

A BIOLOGICAL SURVEY OF THE WEST  
COAST OF BANKS ISLAND - 1955.

by

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Introduction

Before this investigation was planned, three visits were made to Sachs Harbour, Banks Island, from April 10 to 11, 1952, April 3 to 8, 1953, and March 5 to 6, 1954. From the reports of these visits and outline of the present biological investigation was prepared at the request of the Northern Administration Branch. The project was approved and an appropriation was granted in the 1954-55 estimates.

The purposes of the investigation were both biological and economic. Biological information on fur-bearing animals, caribou, musk-oxen, marine mammals, and snow geese was to be collected. The present and future economic status of the native population was to be considered. It was at first proposed that the investigation should be confined to the southern part of the island, between Sachs Harbour and De Salis Bay; but this was later altered to include the west coast of the island. The investigation was scheduled to begin in September, 1954, and continue until mid-December, to resume in February 1955 and continue until June. However, circumstances forced the postponement of the beginning until, March, 1955.

Description

Banks Island, roughly 28,000 square miles in area, is located between latitudes  $71^{\circ} 01'$  and  $74^{\circ} 30'$  N, and longitudes  $126^{\circ} 03'$  and  $116^{\circ} 57'$  W. On the west, it is bordered by the Beaufort Sea, on the north, by McClure Strait, on the east, by Prince of Wales Strait, and on the south, by the Amundsen Gulf. The southern third of the island is intersected by high hills and ridges; at Cape Lambton, the altitude of Durham Heights is marked on the map as 2,500 feet. North of Sachs Harbour, the topography becomes low, with rolling hills and ridges, and flatter land northwards. The east and north coasts of the island have high rocky cliffs. Coal deposits have been found on the east coast at latitude  $71^{\circ} 45'$  N., longitude  $120^{\circ} 30'$  W. and on the north coast at Antler Cove and Castle Bay (Manning, 1953).

Preparations

Equipment and clothing were chosen to meet the requirements of winter, spring, and summer. In August, 1954, provisions, field equipment, gasoline, motor oil, kerosene, dog food, and a 16-foot toboggan were shipped to Sachs Harbour on the R.C.M. Police schooner, "Aklavik". Two drums of gasoline were shipped to De Salis Bay on the native schooner, 'Reindeer', operated by Charlie Brubin. Sachs Harbour was chosen as the main camp because the supplies were landed and stored there. Daily radio communication was maintained by the R.C.M. Police there with the R.C.S. at Aklavik. Sachs Harbour was also the centre of most of the trapping activity.

Arrangements were made to charter the Otter of Wardair Ltd., for the flight to Sachs Harbour. Sam Lennie, an Eskimo guide, was engaged to accompany the writer on the investigation.

Itinerary

During the field investigations on Banks Island, listed in Table I and shown in Figure 1, a total of 2,805 miles were travelled. Of this total, 1,064 miles were travelled by aircraft, 972 miles by motor toboggan, 478 miles by dog team and 291 miles on foot. In the following account, paragraph numbers correspond to those in the table.

