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**GEODETIC SERVICE OF CANADA
DEPARTMENT OF MINES AND RESOURCES
OTTAWA, CANADA**

Report on areas of British Columbia, Yukon, Mackenzie and Franklin Districts visited in 1943 in connection with a program of astronomical observations for map control, required for preparation of Air Navigation Charts.

C.B.C. Donnelly - 1943

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ADDRESS REPLY TO
GEODETIC SURVEY OF CANADA

CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

QUOTE FILE:

Ottawa, November 17, 1943

The Dominion Geodesist,
OTTAWA

Dear Sir:

In carrying out your instructions for the current season, en passant, I may remark that I enjoyed the most pleasurable employment of my experience. This is to be a relation of an air voyage - leaving the technical aspect with the statistics thereof to an appendix hereto - a voyage which involved 12,000 miles or more of flying, and ranging over parts of the Northwest Territories, the Yukon, Victoria and Banks Islands. I am reminded, however, of the narrow margin that too frequently, perhaps, defines success or failure. Taking off at McMurray from a snye of the Clearwater, disaster was imminent. Having left the water, the floats failed to clear a sand bar a few feet high. Due to melting ice stranded in the spring break-up, the bar was saturated, so that while the floats cut trenches a foot deep in passage, the shock was, nevertheless, insufficient to wreck the craft. Faced by a cut-bank, necessitating a climbing turn, there flashed a moment of acute apprehension, as the plane hesitated in performance, and then - safety. As all the instruments and equipment were on board, my field season had a narrow escape. The total load, live and dead weight, was 1,162 lbs., so that no regulation had been violated. It was just one of those untoward occurrences that mark the path of an aircraft's life.

En route to Ft. Vermilion, photographs of the 25th Base line crossing Wabiskaw River were taken; owing to shallow water and "sand bars", we did not attempt a landing. This base line was opened in 1915, 28 years ago. It is interesting to note how clearly it remains a line after the lapse of such an interval. A line such as this provides an economical and excellent control for air mapping. South of Wabiskaw River the country is a well wooded rolling plateau, but on the north and west there are considerable areas of muskeg and swamp.

Ft. Vermilion, also in the clay belt, is practically unchanged in appearance, as yet uninfluenced by the influx of military activity, so rapidly changing the old familiar scenes of yesterday's frontier. But the smiling farm lands stretching southward to the Buffalo Hills tell a story of peaceful prosperity. North of the Peace River the country rises steadily to the Caribou Mountains, with little development, due undoubtedly, to the natural impediment of the Peace River, separating the hamlet from this possible culture.

We flew over the Caribou elevation en route to Buffalo Lake. The top is a well timbered plateau with numerous small lakes; the northern slope, however, is dry; drainage favouring the Peace River with little affection for the Hay. Buffalo Lake was too shallow to land in, although free of ice at this date, June 12th. A landing was made, however, in a neighbouring lake, named for the pilot, Buchan Lake. This lay in the heart of a well timbered undulating plain in the clay belt, profusely covered with aspen, burch and spruce. Buffalo Lake should never be used by aircraft. It is full of rocks, is shallow, and always dangerous in these respects.

Since our initial take off, we have now travelled 530 miles. From Buchan Lake we took the air road to Providence to refuel. Great Slave Lake was a sheet of ice, with shifting leads at the west end, and numerous large

floes of ice floating down the Mackenzie. Providence has its airport south of the village, and the usual colourful quota of military personnel. We followed the Horn River to Fawn Lake, situated in a well timbered rolling country, with considerable swamp, relieved by Horn Mountain, due west of the lake. Marten, mink, fox and lynx are plentiful, I was informed.

From here we flew over Horn Mountain to Simpson to refuel. Our next spot was Lac la Martre. This we attempted to reach from Simpson, but being unable to climb over Horn Mountain, we were eventually obliged to go around the south side of the elevation and landed at midnight on the west end of the lake. On account of shallows and reefs we were unable to approach the shore, so proceeded to a lake lying southwest, and after a laborious effort made the shore and camp. This area is a sheet of timbered swamp, a dreary country, altogether uninspiring. The west end of Lac la Martre is mapped aerially in good position. Thence a 50-minute flight to Tache Lakes, erroneously mapped too far east, and much different in actuality to their map delineation. These lakes are in terrain rising steadily to the Franklin Mountains fringing the right bank of the Mackenzie River. Thence a fast fading gasoline supply landed us at Wrigley, with but 5 minutes to spare. At this point we had air-voyaged 1,800 miles. En route to Wrigley we crossed Blackwater Lake noting the winter tractor road, and supply base, to Great Bear Lake.

We returned to Blackwater to observe a spot. This is a pleasing lake in high land, bordered on the west by Franklin Mountains, cut through by Blackwater River which drains the lake to the Mackenzie. The lake was entirely free of ice on June 17th. There are numerous sandy beaches and the area is well timbered. Aspen has disappeared from the flora, though birch is still in evidence in this latitude.

Thence we turned south to Greasy Lake, a small lake, bordered by swamp, well timbered, shaped like a man in appearance. Greasy Lake is southwest of Wrigley about 70 miles. Thence we went to Norman Wells, refuelled, and took off for Smith Arm of Great Bear Lake, which observation showed to be mapped a considerable distance too far east. We are still in the timbered clay belt, but large areas of barrens are beginning to appear. Great Bear Lake was a sheet of ice at the time of our visit June 21st, but our small bay was clear enough for a landing. A change of wind again filled the bay, but we were able to shelter the craft in a small inlet, until a fortuitous change of wind again afforded freedom. North of the Arm a swampy plateau reached towards Colville and des Bois Lakes; to the west the ground rises steadily to the Franklin Mountains, while to the east Grizzly Bear Mountains pierce the sky line.

From here, we took off for Tweed Lake, named for the Air Engineer. We had flown fuel to this point as a supply base. Tweed lies between Lac des Bois and Colville. Again we are in well wooded country, heavily rolling, with areas of swamp and muskeg. Smoke from far distant forest fires to the south obstructed us occasioned by south winds only.

Thence we flew northeast, crossing the Anderson River, flowing in a shallow valley at this place, and landed on McDiarmid Lake, nestling in rough country and in the clay belt. High head winds delayed our return to Tweed Lake; however, when the wind had dropped, thick smoke replaced it, to such effect that we got lost; our compass being entirely unreliable due to the small horizontal force of these latitudes probably. Actually, the compass needle frequently rotated a full 360 degrees in its erratic gyrations, but the gyro compass provides a steady reliable guide. As we had little gasoline supply left in the tanks, I asked the pilot to land, set up a transit, obtained a position from the sun, plotted the position on the map, and as I had previously observed at Tweed Lake, we were able to determine a straight course for our temporary base, landing with all but empty tanks. Subsequently, I was much amused at the careful supervision the young Air Engineer exercised when, on the eve of departure, we loaded the plane for some wilderness point. "Have you got your clock on board? Better take a spare and your watches. Are you sure you have all your papers and your logs?" But the Ephemeris bogged him down. This he referred to as the book with all the numbers in it. Actually, the crew morale was much improved by this little incident, as being lost is an ever present hazard, impressed on them by the frequency of its

occurrence. But this was the only time it happened to us. On the Yukon side, there have been many tragedies from this cause. We had passed within 20 miles of Lac des Bois and failed to see it through the smoke. It had been the intention to observe on both Lac des Bois and Colville Lakes, but ice conditions forbade it. Tweed Lake happily lay between the lakes, approximately distant 8 miles from each, so that an observation here could serve the dual purpose. West of Anderson River we flew over a mass of small lakes in undulating land with much muskeg; Anderson River borders the sharp change to broken country. The Tweed Lake observation showed that Colville and Lac des Bois are mapped a long way too far east, although their shapes are quite good. En route to Arctic Red River we landed at Patricia Berry Lake to observe a spot, with a view to closing the gap of control provided by Tweed Lake on the east and Mackenzie River on the west. This lake lies in a rolling country, the last residue of the Franklin Mountains which has fallen away to the Mackenzie plain. Patricia Berry, still in clay, is in a well wooded area. All spruce, with no aspen or birch. Thence we flew to Arctic Red River to refuel and reorganize. This took a few hours. It was necessary to charter a gas boat to take fuel and oil to Bill McNeil's small trading post at the mouth of Thunder River, 90 miles upstream from Arctic Red. This was vastly cheaper than flying the fuel. With this supply suitably cached I hoped to complete observations in this area, including one in the vicinity of Letty Harbour, situated on the long peninsula jutting out into Amundsen Gulf, and terminating in Cape Parry. We stayed overnight at Thunder River and heard an amazing story from the principals, the actors in an epic of northern surgery. One night Mrs. McNeil sent an urgent message to George Hurst, a trapper, living hard by in a modest cabin, to the effect that her husband Bill was dying in extreme agony. This was no exaggeration. Bill was dying from bladder obstruction, the suppression causing intense pain. The dying man was seated on a kitchen chair and urged George to operate, begging him to "cut" him. Unable to resist the suffering man's pleadings, and recognizing the imminence of obvious death, George decided to comply. The primitive surgeon went to work with a bottle of iodine and a safety razor blade, his sole equipment, other than a flashlight held in position by old Moses, an Indian, to whom the horror of the situation was of little concern, the members of the household having fled the tragic scene. The first several cuts were ineffective. Incisions I should say, perhaps, but this was too pitifully crude to warrant such dignity. Another guess, however, found the bladder, and the immediately consequent gushing emission brought instant relief from pain, and present safety from death. George's task, however, was yet incomplete. It remained to move the patient to Aklavik, which he did. I saw both principals and advised Bill, who was far from strong, to go to Edmonton to complete his restoration to health so hardily begun. This he did I am glad to say.

