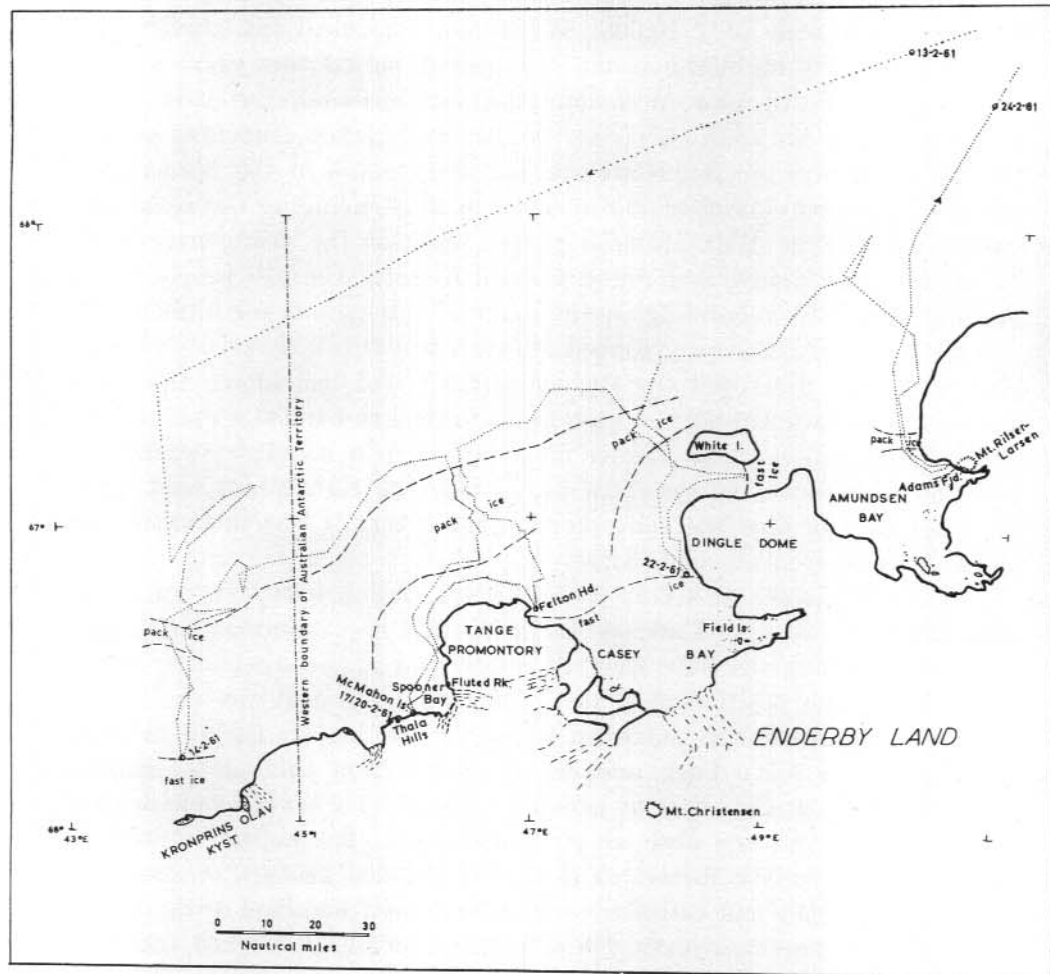
At Mawson the changeover was quite as large and complex as ever and involved a rather substantial construction programme. Once again Gale concentrated on charting and carried out a very comprehensive set of soundings of Mawson Harbour on a scale of 1:2,400 and of its approaches on a scale of 1:10,000. Strickholm continued his gravity programme. But the highlight of the changeover period this year was historical—Mrs. P. G. Law, accompanying her husband, the Director of the Australian Antarctic Division, landed at Mawson, the first woman to visit an Australian Antarctic station. They came in the *Magga Dan* on the beautifully calm morning of 8th February, bringing the remaining twelve men of the 1961 Mawson party. We held the changeover party while they were there, and found we had to cater for 110 people in the new mess, one of the buildings we had erected during our fortnight's stay.

Two months before we reached Mawson a particularly severe blizzard had completely destroyed the Beaver aircraft and had blown the D.C.3 aircraft, which we had been at such pains to land so carefully the previous summer, ten miles across the ice to wedge it in a heavily-crevassed ice cliff 350 feet above the sea. Law and I flew the eight miles west along the coast to it in separate helicopters to check that it was in fact beyond all prospect of recovery or salvage.

We left Mawson at 3 p.m. on Saturday, 11 February, to resume our exploration of western Enderby Land. It was our intention to go first to 44°E. on Kronprins Olav Kyst, 22 miles west of the Australian sector, to try to fix the position of a rocky outcrop noticed at the end of the aerial photographic run made by Squadron Leader D. Leckie in 1956. We planned to move back towards the east from this point, making attempts to reach the coast at several well-spaced intervals between the 44th meridian and the 50th at Amundsen Bay. We hoped to measure magnetic and gravity forces, to study the general geology of the areas and to supplement our astrofixes which had been obtained with the aid of aircraft in previous years. No ship had previously reached the coast of western Enderby Land beyond Amundsen Bay so we intended to obtain soundings wherever possible.

