

REPORT ON PHYSICAL GEOGRAPHY STUDY OF THE WESTERN ARCTIC,
AUGUST, 1947

by

J. Lewis Robinson, Ph.D.

Issued by the
NORTHWEST TERRITORIES AND YUKON SERVICES
LANDS AND DEVELOPMENT SERVICES BRANCH
OTTAWA

TABLE OF CONTENTS

Itinerary

Topography

Mapping

Geology

Ice Conditions

Vegetation

Animal Life

With map showing routes followed
by the Geographer on Expedition Polco.

ITINERARY

I left Edmonton on Tuesday morning, August 19, aboard an R.C.A.F. Canso flying a crew of construction workers to Cambridge Bay. A stop-over of several hours was made at Yellowknife while the radio was being repaired. The route northward was across Yamba Lake and Contwoyto Lake to Burnside Harbour; thence across Bathurst Inlet and Kent Peninsula, arriving at Cambridge Bay about dark.

The next day there was a snow and sleet storm, with winds reaching 50 miles an hour. All planes were grounded.

By noon of August 21, the wind had subsided, and the R.C.A.F. Canso with the magnetic party on board took off for Prince of Wales Island. The route was across the west end of Albert Edward Bay and over Gateshead Island, off the coast, to Cape Lisbourne, the southern tip of Prince of Wales Island. We continued to the northeast to Guillemard Bay, which is really a long inlet that bends inland to the north. From there the route was northward. Low clouds forced the plane lower and lower until we finally had to climb above them. A complete cloud cover lay over the whole north end of the island, and it was impossible to come down through it because of the danger from unknown hills in the northern part of the island. The pilot finally turned the plane around and after searching for an hour for an opening in the clouds headed back for Cambridge Bay. We came out of the clouds near the southwest coast of the island, and crossed ice-choked M'Clintock Channel in bright, late-afternoon sunlight. We crossed the eastern part of Victoria Island slightly to the east of the outgoing route, arriving back at Cambridge Bay at 7:30 in the evening. Flying time - 6½ hours. Distance travelled - 750 miles.

On Friday, August 22, we again tried to reach Prince of Wales Island, after a delay in the morning to fix a short in the wiring. The same route was followed over the west end of Albert Edward Bay. We circled a group of Eskimo tents in a camp there, and a permanent cabin located nearby. We flew above the low clouds over the pack-ice of M'Clintock Channel, reaching the south cape of Prince of Wales Island at noon. The route was northward over the middle of Guillemard Inlet. The weather was clear and visibility was very good. We continued northward over Fisher Lake and noted a different type of country to the north, and came to near the coast on the west side of Browne Bay. We crossed the northwestern part of Browne Bay and continued inland to the northward, finally sighting the lake in the northeastern part of the island, which the party had discovered on an earlier flight. The landing was made difficult by a slight cross-wind, and two unsuccessful bouncing attempts were made before a third approach brought us down. The second landing attempt was almost a tragedy as the plane could neither get back into the air, nor land properly, and simply leap-frogged along, banging the hull heavily with each bounce, until air-speed was obtained to get back into the air.

We spent the night on this lake, called *Allen Lake for the co-pilot, while the magneticians took detailed observations for the Magnetic Pole. Observations were continued Saturday morning, and a take-off into the low cloud cover and cold sleet rain was made at 1:30 p.m. Fresh snow which fell during the night blanketed the surrounding hills. We flew southward above the clouds, finally coming into the open a few miles north of Guillemard Inlet. Our route was southward over the low, flat plain of the southern part of Prince of Wales Island, slightly to the west of our northward incoming route. There was clear weather over M'Clintock Channel,

* New names used in this report have not yet been approved by the Geographic Board of Canada.

and we flew just north of Gateshead Island. We crossed Albert Edward Bay once more, and reached Cambridge Bay at 5:00 in the afternoon.

Sunday, August 24, was spent at the base at Cambridge Bay while the crew rested. The pilot was informed that his supply of gasoline was now nearly exhausted and he had enough left for only one more long flight. The point desired was on the central west side of Somerset Island, east of the Magnetic Pole on Prince of Wales Island. It was decided to await a good weather report from Fort Ross before attempting the flight. Sunday night was quite cold, and a thin layer of ice formed on the lakelets at Cambridge Bay.

On Tuesday, August 26, we had a good report and took off early in the morning for Fort Ross. Snow blanketed all the ridges to the northward on Victoria Island, and was piled up along the southern shores of all lakes. M'Clintock Channel was crossed above heavy cumulous cloud cover, but weather cleared near the Tasmania Islands. We flew up the middle of ice-jammed Franklin Strait, and then crossed over the north-western part of Boothia Peninsula to Fort Ross. The post was lost in clouds and we were unable to locate it.

We continued northward over the interior of Somerset Island to huge Stanwell-Fletcher Lake. The lake was still ice-bound, with loose floes, and only the northwestern part of the lake was open. We circled it for a half-hour, but found shallow shores which prevented landing and beaching. The pilot then turned back and returned to Fort Ross. The scattered cumulous clouds had cleared away from the post by that time, but loose ice from Bellot Strait prevented a landing there.

The Canso was flown southward along the east coast of Boothia Peninsula, looking for a place to land, but new ice was forming on the shores of a lake southwest of Brentford Bay. The pilot then decided to try Pasley Bay, on the west side of Boothia Peninsula, and crossed the rugged interior of the Peninsula to the head of ice-choked Wrottesley Inlet, and thence southward to Pasley Bay. Unfortunately, the ice from M'Clintock Channel had pushed eastward and jammed all three arms of the Inlet. We circled it for a half-hour and noted two Eskimo frame houses there. Since the day was drawing to a close, and gasoline was becoming low, the pilot was forced to give up on this last attempt and a course was set back to Cambridge Bay. Flying time 9 hours. Distance travelled - 1,000 miles.