I may mention that on the east side of the Mackenzie River between Thunder River and Arctic Red there are numerous beaver houses. No hunter has any difficulty obtaining his beaver quota. The pelt is plentiful, but George had to forego this spring hunt, due to an irregularity on his part, promptly punished by the police, whose vigilance and enforcement are worthy of the gratitude of those offices whose duty it is to administer these affairs. In truth, it is a pleasurable duty to acknowledge the practical aid, guidance and information I always received at the hands of the police.

Leaving Thunder River we landed at Charles Hyndman Lake, a beauty spot in a rolling well timbered country, 350 feet above the Mackenzie. At a few thousand feet altitude Anderson River is visible. There is a well defined horseshoe lake near Charles Hyndman to the south, which makes an excellent landmark. Thence to Crossley Lakes, to which base we flew a gas supply. These form a series of 4 lakes lying north and south very nearly. They drain south to a river which in turn flows eastward to the Anderson. These lakes are in distinctive isolation, easily found, if sought, by following the Anderson, from which they are readily seen. The lakes are shallow. Aircraft must be careful. The country is swampy, well wooded, however, and a gently undulating plateau reaches out in all directions.

Having completed the work at Crossley Lakes, we decided to make a flip for Cape Parry. As it was only July 8 we were apprehensive about ice

conditions, but with full tanks and spare gas in 10-gallon containers we took off. In twenty minutes we bade farewell to the forests and emerged over the sunlit barrens. A beautiful sight. A limitless air view. The canyon of the Anderson River breaking the ground line, the Smoking Mountains, the sky line, the panorama of uninterrupted space. I was awed, I felt very much alone. A droning speck in a vast receding expanse of wilderness which we were invading. I realized the friendship of trees in a moment. We crossed the Anderson River, here it flowed through a gorge cut by the ages through gravelly clay overburden, the ground rolling roughly away to a height narrowly separating it from the Horton which parallels the Arctic coast, as if feeling its gentle way for the moment of union, unwilling to merge its waters with the inhospitable Arctic. After crossing the Anderson there is little opportunity in the event of forced landing. Small lakes exist to sit down on, out of which, however, a craft could not possibly take off. We could see Eskimo Lakes in the distance. The ocean was a sea of ice; we crossed the coast west of Cape Parry peninsula, crossed Franklin Bay, and thence north. The southern part of the peninsula is a mass of small lakes, many of which were open. Letty Harbour, however, our destination, was full of floe ice, but Wright Bay, southwest, was clear.

The bay has a long narrow neck, which chokes the ice and keeps it free. The country is high and hilly, with a clay gravel and much evidence of glacial drift, resulting in boulder deposit. We saw a few caribou. June is the coast month for Caribou, but towards the end of the month they retreat to higher ground. Flowers were in bloom on July 8th. The growth is rapid and luxurious under the rays of a never setting summer sun. At Wright Bay we experienced much inconvenience from fog. The thermometer seldom rose above 50° F., but when it did fog followed in calm weather. It blankets the scene with a suddenness disconcerting and depressing. Fifteen minutes on one occasion witnessed the transition from a bright blue sky to an impenetrable mist. Flyers in these regions must be extremely wary in respect of this menace. Generally, throughout Canada, an east wind means a falling barometer and rain follows; but along the coast and north along the west coast of Victoria Island and also at Banks Island, the east wind always, without fail, brought clear weather, fine days. The same occurred at Shingle Point and Kay Point. Wright Bay has been an old Eskimo camp site, and I found several hardwood boards 3 inches thick, which could only have come from ships, giving rise to speculation, envisioning the bay as a whaling winter base. It is ideally suited to such a purpose, owing to the sheltered nature of its disposition.

I believe this site is suitable for a large airport. The ground on the north shore of the bay is aptly formed for runways, and all the construction necessities for a port. If we consider the demands of post-war intercontinental commercial flying, and also the coastal air traffic of our own domestic requirements, the site presents attractions. The coast is a natural guide line, particularly in the dark months of winter. This means of contact flying proved particularly useful to Watt Berry when he once made the hazardous winter flight from Coppermine to Letty Harbour, and Charles Lindbergh on his way westward to the Orient in 1931 favoured the coastal guide line. The air route from Edmonton to Moscow could possibly favour such a base.

Airports for local needs, and refuelling and repair purposes, where deemed necessary in the areas northwest and south of Great Bear Lake, can be chosen with a minimum of difficulty, but within the limits of the pre-cambrian shield, as for instance, east of Great Bear Lake, the opportunities for airport sites are few indeed. Even the facilities for float planes along the ideal route afforded by the Mackenzie River are unable to cope with the competition of wheeled craft. Airports are now cleared with such ease and speed, due to the weight moving power of the Bulldozer, that only two weeks or even less are sufficient to make a landing strip in the wilderness. Just a few years ago President Roosevelt spoke of an intended production of 20,000 planes a year, whereat the world gasped. Last month the United States produced planes at the rate of 200,000 a year. So we must think and plan in terms of flying. The Mackenzie River Basin is developing rapidly. The northwest corner of the Northwest Territories, Victoria Island, Banks Island and the islands north thereof, in my humble opinion, are going to be stepping stones in the path of a busy flying world. Into this picture, the Eskimo can admirably find a place. Let us consider his economic value. The hazards of commercial polar flying can be considerably reduced if, in the event of forced landing, some competent

person on board is able to take charge of ground existence pending rescue. Such competence could be provided by an Eskimo crew man, employed, for instance, as air engineer. Consider the vulnerability of women passengers, or aged passengers, or even fit young men, if called upon to suddenly face the facts of a polar or sub-polar forced landing. Consider the insurance charges on a plane with or without a crewman competent to deal with the problems of housing and hunting consequent upon forced landing.

Primitive peoples live by their hands. The fruits of the chase are, themselves, fashioned into implements for warmth and construction, for tools and traps. The hide of the caribou is clothing and bedding, the horns of the musk ox make a bow, the ivory of the walrus tips a spear, bones make knives under a deft hand. Primitive peoples, therefore, live by their hands. The hands learn thus to make and fashion with dexterity. The Eskimo, highly developed in the use of their hands, are thus natural mechanics. Trained, they could fit into the scheme of polar flying with economic success. Aklavik and Coppermine are good centres for airplane rigging and engine training schools for young Eskimo boys whose qualifications need only be ability to speak and understand English. The Mission School could begin the first part of an engine training, and the hangar could then forward it to completion. It is costing Canada much in time, money and effort to restore the Indian to the economic life of the country; with the Eskimo we are about to introduce to his country a new industry or enterprise; we will find that we will be obliged by the force of nature to employ him; it remains for us to employ him with economy, without entirely weaning him from his way of life, for that is his principal asset which commends his services to the problems of polar flying.

I shot a specie of black duck at Wright Bay, weighing about 4 pounds; drawing the birds showed that nature had not equipped them with a crop. They were supplied with a hard gristly corrugated gullet, which I thought was intended to replace and perform the functions of the crop. The country in the vicinity of the bay is rough, hilly and stony, with a grassy verdure, and some buck brush in low swampy depressions. The southern end of the peninsula falls away to a nearly level lake-filled plain, but to the north the ground is rugged. I was astonished to happily find a scant supply of driftwood in Wright Bay, presumably from the Mackenzie. It had not been transported by the Eskimo, because its disposition along the high-water mark of the beach precluded that supposition. The tidal flow was very nearly 3 feet, the temperature of the water 40° F. and less. The cliffs of the south end of Banks Island were clearly visible in the air. We could not sail across, however, much as we would have liked to, as we had insufficient fuel, postponing the visit, perforce, to a later date of the season. We flew over the lonely tenantless Hudson's Bay Company's Post at Letty Harbour, taking photographs and commented on the bleak dreary prospect of the unfortunate who was to spend the long dark winter there in charge of the post.

We turned back from Wright Bay with some regret, and had sufficient fuel to deflect our return course to the Crossley Lake base and drop down on Anderson River to observe a spot. Flying down the Anderson River we saw a schooner high and dry upright on a goose grass flats. Upon inquiry at a later date at Aklavik, we learned that the schooner was a stove-in derelict wrecked and carried away by the ice. We flew down the Anderson until we found a suitable widening of the valley to permit a landing. We landed beside two families of swans. The birds were very tame, but our guns were not irresponsible. The river here was broad and deep, just emerging from the rugged nature of the barrens through which it had cut deep gorges, into the flats heralding its approach to the delta. To the west the ground was nearly level and swampy; to the east the last high banks of pinkish gravel had floated down to disappear, but beyond the barrens rolled away in arrogant splendour. This is a country that could well support limitless herds of caribou and domesticated reindeer to play an important economic role in the air development of northern flying. Close to the delta, distant about 60 miles, en route to Aklavik, and only 60 miles or so to the timbered lands, contiguous to the shelter afforded by rolling and broken lands, we find a potential habitat lending itself in all respects as a base for the supervision of extensive herds. No doubt there are innumerable such spots, as for instance, at the edge of the wooded limit in the vicinity of Fort Confidence, another ideal spot to centralize a supervised range. Grazing herbage, commonly called

tundra, or tundra grass, is of a light green turning to brown colour and coarse texture, also there is a gray moss named caribou moss which affords feed. Tundra is a Russian word, not properly applicable to our barrens. The word means a marshy plain, and our barrens are not marshy, although due to frost underlying the tundra growth, surface water is unable to seep, and drainage flows but a foot or so beneath the surface, giving rise to a spongy wet depression as the weight of the foot is asserted. This conditions is not general; it seems to occur only on sloping land, contiguous to water areas; on top of the plateau it is replaced by firm grassy land, and this, to my mind, is a more correct visualization of the barrens. Barrens is a repelling name, however, to describe a treeless plain, which in its summer garment, is a phenomenon of inspiring beauty.

