DISCOVERY OF MARGUERITE BAY (ANTARCTICA)

by J. ROUCH

In 1926, Great Britain decided to annex all the Antartic land between the meridians 20° W and 80° W, under the name of Falkland Dependencies. Within these limits are the Louis-Philippe and Joinville Lands, discovered by Dumont d'URVILLE in 1838 aboard the *Astrolabe* and the *Zélée,* and those discovered by CHARCOT during his two expeditions aboard the *Français* (1904-1905) and the *Pourquoi-Pas ?* (1908-1910). Amongst these discoveries by CHARCOT, one of the most important was that of Marguerite Bay, south of Graham Land.

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It was on 15 January 1909 that CHARCOT, on board the *Pourquoi-Pas ?*, discovered Marguerite Bay. The following is the translation of a few passages from his diary, published in Paris in 1910 with the title : *Le Pourquoi-Pas ? dans l'Antarctique* (The *Pourquoi-Pas ?* in Antarctica) :

" The end of the Adelaide Island ice-cap forms a high and beautiful cape, after which a sort of bay, or rather gulf opens out, of which we can hardly guess the depth.

" This land, that we are the first to behold, arouses much emotion in me. We are steering to enter the gulf, and we are perpetually obliged to make detours owing to the reefs which rise menacingly all round us. There are many icebergs, and large blocks of shelf ice are obstructing our course.

" We can already see at a glance that the land stretches further than the latitude given by BISCOE for Adelaide Island, which we had every right to accept as correct, but until today without any proof. We can also see that it does not, as has been generally pointed out, follow a south-westerly direction, but rather, beyond Adélie Land, tends towards a south-easterly direction, then follows a line approximately South 20° East.

" The island towards which we are heading is not in the middle of the bay, as one would think at first, but it is much nearer to the west cape, being separated from it only by a channel 4 miles wide. We pass safely through this channel, and immediately what we thought to be a medium sized bay seems to us to be like a great inlet which could almost be called a gulf. It is now filled with thick, flat shelf-ice.

" I have named the gulf Marguerite, my wife's first name ... I give the land which is a continuation southwards of Loubet Land the name of the present President of the Republic, Mr. FALLIERES. "