The next morning the last of the R.C.A.F. gasoline cached for the magnetic survey was used to move all supplies and equipment from Cambridge Bay to Yellowknife. We hoped to stop at Bathurst Inlet on the way south, but low clouds were again met over Kent Peninsula, and no openings were found until we were over the rolling tundra northeast of Contwoyto Lake. Our route took us over the mining camps at the south end of Gordon Lake and into Yellowknife. Trouble was experienced on the first half of this trip by icing conditions on the wings and tail while in and above the clouds near Bathurst Inlet. The load of the whole party had been poorly packed and the 14 passengers had to be moved about in the plane several times before proper flying speed could be attained.

Saturday, August 29, was spent at Yellowknife, while the Canso was given a complete check-over after its weeks of landing on the water. On the next day we left, hoping to get into Bathurst Inlet to obtain a magnetic observation. Clouds were met very near Yellowknife and stretched all the way to Bathurst Inlet with occasional open patches. There was poor visibility in these open places because of ground haze. Near Bathurst Inlet we came down to 100 feet altitude, but were still in fog, so the pilot turned to the westward

- 3 -

to try to reach Point Lake, which was also desired as a magnetic point. We reached the Coppermine River where the Hepburn River joins it from the west, and turned southward along the river valley to Point Lake.

An excellent, sheltered harbour was located on the north side of a large island in Point Lake, and we landed in this scenic cove. The survey instruments were set up at once and observations started. We spent the night camped on Point Lake and took off at 10:00 a.m., Saturday.

We again headed east for Bathurst Inlet but once more complete cloud cover blanketed the coast and extended inland over the tundra. Again, we had to turn back, and the pilot decided to investigate the Mackay-Aylmer Lake area as a possible magnetic site. We circled Courageous and MacKay Lakes but could find no suitable beaches for mooring the Canso. We continued to the southeast over Back Lake to Wrottesley Lake, and thence northward to the southern end of Aylmer Lake. No sites were found during this time, so the pilot turned back to the base at Yellowknife.

Since it was apparent that it was going to be difficult to reach Bathurst Inlet, and the other point desired around MacKay Lake was out of my Western Arctic area, I then decided that I should leave the magnetic party and come out to start writing my report. By this time the season was drawing to a close, and the Geodetic Survey party north of Great Bear Lake had already ceased operations and were moving their equipment southward. A chance U.S. Army Dakota came through Yellowknife Sunday afternoon August 31, carrying geodetic equipment to Edmonton, so I boarded it and came out with them. I obtained train reservations and arrived in Vancouver Tuesday morning, September 2.

Total flying time in the North was 50 hours, and distance travelled was almost 6,000 miles. For results accomplished see the accompanying topical headings of this report dealing with topography, mapping, ice conditions, and miscellaneous information. The chief problem met was bad weather which either grounded the planes or limited visibility in the air. Further work on Somerset Island and the northeastern part of Victoria Island was planned and could have been carried out in the remaining days of a short season, but the depletion of the gas supply allotted for the expedition necessitated moving the base camp from Cambridge Bay to Yellowknife, which was too far from these areas.

Mainland.

Between Yellowknife and Bathurst Inlet; our route was over the Canadian Shield. The character of topography changes from rough hilly country north of Great Slave Lake, to less hilly country near Coppermine River, then to a gently rolling tundra plain north of Coppermine River, and to rugged country around Bathurst Inlet. The whole region is covered with innumerable lakes, mostly shallow, of all sizes and shapes. The lakes near Yellowknife have irregular shores and many rocky islands, whereas most of those on the tundra are circular pools of different sizes.

Glacial boulders are found all over the region, some of large size being more noticeable north of Great Slave Lake. Long, twisting eskers are also common, especially in the region between Great Slave Lake and the Coppermine River and eastward. Some of these gravel ridges stretch for several miles. Their general direction is east-west.

Rugged, rocky hills are typical of the region north and east of Yellowknife. They become less rugged east of Gordon Lake and north of Jolly Lake. Eskers are more numerous north and east of these two lakes. The low areas are filled with lakes, or in some cases, swampy vegetation. The rocky slopes are covered with trees south of the tree-line, and tundra vegetation in polygon structure north of it. The hill tops are usually bare in both regions.

The Coppermine River was difficult to pick out from numerous surrounding lakes. The river has numerous rapids, and often broadens out into long narrow lakes.

North of Contwoyto Lake, the topography flattens out; rocky hills become low, flat domes. There is more vegetation and few rocky hills. An occasional long esker has a general east-west trend.

The Peacock Hills stand out above the surrounding country. They are one line of hills composed of sharp ridges, with a few single conical hills nearby. They were the only outstanding relief feature seen across the rolling tundra and rise probably 500 to 1,000 feet above the surrounding region. They are farther east than they are mapped. Although visibility was good, no feature corresponding to

the Willingham Mountains could be seen in that direction, but they may be farther to the westward. East of Peacock Hills, there was an extensive area of a mile or more of bare gravel and boulder surface. No vegetation was noted over the entire flat boulder plain. Eskers are the only relief features in this level region northwest of Contwoyto Lake.

The topography becomes somewhat rugged towards the mouth of the Burnside River. The major tributary joining the Burnside River from the southeast is deeply entrenched into the Precambrian rocks. The topography along the river has a rugged appearance, and would be called hilly from the ground, but the hills are only slightly higher than the surrounding rolling country back from the river. Near the shores of Bathurst Inlet, the rocky hills rise above the surrounding country and the topography is markedly rugged. The inlet is quite scenic. Bare rocky hills rise steeply from both sides, and there are numerous rocky islands of different sizes in the Inlet.

East of Bathurst Inlet, the rugged character of the topography continues, with relief gradually decreasing. The country is rough and broken, although not steeply rugged. The relief is caused by numerous rock ridges, and the whole area has a very barren appearance. Small, irregular lakes occupy all depressions in the rocky surface. The flat appearance, which is characteristic of the region southwest of the Inlet, appears in the distance to the east.

Southeast of Melville Sound the country is generally level, with a few rugged low hills rising above the surface. To the eastward, the surface is a flat tundra plain. Several long, narrow rivers have cut down into the surface, and flow northward and northwestward towards Melville Sound. The region has an appearance similar to the level country southwest of Bathurst Inlet, except for the rivers which are not common in the mainland interior.