Many thousands of geese flock to the delta of Anderson River, and there await favourable conditions on Bank Island, their ultimate nesting destination.

We returned to Crossley Lakes retrieving parts of equipment and supplies cached there, and then to Arctic Red to refuel; that same evening we tied up at Aklavik, June 16, having now flown 8,000 miles.

Aklavik is a thriving centre. Dr. Livingstone is experimenting, successfully I believe, with a milking herd of cattle. There are two missions, a wireless installation, operated by the Department of Transport, a modest hotel and several traders, one of whom, I was informed, was income taxed \$17,000. This, from an independent trader, bespeaks a business of no mean order. Obviously there is an immense amount of wealth in the delta, contributed mostly I suggest by the humble little muskrat. I asked an Eskimo, casually, the extent of his spring rat hunt. Apologetically, he replied he had made a poor hunt, only securing 1,900, but that the spring before the last he had made a normal kill of 5,000. At \$1.80 per pelt, here was a resource of \$9,000 in a six weeks period of lawful hunting. This may appear, superficially, to be an abnormal claim, but years ago I wintered at Aklavik, and photographed a canoe load of rats (400), the result of a single night's hunt. I respectfully suggest that this is too much wealth to take annually from this bountiful natural resource. There is a possible danger of serious depletion. As mink subsist mainly on rats, a depletion in rats would affect the survival of mink, also a fine source of wealth to the delta hunters. There are several effective means of curtailing excessive hunting of rats. A quota system as applied to marten and beaver is one effective method. Another is to outlaw the outboard motor, and the 22 calibre rifle, or both these engines of destruction. A canoe hunter with an outboard motor is able to cover too much territory in his peregrinations to the detriment of the rat. The rifle used in conjunction with the hunter's ability to "Call" becomes truly deadly. Now if we remember that this general killing takes place during the mating season, full advantage of which is exploited by the "call", we can readily see how supinely the rat falls victim to the hunter so equipped, and the waste engendered by the fact that the female may be heavy with young at the time of her death. Aklavik, no doubt, will soon be equipped with an airport. These regions are becoming more and more accessible to "whites" always very ready to "clean out" a good district, so that it appears to me this question of conservation might be given further consideration. I saw Indians and Eskimo carrying bills of \$100 denomination, and dining in the restaurant with their wives and children at \$1.00 a meal each, this despite the facilities of their camps located within a few minutes walk of the hotel. Reindeer meat was served in the restaurant. The carcasses had been lawfully purchased, I was informed, from the authorities; but it would be a good thing to suspend butchering and sales necessary, I presume, to maintain herds of a size compatible with the field staff available for their supervision. But it occurs to me that the release of excess reindeer to permit them to fend for themselves as do the caribou in the wilderness state, might result in populating the barrens with a good resource.

Military activity had not yet reached Aklavik at the time of my visit. The first boat arrived and an idle passenger engaged in conversation, an overall clad casual spectator on the bank of the river, one of many assembled to witness the hustle and bustle of arrival. "Are you going out"

asked the passenger, "I wish the hell I was" replied the priest, for such indeed he was, "Oh" said the passenger, "Then you are located here", "Why hell" said the good man, "I run the mission here". Yes sir, he was Irish. I thought this little story of excellent vintage, expressing a spontaneous unembarrassed freedom of thought and movement, typical of the North, and indicative of the inner meaning of democracy, not from a political, but from a strictly human point of view.

From Aklavik we took off for Shingle Point, our next spot. The Arctic shore here is about 60 feet high, surmounted by an undulating plateau rising uniformly to the mountains at no great distance to the south. The point is hardly a point any longer, the westerly anchor is covered when a strong north wind blows and makes an island. Pathetic relics of its once flourishing mission speak of other days. The Hudson Bay Company is now abandoned and fast falling in ruin. Heavy north wind seas sweep the Shingle. On the side hill on the south side of the lagoon there remains the mute testimony of other days, a graveyard with many inscribed marble headstones. A paling fence encloses the last resting place of Lena, whose young husband makes a yearly pilgrimage to paint and freshen the sacred spot. The cardboard plate showing her name and age, and a simple prayer, the pathos of the misspelling, and the sad effort at printing, are all shielded under a piece of glass to protect the simple epitaph from the ravages of summer rains and the bitter blast of winter snows. The love and devotion in the wilderness setting, a wilderness emphasized by the decaying evidence of a one time habitation, give cause for contemplation, require a brief pause for reflection. Two families of Eskimo were encamped close by, hunting white whale. One man spoke English disconcertingly well. I was searching for a post which we had established there in 1923. This Eskimo advised "to prospect around a bit". He also spoke glibly of Latitude and Longitude, and asked to see my chronometer, which he named with faultless pronunciation. He was an Alaskan, seeking Canadian citizenship. He asked me for "a detailed map of the delta, as this would aid me considerably in my ratting". I asked for his name and address, but he wrote it down for me, choosing the back of my Chambers Logs. for the inscription, explaining "you are a busy man, and your log. book will continually remind you of your promise".

It is all clay belt in this vicinity, as at Kay Point our next spot, covered with tundra, but willows grow in the well watered valleys of some but not all rivers. The growth is more profuse the deeper and narrower the cleft.

We could not land at Kay Point itself. There were numerous bars and built up spits in evidence, so we circled the bay of Babbage River. The delta was silted up, as well as the bay, in consequence, we landed 3 miles off the coast, and much difficulty getting to the shore on account of shallows. An Eskimo formerly encamped on the shore aided us by direction to a narrow channel, by means of which we were able to follow through to a beaching, sheltered from the waves, but not from the wind. Fortunately, the tide was at the flow; without this condition the approach is almost impossible. We received caribou from the Eskimo, perfectly frozen in a natural frigidaire, a hole in a side hill. They were making a komatic sled from Mackenzie driftwood, deposited in great quantity along this coast. Most of it comes from the Liard River, brought about by rapid erosion of its muddy banks in the spring freshets. They also offered us seal caught in a fish net, evidently when in pursuit of fish already gilled. We, in turn, offered them tea and cornflakes, which they much appreciated. There was an auxiliary schooner cast upon the beach by the ice. The engine and hull appeared to be in good condition. The Eskimo could not identify it, meaning it must have come a long way. Caribou are plentiful along the coast in June, but in July they retreat to the hilly country.

We returned to Aklavik, taking off under hazardous circumstances. Taxing out to sea, we found the waves high. We attempted a take-off, but the floats were striking with such force that we desisted; in the lee of Kay Point, the waves were less high. After a long run, flanked by bars we took the air for Aklavik.

Every fall, I understand, there is a general exodus of hunters to the mountains for caribou, and the slaughter is extensive. One couple

blandly informed me of its modest requirements - 150 carcasses. Perhaps, this might bear investigation by the constituted authorities.

In order to comply with the regulations of the Department of Transport the pilot had to undergo a medical examination, required every six months, so we were obliged to go to Yellowknife. Once a flourishing community, it was now inactive; only one mine, Consolidated Smelters, was then producing, doomed, however, to an early closing, owing to the demands of Selective Service on labour for more essential services.

Here we switched from a single-engined Norseman to a twin-engined Barclay, a beautiful all-aluminum ship, the principle of construction is that the structural strength is in the fuselage throughout. We also switched pilot and crew, and took on board Bill Windrum, Superintendent of Yellowknife Division of the Canadian Pacific Airlines, who elected to spend his summer holidays with us. He was a welcome addition, as I particularly wanted him to see the Arctic Islands' conditions, so that he could advise intelligently if and when further work is carried out in those distant regions. Obtaining the Barclay was an essential. I understand the regulations governing the operations of commercial aircraft, specify that only twin-engined craft may operate more than 50 miles off the mainland. However, I was glad of the gyro compass installation and the universal radio equipment, as we had hitherto been flying without these safety appliances in the Norseman. There was a crystal radio in the Norseman, but we had never been able to contact any base. After two forced landings we arrived at Coppermine, refuelling en route at Eldorado. Here the barges were loading \$1,000,000 worth of concentrate recovered from uranium ore or pitchblende. Sacked in 100-lb. lots, the shipment is barged to Norman and thence south on the Mackenzie. I was informed that a byproduct of the concentrate was used extensively in the manufacture of our "block busters". This was and is highly secretive, and no further details were divulged, despite my earnest and tactless questioning. Eldorado works 24 hours a day, and is supplied by an excellent float plane service from Yellowknife.

Upon arrival at Coppermine we refuelled and took off for Holman Island, situated at the northwest corner of Prince Albert Sound, arriving at about 10.30 P.M., July 31st. We flew a direct course set by gyro compass for Stapylton Bay, thence for Cape Baring, thence for Holman. Prince Albert Sound was choked with ice to the east, but the western end was open. South of Stapylton Bay, the country is a rolling plateau with sharp excarpments of rock exposed through erosion on the southern face, and falling north in even slopes to a plateau, to be again broken by a succeeding escarpment. There are many small lakes and numerous small rivers. Victoria Island is very rough as seen from the air. Mountains of good height relieve the sky line. I met no one at Coppermine or Holman who could describe anything of the interior. Travel appears to be coastal only, with perhaps comparatively short distance incursions inland. The Eskimo state that there are no musk ox on Victoria, but I think they are very much mistaken. The straits so easily traversed from the mainland in winter afford passage. Coloured fox, for instance, have crossed the straits after progressing into the mainland barrens, and while not numerous, have been trapped recently on Victoria, in numbers sufficient to indicate that their northern migration is to be a matter of permanence. Hence, white fox are going to suffer. The coloured fox are larger and swifter, so we may expect them to run down the white and devour them. Why then should Victoria be void of musk oxen? A glance at the map will show the utter lack of information in respect of the interior of Victoria. I was informed that native copper occurs in two places on Victoria. I take this opportunity of strongly recommending that Victoria be completely observed, photographed and mapped next summer, not only for needs of economic discovery, but for the immediate mapping requirements of post-war flying and the selection and construction of strategically located airports.