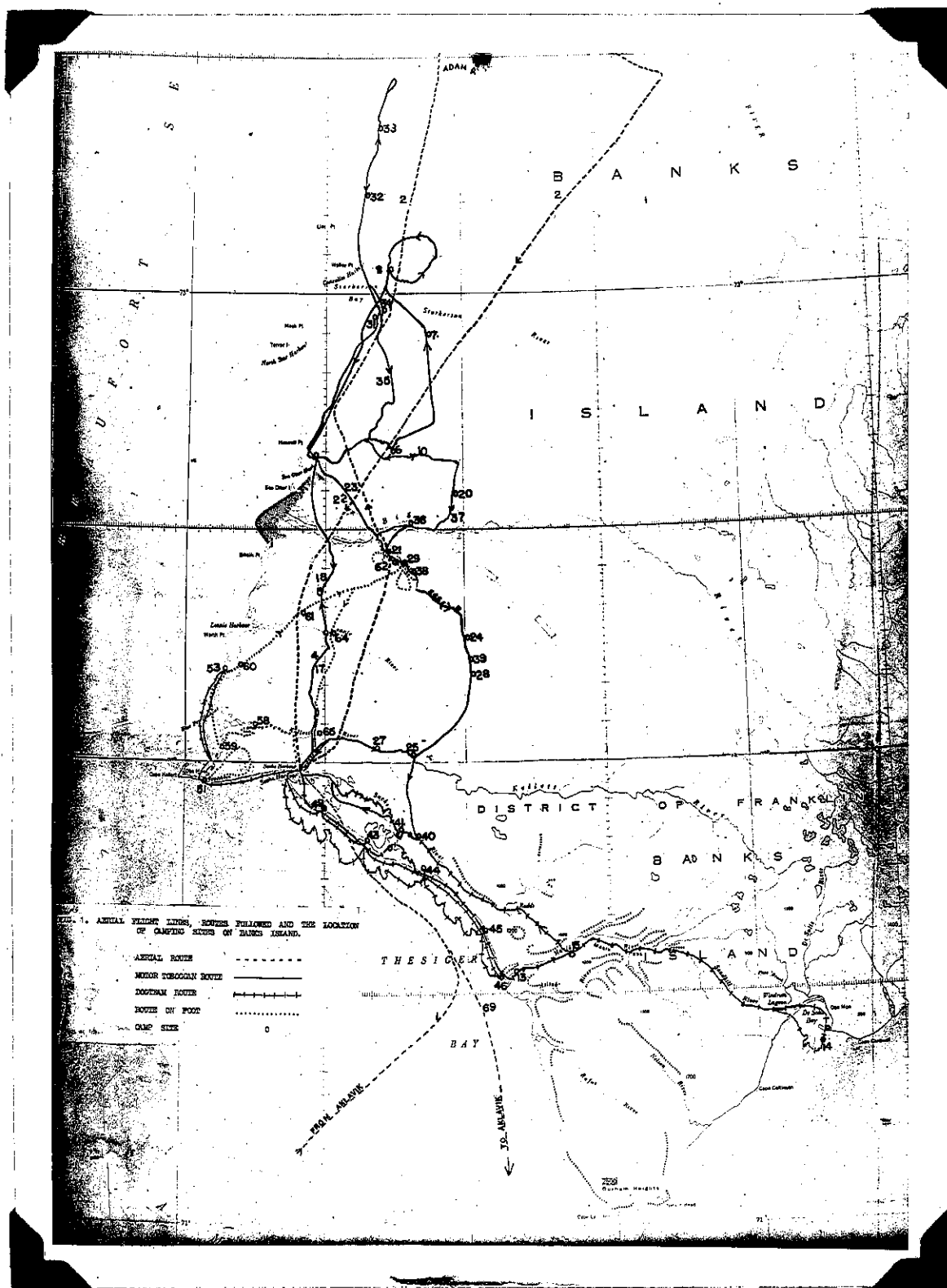


Fig. 1. Aerial Flight Lines, Routes followed and the Location of Camping Sites on Banks Island.

Table 1. A List of the Field Trips Undertaken on Banks Island, with the Method and Mileage Specified.

<u>No.</u>	<u>Date</u>	<u>Area</u>	<u>Method</u>	<u>Mileage</u>
1	Mar. 16	Aklavik to Sachs Harbour	Aircraft	394
2	Mar. 16	Sachs Harbour to Bernard River and return	Aircraft	276
3	Mar. 19	Sachs H. to Little Bluff	Motor toboggan	25
4	Mar. 22	Sachs H. to Lennie R.	" "	24
5	Mar. 23	Lennie R. To Sea Otter Harbour	" "	24
6	Mar. 24	Sea Otter H. along Sea Otter R.	" "	60
7	Mar. 25	Sea Otter H. to lake south of Storkerson Bay	" "	35
8	Mar. 26	To north side of Storkerson Bay and area	" "	35
9	Mar. 27	Storkerson Bay to Sea Otter Harbour	" "	40
10	Mar. 29	Sea Otter H. along Sea Otter R.	" "	60
11	Mar. 30	Sea Otter to Sachs H.		53
				<u>356</u>
12	Apr. 4	Sachs H. to Fish Lake	Dog team	20
13	Apr. 5	Fish L. to Masik River	" "	35
14	Apr. 6	Masik River to De Salis Bay	" "	61
15	April 8	De Salis Bay to 12 miles from mouth of Masik R.	" "	53
16	Apr. 9	Masik R. to Sachs H.	" "	57
				<u>226</u>
17	Apr. 15	Sachs H. to Lennie R.	Motor toboggan	24
18	Apr. 16	Lennie R. to Sea Otter	" "	24
19	Apr. 17	East from Sea Otter		26
20	Apr. 19	Towards Big R.	" "	20
21	Apr. 20	Big R. and up Egg R.	" "	18
22	Apr. 22	Egg River to Sea Otter H.	" "	18
23	Apr. 23	Sea Otter H. to Egg R.	" "	18
24	Apr. 24	Up Egg River		20