We commenced our first probe on 13th February along the 44th mer-

idian, and soon had to heave-to overnight for 15 hours because of poor visibility in the snow showers. At that point we had come 592 nautical miles from Mawson. Next day we moved back and forth along the edge of the heavy, dense pack ice looking for any weak point where we might enter the ice. We saw the Japanese Antarctic Research Expedition ship "Soya" travelling eastward a mile astern of us and spoke to her. She was occupying oceanographical stations in the area. The Japanese told us that around Syowa, several days before, the fast ice extended 55 miles out from the coast, information which did not give us much encouragement. We entered the pack ice shortly afterwards and made our way through a belt of it 10 miles wide into a large pool in which we were able to sail twenty



MAP 4

Chart showing the track of ANARE ship *Thala Dan* from 13 February, 1961 to 24 February, 1961.

miles south before being stopped by fast ice 15.7 miles from the rocky outcrop on the coast which we had seen in Leckie's aerial photographs. We moored to the fast ice and carefully considered our chances of reaching the rocks.

This was an important probe where we needed an astrofix, but it seemed to me that so much time would be required to reach the mainland that I did not feel justified in asking anyone to venture so far over the weakened fast ice at that season on foot. We would have had to haul 500 lb. weight of instruments and survival gear. However, it did seem practicable, in the opinion of the surveyors, to attempt an astrofix on the ice near the ship, and to tie it to a feature on the rocks by triangulation. This we were able to do next day, 15th February, fixing the position of a notch near the top of the highest hill on the coast in that area, a point recognizable on the aerial photograph. The position was found to be $67^{\circ} 58.5'S.$, $44^{\circ} 03'E.$, swinging the whole coast in that area some 13 miles S.S.E. from the position previously estimated and plotted on the maps.

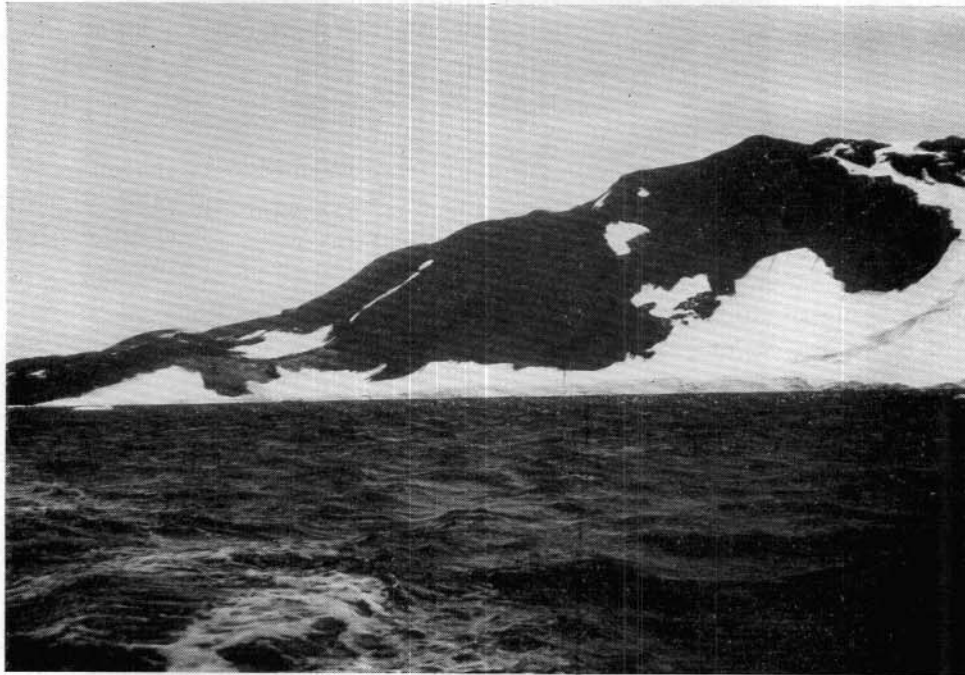
There was a very slight movement of the ice in the swell at this time. It did not affect the accuracy of the theodolite observations but prevented Strickholm from obtaining a gravity measurement. Merrick set up his magnetometer on the fast ice half a mile away and was able to read the horizontal magnetic component and the declination (H and D), but could not measure the vertical component. These results were nevertheless very valuable because no magnetic components had been measured in this region previously.

We finished our observations at 4.00 p.m. and put to sea immediately to see if we could find open water inside the pack again at $45^{\circ}E.$ which might lead in to a rock we could see 15 miles away at $44^{\circ} 20'E.$ However, in that longitude next day, whilst still about 35 miles from the coast, we found the pack impenetrable, and saw nothing but ice blink ahead, so decided to move along the edge of the pack to probe again near $46^{\circ}E.$ in Enderby Land. It seemed to me that at $46^{\circ}E.$ we would have a reasonable prospect of finding open water in the northwestern and western lee of the large unknown promontory west of Casey Bay, and that we might be able to probe down the west coast of the promontory into the unnamed bay at its base.