Having refuelled at Holman we left immediately, then 1.30 A.M., for Banks Island. Unable to reach Banks, owing to the rapid formation of a fog bank, we were forced down at Fort Collinson, but by 8 A.M. the fog cleared

off and we reached Banks, coming down at the head of De Salis Bay through a hole in the fog. Nelson Head was invisible through the blanket, but to the west and northwest rugged and even mountainous country was faintly discernible. Our pressing concern was to effect a landing, and we promised ourselves an exploration flight when the weather cleared. There is a natural basin, protected from ice and waves by a long and narrow sandpit. The basin is suitable for mooring schooners and float aircraft. I named it Windrum Anchorage for the Canadian Pacific Airlines Superintendent. An excellent site for an airport abuts the anchorage, with fresh water in abundance from two rivers entering the bay. The soil is of a fine texture, easily worked, and readily drained. The south end of Banks Island, mapped as Nelson Head, is a bold headland, which appeared to me to be 2,000 feet high and looked like a sheer cliff; the vicinity of Masik Pass is mountainous. Much ice drifted in Minto Inlet and Prince of Wales Strait, and off the south end of Banks Island. This was all local ice. We saw nothing of the Polar pack. We saw only one camp of Eskimo on a sandspit near Fort Collinson, the only sign of human habitation, save the mark between Holman and Banks. Owing to the limited gas supply - Edmonton records showed a good supply cached at Holman, but all of this supply, with the exception of six 45-gallon drums had been moved by Eskimo schooner to Cambridge Bay - we were unable to make an exploration flight of Banks Island, much to our disappointment. With adequate gas, we could easily have had a look at Prince Patrick Island. The Eskimo state that Banks Island is the principal breeding ground of the white fox. The tracks they observe in the early spring converge on that destination from all points. Spring feed afforded by the hordes of geese that flock the interior breeding grounds may account for the fox migration. Be that as it may, the island is a great source of wealth; the Banklanders, as the island Eskimo are termed, trade at Aklavik; from the vicinity of Nelson Head, they sail a course for Cape Parry, their principal landmark, navigating from the backward view of Nelson Head and the eventual forward view of Cape Parry. The Hudson's Bay Manager at Aklavik told me of a \$20,000 catch of white fox made on Banks Island by a single hunter, another who paid an income tax of \$900, and the late Mr. A.M. Perry, D.L.S., told me of an Eskimo family catching 700 fox on Victoria Island one winter, the winter of 1934-35, if I remember correctly.

Apropos of the tax above referred to, I was asked by several Eskimo if they could be lawfully income-taxed. This was a poser. As some of them were undoubtedly taxed, it must have been done under proper authority. On the other hand, it seems strange that wards of the Government, unworthy of the political franchise, should bear the burden of Government; yet, again, the citizens of the Northwest Territories exercise no vote, but this is from a different motive it seems. They have still the right; the exercise of the right is merely suspended, mainly, perhaps, on account of geographical difficulties interfering with the function of practical political assembly. It seems to me, however, from remarks I have heard here and there, that the people of the Northwest Territories will not be long in raising their voices for parliamentary representation.

The difficulties of assembly for the purpose of voting, resulting from the scattered nature of population, over very long distances, have now been largely overcome by the presence of airports and aircraft, which are the heralds of a new era. Possibly, nowhere in the world has a highway received the glamorous and spectacular advertisement as that lavished on the Alaska Highway, and not unjustly, but this is only the beginning of the great net of northern highways already in process of extension. Ft. Nelson to Norman; Norman Wells to Whitehorse, great arteries being added already, with the promise of feeders in many directions. The machinery and energy are in the country, in situ, as it were. The post-war tourist attractions of this country made available by the bulldozer, in startling contrast to the laborious building of the Burma Road, will, in my humble opinion, assume proportions, such that the industries, consequent upon a flowing tourist traffic, will emerge in ever growing volume and prosperity. It, therefore, seems to me that it is not a bit too early to select areas to set aside as national parks, in keeping with the wise policy in practice of setting aside national playgrounds.

As a preliminary to all development, irrespective of its nature, be it on the ground or in the air, the vital necessity of preparation

consists in laying down a net of precise or special surveys of base line accuracy, or even superior to that precision. Permanent monuments at frequent intervals are a means of registering all land transactions about to become numerous. Without the base of a definite system, it may well happen that confusion will result - if the precise net does not precede the rush of business activity. These surveys, following the lines of least resistance - the constructed highways - should be instituted without delay, so that all subsequent surveys of townsites, group lots, farms, mineral claims, parks, etc., may be completely tied in and registered by reference to the base net, each parcel or tract bearing a mapped relation to the other though far from abutting one another. I cannot stress too much the urgency of this work. In view of the rapidly expanding pattern of airports and natural float landing facilities, we must remember that the plane can now point its prop to any part of the compass. Thus the whole of the mainland northland is conquered and at the disposition of latent capital, which at the end of the war will be seeking its outlet.

On a fine day we left Banks to return to Holman. Due to an offshore wind we hugged the coast. Engine failure out of range of coastal protection entailing a forced landing in a heavy swell must always receive consideration. A dipped wing to be quickly expected in a swell will soon be followed by total loss. Flyers must resist the temptation to cross large bays when the wind is offshore. Fort Collinson affords good ship and plane Harbourage. The country is very hilly, rising to 700 feet, with escarpments of rock, split by frost, breaking the elevated surface in frowning appearance. We reached Holman to find the bay which we had left but a few days ago completely adrift with large and thick cakes of ice. An east wind had brought out floes from Prince Albert Sound, floating a field 15 miles wide and of an extent in length beyond the scope of estimate. Incidentally, an east wind is the fair weather wind in this locality. We were obliged, therefore, to land in a fresh water lake of good areage, $1\frac{1}{2}$ miles north of Holman, and there await a change of wind favourable for clearing the bay. I engaged Eskimo packers to carry the observing equipment and radio receiver, etc., over the $1\frac{1}{2}$ mile portage. The Hudson's Bay Company's Post is erroneously referred to as Holman Island. It is, however, located on Kings Bay, about 4 miles from Holman Island on the mainland. The site is flanked by mountains 1,000 feet high, tipped by precipitous cliffs of basalt, with much talus, due to the action of frost. They form an impressive and grandiose background to this little outpost of civilization.

By report, fog is more prevalent in the spring and summer as the air is rapidly warming, cold air sweeping over the lower warmed surface condenses the moisture content of the warm strata to form the phenomenon. A warm day typifies the action. It is almost always a sure advent of fog. A gentle vertical convolular air motion is an adjunct to give the wraith-like body depth, not too violent to effect dispersal, as a calm serene atmosphere seems to be the normal condition under which a fog bank occurs, frequently appearing with a suddenness that is startling. It is possible that the disposition of ocean currents allied with air currents are a traceable cause of the occurrence. A notable and established fact to the effect that considering any specific latitude, the western side of a continent is always warmer than the eastern, and further, that sea temperatures are generally cooler than land temperatures, give rise to the consequence of prevalence of westerly winds and the warmth stored up from the nature of their source. The Arctic is low in saline content due to slow evaporation obviously explained and the inrush of large freshwater streams. In freezing the salts are generally returned to the underlying water, but in continued hard frosts they appear in a crystallized form on the surface. This removed, the ice may be melted for drinking purposes, although it yet contains a considerable salt content, having been reduced by but $\frac{2}{3}$. Arctic seas, it must be observed, are low in saline content. The surface water is, therefore, light and tends to spread over the surface. This, by the way, is a contributory cause to the flow of current, a startling fact. Precipitation over the western islands is low, thus winter formations of ice and snow are carried off by summer heat and the land areas are cleanly exposed for the support of animal and floral growth. These western islands, unlike their sisters to the east, are low, precluding the formation of glaciers, which require in these latitudes an elevation of at least 4,000 feet to favour forming. The channels between the western islands are shallow, due to geological phenomena, and are, in consequence, usually ice locked. The total area of the Canadian

Island Archipelago is over half a million square miles, to which Victoria Island contributes 74,000. Just a casual view of these vast areas of islands and mainland, tundra covered, evokes the prospect of a vast reindeer industry.

Let us consider. A herd of reindeer normally doubles every 3 years. The barren land hides in a few odd corners something like three million head of caribou. Given a ranching impetus, surely it is not unreasonable to visualize ranchers possessing herds reaching to thirty million head or more. This animal domesticated since time immemorial has, unlike other domesticated wild life, retained his primitive instincts in the vital ways of self preservation. He needs no hay or man made shelter. He can survive and prosper in his natural habitat, oblivious to man made aid.