25	Apr.	25	Upper Egg River to Kellett R.	Motor toboggan	22
26	Apr.	25	Kellett R. to Sachs H.	" "	23
27	May	2	Sachs H. to Kellett R.	" " and one dog team	14
28	May	3	Kellett R. up "Sideways" Creek	Motor toboggan & one dog team	26
29	May	4	"Sideways" Creek to lower Egg River	Motor toboggan & one dog team	25
30	May	5	Egg R. to Sea Otter H.	Motor toboggan & one dog team	25
31	May	6	Sea Otter H. to Storkerson Bay	Motor toboggan & one dog team	28
32	May	7	Storkerson Bay north to coast	M.T. and dogs	20
33	May	8	To Adam River	" " " "	26
34	May	9	To south side of Storkerson Bay	" " " "	32
35	May	10	Storkerson Bay to Sea Otter H.	" " " "	38
36	May	13	Sea Otter to Big R.	" " " "	24
37	May	14	Big R. to Creek north - east of River	M.T.	32
38	May	15	Big R. and up Egg R.	M.T. and dogs	20
39	May	16	Up Egg R.	" " " "	25
40	May	17	Upper Egg R. to Sachs R.	" " " "	40
41	May	18	Sachs River	" " " "	4
42	May	19	to Sachs H.	" " " "	24
43	May	28	Sachs H. to 'Climb'	dog team	30
44	May	29	'Climb' along west coast	" "	28
45	May	30	Along west coast	" "	32
46	May	31	Mouth of Masik R.	" "	20
47	June	1	Inland from Masik R.	on foot	15
48	June	2	On west coast	dog team	26
49	June	3	On west coast (near Sasha H.)	" "	20
50	June	4	Sachs Harbour	" "	14

51	June	6	Sachs H. to C. Kellett	dog team	16
52	June	7	C. Kellett area	on foot	18
53	June	8	Cape Kellett to Blue fox	dog team	24
54	June	9	return to C. Kellett	" "	26
55	June	10	C. Kellett to Sachs H.	" "	16
					<u>478</u>
56	June	17	Sachs H. to Kellett R.	on foot	10
57	June	19	Sachs H. to mouth of Kellett R.	" "	16
58	June	20	Kellett R. to coast	on foot	12
59	June	21	near Kellett R. towards Worth Pt.	" "	18
60	June	22	to north of Lennie R.	" "	16
61	June	23	to Egg R.	" "	20
62	June	24 to			
	July	3	Egg River Area	" "	88
63	July	4	Egg River to Lennie R.	" "	18
64	July	5	Lennie R. to Kellett R.	" "	22
65	July	6	Kellett R. to Sachs H. and return	" "	15
66	July	7	Kellett R. to Sachs H. and return	" "	15
67	July	8	Kellett R. to Sachs H.	" "	8
					<u>291</u>
68	July	23	Sachs H. to Aklavik	aircraft	394

1. On March 14, 1955 the Otter was loaded with supplies and equipment. An attempt to fly to the island next morning failed when fog was encountered and the aircraft turned back to Aklavik. At 0900 hours on the 16th a second attempt was made. Clear weather with unlimited visibility prevailed throughout this flight. The west coast of the island was followed to Sachs Harbour, where we landed at 1230 hours. The ground temperature at Sachs Harbour on arrival was  $-50^{\circ}\text{F}$ , with a slight east wind.