We started to push south into the pack at $46^{\circ} 20'E.$ at 1.00 p.m. on 16th February and, by the time the light began to fail at 8.00 p.m., we were within sight of a large pool stretching along the west coast of the promontory. We stopped overnight in the ice and moved into the pool a little after 6 a.m. next morning. For the next six hours we felt our way carefully down the west coast in uncharted waters into the bay,

which proved to be very beautiful. The coast was continuous ice cliff down to about $67^{\circ} 32'S$. where there was a bold vertical face of black organ-pipe rock formation falling several hundred feet sheer into the deep still water. Beyond it was a complex of glacier tongue and icebergs and through gaps between the icebergs we could see several miles of reddish-tinged rocky hills forming the southern shore of the bay. The water in the bay was very deep, in some places exceeding the 700-fathom range of our echo sounder, until five miles from the southern coast when it became less than 100 fathoms. Moving south-west around the marching icebergs, which were evidently coming from a very active glacier system disgorging into the southeast corner of the bay, we approached the south coast near two small, rocky islands and found a small cove half a mile from them which promised good shelter for the ship whilst we worked. The most prominent feature of this coast as we approached was the reddish-hued rocky hill which rose to a hump near its western end. We measured its height with radar and sextant and found it to be about 850 feet.

We passed west of the two small islands to enter the cove and tied up beside a small ice shelf which gave us access up a steep slippery ice

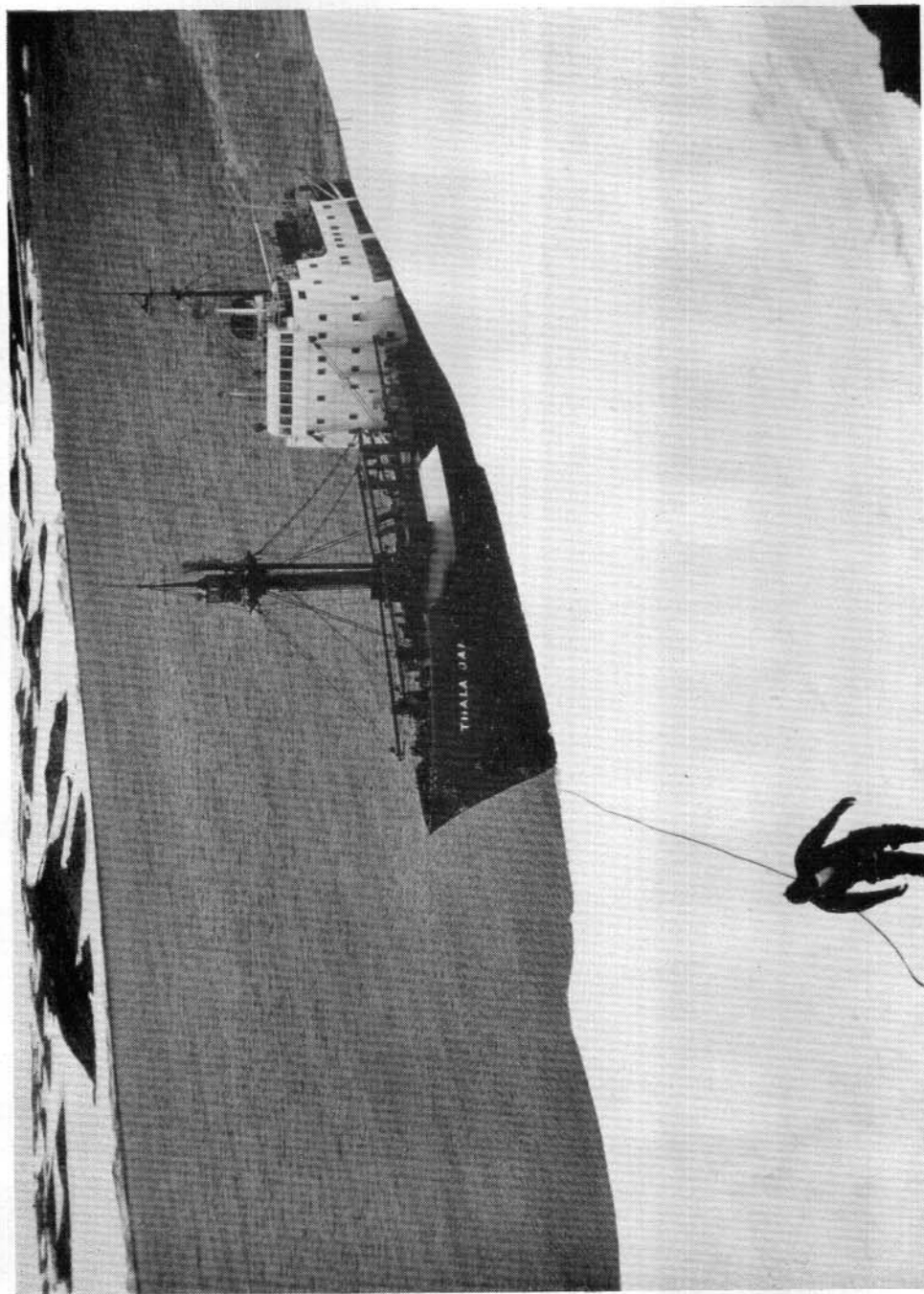


ANARE photo 7931

D. F. Styles

PLATE 3

Crest of the Thala Hills, Western Enderby Land, looking E, February, 1961.