If the original idea fostered by the Government was to provide the Eskimo a means of sustenance, it, in itself, was a valuable step. The lead was given, and it seems to me now possible, by rigid conservation, to utilize the barrens to an extent undreamed of, using the natural resource of grazing space to advantage until such time as the plow once again claims precedence over areas allotted to the rancher. For the plow eventually will invade the barrens. Actually, within the Arctic circle cabbages grow faster and larger than in temperate zones, rate and progress of growth being subject to hours of sunlight, uninterrupted heat, rather than the length of summer in terms of months duration. Thus plant life flourishes in the barrens of the Arctic. The conversion of plant life to meat is the philosophy, employing the truth that meat or animal life is simply grain converted.

At Holman we were afforded several opportunities of summer seal hunting. The hunter, armed with rifle and harpoon spear, lands on a cake of ice, hauling the boat up, and patiently awaits the appearance of a seal's head, as he blows for air. A successful shot having slain the victim, he leaps for the boat and rows with frantic speed to harpoon the sinking carcass, at this time of the year, early August, bearing but a light thickness of blubber, about $\frac{3}{4}$ of an inch deep. This blanket is inadequate to support the body, which must, therefore, be speared to be retrieved. The liver is a delectable dish, particularly if flanked with bacon. The winter hunt differs greatly. By means of a specially trained dog employing perceptions not cognizant in the genus homo, the seals' blow holes are searched out and indicated to the hunter by his canine assistant. A hunter is stationed at each hole, and with poised spear, awaits with interminable patience, the blow. He stands, in a bent over posture, with his feet wrapped in the additional protection afforded by a polar bear hide. An essentiality to the success of the hunt demands that he keep his feet immovable, seal being very sensitive to the reverberations of the slightest frictional sound caused by moving them. He is at liberty, however, to call out or speak, to flog his arms in the interest of circulation. There may be a depth of snow 5 feet in extent covering the blow hole. Some hunters place a feather or a thin paper on the surface of the snow, a fluttering of which indicates that the seal is blowing, whereupon the hunter strikes. This stratagem is only practicable in calm atmosphere, of course, but strangely enough, this is the rule rather than the exception. Violent storms are infrequent in the Arctic, though hard drifting snow in light winds conduce to invisibility, and this is the main evil of the blizzard. Having speared the seal, if such be his good fortune, he must, with his knife, handily placed for the emergency, enlarge the blow hole for the withdrawal of his victim, very easily killed by a minor blow on the nose or head. The seal's flippers are equipped with sharp claws, and by means of the rapid agitation he can attain, he scrapes the ice newly forming, and thus maintains access to the outer world. An Eskimo woman with a 4-inch semi-circular knife, termed "oola", removed the hide and blubber in one unit, dressed the carcass, dismembered it, and then removed the blubber from the hide, in less than 3 minutes. The blood is jealously treasured. The huntress does not sit or squat to do her work, she stands, bending at the hips acutely forward in the execution of her art.

The large seal and the walrus do not, except in very rare instances, inhabit these waters. As has been stated, the channels between the islands forming this low plateau are shallow, due, perhaps, to erosion and faults occurring in the dim ages of antiquity; hence ice blocks them. To this is due the great difficulties of those hardy adventurers who sought the Northwest passage to the Pacific. Now, consider the natural habitat of walrus and

large seal. In the Eastern Arctic they thrive in abundance, and again so on the Alaskan side, seeming to indicate that they migrate by means of a deep water channel to the north of our ice-locked southern channels, possibly via Viscount Melville Strait, or even north of that.

Holman boasts a two-way wireless, operated by the Hudson's Bay Company, whose post manager has had a thorough training under the auspices of the Company. Holman is also a meteorological station, daily observations being made by the same agent.

One of the photographs in the appendix hereto shows an Eskimo-made caribou skin tent. In this dwelt an ancient dame in poverty and squalor. She told us of her tragedy. In the middle of the mouth of Prince Albert Sound is a clustered group of small islands. Many, many years ago, when she was a young, unmarried girl (presumably 70 years ago), her tribe, in toto, in the very early spring, repaired to these islands with their dogs to hunt seal. Unprecedentedly for that time of the year, the ice broke away from the islands, the gap widened and failed to close during the ensuing weeks and months. The seal source of supply was exhausted, to be followed by the dogs, and eventually, as the weaker slowly perished from hunger, they ghoulishly gave sustenance to the survivors. They made kyaks out of the material furnished by the komatick sleds and the hides available, but the wind blew with a velocity and persistence for months on end without cessation, raising waters incompatible with the sea-going property of the kyak. Thus gradually their energies faded into oblivion, until at the last only a very few lived to see the quietening of the waters and to effect their own rescue to the mainland; but, in the tragic interval, she had partaken in the gruesome repast, which followed upon the death by starvation of her own brother.

The vagaries of nature marooned the entire tribe, virtual extermination followed, and this, she explained, is the direct cause of the present depopulation of the Eskimo people in these areas. Sufficient time has not yet elapsed to rebuild it; but this is not altogether the cause. Eskimo families are now very small, in comparison to other times. The slaying of girl babies to preserve the balance between hunter and non-hunter population is largely responsible, coupled, no doubt, with the infusion of white-man diseases, undermining health in a climate that demands everything in the most rugged of constitutions.

Such is the story she told, however, she the sole remnant of that once prosperous tribe, to the accompaniment of tears streaming down her withered cheeks, tears of remorse, the saddest tears of all. Strange that the visible source of her grief had not long since dried up. Stranger still, that in that savage untutored breast the fires of remorse had found and held a harbourage throughout the long lapse of time, in realistic appreciation of the philosopher's dictum, in the still stranger shock, that "with the utmost ingenuity of metaphysics, and with all the amplification of travel, both by land and by sea (and now by air) a man can never escape from his past history".

We left Holman on August 6th south bound for Coppermine, but dropped down en route to observe a spot at Baffa Lake, which lies about 5 miles due east of Cape Ernest Kendal on Victoria Island. The formation is of the same general description. A rugged hilly country with the same greenish sheen of tundra rolling endlessly away to infinity. A pleasant flight over a fleecy bed of fluffy clouds, surmounted by a speckless azurite sky, took us to Coppermine. There are numerous installations at this place - missions, wireless, trader, police. There is no hospital. There is a hospital at Aklavik, thence we reach across to Pangnirtung on the southeasterly coast of Baffin Island, a distance of roughly 1,500 miles, before we come to the next hospital aid centre; in all this vast intervening space, there is no organization for the government of health beyond the elementary scope of first aid. Independent traders with schooner equipment set up shanty cabins at isolated points. This means that the Hudson's Bay Company is obliged to also set up competitive posts in the vicinity of those places. It follows that the Eskimo is too well served in the matter of his geographical convenience and insufficiently served economically, for this ruinous competition means immensely increased overhead. I have always believed that the Hudson's Bay Company should receive favoured treatment on account of its stability and permanence. Private traders are here today and gone tomorrow, prosperous today and bankrupt tomorrow. Would

it not be feasible to locate a metropolis of administration, centralizing an area of, say, 500 miles radius, at which would be located police, hospital, school, traders, wireless, airport, etc. This would effect the collection of the Eskimo population into units, and operate to the benefit of health and well-being.

We were a few days at Coppermine and having changed back to our single engined Norseman, and having replenished our supplies and fuel (actually, we had landed at Coppermine at the completion of the northern trip with but an hour's fuel in the tanks, having exhausted all the supply at Holman) took off for the headwaters of the Rae River. There were numerous lakes in this vicinity, but most of them were too shallow for a landing. We landed in Libby Lake, named for the Air Engineer. The formation here is an undulating plateau 800 feet above sea level. Thence we went to Bernard Harbour, apparently an Eskimo camp site since time immemorial. The harbour is a natural shelter protected by many islands which close off the bay from the fury of outside storms. The trading post is now abandoned, but the police cabin is maintained, well supplied with equipment to serve as a refuge for travellers and for police patrol. The wreck of a Ford snowmobile excites the imagination, as to the why and wherefore of its presence so far, far away from its formal sphere of life.

We returned to Coppermine and having refuelled, proceeded to the site of Fort Confidence, interrupted on the way by a forced landing, due to the blowout of an exhaust gasket and clamp. Here we unearthed an old palisaded grave, a few bones, and a wooden plaque, on which is painted in stencilled green an inscription in a good state of preservation - the paint having resisted erosion, so that the painted portions stand up in relief - "F.I. THINTEABET" 26th May '49. The plaque was nailed to an upright with hand-made wrought iron nails, and found buried under 18 inches of the accumulations of almost 100 years. Hard by were some of the weather beaten remnants of the dead hunter's toboggan. For such I presume he was one of Franklin's men. The ancient fireplace chimneys still stand surmounting the heaps of flat stone rubble that formed part of the buildings of the site. Large timber once flourished here, the axes that felled it are rusted and scattered, but the stumps still stand 15 inches in diameter, defiant of the attack of time, aided in the battle by the climatic cold of the region. The clearing is grown over with white willow, but trees have not intruded. The site was chosen with cunning in a narrows affording protection from the blast of Great Bear Lake. It is interesting to observe that Franklin chose rather to perpetuate abstract virtues in naming his bases than to honour the living or dead, inspiring names really, names which conceivably were prompted by the high morale with which the great explorer was bountifully imbued - Reliance, Confidence, Enterprise.