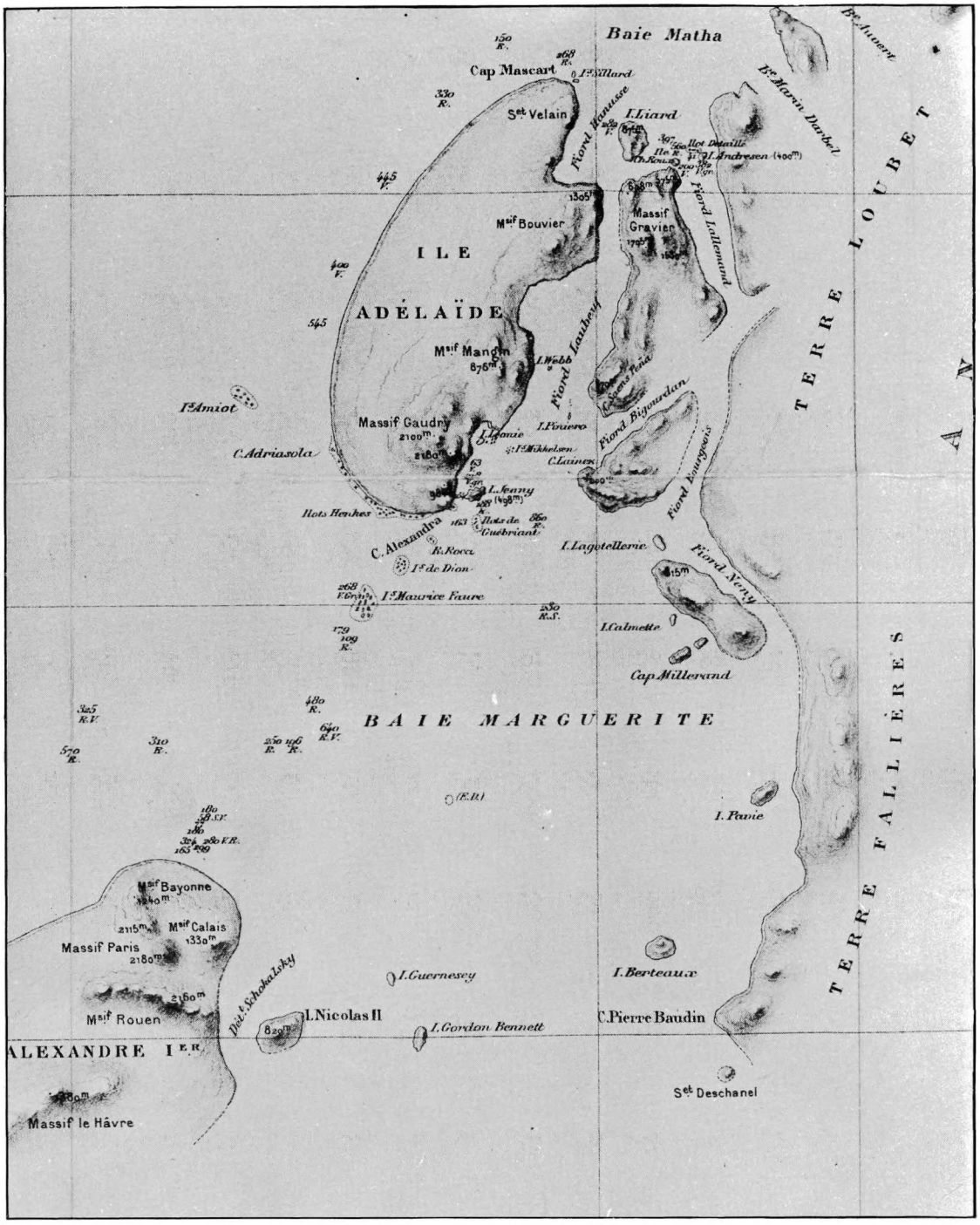

FIG. 1. — Portion of the chart established by the first and second Antarctic expeditions lead by Doctor J.B. CHARCOT (1904-1905, 1908-1910).