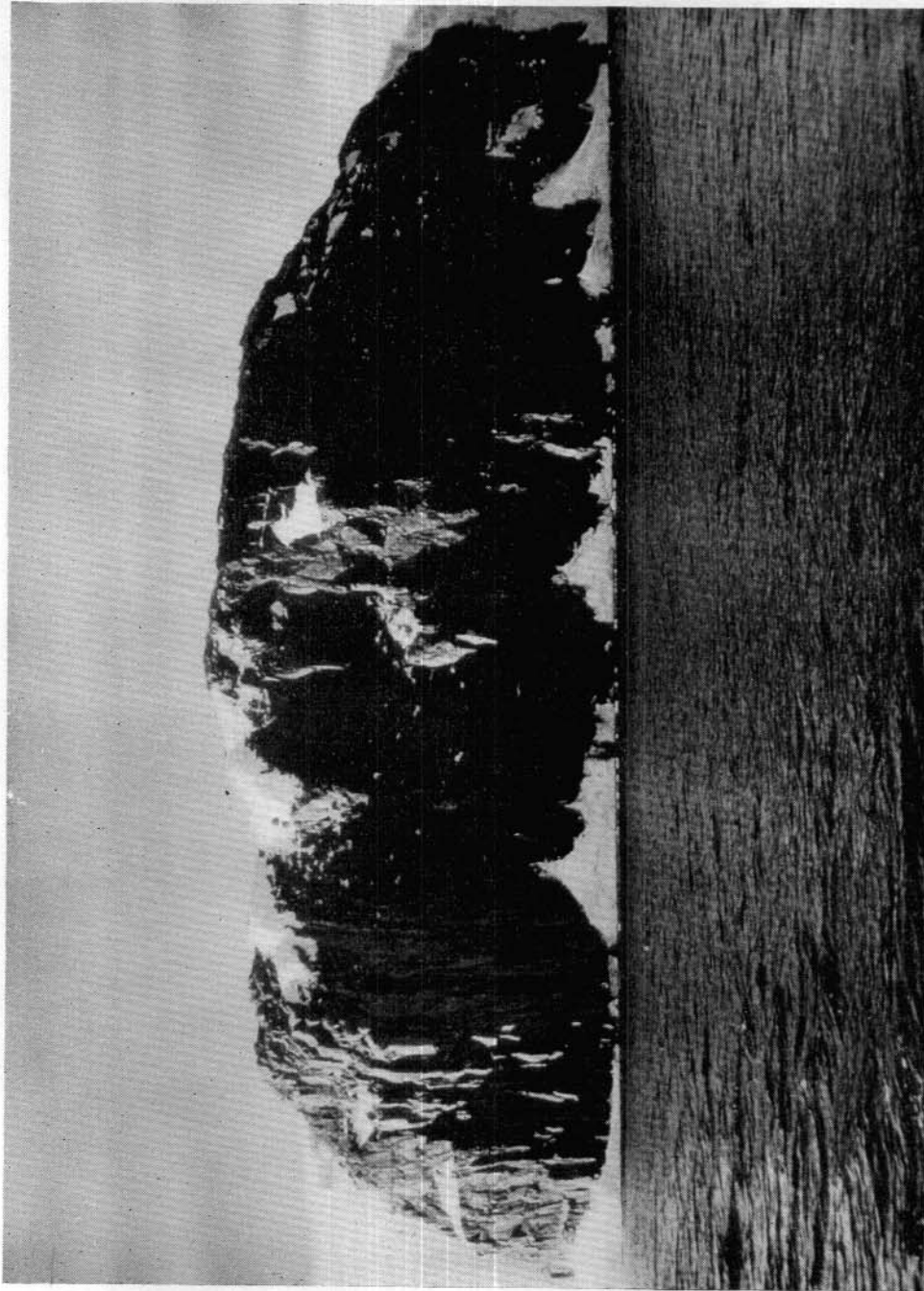


ANARE photo 7982

PLATE 4

Cove near McMahon Islands, Western Enderby Land, February, 1961.