Between the Coppermine River and Contwoyto Lake, about 60 miles from the Coppermine River, there is some rugged country, which may be the Willingham Mountains. There are no definite ranges, but the topography is rough and broken, with numerous high rocky ridges. There is a large lake about 50 miles from the Coppermine River,

extending northwest-southeast, which may be Tukiohuk Lake or Kigyik Lake, if it was mapped farther south. The lake is much longer than it is wide, and contains a large, and some small, islands. The islands have steep, eastward-facing escarpments, and dip down to the west. There also appears to be some folding.

West of this lake, the topography is less rugged. The escarpments are still present, but not as marked nor as high. A meandering river, deeply entrenched into a broad, apparently misfit valley, flows to the northwest through this region.

At the junction of the Coppermine River and its tributary, the Hepburn River, the topography is hilly, but more rounded and subdued than farther east. Higher hills of old Precambrian rock rise to the north of Point Lake. The region around Point Lake is typified by rocky hills about 300 to 500 feet above the general level, with broad grassy tundra stretching between the hills. The setting of the island in the middle of Point Lake was considered the most scenic of the summer's camping places.

Eastern Victoria Island.

The section covered in six flights lies between Cambridge Bay and Albert Edward Bay, and between the latter and Collinson Peninsula. With one exception, different routes were taken each time.

Northeast of Mount Pelly, a low tundra, lake-covered plain stretches as far as Albert Edward Bay. Near Mount Pelly, and for several miles to the northeast, the topography is rolling. The surface is composed of low, flattened bare domes of glacial drift or disintegrated rock. The lower slopes are covered with yellowish-green tundra vegetation. Solifluction is active in bringing rock and soil material down nearly all slopes, and tends to round off the valleys. All depressions are water-filled, making shallow lakes of all sizes but generally small. The lakes vary in colour within short distances, probably dependent upon depth and plant life in the water. There is one long modified esker near Cambridge Bay, but no others were seen over eastern Victoria Island or on Prince of Wales Island.

A region of low hills is found about 10 miles south of the western arm of Albert Edward Bay. Rolling hills and linear ridges rise from 200 to 300 feet and in some places climb steeply from the shores of the many lakes. The lakes are somewhat larger in this area. South of the central part of Albert Edward Bay, the topography is quite flat, with shallow water and shoals offshore. There are low ridges of former gravel beach-lines along the shore. Possibly the ridges are due to ice-push. Inland, small circular hills rise from about 50 to 100 feet and show a series of ascending beach-lines around them.

North of Albert Edward Bay, the country is quite similar to that to the south. Numerous tiny circular shallow lakes cover most of the surface. The coasts of the Bay are shoal and shallow, and raised beach-lines were seen along all shores.

On the south side of Collinson Peninsula a few miles from Albert Edward Bay there was a small hill similar to Mount Pelly. It has a broad, flat-topped surface, and beach-lines in terraces around the slopes. The hill is about 300 feet - half the height of Mount Pelly.

Near the north coast of Collinson Peninsula there were several peculiar extensive areas of pure white gravel or small rounded boulders. One area almost a mile across looked like white sand from the air, but through field-glasses proved to be made up of small white boulders forming a level plain. The whole section was devoid of vegetation. About 13 miles farther south there was another similar whitish region of gravel or boulders. At this place, the areas were not as large as those near the coast.

Prince of Wales Island.

The topography of the parts of Prince of Wales Island that were seen is of three major types: (1) The southern part is a flat, almost barren, gravel and disintegrated rock plain, covered with many small lakes and having a few notable rivers; (2) the central eastern part of the island is a low plateau of red sandstone, being better drained, with many shallow, broad streams, and having few lakes and

more vegetation; (3) the eastern islands and the edge of part of the northeastern coast are high and rugged, probably of Precambrian age.

The whole southern part of the island, south and southwest of Guillemard Inlet, is a low plain. Swamps and marshes are quite common, and small shallow lakes are numerous over the whole region. There are a few larger lakes in the area, but they are not common. There are not as many little lakes, however, as on eastern Victoria Island. The interior behind the southwest coast is not quite as wet, but is similarly low and flat and has many small lakes. There are a few major rivers flowing through the area, being entrenched some 50 to 100 feet into the unconsolidated material. Two which were noted drain southward to Cape Swinburne in slightly meandering valleys, and two others drain northward to Guillemard Inlet. All four have a curving character, with slight entrenchment.

Raised beach-lines were noted on Swinburne Island at the south, and also for a few miles inland along the southeast coast. Most of the surface is composed of low, flattish domes of gravel and disintegrated slabs of sedimentary rock. There is a marked contrast between vegetation cover as found on the lake-covered plain of eastern Victoria Island, and the somewhat similar plain of southern Prince of Wales Island. Vegetation is surprisingly sparse on Prince of Wales Island; there is some ringing the lakes, and some lowlands have marshes, but the slopes and dome-tops are almost entirely barren and make up the largest percentage of the surface cover.

The character of the country changes around Guillemard Inlet. Topography becomes more rolling and low hills of possibly 500 feet rise above the surface to the west of the Inlet. The hills are scattered and form no definite range. The hills along the east side of the Inlet rise more steeply from the water, and slope back to a rolling plateau in the distance. The east coast of the island, around Willis Bay, is low, rising gently inland to lake-dotted country. Ancient gravel beach-lines are more common on the gentle slope on the west side of Guillemard Inlet. There are low hills on

- 6 -

both sides of the north end of the Inlet, where a large river empties into it from Fisher Lake. The hills extend off to the west of this north arm of the Inlet.

Polco River drains from Fisher Lake to Guillemard Inlet. It is entrenched some 50 feet or more near its wide mouth, but meanders back and forth across a level plain south of Fisher Lake. It receives several tributaries along the way, the largest of which joins it from the northeast just before emptying into the Inlet. The Polco River is the broadest seen in the whole southern part of the island and is apparently deep.