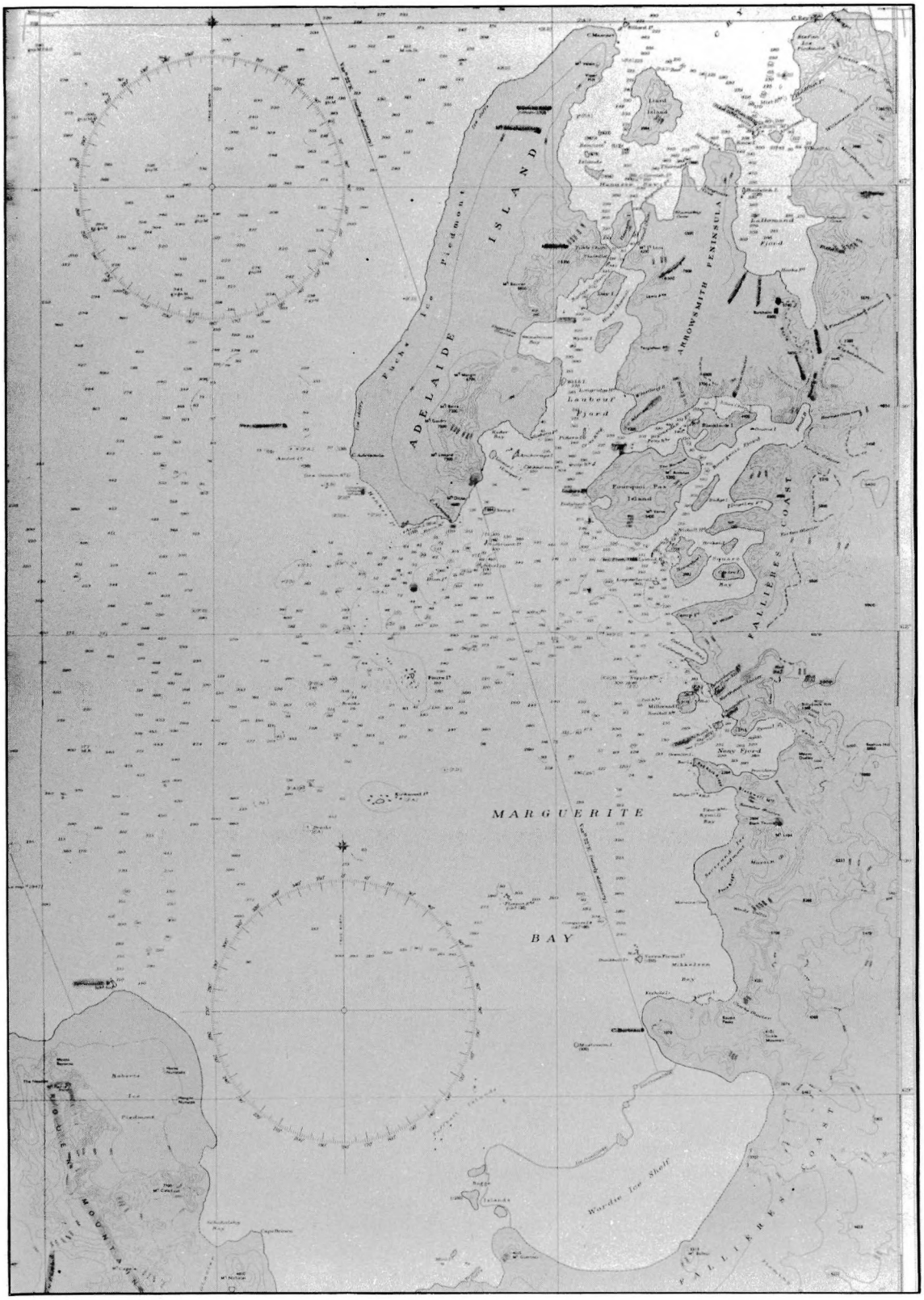

FIG. 2. — Portion of British chart No. 3571.

CHARCOT, with the *Pourquoi-Pas ?*, remained in Marguerite Bay until 30 January 1909, covering all the areas left accessible by ice at that time of the year. He wanted to spend the winter there, but was unable to discover a suitable mooring place for his ship.

Lieutenant Commander M. BONGRAIN (who later became Rear Admiral) drew the chart of Marguerite Bay up to latitude 60°, and he described it in the following manner (Second French Antarctic Expedition, Charts, Description of Coast and Pack-ice, Sailing Directions, Paris, 1912) :

" Marguerite Bay is the deep indentation of the coastline between Adelaide Island, Loubet and Fallières Lands, and Alexander Land.

" The northern and eastern parts of this bay branch out into several fjords which cut deeply into Loubet and Fallières Lands.

" Towards the south, it extends out of sight between Fallières and Alexander Lands, forming a virtual arm of the sea, in which we never saw any sign of land.

" To the east of the rise in the sea bed which seems to connect Adelaide Island and Alexander Land, Marguerite Bay forms a trench of a depth varying between 600 and 800 metres.

" Several islands or archipelagos are to be found in the northern part of Marguerite Bay, in the prolongation of Adelaide Island. These are :

" Roca Reef, formed by two rocky peaks, not very high and often quite difficult to distinguish amongst the pack-ice.

" The Dion and Maurice Faure Islands, groups of rocky islets, 30 or 40 metres high and bristling with a mass of reefs. The *Pourquoi-Pas ?* twice found itself to be in the middle of these reefs, although more than a mile away from the islands.

" The Guébriant Islets, made up of three rocks, not covered by snow.

" Jenny Island, the largest, situated east of the southern point of Adelaide Island. It is slightly more than 2 miles long, and has an altitude of 450 m. In the south-west, at the foot of the highest summit, is a terrace with a very even surface, which is 400 to 500 m long and 50 to 100 m wide. Its height is 8 m above sea level. This terrace is made up of shingle and shows all the characteristics of a former sea shore. A whale bone found on the terrace led to the conclusion that this feature is due to a fairly recent upheaval.

" Jenny Island was, when we passed it, joined to Adelaide Island and Loubet Land by the coastal pack-ice. We thought we could find shelter in its immediate surroundings. Unfortunately, anchorage is never possible in the vicinity of the island, whose rocky coast drops steeply to the sea more than 250 m below. "

Jenny Island being the only point on Marguerite Bay where we succeeded in landing, we think it is interesting to give the description written by E. GOURDON, geologist of the expedition. The dimensions and altitude estimated by eye by E. GOURDON differ slightly from those of M. BONGRAIN, but those of M. BONGRAIN are clearly the accurate ones, as they were found using a theodolite for topographical stations.