D. F. Styles



ANARE photo 7926

PLATE 5

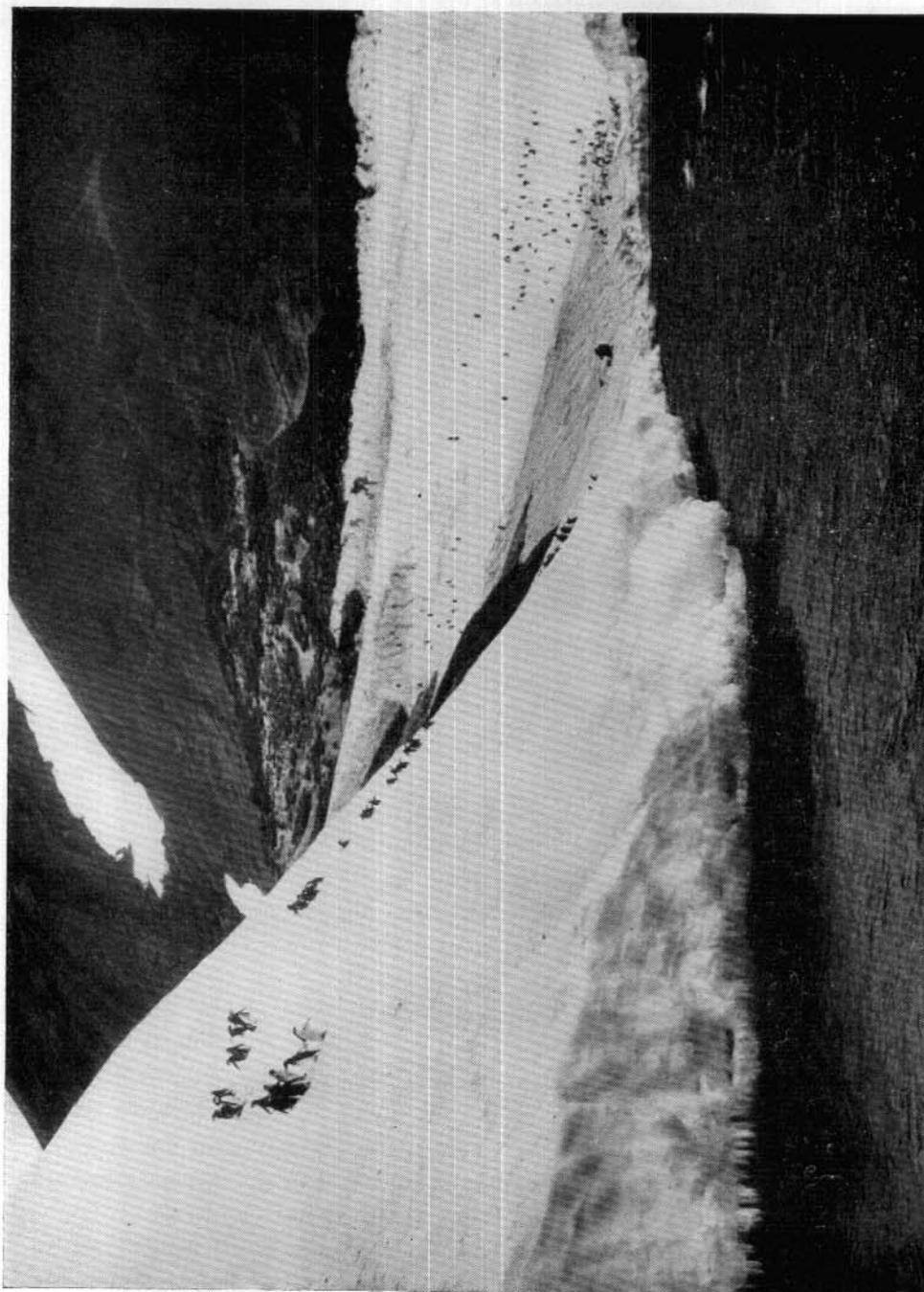
Fluted Rock, 67° 34'S, 46° 20'E, February, 1961

D. F. Styles

slope to a small rocky peninsula. Since the rocks were only 50 yards away the ship was moored to them and was safe enough in the north wind with 50 fathoms of water under her keel. The ice-bound cove in which we lay was about one third of a mile in diameter and gave very good shelter, as its fairly narrow mouth faced north-west, away from the prevailing winds. As the wind swung round to the south-east the ship simply moved a short distance to nose into the ice edge in the direction of the wind.

During the next three days we used the ship's boat and our launch to visit all the interesting rock features within a twelve mile radius of the cove. On Saturday, 18th February, the day after we moored, the sky was overcast and the wind remained high all day, so little work was done: we repaired our launch, which had been damaged whilst being used to instal a paraliactic auroral camera on an island off Mawson, and took another gravity reading. There was some magnetite in the rock near the ship so we deferred the magnetic readings for the time being until we could move to another locality. However, the following two days were fine and we landed at nine different spots for various reasons and visited the high "organ pipe" rock across the bay. On the 24-mile run (there and back) we were followed very closely at times by a school of minke whales which appeared to be flirting with the launch. One, which we estimated to be 30 feet long, surfaced only ten yards behind us. The rock samples we took from all ten landing points showed the metasedimentary basement rock which was characteristic of this area, with some feldspar intrusions giving it its reddish colour. There were also some morainal deposits. The magnetite was confined to the small promontory near the ship. We also visited the bottom of the bay where the glacier tongue protruded from the plateau ice. Dr. Newton, the medical officer, Ruker, the geologist, and I climbed the highest hill to build a small cairn on its crest. We measured gravity, not only near the ship but also at the foot of the highest hill, and used the latter point also, since it appeared to be quite free of magnetite, to measure the H and Z magnetic components. On our third day there the sky cleared sufficiently for the surveyors to obtain a good astrofix, which was calculated later to give our position as $67^{\circ} 38' 5''$ S., $45^{\circ} 58' 5''$ E. We tried to obtain some marine samples on that day too, but lacked suitable equipment: all we dredged were some dead starfish and algae from the narrow ice-choked channel between the two islands half a mile from the mouth of our cove.

After our return to Melbourne we named this fine bay Spooner Bay, the hills along its southern shore Thala Hills for our ship, the islands off our tiny cove the McMahan Islands in honour of Frank McMahan, my lieutenant on several voyages, and the large promontory west of Casey Bay Tange Promontory in honour of Sir Arthur Tange, permanent