Leaving Confidence we flew to Eldorado to refuel, but were unable to land due to high wind driven waves. We landed, however, in nearby Cameron Bay. This town presents the appearance of a ghost town. Uninformed, one might imagine that the population had fled before the threat of pestilence. The exodus was due to the war measure of closing the mine; not a soul remained, not a vestige of life; many articles of value were left behind in the seeming stampede to evacuate. A casual visitor found a box of Coronas and two quarts of excellent rum on the beach, a conclusive evidence of the hurry to depart. We left immediately for Norman Wells, and thence for Good Hope, proceeding the next day to Arctic Red River, whence we took off for the headwaters of Rat River, our destination being Summit Lake. We found the lake suitably large for a landing, but not large enough for a take off. From later information obtained at Ottawa, it is conceivable that I mistook the examined lake for Summit Lake, although I had taken the precaution of consulting Louis Cardinal and a Mr. Clark; both have travelled the route repeatedly. The lake I examined does not conform in shape to the lake plotted on a map I have since seen, and mapped from aerial vertical photographs. The map delineation from this source should be conclusive, unless mountain shadows were so falling at the time of photography to practice a deception. As Summit Lake is an important topographic feature indicating the Northwest Territories-Yukon Boundary in this vicinity, an observation here is of first importance. I regret I was unaware of this important condition at the time of my visit, estimating the spot as of mapping necessity only, and perhaps justifiably considered it of secondary importance owing to its proximity to the Husky and Peel River control traverses. But for this, I may assure you, Sir, that I would have proceeded by canoe to secure the observation, which meant but a three-day voyage from McPherson.

Somewhat disheartened, we returned to Arctic Red River, refuelled, and proceeded to Good Hope. We proceeded next day to Wrigley, and thence to Foran Lake, a spot I had seen in the distance in 1942 en route to Dal Lake. Foran Lake lies in the heart of the Mackenzie Mountains, a spot of beauty, although the mountains fall far short of the elevations they reach to the west and southwest as they approach the divide. I think the area surrounding Dal and Foran Lakes might well be looked over by an appropriate officer, with a view to selection of a national park. The area is readily reached from the Mackenzie, and abounds with moose, caribou, grizzly bear, goats and sheep, the streams alive with trout, all set in surroundings of natural beauty, with which mountain scenery can usually be associated. There is another area in the vicinity of Tuchido Lakes, easily accessible from the Alaskan Highway, west of Nelson Airport, that embodies the best that all types of tourists can possibly demand. These areas are well worth examination for national park purposes.

From Foran Lake we returned to Wrigley Airport for fuel, thence to Wrigley itself to retrieve cached equipment, thence to Simpson. The following day we took off to refuel at Simpson Airport, situated 12 miles up the Liard River on the left bank thereof, thence to Watson Lake, and on to Whitehorse, landing on the Lewes River. Watson Lake Airport differed vastly in appearance on account of constructional improvement to its wilderness dress of 1941. The runways are second to none in Canada; the main runway is terminated at both ends by bays of the lake, adding beauty to its utility. The flight to Whitehorse was impressive as successive ridges of mountains slid by exposing the Wold Lake plateau, caught up and depressed from view by more mountain ranges, as the plane sped swiftly westward urged onward by a following wind.

We remained at Whitehorse for 5 days. The plane was requisitioned to search for a Fairchild 71 lost in the mountains north of Watson. It appears that an airlock in the fuel feed system occurred as the pilot switched from a consumed to a full tank, necessitating a dead engine landing on a mountain side. This he accomplished. Upon regaining consciousness, he walked 20 miles, having secured the crystal and mike of his radio set, very difficult to replace in these times, about his person. Arming himself with his rifle, and carrying his sleeping bag, he set out, and upon hearing the engine of the rescue plane, he removed and waved his white shirt, the effect of which was successful. A few more days at Whitehorse, and our engine had received a thorough top overhaul, although we were somewhat disconcerted to find an outboard engine starting rope wound around the throttle rod, discovered only when the cowling was removed.

Whitehorse belies its name. Set amongst beautiful surroundings, and curving gracefully on the Lewes River, overlooked by the spotlessly appointed airport on a natural plateau as if nature had herself fashioned it for its destined function, it is anything but white. Commerce has secured the town for its own, commerce in an ugly form, in an avaricious form. Money floats and circulates with an ease and with a total disregard for its worthy importance, as if there were no tomorrow, as if thrift had said goodbye for all time. I am informed that the maids at Whitehorse Inn receive \$75.00 a month for a six months period of service, and that they are flown in and out free of charge. This reflects the condition of the high cost of meals. As there is rail (narrow gauge) communication to Skagway, distant 90 miles, it is difficult to understand the extravagance, except to assume perhaps that as money is plentiful, extravagant demands are met for goods and services. The liquor line, converging on the door from both ends of the sidewalk, supervised by Canadian and U.S. Police, is a daily and common sight. I heard later that the Inn had been temporarily closed on insanitary grounds. Curiously, the present owner acquired the flourishing premises from two Japanese owners, having outdrawn or outbluffed them in the ancient North American pastime of poker, so rumour has it. From Whitehorse we went to Mayo Landing, flying the length of Lake Laberge, immortalized in The Cremation of Sam McGee, by Robert Service. A beautiful body of water, glinting in the sun of the late afternoon, and nestling in a groove, as if the wooded mountains had drawn apart to provide a place for a welcome visitor.

We crossed Salmon River and entering a broad plateau, traversed its length to cross Pelly River, again entering an extended plateau reaching almost to Mayo. The landing here was sticky, and the take off worse, as the river

was low and the run limited. An airport is in operation $1\frac{1}{2}$ miles north of the town, on the route from Whitehorse to Dawson and Fairbanks. The silver mine, located 40 miles from Mayo, and which gave rise to its boom, is now closed owing to war exigencies resulting in business paralysis. We bought Champagne and Burgundy (old stock) at Mayo, and promised ourselves a renewal, but in the interim the boat had paid the town a visit and had "cleaned out" everything delectable. We were furnished with large moose steaks for \$1.00 or so, but a side order of fresh tomatoes soared to 75 cents.

We left Mayo flying up towards the headwaters of Stewart River, branching up Canyon Creek, a tributary of the Hess, and sat down on Swan Lake, just a few miles west of its twin, Pleasant Lake. We took possession of a trapper's cabin, which posted a warning to the effect that a bear trap was set under the cache supported by 12-inch spruce poles. Upon investigation we found the trap with the grizzly's foot fast and chewed off in order to make his escape. He had bitten and clawed at least one-third of the way through the cache support poles.

The mountains at Swan Lake are not inspiring. Having completed our work at Swan, with due caution having regard to the possible presence of the grizzly in the neighbourhood, we took off for Pincuc Lake due north 100 miles or so. Unhappily, the clouds came down as we were nearing our goal, so that we could not rise above the peaks to command the view necessary to find the lake. The mountains here are a mass of formidable peaks, snow covered, and a perfect wilderness of disordered arrangement. We are near the divide. We descended the Bonnet Plume River, until fearful of the narrowing valley and low ceilinged clouds which were now enveloping the peaks, we turned back, with reluctance, to Swan Lake. One hundred miles of our journey had been over entirely dry land, and we were all unwilling to make a second attempt, even had we had the gas.

We then went to Ruth McDougall Lake to determine a spot set in mountainous surroundings, a large lake, probably 12 miles long by 2 wide. Thence we attempted to reach Sheldon Lakes, but were forced down by quick forming fog, which cleared later, enabling us to reach Sheldon Lakes, lying at the feet of their eternal guardian, Mount Sheldon. The oil pipe line from Whitehorse and highway located to pass here had not quite reached the spot, but we could hear, under favourable circumstances, the harsh clank and angry buzz of the bulldozers as they inexorably bored their way into the sanctuary of the mountain wilderness. There is a small trading post at Sheldon Lakes, supplied by plane, a few nondescript Indians, much game, but no trout, which have ceased making their appearance in these waters for the last four or five years.

From Sheldon we followed the Ross River northwest for 40 minutes to drop down on Itsi Lake, one of a chain of lakes in a narrow valley, lined with high mountains, snowcapped at this time of the year, early September. Thence we flew to June Lake, following the Christie Pass route, a marvel of scenic beauty, narrow valleys and broad plateaux, until crossing the divide at low altitude, we descended a tributary branch of the Kiele River, which we followed to the neighbourhood of Sekwi Canyon, seeking a route to June Lake, lying a little north of the Canyon. We saw a Fairchild 71 ten miles or so away, and following it, were led to the lake. I was much surprised to meet Guy Blanchet, who had charge of several camps locating the pipe line and highway. He looked well and hardy, having but just returned from a 200-mile pack train trip, no mean feat in this mountainous terrain. In one day he had seen five grizzlies, one of which had taken possession of a moose, fallen victim to his rifle, and to which he was then returning with horses to recover. However, the storming grizzly was speedily stopped by a fusillade of 303's. Blanchet left with the Fairchild that evening to distribute provisions to his scattered camps by flying low and dropping them out of the door. The plane returned in a couple of hours, less the door, which had been torn adrift by wind pressure, fortunately missing the tail plane assembly, a circumstance explained by the design of the craft, resulting in a "tail high" flying position. Gordon Turnbull and Suerdrup and Purcel maintain a supply depot at June Lake, from which pack trains distribute as necessary. One hundred and ten horses are engaged in this work. The depot lists every imaginable grocery one might see on the shelves of pre-war retail stores. The firm is

one of Surveyors and Engineers subsidiary to the U.S.E.D., the abbreviation of U.S. Engineering Department.

June Lake is another natural beauty spot amid high mountains, and might well be examined as the base of a national park.

The achievements of the oil pipe enterprise are the more marked on the Whitehorse section of the route. Progress here is better than on the Norman side, but I think it won't be long before the junction is made. I think it possible that, when once the line is an accomplished reality, a subsidiary spur may be drawn from the vicinity of June Lake to Mayo, Dawson and Fairbanks. The general flow of water in this direction is an indication of valley routes and the comparative ease of construction afforded by these natural conditions.