" Jenney Island ", writes E. GOURDON, " which is less than four miles wide at its broadest point, is formed by a semicircular mountain, more

than 500 metres high, and is mostly free from snow; from a distance, it looks like a breached crater. Its sides are steep, often even vertical, its crests sharp and very split. A long scree of debris fills the inlet and falls away towards the east. There is a small glacier half way up this slope. A terminal glacier lies on the north side. The rest of the coast is formed by screes; a belt of shingle extends to the east and to the south. The most unusual feature of this coast is a vast terrace, absolutely even, slightly sloping towards the North, 700 to 800 m long on the eastern side, completely covered by shingle, and about 20 metres above sea level. It has all the characteristics of a former shore line. The rock is granitic, quite dark in colour, crossed by numerous, thick volcanic veins. "

Let us go back to M. BONGRAIN'S description of the coastline around Marguerite Bay :

" Léonie Island, about 15 kilometres north of Jenny Island, is situated in a sort of *cirque* formed by the glaciers of the east coast of Adelaide Island. Its height is 370 m. It is probable that a ship could find good anchorages in the vicinity of Léonie Island, the proximity of the glacier being the reason for anticipating a muddy bottom.

" Laubeuf Fjord, which links Marguerite Bay with Matha Bay, separates south Adelaide Island from Loubet Land.

" Fallières Land forms the eastern shore of Marguerite Bay. We were not able to get nearer than 15 miles to this land, which contains many fjords : Bigourdan Fjord, Bourgeois Fjord, Nény Fjord. The last cape sighted by the *Pourquoi-Pas* ? was Cape Pierre Baudin, in latitude 69°. No land was sighted between this Cape and Alexander Land.

" The only outstanding features to be pointed out are : Lagotellerie Island, situated in the centre of the approaches to Bourgeois and Nény Fjords; Calmette Island with its jagged peaks, completely free from snow; Cape Millerand, with the appearance of an inclined iceberg; Cape Pavie, with a characteristic fault; Berteaux Island, with its jagged profile and a cone-shaped tower at one end; finally, Deschanel Peak, slightly to the south of Cape Baudin, and probably situated on an islet.

" Alexander Land forms the eastern shore of Marguerite Bay. This land was the object of our expedition and, after two attempts, we were able to approach the coast to within 3 miles and to see it from the north-east, the north and the west. It is made up of a row of several mountains linked by a convex crust of ice : the small Bayonne Massif (1 420 m) separated from Mount Paris by snow covered ground; Paris Massif, which extends towards the south-east a narrow ridge dominated by three summits, the highest reaching 2 180 m, and which presents, from the north, a peculiar shape visible from a distance consisting of four rocky pinnacles of uniform height, resembling the teeth of a saw; Calais Massif in the east is only small, with no well marked summit, reaching 1 330 m.

" To the south of this first line, and separated by a deep valley, rises from east to west the Rouen Massif, with rounded crests reaching 2 100 m. Finally, more to the south, a line of summits, direction NE-SW, form the Hâvre Massif, and stretch as far as the southern limit (visible) of Alexander Land; the maximum height of this Massif is 1 900 m, numerous nunataks piercing its frozen crust.

" Alexander Land is flanked, in the east (i.e. in Marguerite Bay) by several islands, the largest of which is Nicolas II Island, with its very accentuated relief and reaching a height of 820 m.

" The entrance to Marguerite Bay between the southern point of Adelaide Island and the northern point of Alexander Land is about 60 miles long. "

Following CHARCOT's two expeditions on board the *Français* and the *Pourquoi-Pas ?*, Lieutenant-Commander BONGRAIN prepared a map of the South American Antarctic and the surrounding islands, from the South Shetland Isles to Charcot Land, and this chart is listed under number 5452 in the *Recueil général de l'hydrographie française* (General chart collection of the French Hydrographic Office), and for several years, served as a basis for the revision of nautical charts and atlas maps.

While these geographic results were being obtained, during the 17 days which the *Pourquoi-Pas ?* spent in Marguerite Bay from 14 to 30 January 1909, the members of the expedition devoted themselves to various scientific research work, all of which was of great interest in this completely unknown land. R. E. GODFROY measured the tides at Jenny Island using a Favé mareograph; SENOUQUE made observations of magnetism; E. GOURDON, apart from the observations on Jenny Island we have already mentioned, took numerous notes on the glaciology of the bay; the naturalists, L. GAIN and J. LIOUVILLE, studied terrestrial and marine fauna; the author of this article carried out 17 days of meteorological observations, 25 soundings and 16 hydrological stations.

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After the return of the *Pourquoi-Pas ?*, nearly 20 years passed before new observations were made on Marguerite Bay.