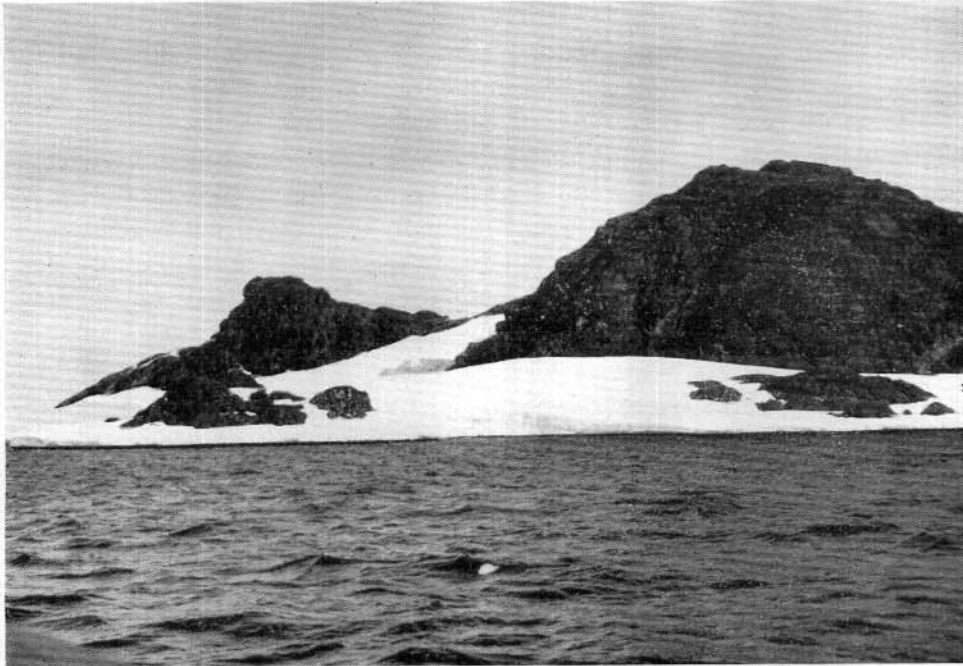
ANARE photo 7930

D. F. Styles

PLATE 6
Magnetic station at Thala Hills, Western Enderby Land, February, 1961.

head of the Department of External Affairs. The "organ pipe" rock across the bay was named Fluted Rock.

By 6.00 p.m. on Monday, 20th February, we had finished all we could do in that interesting bay, but deferred sailing until 6 next morning because of the poor evening light so late in the season. All morning we followed Tange Promontory first north, then east, then south-east, keeping three to four miles off shore, and so made our way into the north-west corner of Casey Bay for our next probe on the north-eastern shore of the promontory. We were stopped at noon by fast ice which stretched away into the distance across Casey Bay at approximately $67^{\circ} 18'S$.



ANARE photo 7929

D. F. Styles

PLATE 7

Near Felton Head, on the western shore of Casey Bay, Enderby Land, looking W, February, 1961.

We left the ship nosing into the edge of the fast ice under power and went in the ship's boat to a point five miles away among a group of icebergs, to land on a rock outcrop where Kirkby, the surveyor, had obtained an astrofix during the year. Leaving Merrick, Ruker and Strickholm to their tasks we went searching in the launch among the icebergs for traces of an emperor penguin rookery which had been sighted from the aircraft flying the survey party to this area earlier in the season. We first went into a series of tortuous passages between the bergs but were

forced to retreat from the point where they closed together, turning with some trepidation in the narrow passage in case the vibrations from our engine should cause an ice fall.

We landed next on a sort of roadway of fast ice 100 yards wide between a berg and the land-based ice cliffs, but were able to advance only 300 yards over the deep snow on its surface before being stopped by pools of sea water. So we sailed out around four bergs touching, or almost touching, each other and landed again on the fast ice at a point where we could see clearly that it was possible to reach land-based ice without climbing a cliff. From there we marched firstly back towards where we had recently been blocked and then across to the plateau ice which sloped gently over a dome down to the fast ice. Climbing up the dome, looking too far ahead, I plunged one leg through a snowbridge into a small crevasse which became a much larger one higher up the dome. From the top of the dome we could see no trace of the rookery and, as the weather was beginning to close in, we decided to return to collect the other three members of our party immediately. Just before landing to pick them up, we received a warning by radio from the ship that there were some snow squalls moving across the bay. Fortunately, Merrick, Ruker and Strickholm had finished their measurements so we hurried back to the ship, flirting with another herd of minke whales on the way.

By 4.00 p.m. we were on board and began to sail north. After five miles on this course we attempted to take a short cut east across Casey Bay, but were soon turned back by fast ice held in position by bergs which had ploughed into it. We therefore moved north into the pack again, stopped overnight, and reached the open sea at 10.20 a.m. the following day, after traversing 25 miles of heavy dense pack. After lunch we moved into the pack once more, fourteen miles north-west of White Island, heading for Dingle Dome to see if there were any land there and to try to obtain a set of soundings in the channel between Dingle Dome and White Island. We sailed past White Island and some twelve miles down the west coast of Dingle Dome into Casey Bay. Once more, however, we were stopped by the fast ice which, we now realized, filled the whole of the southern three-quarters of the thirty-mile-wide Casey Bay. We spent the night just inside the edge of the fast ice in latitude $67^{\circ} 12'S.$, fourteen miles from the Field Islands which were the nearest land to be seen. We saw no rock at all on White Island or Dingle Dome, only ice.