According to the Engineers' dictum, it is not necessary to confine the pipe to valley bottoms; in fact valley bottoms and side hill locations cause much trouble and endanger the line through shifting debris. Four thousand feet is the elevation quoted, provided it is practically adhered to, but a reasonably constant elevation is sought to avoid up and down inconsistencies, resulting in expense in construction and pumping. I am informed that the pipe line is being surface laid and not buried. Last winter sub zero weather at Whitehorse reached 71° F. and at Simpson, 70° F. As the oil must be pumped and will be delivered crude, I am at a loss to understand how this can be accomplished in this extreme climate, the factor of viscosity entering dominantly into the problem.

We left June Lake on September 8th, arriving in Edmonton on the 10th by way of Oba Lake, Watson, Ft. Nelson and Ft. St. John, each base representing stops for refuelling.

I thank you for affording me the opportunity of furthering the interests of the office and the Department in however humble a manner. And before terminating this voluminous report, I again wish to bring to your attention the sense of deep gratitude I feel towards your staff, and particularly Mr. McDiarmid for the unvarying willing assistance and kindly aid always ready, and always at my disposal.

I am,
Dear Sir,
Yours faithfully,

APPENDIX TO REPORT

Final returns consist of the following, for which astronomic positions have been supplied:-

Rae
Wasekamio Lake
Great Bear River at Great Bear Lake
Vicinity of McMurray, Alberta
Victory Lake, South of East End of Lac la Martre
Gypsum Point, Great Slave Lake

Tracings of these 6 spots were compiled from information available at the Surveyor General's Office, Ottawa, and the blue prints therefrom supplied to R.C.A.F. Headquarters before departure for the field, together with identifying aerial photographs obtained from the central photo library of the Mines Branch.

Wabiscaw River
Fort Vermilion

Tracings of the above 2 spots are filed in the office of the Dominion Geodesist; 7 blue prints of each were made for disposal by Mr. McDiarmid. The spots were visited in the field and identifying photographs obtained from the air.

The following list shows spots observed and photographed. Tracings are filed and 7 blue prints of each were made for disposal by Mr. McDiarmid.

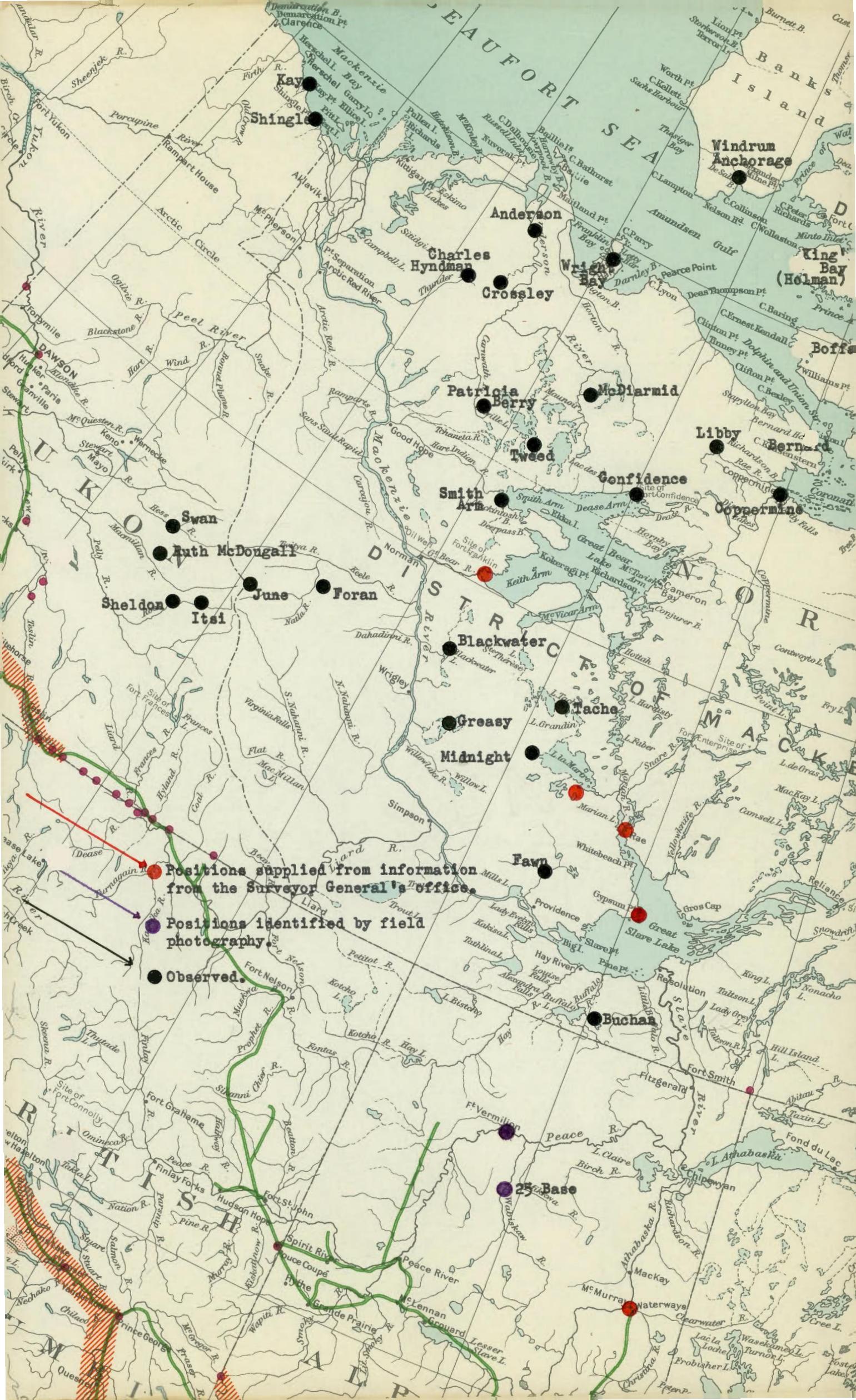
Crossley Lakes, N.W.T.
Baffa Lake, Victoria I., N.W.T.
Fawn Lake, N.W.T.
Confidence, N.W.T.
Libby Lake, N.W.T.
Shingle Point, N.W.T.
Charles Hyndman Lake, N.W.T.
Bernard Harbour, N.W.T.
Foran Lake, N.W.T.
Kings Bay, Victoria I., N.W.T.
Blackwater Lake, N.W.T.
Tweed Lake, N.W.T.
Buchan Lake, N.W.T.
Midnight Lake, N.W.T.
Tache Lake, N.W.T.
Greasy Lake, N.W.T.
Smith Arm, Great Bear Lake, N.W.T.
McDiarmid Lake, N.W.T.
Patricia Berry Lake, N.W.T.
Wright Bay, Cape Parry Peninsula, N.W.T.
Anderson River, N.W.T.
Kay Point, N.W.T.
Coppermine, N.W.T.
Windrum Anchorage, Banks I., N.W.T.
Swan Lake, Yukon
Ruth McDougall Lake, Yukon
Sheldon Lake, Yukon
Itsi Lake, Yukon
June Lake, N.W.T.

259 observations for magnetic declination were made and have been handed to Mr. McDiarmid for transmission to Mr. Madill.

Approximately 330 negatives were exposed, points from which accompany reports and returns. The negatives have been handed to Mr. McDiarmid for filing.

Written descriptions for each station in quintuplicate have been compiled to accompany blue prints and photographs in the final returns.

Star tables up to 70° for the fixed altitude method of observing have been compiled, but not for higher latitudes, which may be necessary for next year's programme.



Positions supplied from information from the Surveyor General's office.

Positions identified by field photography.

Observed.

Kay

Shingle

Anderson

Charles Hyndman

Crossley

Patricia Berry

McDiarmid

Tweed

Smith

Confidence

Swan

Ruth McDougall

June

Foran

Sheldon

Itsi

Blackwater

Greasy

Midnight

Tache

Fawn

Rae

Buchan

25 Base

McMurray

Windrum Anchorage

King Bay (Holman)

Libby

Bernard

Coppermine

Slave Lake

Great Slave Lake

Slave Pt

Pine Pt

Resolution

Taitson L.

Lady Grey L.

King L.

Nonacho L.

Hill Island L.

Fond du Lac

Chipewyan

Mackay

Waterways

McMurray

Charwater

Wasekoy L.

Turnon L.

Washer L.

Robisher L.

Christina

Pagan

Lesser Slave L.

St. Lennan

Grande Prairie R.

Peace River

Peace R.

Fort Vermilion

Fort St. John

Hudson Hope

Fort Graham

Fort Conolly

Site of

Thyade

Spoon R.

Chilaco

Prince Geor

Fraser R.

McGregor R.

Wapiz R.

Symon

Grande Prairie R.

Peace R.

St. Lennan

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Chilaco

Prince Geor

Fraser R.

C.B.C. DONNELLY'S REPORT

1943

The photographic negatives for pictures appearing in this report are located in the astronomic files at the Geodetic Survey.



U.S. Engineers' Stores, McMurray

729-1-H



25th Base line crossing Wabiscaw R. Photo in smoke at 4000 ft. 28 years after survey.

729-1-E



Fawn L., N.W.T. Horn Mtn. in distance.

329-14-B



Fawn L.

329-14-A



Midnight L.

334-5-D



Midnight L. Lac la Martre in distance, a sheet of ice. Middle of June.

334-5-A



One of Tache Lakes. Lake Grandin frozen over.