2. The aircraft was unloaded and preparations for an aerial survey were completed. It was planned to fly from Sachs Harbour to the Bernard River, thence across to the east coast and back to Sachs Harbour. At 1505 hours, we departed, flying north, inland but parallel to the coast, as far as the Bernard River (Fig. 1). From the mouth of the Bernard River, we flew inland along the river about 40 miles, and then returned directly to Sachs Harbour, shortening the flight because of

unfavourable weather conditions, poor light, and failure of the aircraft heating system in air temperatures of about  $-40^{\circ}\text{F}$ . The possibility of flying to the east coast and establishing one or two caches north of Sachs Harbour, was discussed with the pilot; but as the location of the caches was not settled, and as it was necessary for him to return to Aklavik early the following afternoon, this was postponed to a later date.

3. From March 17 to 21, the field equipment was sorted and stored. Supplies shipped by boat the previous August and carefully stored by Csts. Canam and Alexander of the police, were found in excellent condition. Before attempting a long trip, it was considered advisable to test the performance of the motor toboggan in the immediate area. On March 19, accompanied by Peter Sydney, we travelled across to the Kellett River and followed the river to 'Little Bluff', covering a distance of 25 miles in seven hours, with frequent stops. The air temperature was about  $-30^{\circ}\text{F}$  with a strong ground drift. On the return journey, two adult female and one rising-yearling caribou were hauled.

On March 21, we assisted Csts. Canam and Alexander to inoculate 50 dogs belonging to the Sachs Harbour trappers.

4. On March 22, at 1200 hours, we left Sachs Harbour (Fig. 2) for Sea Otter Harbour on the motor toboggan pulling a heavy load. Peter Sydney and Angus Elias travelled with us by dog team to visit their traplines. This trip was to be the first real test of the motor toboggan on the tundra. After repairing a link in the drive chain that broke as we were leaving the settlement we climbed the ridge, about 350 feet in height, behind the settlement, and travelled northeasterly down a gently sloping plateau to the Kellett River. We crossed this river, and ascended the bank at 'Easter' Creek. Beyond this creek, there is a large windswept lake. From the lake, we followed a creek, and crossed lakes and tundra. The snow was soft in the sheltered creek, over which the motor toboggan travelled rapidly and smoothly, but on the exposed tundra and lakes, it pounded heavily on the sharp, hard snow-drifts. At 1815 hours, we stopped and set up the Mt. Logan tent on the Lennie River.

5. On leaving camp next morning at 1000 hours, visibility was restricted to a few feet, and the toboggan almost capsized on a five-foot snow drift, which we did not see. Twice, it became stuck in deep, soft snow, but was freed by hand. With no visible horizon, the size and distance of objects could not be judged. Before reaching the Big River, we became lost and had to use the compass to locate the direction. After we crossed the Big River, the fog cleared and we arrived without any difficulty at Sea Otter. Angus Elias, Moses Raddi, and Pat Keevik lived there in a one-roomed, wooden frame cabin enclosed in ice blocks for insulation. Noah Elias and his family lived in a tent about a mile away.

6. On March 24, a 60-mile trip by motor toboggan was made northeast of Sea Otter. Angus Elias accompanied us on this trip. Ten wolf baits were set out on his trapline, on which a number of foxes had been eaten by wolves. The Sea Otter River was followed up to a tributary creek with bare rounded hills on both sides, which was followed to its source. Scattered rocks were strewn along the top and sides of the banks. Travelling conditions were very good, but it was cold driving the toboggan and Elias found riding on the toboggan much colder <sup>than</sup> travelling by dog team. The trip was made in



seven hours; by dog team, it would have taken two days.

7. On March 25, Sam and I followed Noah Elias on his trapline extending from Sea Otter to Storkerson Bay. We followed the Sea Otter River and continued up the third tributary on the east side about ten miles, then north towards Storkerson Bay. After camping at 1930 hours we spotted an aluminum-coloured aircraft flying from Storkerson Bay to Sea Otter and Sachs Harbour. Later, this was identified as a chartered aircraft with the Sub-District Administrator on board, trying to locate our party.