The following day, 23rd February, we sailed north along the eastern side of Casey Bay into the channel between White Island and the mainland where we had gone in February, 1960, but this time found much less ice in the channel and were able to proceed fifteen miles, almost to the south-eastern tip of White Island. Again we confirmed that there were

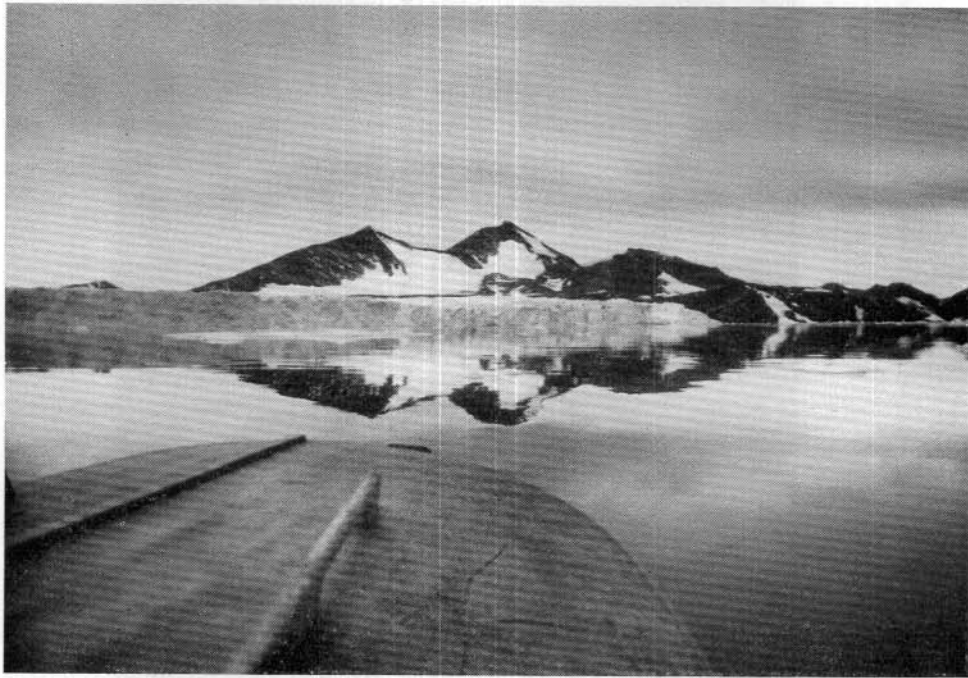
no rock outcrops on these coasts, so had to be content with soundings and with making corrections to the map, replotting the north-west coast of Dingle Dome. The soundings were interesting, increasing from 95 fathoms as we entered the channel to 375 fathoms in the next 12 miles. Using the ship's radar, we found that the channel was 8.2 miles wide at the western end, increased to 9.2 miles in the middle, and was only 6.5 miles wide at the end of our run near the south-eastern corner of the island. At this point we were again stopped by fast ice and had to retrace our path back past the western tip of White Island through the eight-mile belt of pack lying north-west of it to reach the open sea. Here we turned east again towards Amundsen Bay.

At this point Captain Petersen told me that our fuel situation was precarious. Our six probes in the last ten days had used more fuel than was anticipated at the beginning of the Enderby Land exploration. He pointed out that a seventh probe (into Amundsen Bay) would normally take two days and would make it necessary for us to take on fuel at Kerguelen. However, the ice conditions had been so favourable to our efforts this year that I was reluctant to give up the opportunity of completing the pattern of landings, rock sampling and magnetic and gravity measurements that were being established at such favourably-spaced intervals along the coast of Enderby Land, especially since the weather of the last two days looked as if it would hold for at least a little longer. As we had to go back to Mawson we decided to take on some reserve fuel there, and the Captain agreed to see what we could achieve in a one-day probe into Amundsen Bay.

We stood off the entrance to Amundsen Bay overnight and made a very rapid run on 24th February into Adams Fjord, taking the ship to within three miles of the foot of Mt. Riiser Larsen near where Law had taken an ANARE launch in 1958. The fjord was deep but fairly well choked with icebergs and young ice. The head of it was fed by a small steep glacier with a concave surface filling a perfect V-shaped valley. The mountains stood all round, those on the southern shore rising in dozens out of the smooth creamy sheet of plateau ice. The scenery close at hand was magnificently alpine.

It was a problem to know what to do with the ship. The Captain tried to place her with the engines slow ahead and the stem resting against a low section of ice cliff, but in the narrow fjord the swell was quite noticeable. After watching her bump her stem rather heavily against the ice a few times the Captain abandoned that position and simply stopped the ship in a corner of the fjord sheltered by a glacier. Eight of us left the ship in her launch and, after failing to get ashore at two points because of the swell, succeeded at a third spot on a narrow ledge at the foot

of Mt. Riiser Larsen. We left Merrick, Strickholm and Newton there with their equipment and moved on to land again half a mile away. Ruker concentrated on collecting rock samples while the others walked over a hill to try to reach the emperor penguin rookery in the time allotted. We could not penetrate much further into the fjord because there was so much young ice, up to twelve inches thick, moving about and forming and closing an intricate pattern of pools. I tried for an hour to reach the small glacier at the head of the fjord, but then had to leave it to go back and pick up the three small parties and return to the ship in time to reach the open sea by nightfall.



ANARE photo 7927

PLATE 8

D. F. Styles

Adams Fjord and Mount Riiser Larsen, Enderby Land, looking NE, February, 1961.

By that time we had done all we could do in Enderby Land that season and hurried back to Mawson to collect the ten men we had left there and to take on some fuel. It would have been very interesting to have gone further into Amundsen Bay and to have measured the magnetic declination at two more points, but there was not sufficient time nor fuel.