In 1928 and 1929, Sir Hubert WILKINS, famous for his aerial expeditions over the Arctic Ocean, undertook a series of reconnaissances by air in the American Antarctic : WILKINS believed he had discovered several straits crossing Graham Land from west to east; south of Fallières Land discovered by CHARCOT he thought he detected a series of islands which he named Finley Isles, a continuance of Graham Land. A large strait, Stefansson Strait, in latitude 71°, separates the Finley Isles from the real antarctic continent, of which WILSON believed he saw the coast, and which he called Hearst Land.

WILKINS' chart, breaking up Graham Land and transforming it into an archipelago, for which he proposed the name Antarctic Archipelago, was immediately adopted by cartographers. On this map, Marguerite Bay is a vast arm of sea stretching between Alexander Island and the Antarctic Archipelago.

In 1935, Lincoln ELSWORTH made a remarkable flight from Graham Land to Little America in Edward VII Land, east of the Ross Sea. During this flight, he flew over the Stefansson Strait; he judged it to be much narrower than WILKINS had said, but he did not deny its existence.

It was left to John RYMILL to show that all that WILKINS had thought

he had seen in the southern part of Graham Land, Casey Channel, the Scripps and Finley Islands, and the Stefansson Strait did not exist.

In 1936, John RYMILL succeeded in reaching, with his ship the *Penola*, Léonie Island in Marguerite Bay, and there he found a suitable anchorage, as BONGRAIN had anticipated. From there, he left by plane to look for a wintering base on the coast of Fallières Land, nearer to the Stefansson Strait, of which he wanted to find the exact position and dimensions.

Near a bay which CHARCOT had called Nény Fjord, he discovered a small island which seemed to be accessible for his ship, and suitable for erecting a hut on it and a shelter for the aircraft. It was on this island, which was named Debenham Island, and which is situated in latitude 68°7′ S, that RYMILL and his companions spent the winter. The *Penola* was easily able to disembark the material and the dogs, before sailing northwards to spend the winter in the Falklands.

During the air reconnaissance which had enabled him to discover the wintering base, RYMILL had noticed a vast land joining Alexander Land to Graham Land : this land seemed completely different from the descriptions WILKINS had given of it. To the east of Marguerite Bay, instead of numerous straits rejoining the Weddell Sea, there was an unbroken line of high mountains, from which immense glaciers descended. To the south, Alexander Land seemed to be connected to Graham Land by a chain of high mountains.

In order to obtain more accurate data, as soon as the wintering base had been established on Debenham Island, RYMILL proceeded, before the winter, with methodical reconnaissance flights to the north and south of the base.

In the north, he found that the only channel existing between Matha Bay and Marguerite Bay was at the end of Laubeuf Fjord, as BONGRAIN had discovered. No channel towards the Weddell Sea existed in these latitudes.

In the south, the existence of a chain of mountains between Fallières Land an Alexander Land was confirmed. If a channel to the Weddell Sea existed, it could only be in the continuation of a narrow fjord, the end of which had not been observed.

Reconnaissances by sledge enabled an exact determination of the outline of Marguerite Bay to be made.

Beyond Cape Baudin, the last cape marked on CHARCOT's map about 60 miles south of Debenham Island, lay the unknown. The complete map was to be drawn, as the reconnaissances by plane had only given rather vague information. Berteaux Island, marked by CHARCOT off Cape Baudin, is part of the mainland, and has become Cape Berteaux.

To the south, a vast inlet is covered by shelf ice, which was called Wordie Shelf Ice. The cliffs of ice which border it are only 5 or 6 metres high; it rises in a gentle slope towards the interior and is heavily crevassed.

A quite large valley enabled the explorers to reach an altitude of 1 800 metres, where a chain of mountains barred their route to the Weddell Sea. The highest summit of this chain, Mount Wakefield, is 2 850 m high. It is the highest summit in Graham Land, and it seems odd that this summit is in the exact position of one of the straits reported by WILKINS.

The fjord which opens out into the southern part of Marguerite Bay is about 30 miles wide and was explored up to latitude 72°. It was named George VI Fjord.

The fjord gets progressively narrower until latitude 71°30′, where it is about ten miles wide, and then gets wider again. Its general direction is SSE, and it seems to turn towards the south and the south-west beyond latitude 72°.

The eastern side of the fjord is a succession of promontories and glaciers, similar to the usual aspect of the coast of Graham Land; several summits reach 1 500 to 1 800 m. This group of mountains has been called the Batterbee Mountains.

The western side of the fjord, which prolongs the east coast of Alexander Land towards the south, is formed of a steep wall of mountains, the summits of which reach a height of 2 500 m. At the foot of these mountains it was possible to disembark on to stratified, fossil-bearing ground, not covered by snow.