8. On March 26, at 0845 hours, we continued in a north-westerly direction. The south bank of the Storkerson River was high and free of snow. Below, the large mouth of the river could be seen. Hard, sharp snowdrifts were encountered crossing the river, and travelling on the motor toboggan was slow. Our hands and feet became numb with cold and it was necessary to alternate driving with running behind to warm up. At 1215 hours, we reached a snowhouse on the north side of the bay where we enjoyed a warm meal. Starting again at 1330 hours, a round trip was made northeast of the bay following creeks.

9. The next day, we returned to Sea Otter, along the coast. Travelling was again difficult and slow because of hard snowdrifts.

On March 28, we remained in camp overhauling the machine and examining specimens. Two trappers, P. Sydney and A. Elias returned from their traplines. Trapping activities for the season were almost completed.

10. On March 29, a second trip was made along Elias dayline to visit the wolf baits.

11. The next day, Sam and I travelled to Sachs Harbour with a heavy load, consisting of a Mount Logan tent, two sleeping bags, cooking utensils, stove, food, four jerry cans, two empty 10-gallon drums, 13 unskinned foxes, one large bale of fur, and one polar bear skin.

12. It was planned to proceed to the Adam River. On April 1, a short relay trip was made to set out 30 gallons of gasoline on the opposite side of the Kellest River. Returning to the settlement a countershaft bearing broke, and we completed the trip on foot.

The following day, a dog team hauled the machine to the settlement. Repairs could not be made because a spare countershaft bearing had not been taken. It was necessary to order a new set of bearings. As there was <sup>no</sup> regular air service, it was not known when the parts could be received. Thus it was necessary to cancel the proposed trip to the Adam River and arrange to travel to De Salis Bay by dog team.

Two days were spent bartering with the trappers. Finally, on April 4, Sam, Andy Carpenter and myself left Sachs Harbour at 1430 hours with two dog teams. From the mouth of the Sachs River, we crossed overland to the coast, which was followed to the 'Climb'. Old ice was not piled up on the shore, except in a few places. Piles of ice about 20 feet high were encountered, but could be avoided. The coastal cliffs were exposed and consisted of a brownish sandy type of soil.

After travelling a few miles inland we camped near 'Fish' Lake at 1800 hours and installed the radio. At 1945 hours, Aklavik was heard on the sked with Sachs Harbour. At the completion of this sked, a successful transmission with Sachs Harbour was held. Our transmission was not very clear, possibly because of the short distance.

13. From 0945 hours, April 5, we travelled overland towards the coast. Normally, the portage is only a short one, but the direction to the coast was mistaken, and a long, difficult trip resulted. The ground was covered with a thin layer of snow. In places, bare gravel patches were encountered. The area appeared to support little vegetation. When the coast was reached, it was found that the cliff was too steep to attempt a descent with the dogs. By travelling on the top of the cliff, a gradual descent to the sea ice was found. Along the coast, a smooth patch of ice between the shore and the rough ice was followed (Fig. 3). The coast was followed, although travelling on the salt snow was slow and hard for the dogs. The coastal cliff was of conglomerate composition. The ridges inland were, of course, gravel. Near the Masik River, we travelled over a flat, sloping towards the hills. After reaching the Masik River, we travelled until 1810 hours before setting up camp on the north side of the river (Fig. 4). At 2000 hours, XJD-58 (Sachs Harbour) was received on 4270 mg. Our transmission was better on 4270 mg. than on 3335 mg. Aklavik was received clearly.

14. On April 6, at 0945 hours, we continued up the Masik River. This river valley is said to be subject to violent sudden, blizzards, with winds of gale strength, but we were favoured with clear, calm weather. The river valley is wide with high hills on each side (Figs. 5, 6). The river is a small meandering stream on a gravel river bed. The gravel bars were bare of snow and that it was laborious trying to prevent the bottom of the toboggan being gouged by sharp stones.

At 1700 hours, we reached the divide at the source of the river. On a steep, downhill gradient we followed a creek that flows into De Salis Bay. In crossing the bay to the Eskimo camp on the opposite side, the direction was misjudged in the diffuse light. After three hours more travel without locating the Eskimo camp, it was decided to camp on the ice. It was found that the tent was more comfortable and warmer there than on land. Later, I was told that the Victoria Island Eskimos build their snowhouses on the ice because it is warmer. Snow was scraped off the top of drifts to melt into drinking water.