South and east of Fisher Lake, the country is level, or nearly so. There are very few small lakes, as were seen in the southern part, but a few large lakes. There are, however, more small rivers. The surface cover has the same barren appearance, being composed of loose in consolidated material in broad level stretches of bare rock.

North of Fisher Lake, the lakes almost entirely disappear. The surface is the same barren, level country, but is crossed by numerous small, almost-dry, rivers flowing in broad, shallow valleys. They drain towards the south, and have river-beds of gravel and small boulders. About 10 miles north of Fisher Lake there is an area of low hills with a few small lakes and several small rivers. It is possible that this is the eroded front edge of an escarpment forming a higher level plateau to the north.

Northward, the topography has the same level appearance, but has more vegetation in the valleys and the streams flow eastward. There are numerous shallow streams separated by long slopes and low ridges. A few of the larger streams are slightly entrenched, and as they near the escarpment to the east they become deeply entrenched. The river valleys, instead of being gravel beds, are covered with a reddish mud, and this reddish colour shows across the rolling plains. About 15 miles north of the hills noted in the preceding paragraph, there is another small area of small lakes and poorer drainage, with streams flowing eastward from it.

- 7 -

West of Browne Bay, a sharp, reddish escarpment rises above a narrow plain along the coast. The plain is a lake-covered marshy tundra, with many streams meandering across it. The escarpment rises several hundred feet abruptly from the plain as a red cliff. Rivers have cut down into the escarpment front and flow through spectacular canyons. From the coast, this escarpment would have the appearance of rugged hills, but the country west of it is really a level plateau, which was described in the preceding paragraph.

The escarpment is broken by the wide indentation of Fortier Inlet. It continues north of the Inlet, running east-west parallel to it and then swinging to the north. The northeastern part of Prince of Wales Island has three types of topography within a small area. The coastal region, and the islands on the east side of Browne Bay, are high, mountainous sections composed of rugged Precambrian rocks. The islands are steep-sided and rise abruptly from the water. They may possibly reach an altitude of 2,000 feet. The same type of topography continues to the north along the mainland coast to Back Bay. Mathias Mountain is one of several in this definite range.

West of the mountains, a flat lowland with many small lakes separates the mountain range from the escarpment front. This lowland extends northwards, becoming narrower, and merges with the plain near the Drake River, which empties into Back Bay.

The escarpment and central plateau have a character similar to that of the region west of Browne Bay. The edge is cut into canyons by many unmapped rivers. The upland is level, or gently rolling, near rivers. The escarpment remains red, but the country inland loses its reddish colour, even in the shallow stream valleys.

The Drake River is a definite valley pass across the northeastern part of the island. Its mouth at Back Bay was not seen in the distance, but the valley extends to the northwest. A small circular lake receives the waters of a major tributary which drains from the plateau to the southwest. The tributary has a broad valley without the canyons which are typical of rivers farther south. The

Drake River drains Allen Lake, a peculiar rectangular lake about five miles long and less than a mile wide. Its shores are fairly straight along both sides, and the delta mouth squares one end, giving it a rectangular appearance. The source of the river which empties into Allen Lake is in the hills near the coast of Baring Channel. Its valley has sloping sides, rising gradually to hills on both sides to the north and south.

Allen Lake has hills a few miles to the north and south. The tundra slope rises gradually in a rolling surface to the higher hills, which have steep slopes near their crests. The entire lower slope is composed of mud and disintegrated red sandstone slowly creeping downhill by solifluction. There were no major streams emptying into the sides of the lake, but some dry stream-beds gave a slightly rolling appearance to the slope. The hills south of the lake had an elevation of some 500 feet above the lake level (260 feet), and therefore an altitude of 750 to 800 feet. The hills north of the lake were a little higher, probably 900 to 1,000 feet in altitude, while those in the distance northeast of Allen Lake rose to still higher elevations in rolling, rather than rugged, hills.

Very little was seen of the west coast of the island except from a distance through field-glasses. The land at the head of Ommanney Bay is low and lake-covered. The head of the Bay itself is a maze of small low islands and shoals, so that it was hard to differentiate shore from bay from a distance. A range of hills, which the party named the Serson-Clarke Range, rises above the general level to the east and northeast side of Ommanney Bay. These hills are marked on the maps. and since their silhouettes were seen from the east, they must be hills and not the front of an escarpment, as on the west coast of Browne Bay. It would be interesting to know their rock composition.

Somerset Island.

The country flown over lies between Fort Ross and Stanwell-Fletcher Lake in the southeastern part of Somerset Island. Fort Ross lies on the dividing line between rugged Precambrian topography to

the west and a low sedimentary coast to the northeast. About 10 miles directly to the north there is a large eastward-flowing river with entrenched canyon sides. The surrounding country is rolling, but not rugged. Hill tops are bare, but vegetation grows on slopes. The next 20 miles is rolling country with many small rivers flowing in broad gravel-filled valleys. The rocks had the weathered appearance of eroded Precambrian rock. Unlike the topography farther south, there were few lakes in this region, except a few small ones between hills.

Ten miles south of Stanwell-Fletcher Lake, the topography changes from hilly, low rock ridges to a rolling lowland with even fewer lakes. This lowland extends to the southeast side of huge Stanwell-Fletcher Lake. On the northeast side of the lake, the land slopes up gradually to a level plateau which extends off to the horizon in the northeast. There are several rivers draining across this upland towards the lake, cutting into the general surface in shallow valleys, but the level profile is maintained.

West of this plateau, a lowland extends far to the north in an inverted-V shape, finally disappearing where the plateau merges with the mountain range to the west. Several rivers, some of them large, emptying along the north side of the lake, drain across this lowland in meandering courses. Some of the river mouths have broad deltas, and shallow water extends some distance offshore.