340-7-B



Timber typical of Tache L. country.

340-7-A



Blackwater L., N.W.T. showing Franklin Mountains. 328-3-0



Timber McDiarmid L., N.W.T.

338-9-G



McDiarmid L. in rolling country.

338-9-E



Letty Harbour, N.W.T. July, showing H.B.Co.

341-15-A



Ice at Letty Harbour in July.

341-15-B



July 12, Letty Harbour.

341-15-C



Wright Bay, free of ice early in July.

341-19-A



Narrow entrance to Wright Bay.

341-19-B



Plane Harbour, Wright Bay.

891-20-F



Airport Site. Wright Bay.

891-20-J



Flowers early in July, Wright Bay. Lat. 69°44'!

891-20-D



Wright Bay. Plateau 50' above sea level. 5' snow bank July 8th.

891-20-E



Wright Bay.

891-20-I



Verdure, Wright Bay.

891-20-H



Camp observing transit, and windbreak built with driftwood.

891-20-G



Anderson R., N.W.T.

342-17-J



E. Bank Anderson R. End of high hills falling
to Delta flats.

342-17-H



Anderson R.

342-17-I

Moss

Growth on W. bank 60 miles from delta.

342-17-A



The E. bank is pink gravelly clay. The W. bank
is sandy clay of natural colour.

342-17-F



Anderson R. cutting through clay formation.

342-17-E
342-17-E



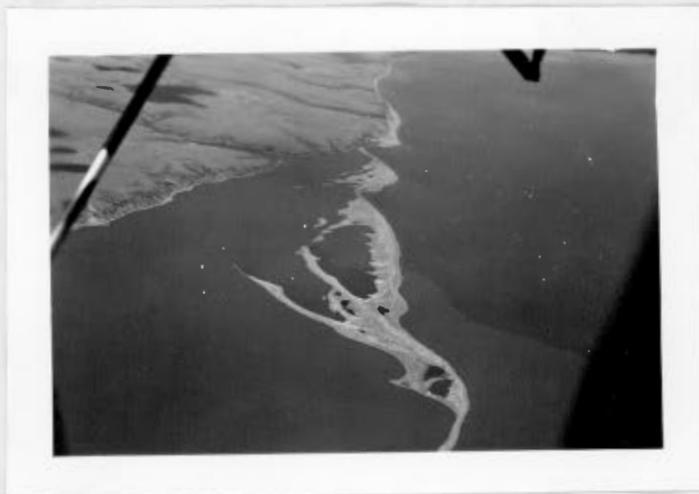
Delta aspect of Anderson R.

342-17-K



Anderson R. breaking into delta.

342-17-B



Shingle Point, N.W.T.

343-18-A



Mountains south of Shingle Point.

343-18-F



Old H.B.Co. and C. of E. Mission, Shingle Point.

343-18



Kay Point, showing shifting sand bars.

337-16-A



Eskimo village, near Kay Point.

337-16-B



Eldorado Mine.

891-22-D



891-22-J



Windrum Anchorage, Banks Is.

347-22-M



Banks Is.

891-22-H



Cairn with sealed memorandum; airport site.

347-22-I



891-22-K



McMurray. Confluence Clearwater and Athabasca.

891-22-N



King's Bay. Victoria Is. Skinning and dressing seal. Aug. 7th.

891-28-E



Basalt erosion, King's Bay.

891-28-C



King's Bay.

891-28-G



King's Bay, Aug. 7th

891-28-H



Dead seal, King's Bay.

891-28-A



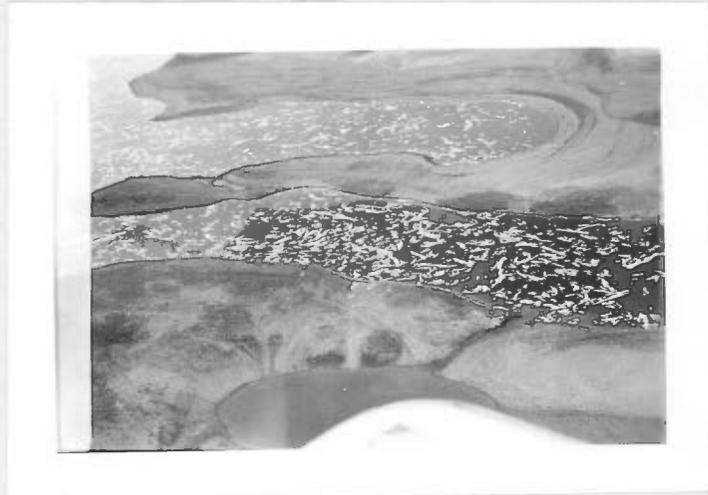
Seal hunter with harpoon in winter garb.

891-29-D



Seal hunter with harpoon and line.

891-28-B



Ice in King's Bay, Aug. 3. H.B.Co.

348-29-B



Kyak. King's Bay.

348-29-C



Off to shoot seal, King's Bay.

348-29-11



Skin tent. Basalt cliffs. King's Bay.

348-29-6



H.B.Co. King's Bay.

348-30-B



Airport site. King's Bay.

891-30-G



Erosion of Cone Mtn. King's Bay.

348-29-E



King's Bay.

348-29-D



H.B.Co. Basalt cliffs. King's Bay.

348-29-F



King's Bay formation.

348-30-A



King's Bay.

348-30-C



Boffa L. Victoria Is.

891-30-F



Boffa L.

891-30-E



Boffa L. Wireless aerial.

891-30-D



Cannibal Is. Prince Albert Sound.

891-30-H



Low cumulus, 3000 ft.

345-26-A



Coppermine, N.W.T.

345-26-D



Coppermine, N.W.T.

345-26-B



Coppermine, N.W.T.

345-26-C



Bernard Harbour, Police cabin.

346-23-D



Bernard Harbour, N.W.T.

346-23-E



Confidence.

351-25-C



Confidence, N.W.T.

351-25-F



Confidence. Ruins of Franklin's base.

351-25-G



Foran L., N.W.T.

339-27-A



Foran L., N.W.T.

339-27-D



Foran L.

339-27-C



Redstone R., N.W.T.

339-27-F



Redstone R., N.W.T.

339-27-G



Canyon. Redstone R.

339-27-H



Foran L., N.W.T.

339-27-B



Mountains near Foran L.

339-27-E



Watson L. airport, Y.T.

891-38-B



Mountains W. of Watson

891-38-E



Mountains near Teslin, Y.T.

891-38-C



Oil pipe and highway near Teslin.

891-38-D



Whitehorse, Y.T.

891-38-A



Swan L., Y.T.

353-37-X



Swan L.

353-37-D



Mountains at Swan L., Y.T.

353-37-E



Mountains Vicinity of Bonnet Plume R.

353-37-F



353-37-G



Ruth McDougall L.

354-40-F



Ruth McDougall, Y.T.

354-40-B



354-40-E



At Sheldon L., trader's garden.

352-36-H



Sheldon L.

352-36-D



352-36-I



Sheldon Lakes.

352-36-K



352-36-G



Sheldon Lakes.

352-36-I



Mt. Sheldon 7250 ft. Path of oil pipe.

352-36-J



Christie Pass. Plateau lands.

891-24-H



Mt. Christie 7300 ft.

891-24-G



Mt. Christie

891-24-F



891-24-E



891-24-D



Christie Pass.

891-24-C



Christie Pass.

891-24-B

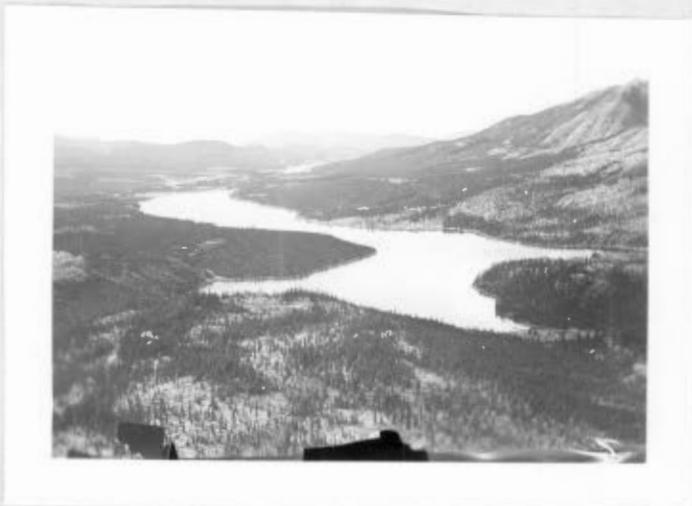


891-24-A



Christie Pass to Itsi Lake.

355-32-F



Itsi L., Y.T.

355-32-C



Moose swimming Itai L.

355-32-A



June L., N.W.T.-Y.T. bdy.

356-34-B



356-34-A



356-34-C



June L.

356-34-F



June L.

356-34-B



June L. Mountains.

891-33-1



891-33-2



Christie Pass Mountains and high plateau lands. 891-33-D



891-33-C



891-33-B



Nearing Itsi L., Y.T.

891-33-A



Itsi L., Y.T.

891-33-G



Mt. Sheldon in clouds.

891-31-B



Mt. Sheldon in clouds.

891-31-A



Liard R. near Watson.

891-31-C



Alaska Highway following Liard R.

891-31-E



Nelson Airport.

891-31-A



Edmonton.

891-39-E



891-39-F



Liard R.

891-31-H



Liard bridged near Watson.

891-31-D



At Sheldon L., Y.T.

352-36-M



Watson L. airport.

891-31-F



And this is Canada.

891-39-D



And this.

891-39-B



And this.

891-39-C