Next morning, the Eskimo camp was in sight about a mile behind us. Four trappers, Charlie Grubin and his family, Willie Grubin and family, Moses Albert, and Timothy Lennie trapped from this camp. Willie Grubin and Moses Albert had left for Sachs Harbour and Lennie was visiting the Kogmolik camp between Jessop Bay and De Salis Bay. It was a warm camp consisting of two tents in the shape of a "T", covered by an inner layer of moss and an outer layer of blocks of ice. An air space between the ice and the moss reduced radiation and prevented dampness. Thirteen persons, four trappers, two women and seven children lived in these crowded quarters. Coal, purchased at Tuk, supplemented by driftwood, was burned for heat. No attempt was made by these trappers to gather

coal at the coal deposit, on the coast 40 miles northeast. Most of their staple food items such as tea, coffee, sugar, butter (none), and milk were in short supply. Supplies could be purchased at Holman Island, but the prices were high.

C. Grubin said that the three Kogmolik families lived poorly. The trappers were lazy and poor providers. Recently, while the trappers went to Holman Island for supplies, the women and children had existed on tea and seal skin until these were exhausted, and then almost starved. A cache of caribou meat, made during the summer, had been eaten by foxes. On another occasion, T. Lennie, and Morris Kooloka on a trip to Holman Island had arrived at De Salis Bay with their dogs in starving condition. In their plight, Charlie gave them a few supplies to hunt seals at Nelson Head. They succeeded in killing a polar bear and returned to their camp. The trapping success of these natives was poor.

15. On Good Friday, we left De Salis Bay at 0915 hours in warm, sunny weather. Charlie Grubin's son, John, accompanied us. The same route to the Masik River was followed. On the way the sky became overcast, with a strong, cold east wind that increased as we approached the top divide. In the Masik River valley visibility was reduced by drifting snow. One of the teams following behind became separated from the party and was not found for some hours. At 2000 hours, camp was assembled on a creek, running into the river. In spite of the blizzard, radio transmission and reception were excellent. While we were experiencing a howling east wind the weather at Sachs Harbour was foggy with a strong west wind.

16. Next day strong east winds with drifting snow continued, although visibility improved. At 1030 hours, we started overland towards Raddi Lake. A few inaccuracies were found on the map, including a creek flowing into a lake near Raddi Lake not shown on the map. Raddi Lake was windswept with patches of blue ice showing. The natives set nets in this lake in the spring, catching lake trout. On the west side of Raddi Lake, a series of rounded hills were seen. Along the Sachs River, which flows through Raddi Lake there is a formation of pyramid-shaped hills on the west side, in contrast to the long sloping plain on the east side (Fig. 7). In places, the ice in the river had raised to form large oblong-shaped bubbles. Near 'Fish' Lake, a portage was made overland from the Sach River towards Sachs Harbour. Two formations of sand dunes were found, the largest about 12 miles from Sachs Harbour. After reaching the lower part of the mouth of the Sachs River, we travelled on the ice to reach the settlement at 2030 hours.

From April 10 to 14, the field equipment was overhauled and the motor toboggan repaired. On April 11, a chartered aircraft arrived at Sachs Harbour with mail and the spare parts. On installing the countershaft bearings, it was found that the shaft had been badly worn. A zinc shim, made from a discarded primus stove, was used to fit the bearing to the shaft. This repair was not considered permanent, but the best that could be done under the circumstances.

On April 13, ten trappers and their dog teams left the settlement after the Easter festivities. Some were returning to Sea Otter and De Salis Bay, others going to hunt caribou and to fetch supplies from Big Bluff.

17. On April 14, we set out for Sea Otter Harbour but after 30 minutes returned because of weather conditions. On the ridge behind the settlement, visibility was restricted to a few yards by drifting snow. Weather conditions improved slightly the following day so we set out again. The 30 gallons of gasoline cached on "Easter" Creek was added to the load, now estimated to weigh between 700 and 800 pounds. On windswept lakes and on the tundra the machine pounded on the bare ice and hard drifts, which, because of the overcast, could not be distinguished; and it stalled frequently in the deep snow collected in the sheltered creeks. Adding to the discomfort, a strong ground drift was blowing. At 1900 hours, we camped on the Lennie River. Reception and transmission were fair. Aklavik and Old Crow were received on 3335 and 4270, respectively.