When we were only 90 miles from Mawson two days later we were overtaken by a violent storm with winds gusting up to 74 knots. It exceeded 100 knots at Mawson and damaged some aerals. This delayed our

entry into the harbour for three days and we used another 15 tons of our precious fuel while riding it out north of the iceberg corridor leading to the station. We moored in Mawson Harbour at 3.45 p.m. on 1st March after sailing a total of 1,900 miles on the Enderby Land diversion.

We left Mawson at 3.45 p.m. on 2nd March, and after a fairly rough passage anchored in reasonably good weather off Atlas Cove at Heard Island four days later. Unfortunately, the wind this year, too, showed the same tendency to swing and freshen and expose us to the dangerous lee shore. We therefore sent only three small parties ashore, in two launch trips, one to reoccupy the magnetic station, one to examine the gentoo penguin rookery at South West Beach and one to survey the condition of the old Australian station on the shore of Atlas Cove. Merrick found the piers a little unstable at the old magnetic station, but managed to obtain a satisfactory set of measurements. Newton estimated that there were 1,000 gentoos at the rookery; he also saw several elephant seals which had received their brands at Macquarie Island 3,500 miles east, as well as a fur seal (a species which was nearly extinct recently) and two emperor penguins which rarely come so far from Antarctica.

Four hours after anchoring we were away again, heading for Kerguelen. The wind began to rise as we approached it next day until it exceeded 50 knots in the large Baie du Morbihan. Conditions deteriorated as we went on and in the next two and a half days or more we struggled with a very heavy storm in which the wind gusts rose to 70 knots. We anchored off Pointe Mulloy for the first eighteen hours and then ventured in to the anchorage off the station at Port aux Français, only to find that we dragged our anchors—largely because they became fouled with kelp. The Captain finally gave up the attempt for the time being and moved several miles out into the middle of the Baie du Morbihan where he found an anchorage with open water in his lee. Next morning, 9th March, he made a second attempt and succeeded in anchoring three-quarters of a mile off Port aux Français, but the winds were still 40 to 50 knots at the ship.

Whilst we were anchored out in the middle of the Baie du Morbihan the wind was too strong for us to risk lowering a boat or a DUKW over the side; but the French leader, Jean Roly, and lieutenant, Georges Redonnet, ventured out with their crew in the vedette at 1.30 p.m. Six of us went ashore with them. The rest of our party came ashore when the ship reached the anchorage next day during a brief lull in the storm, much to the delight of the French who had had a feast waiting for us for the past 24 hours. The wind rose again, however, and though we made the attempt at 3.30 p.m. we found it impossible to discharge cargo into the DUKW alongside the ship because she rolled so much in the wind gusts. The cargo was finally discharged early in the morning of

our third day at Kerguelen, 10th March. Whilst we were waiting, the French took great pride in showing us over their well-organized scientific station and sealing factory. We went with Strickholm to the ionospheric station where he obtained his final set of gravity measurements for the voyage.

After entertaining a number of our French colleagues for lunch on the *Thala Dan* we sailed for Melbourne at 3.00 p.m. on Friday, 10th March. Following the great circle path home, we sailed into an area of icebergs and growlers in the rather low latitude of $51^{\circ} 50'S.$, and found it necessary to slow down at night, for the growlers were indistinguishable from white-capped waves in the darkness and were heavy enough to be dangerous. But a greater delay was to come. Approaching the longitude of South Australia in latitude $48^{\circ}S.$, we ran into a severe storm for three days. Although the wind on this occasion did not exceed 60 knots, there was a precipitous sea and we had to heave-to, heading north-west into the wind for 15 hours. It was a relief to move gradually out of these rough conditions into the calm weather which prevailed during the last two days of our approach to Melbourne. We berthed before noon on Wednesday, 22nd March after an absence of 76 days.

ACKNOWLEDGEMENTS

A total of more than 130 Australians took part in these two voyages and all contributed, in their various fields, to the successful prosecution of the work. I would like to mention especially my lieutenant on these and other voyages, Frank McMahon, Supply Officer of the Antarctic Division, whose management of the work on the ship was invaluable at all times; John Béchervaise, leader of the 1959 Mawson party, whose enthusiasm for field work, in particular, and wide knowledge of Antarctic matters were inspiring; Dr. Grahame Budd, second-in-charge of the 1959 Mawson party, for his wise and skilful handling of Squadron-Leader Sandercock's poliomyelitis; Sid Kirkby, surveyor at Mawson 1960, who led the party through northern Enderby Land; Dr. Geoffrey Newton, medical officer at Mawson in 1960, who was always so ready to take part in landings at new points; Commander Tom Gale, officer-in-charge of the Antarctic Mapping Branch, Division of National Mapping, for his astrofixes and hydrographic work, and David Carstens, surveyor of the same Branch, who assisted him; Squadron Leader Norman Ashworth, R.A.A.F., for his appreciation of the rock airstrip at Davis; Robert Merrick, geophysicist of the Bureau of Mineral Resources, Geology and Geophysics, who rigorously pursued his programme of magnetic measurements even when landings were so difficult as to be dangerous; Richard Ruker, geologist

of the same Bureau; and, not least, to the Australian Army DUKW contingents under Captain Victor Smith (1960) and Lieutenant Colin Bryant (1961) who so ably and conscientiously re-supplied the stations. I would like to mention particularly, also, the pleasure we found in the company of James R. Hays, attached to the 1961 expedition as observer for the United States of America: he shared in all our activities most readily and contributed to the success of the expedition.