West of Stanwell-Fletcher Lake, an imposing mountain range rises abruptly above the lowland and lake. It was called Lew Robinson Range. It has an altitude of about 2,000 feet, with steep hills facing to the east. The peaks along the range are rounded, but greatly cut-up into rough topography. The range extended to the horizon to the north, rising above the plateau, into which the peaks merged. Some of the northern peaks were heavily snow-capped. There is a deep gap in the range on the northwest side of the lake. An inlet, which broadens out into a chain of lakes, leads westward between high, steep slopes, making a very scenic pass. The opposite end of this narrow arm of the lake could not be seen in the rugged country to

- 10 -

the westward. The escarpment face of the range was seen to continue to the southwest of the lake at least 10 miles, and then was lost in the clouds. It had the same rugged characteristics of rounded peaks, steep-sided high valleys as did the northern part of the range.

On the southwest side of the lake a broad valley extends southward between the mountain range, and slightly hilly country directly south of the lake. A meandering river, much too small to have cut the broad, flat valley, drains into the corner of the lake. This lowland valley was also lost in the clouds to the southward.

Boothia Peninsula.

The northwestern corner of Boothia Peninsula is rugged. North of Wrottesley Inlet, the capes are high and rugged, but their slope from the water of Franklin Strait is gradual. Ancient beach-lines were noted on the slopes of this coast. East of Gibson Island (which is definitely an island) the rugged Precambrian rocks lie in series of bare rocks ridges with steep bare sides. There are lakes in most of the narrow valleys, and some vegetation on the slopes near the water.

The east side of Boothia Peninsula is also rugged, rising steeply above the arms of Brentford Bay. Several peninsulas jut out into the Bay. They are very low and flat, and marked by raised beach-lines of rounded boulders and gravel. One of the arms of Brentford Bay extends almost across Boothia Peninsula, separated from a western inlet by only a narrow low ridge.

South of Wrottesley Inlet, a broad valley extends southward parallel to the west coast. A fairly large river drains through it to the southeastern end of the Inlet. West of this valley there is rolling country, through which a river drains southward to the north arm of Pasley Bay.

The topography around Pasley Bay is very flat, although slightly rolling in the valley to the north. Eastward, a level plain with rather sparse vegetation slopes up gradually to a sharp escarpment which marks the western edge of the Precambrian rocks. These

- 11 -

rocks are farther west than previously mapped. The rugged hills were snow-capped on August 26, and rose a few miles east of the long central arm of Pasley Bay, and a short distance farther east of the northeastern arm.

South of Pasley Bay, the low flat coast extends far to the horizon without a break (altitude of plane 1,500 feet on a clear day). Sand and gravel beach-lines parallel the shores and extend a short distance inland.

MAPPING

Most of the map corrections and additions on Expedition Polco were made by F/O Johnny Goldsmith, navigator. The chief additions have been made in the region northeast of Cambridge Bay on Victoria Island, in Prince of Wales and southern Somerset Islands, and northern Boothia Peninsula. These corrections were checked in the field and found to be quite accurate, and there was little further that the two of us could do except add details on later flights. The new mapping will be found on the 8-mile air navigation sheets, which will be submitted by the navigator of the expedition. They should be checked with the numerous aerial photographs, which were taken by myself and Goldsmith, before incorporation into the new maps.

The major changes and additions are as follows: The country between Cambridge Bay and Albert Edward Bay is covered with innumerable lakes of all sizes and shapes. A few of the larger ones have been mapped on the 8-mile sheets. A cabin is located on the south side of the mouth of a river draining into the northwest head of Albert Edward Bay. This river drains a large lake to the north, which was named Goldsmith Lake by the navigator. Another large lake is located slightly to the north of this. The coastline of Albert Edward Bay is roughly correct in outline, but Goldsmith was able to add a great deal of detail in bays, points, and inlets, while making seven or eight trips over the Bay by different routes.

New discoveries were Marjorie and David Islands off the northeast coast of Collinson Peninsula, Victoria Island. Marjorie Island lies between the coast and Gateshead Island, which is farther

off the coast than mapped. The records of the first exploratory expedition should be checked on this point, because it is quite possible that the island which we named Marjorie, is really Gateshead Island, which would be seen from the coast, and the larger island to the north of it is really the new island which has been heretofore unknown. Numerous aerial photos were taken of this new and larger island, and its details sketched on the 8-mile map.

On a later trip another group of small islands were seen to the north of Gateshead Island. They totalled nine islands in all, of which six were close to Gateshead and three were farther out in M'Clintock Channel. We named these new islands David Islands. The islands have a north-south arrangement extending off from Gateshead. The northern one is the largest, being slightly over a mile in length and having an elevation of about 100 feet. It has several small lakes on its north end. The island third from the north lies in an east-west direction.

Numerous changes in detail and outline have been made on Prince of Wales Island. An astronomical position was obtained at the head of Guillemard Inlet, indicating that it is farther north than mapped. Therefore, the whole south coast should be moved farther north, and should be more rounded and less pointed. Cape Swinbourne, the southern cape, is actually a small island in an indentation in the southern cape. Two well-defined rivers drain into the northwest corner of the strait separating the island from the mainland.

The interior of Prince of Wales Island, in the southern part, has many large lakes, as well as the usual innumerable small ones. Only a few of the large lakes were mapped, because of the difficulty of locating their exact position. The island has many well-defined rivers, especially in the central part, but only a few could be mapped or indicated because we did not follow along their courses. Aerial photography will be the only accurate way to define the drainage pattern of the island.

A major change in the southeast coast is the shape of Guillemard Bay. Instead of a bay, it is really a long inlet which extends

inland almost 10 miles, and then bends sharply to the north and stretches about 15 miles to the northward, surrounded by hilly country. A few miles within the mouth of the outer bay, several islands almost close off the entrance and keep out the pack-ice. Two more islands are located at the bend of the inlet, again almost filling the inlet. Long stretches of open water are found in both the outer bay and inner inlet. A large meandering river flows into the head of Guillemard Inlet. We named it the Polco River in honour of the expedition. It has a large tributary joining it from the east near its mouth. The tributary flows from the northeast interior, while the Polco River twists and turns from Fisher Lake. It flows in a broad valley with low hills scattered on both sides.