The fjord is covered by thick ice, heavily crevassed, towards its mouth in Marguerite Bay.

Concluding his expedition, RYMILL was able to write : " Now we have explored, on foot and from the air, the whole of the coast of Graham Land between latitudes 64°30′ S and 72°30′ S, we can confirm that this coastline is absolutely unbroken, and does not provide any channel towards the Weddell Sea. "

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In 1940 and 1941, a group of American explorers under the direction of BLACK, as part of Admiral BYRD's third expedition, installed itself on the shores of Marguerite Bay, near the base RYMILL had occupied, not far from Nény Fjord. Numerous reconnaissance flights and topographic surveys carried out on foot completed RYMILL's map. In particular, BLACK discovered that the fjord which runs between Graham Land and Alexander Land, which RYMILL had named George VI Fjord, is in reality a strait : after running in a north-south direction, until about 73° latitude, it turns sharply towards the west and the north-west, to open out into the Bellingshausen Sea, and makes Alexander Land into a large island. Stretches of free water were seen at its western opening, which has been called Ronne Bay.

In short, Marguerite Bay, of which the entrance is about 60 miles wide between Adelaide Island and Alexander Land, is connected with Matha Bay in the north by Laubeuf Fjord, and in the south with the eastern part of Bellingshausen Sea, by George VI Fjord and Ronne Bay.

In 1941, the ship of the Byrd expedition was not able to reach Marguerite Bay, and BLACK's group was evacuated from its base on Nény Fjord by plane. The scientific collections left at Nény Fjord were found intact in 1943 by the Argentine ship *Primero de Mayo,* which was lucky enough not to be obstructed by ice in Marguerite Bay. All the material left by the Americans was sent to Washington, where it arrived in good condition in December 1943, in spite of the ups and downs of the war.

Like RYMILL's expedition, BYRD's expedition to Graham Land and the voyage of the *Primero de Mayo* so to say gave a new value to the discoveries made by CHARCOT more than 30 years before, and gave them the important place they deserved amongst the polar discoveries which followed. English and American geographers acknowledged this; in memory of CHARCOT, a coastal island off the coast of Fallières Land received the name of Pourquoi-Pas ? Island.

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In 1947, Commander Finn RONNE, of Norwegian origin, who had taken part in Admiral BYRD's second and third expeditions, was charged by the United States to continue the exploration of Graham Land (called Palmer Land by the Americans) towards the south.

Finn RONNE chose Stonington Island as his wintering base, on the shore of Nény Fjord in Marguerite Bay, where he had already stayed during BYRD's third expedition from 1939 to 1941.

The American Navy gave him the use of a strong wooden ship, *The Port of Beaumont, Texas,* with three aircraft and two tractors. The vessel reached Stonington Island on 12 March 1947 without great difficulty. RONNE found the permanent station which the English had established there in 1944, about 200 metres away from the buildings which the Americans had left in 1941. This station comprised about ten men under the command of Major BUTLER, who hastened to give RONNE every help in the taking of meteorological observations, which was his special task.

From the time of his arrival, RONNE gave his attention to establishing an auxiliary base in the south, and he left in his ship to search for an accessible disembarkation point. The *Port of Beaumont* reached a latitude of 69°20′, going beyond Cape Berteaux, the last point of Fallières Land seen by CHARCOT, and thus breaking the record of navigation in Marguerite Bay.

RONNE discovered no suitable site for an auxiliary base, and returned to Stonington Island. An anchorage was found for the ship in a small bay a third of a mile from the base, where it was blocked by ice from the beginning of May, and where it spent the winter in complete safety.

The main part of the expedition's programme was the exploration of the Weddell Sea. This having been carried out using his aircraft, RONNE set himself the task of completing south of George VI Fjord his own work of 1940. In 1947 he discovered some mountains more than 3 000 m high, up to latitude 74°30′ S, and he completed the map of the east coast of Alexander Land.

Now he only had to wait until the ship was no longer blocked by ice, which did not seem likely to happen before March. But RONNE received an agreeable surprise by radio : two ice-breakers of the American Navy, cruising in the Antarctic, announced that they planned to call at Stonington Island on 12 February. He immediately decided to make use of their services. His ship was easily freed by them, and on 20 February 1948 the whole expedition took the route northwards again.

The outline of Marguerite Bay was henceforth known exactly.

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