There is no Colquhoun Range as indicated so definitely on the 8-mile maps. There are hills in the region of Fisher Lake, probably reaching 400 to 500 feet, but they are scattered and isolated and, from the air, fail to appear as any definite line of hills or a range.

Fisher Lake is one of the large lakes in the interior. Its northern end trends off towards the northwest. Its eastern side has several points and jutting peninsulas. Two well-channelled rivers flow into the northeast part of the lake, about two miles apart, the most easterly one being the largest. A small lake, in a lakeless country, lies between these rivers, and northeast of Fisher Lake.

The large lake shown on the 8-mile map to the northeast of Fisher Lake is not in that position, for we flew over this area without seeing it. There are several large rivers in this area, flowing towards the east, and cutting through canyons in places. One of them could very well drain a large lake but it would be located further to the west. On the other hand the lake and river so mapped might flow directly north towards Browne Bay, and would have been farther to our east.

The hills shown on the west side of Browne Bay are actually the front edge of a definite escarpment which has been carved into hills and canyons by numerous rivers flowing from the plateau to the westward. A narrow flat coastal plain separates this escarpment

from Browne Bay.

The inlet on the northwest corner of Browne Bay is much wider than indicated on the map, but extends about the correct distance inland. There are numerous small rocky islets on the south side of the entrance to the inlet. The inlet was named Fortier Inlet, for the geologist on board the 'plane.

The same escarpment continues to the north of Browne Bay, and a broad tundra-covered lowland separates this escarpment from the rugged hills along the east coast. Numerous entrenched streams flow across the lakeless plateau to the west and cut into the face of the escarpment.

Allen Lake, where we landed on northeastern Prince of Wales Island, is a rectangular broadening of a major river which flows into the northwest corner of Back Bay. The river heads somewhere in the hilly country south of Baring Channel, and has a delta mouth where it empties into the southwest side of Allen Lake. The lake is about five miles long and possibly a mile wide.

Its elevation was computed as about 260 feet above sea-level. The limestone and red sandstone hills on the south side of the lake rise about 500 feet above the water, or have an altitude of about 750 feet. The hills to the north are higher, probably reaching an altitude of about 900 feet. The river draining Allen Lake broadens out into another lake - smaller and circular - to the eastward, and is located in the lowland near the coast. This small circular lake receives a major tributary from the southwest. The combined rivers then flow eastward to empty into Back Bay. The name of Drake River was suggested for this stream, in recognition of the capable pilot of the Canso aircraft.

There are islands lining the east side of Browne Bay as marked on the map. but we were not close enough to them to note any details for mapping. All are very high and have precipitous coasts. One of the smaller central islands of the group has a saddle in the middle and is high at the north and south ends.

The southern interior of Somerset Island was explored in a

flight from Fort Ross to Stanwell-Fletcher Lake. The lake is huge and roughly circular, occupying much of the interior country west of Creswell Bay. Union River, which drains it, is quite broad. The lake has two small islands along the north side near the river outlet. A small flat peninsula juts out from the west side of the lake, and three small low islets are south of it. A broad inlet or chain of lakes extends westward through the mountain range from the northwest corner of Stanwell-Fletcher Lake. This inlet, lined by high mountains, disappeared in the distance near the west coast, and should be investigated some day because it may possibly reach the west coast. In that case, the southern end of Somerset Island would actually be a separate island. The large mass of loose ice still in Stanwell-Fletcher Lake, when other lakes were ice-free, may possibly indicate the lack of a current. Therefore, this body of water may not be a river and lake, but a strait.

Several streams flow into the north side of Stanwell-Fletcher Lake, across a broad, lake-dotted lowland, and empty with delta mouths into shallow water. One large stream enters the southwest corner of the lake, flowing in a broad valley at the base of the mountain range to the westward.

A previously unknown mountain range rises very abruptly along the west side of Stanwell-Fletcher Lake. It has a steep escarpment and rugged, rounded hills forming a north-south range. Its elevation is around 2,000 feet. It extends far to the northward, being joined by a lower plateau from the eastward, and also extends southward into the lower hilly country, but its extension was lost in the clouds. My excitement over this new range resulted in it being named the Lew Robinson Range by the crew.

On Boothia Peninsula, minor changes were made on the west coast and a few details added in the interior. The Tasmania Islands are more numerous than mapped. In addition to the large major island, there is one small island to the north, and seven smaller, irregular-shaped islands to the west. Most of the islands have a northwest-southwest trend, and the larger ones are relatively high

flight from Fort Ross to Stanwell-Fletcher Lake. The lake is huge and roughly circular, occupying much of the interior country west of Creswell Bay. Union River, which drains it, is quite broad. The lake has two small islands along the north side near the river outlet. A small flat peninsula juts out from the west side of the lake, and three small low islets are south of it. A broad inlet or chain of lakes extends westward through the mountain range from the northwest corner of Stanwell-Fletcher Lake. This inlet, lined by high mountains, disappeared in the distance near the west coast, and should be investigated some day because it may possibly reach the west coast. In that case, the southern end of Somerset Island would actually be a separate island. The large mass of loose ice still in Stanwell-Fletcher Lake, when other lakes were ice-free, may possibly indicate the lack of a current. Therefore, this body of water may not be a river and lake, but a strait.

Several streams flow into the north side of Stanwell-Fletcher Lake, across a broad, lake-dotted lowland, and empty with delta mouths into shallow water. One large stream enters the southwest corner of the lake, flowing in a broad valley at the base of the mountain range to the westward.

A previously unknown mountain range rises very abruptly along the west side of Stanwell-Fletcher Lake. It has a steep escarpment and rugged, rounded hills forming a north-south range. Its elevation is around 2,000 feet. It extends far to the northward, being joined by a lower plateau from the eastward, and also extends southward into the lower hilly country, but its extension was lost in the clouds. My excitement over this new range resulted in it being named the Lew Robinson Range by the crew.

On Boothia Peninsula, minor changes were made on the west coast and a few details added in the interior. The Tasmania Islands are more numerous than mapped. In addition to the large major island, there is one small island to the north, and seven smaller, irregular-shaped islands to the west. Most of the islands have a northwest-southwest trend, and the larger ones are relatively high

- 16 -

and rugged. East of Pasley Bay, a definite escarpment marks the edge of the Precambrian rocks, and rises abruptly above the flat tundra lowland along the coast.

No attempt was made to do accurate mapping work during several flights over the mainland between Yellowknife and Bathurst Inlet and west to the Coppermine River, since we felt that this would soon be done much more accurately by aerial photography. The whole region is a maze of small lakes, and since it is unmapped, there were few features by which to orient oneself.

A very large unmapped lake was noted about 60 miles east of the Coppermine River, where it is joined by the Hepburn River. It is very long from northwest to southeast, and has several large islands in the centre, each having steep eastward-facing escarpments and a more gentle slope down to the west. Contwoyto Lake is in the region as mapped, and is fully as large as shown. It is even possible that the southeastern arm extends farther than mapped. It has a fairly regular shoreline, and few islands, unlike other lakes in this region, and would appear to be a good base lake for future geodetic work in this region.

Several unmapped rivers of notable size drain northward to Melville Sound from the rolling country east of Bathurst Inlet. Elu Inlet, at the eastern end of Melville Sound, has little relation to its present mapped appearance. A narrow channel between islands and peninsulas joins the broad eastern part of the Bay to the western section. The eastern side has numerous small islands along the southern shore and much shallow water.

GEOLOGY.

A geologist and his assistant accompanied flights of Expedition Polco, and their reports will undoubtedly deal with the technical results of their work. My observations can only be of general nature and indicate places for further interesting geological study.

On the mainland, one of the interesting regions is that around the large unknown north-south lake east of Coppermine. There

- 17 -

one finds a dipping formation similar to that described in the Coppermine Series farther north, but the escarpments all face towards the east. The structure involved there would make an intriguing problem, for folding within the dipping formation could be noted from the air.

On Prince of Wales Island, observations indicate some changes needed in the Geological Map of Canada and the possibility of further geological discovery in the northeastern part of the island. The west side of Browne Bay is not Precambrian as mapped, but has a narrow lowland without noticeable exposures, and a steep red sandstone escarpment all along the western side. Since the colour of the exposed rock and general surface changes north of Fortier Inlet, it is quite possible that another layer of rock caps the sandstone to the north. At Allen Lake, Dr. Fortier found limestone capping the hills, and no sandstone in place, although it was everywhere in the stream valleys in disintegrated slabs. He also found a few poor fossils. It may thus be postulated that the southern and lower part of the central plateau is sandstone, and that the northern and higher part of the plateau has an additional limestone layer.

The islands in the mouth of Browne Bay appear to be Precambrian, and rocks of a similar character form the mountains along the coast to the north as far as Back Bay. Between the mountains of the coast and the sedimentary central plateau there is a broad lowland which may be the result of emergence.

On Somerset Island, it would appear that the eastern limit of Precambrian rocks was formed by the escarpment of Lew Robinson Range west of Stanwell-Fletcher Lake. West of this range, rugged hills could be seen, and east of it, and northeast of the lake, there was a rolling sedimentary plateau. Between the two, and north of the lake, there was a broad lowland, which narrowed to the north.

Between Fort Ross, which is also on the contact of the Precambrian and sedimentary, and Stanwell-Fletcher Lake, the line is difficult to determine. The topography seen about half-way between

the two was similar to that of the sedimentary plateau of Prince of Wales Island, but the weathered rock looked very much like the rocks of Precambrian age seen in northern Boothia Peninsula around Bellot Strait. Ground investigation would be needed to determine whether the Precambrian swings to the east, south of Stanwell-Fletcher Lake, or whether it continues straight south of the west end (as indicated by the escarpment) and then swings eastward close to Fort Ross.

On the west side of Boothia Peninsula, the Precambrian line should be mapped farther southward and westward. The Tasmania Islands have a Precambrian topographic character, and the mainland behind them has the same appearance. The southern head of Wrottesley Inlet also has a Precambrian character, with some interesting folding. The western side of the Precambrian forms a marked escarpment just east of the head of Pasley Bay, and could be clearly seen from an altitude of 500 feet above the mouth of the Bay. The line would appear to come out to the coast somewhere south of, and close to, Wrottesley Inlet.

ICE CONDITIONS

All lakes between Yellowknife and Bathurst Inlet were open on August 19. A few small patches of snow were noted on northern slopes, especially near Bathurst Inlet, and they were more numerous south of Kent Peninsula. There was no ice in Dease Strait or east of Kent Peninsula.

M'Clintock Channel was solidly jammed with heavy pack-ice on each flight over it from August 21 to August 26. There were a few hundred yards of open water along the shallow shores of northeastern Victoria Island, but grounded floes on the beaches and loose ice in most of the bays. Between the coast and Gateshead Island there were a few small open areas, but no long leads which would permit navigation except perhaps by heavy ice-breaker at a slow rate. The ice in this section was crowded together more solidly than in M'Clintock Channel to the eastward. There was loose ice around Gateshead Island and open water between the small islets off the west shore. Solid ice floes surrounded the David Islands to the north of Gateshead Island.

The pack-ice of M'Clintock Channel had a few open areas, perhaps 200 yards across, and some short leads between floes near the centre of the channel. Some of the floes were a mile or more in width and unbroken. They were blue in colour and covered with white snow. Often, ridges marked places where the ice had rafted to additional thickness. Sometimes a few yards of open water would separate one broad floe from another, so that the ice was not a complete solid mass. No movement was apparent during the brief view obtained from the plane.

The pack-ice was loose around Cape Swinburne, Prince of Wales Island, and a strip of open water, lined with grounded floes, extended a quarter-mile offshore. Loose ice was in the inlet between Cape Swinburne Island and the mainland.

The small shallow lakes on Prince of Wales Island were ice-free during August 21 to August 23. There was no snow on the ground except that which fell in the northeastern part during the evening of August 22.

Franklin Strait, southeast of Tasmania Islands, was jammed full of pack-ice similar to that in M'Clintock Channel. The ice was looser to the northeast, where it probably could have been navigated by small boats. On August 22, the ice was packed off the coast at Guillemard Inlet, but there was no ice in the inner harbour. On the next day, the ice had moved farther to the east and the whole outer Bay was ice-free. There was much loose ice in the central part of Browne Bay, and in Peel Channel to the east, but none in the inlets on the west and north side of the Bay.

The ice jammed against the rugged coast of Boothia Peninsula north of Tasmania Islands. Heavy pack-ice filled Wrottesley Inlet to its head, and could be seen in other inlets to the north. Pasley Bay, which had been open in mid-August, had much loose ice in both north and south arms on August 26, but an island near the entrance kept the shallow central arm free. Snow covered many slopes on northwestern Boothia Peninsula.

There was a great contrast in ice conditions between the

western and eastern ends of Bellot Strait. The western end had heavy ice, and there was much loose ice in the Strait, but Brentford Bay was entirely ice-free. There was loose ice around Fort Ross, moved by the tides, and much grounded ice on the shore. No ice could be seen for at least 10 miles eastward in Prince Regent Inlet, and there was none seen along the eastern shore of Somerset Island.

Stanwell-Fletcher Lake in south-central Somerset Island was almost full of ice except for a section in the northwest corner. The ice was packed solidly in the southern and eastern part and appeared to be very little broken up. The Union River could not be seen clearly to determine if ice was being carried from the lake. Other smaller lakes to the south contained no ice, but there was old snow on many slopes of the rugged hills.

Albert Edward Bay was entirely free of ice during late August, but Victoria Strait was packed solidly with pack-ice in mid-August. On August 26, snow covered all of the high ridges and northern slopes north of Cambridge Bay, and was also common on Collinson Peninsula.

Ice formed on a small lake at Cambridge Bay on August 25, when the temperature dropped to 30°F. It melted, however, during the following morning. New ice was also reported on a lake southwest of Brentford Bay on August 26.

VEGETATION

The tree-line, as mapped on the 8-mile Air Navigation sheets, is reasonably accurate north of Great Slave Lake. Trees begin to thin out north of the McRae River, where they are found only in sheltered places and on the deltas of small rivers. Shrubs grow along the slopes and at the base of eskers where no other shrubs are found in the area. Trees disappear around Mohawk Lake and only low shrubs grow in the well-drained sites. North of Jolly Lake, true tundra vegetation extends over all lowlands. The rock ridges are bare both within the forested zone and in the tundra.

Trees begin to disappear south of Courageous Lake, and none are found to the north of it. Small shrubs grow along esker

slopes south of Lac de Gras. Near Lockhart Lake, the tree-line is a very definite boundary - trees grow on the south side of the lake in some abundance, whereas none are found on the north side. Tree-cover is nowhere complete near the tree-line, but trees grow in extensive clumps in lowlands and in valleys between bare ridges. Farther south and westward, the trees creep higher up the slopes and soon cover all of the country. Stands are never dense, however.

At MacKay Lake there were small clumps of trees on the southern end of the lake, but no other trees in the area. Along the Coppermine River, trees extend farther north than in the surrounding country. East of the junction of the Coppermine and Hepburn Rivers, the trees grow in valleys and delta mouths of streams for about 10 miles from the river. In the valley of the Coppermine, trees grow everywhere along the river banks and on the lower slopes of the hills. The trees disappear around the west end of Point Lake, and from the air none were seen in the surrounding area. A clump of about one dozen spruce were found on the large island in Point Lake. They were short but about six inches in diameter, growing in a spongy swamp surrounded by heavy willow undergrowth. In wet valleys on this island, the dwarf willow spread out along the ground and grew to a height of two to three feet, making a difficult barrier for walking.

Vegetation on eastern Victoria Island is the typical tundra cover, in polygon formation, as found on the mainland. Vegetation, there, was not a complete a cover as on the grassy plains around Contwoyto Lake. Rock ridges and domes had no vegetation, but all lowlands and regions around lakes had a full vegetation cover.

On Prince of Wales Island, the southern part of the island was notably lacking in vegetation. A very large percentage of the surface was barren, disintegrated rock and gravel. Of all regions seen during the summer, this section had the least vegetation cover. There was some growth ringing the lakes, but otherwise the level plain was simply a large field of gravel. North of Fisher Lake, the

vegetative cover increases, and in the northeastern part of the island, around Allen Lake, it is just as complete as was seen near Cambridge Bay or Point Lake. Tundra vegetation grows on the gentle slopes of the stream valleys in the southern part of the central plateau, and on all but the upland rock hills in the northern part.

ANIMAL LIFE.

Few signs of animal life, or animals themselves, were seen during the summer's work. Low clouds and poor visibility limited the extent of country seen. Many flights were made at low elevations of under 1,000 feet, however, because of cloud cover, enabling us to see the ground quite clearly, although limiting the width of visibility. Powerful field glasses were used to scan the ground for any signs of movement.

On the mainland, other parties reported large herds of caribou migrating south into the woodlands, but we saw very few. One herd of about 100 was seen near MacKay Lake in late August. While we were camped at Point Lake, four caribou were seen grazing on the large island in the lake. Numerous trails were seen across the tundra north and south of Contwoyto Lake, but no animals were sighted.

A small herd of about six musk-oxen was seen by the crew while on an earlier flight in early August about 20 miles south of Bathurst Inlet. No further observations were made.

No animal life was seen in several trips across eastern Victoria Island, and visibility was consistently better in this area than elsewhere.

The only animal, other than birds, seen on Prince of Wales Island was a small polar caribou sighted near the head of Guillemard Inlet. The beast was unafraid, and approached quite near the party camped on the Inlet.

The rest of the island was searched carefully for signs of musk-oxen which were reported to live there, but none was seen, nor were there any trails. It is doubtful if the scanty vegetation of

- 23 -

of the southern part of the island would support any grazing animals. If they do exist on Prince of Wales Island it would be in the north central part, and it is doubtful if there are 1,500, which is the number suggested by Anderson in a government publication.