18. At 0930 hours, we continued to Sea Otter, following the route used on previous occasions. When possible, the deep snow in the creeks was detoured by travelling on the exposed ridges. Drifts at the mouth of the Big River, increased in depth by the recent blow, were avoided by manouvering the machine between them. However, the toboggan overturned once so that it was necessary to reduce the load. The countershaft bearing had broken again, but we continued to Sea Otter, arriving at 1815 hours. On the radio sked, replacement parts were ordered.

19. On April 17, three hours were spent repairing the countershaft. At 1230 hours, we left Sea Otter to visit the poison stations. The river was covered with a soft layer of snow, a great improvement compared with the hard, drifted snow on the coast. Throughout the day, the wind increased to gale strength in the evening. By 1700 hours, visibility was reduced by drifting snow, and it was impossible to estimate distances or perceive objects. By 1845 hours, we were beginning to lose direction frequently and decided to camp. In spite of the bad weather, radio communication was good. Aklavik and Herschel Island were heard clearly, Old Crow only faintly.

The storm continued throughout the night and on the following day visibility was about 100 yards. The tent rattled and shook in the wind, but it was warm and dry inside. To heat it, three quarts of gasoline were used in the coleman stove, with one burner going; a quart lasted  $4\frac{1}{2}$  hours. Transmission and reception on the radio were excellent.

20. On April 19, the storm subdued but the weather remained overcast with a northwest wind. Two hours were spent digging the equipment out of the snow (Fig. 8). At 1000 hours, we continued along the creek, visiting the poison stations. From the head of the creek, we crossed towards Big River, camping at 1800 hours. Radio reception with XJD-58 was good, although radio conditions were poor. Reception of Aklavik and Herschel Island were weak and Old Crow was not heard.

21. On April 20, as we were leaving camp at 0900 hours a strong southeast wind between 30 to 40 M.P.H. developed. Our camp had been pitched in a narrow gully surrounded by high banks and drifting snow funnelled through the creek. Luckily, our equipment was anchored otherwise it could have been blown away by the wind. We reached Big River at 1200 hours, as we travelled the wind decreased and the weather became clear and sunny. Snow began to melt on the exposed banks of the river. The gravel banks commenced to thaw with the sudden change in temperature.

For the first time, it was warm enough to travel comfortably without fur clothes.

The north side of Big River was followed to Egg River on which we travelled four miles. The snow softened by the heat of the sun made travelling conditions ideal. At 1750 hours, camp was set up on the east side of the river, the centre of the snow goose nesting area. On the radio, the R.C.M. Police aircraft was reported to have landed and departed from Sachs Harbour, leaving mail and spare parts which were being brought to Sea Otter Harbour by returning trappers. Aklavik was received poorly, Herschel Island clearly and Old Crow not at all.

From about 2000 hours, a strong east wind increased rapidly throughout the night. On April 21 there was no horizontal visibility, but clear blue sky was visible overhead through the drifting snow. We remained in the tent which at times, appeared as if it might collapse under the force of the wind.

A few alterations to improve the construction of the tent are suggested. The window located at the back should be omitted or improved to prevent drifting snow blowing in. The base of the upright tent pole should be enlarged; the present one is narrow and gradually wears a hole in the ground sheet as the wind blows the tent back and forth. During the blizzard, radio reception was good; Aklavik and Herschel Island were received.

22. After 40 hours weather conditions improved. Although there was a strong ground drift, we travelled to Sea Otter Harbour, from 1445 to 1930 hours. Radio transmission and reception with XJD-58 was maintained. Aklavik and Herschel Island were received.

23. On April 23, we returned to our camp on the Egg River travelling from 1120 to 1650 hours, with a 40-minute stop. Radio communication was maintained with Sachs Harbour. In the evening, the wind slackened and the temperature dropped.

24. At 0930 hours, on the 24th we continued up the Egg River. The weather was warm with an overcast sky. Wolf baits were set out along the river. During the morning, a caribou bull was collected, butchered, and examined.

Egg River is a small, meandering stream, with branches cut through gravel deposits. Leaving the river, we followed a large tributary on the west side, towards the Kellett River. At 1750 hours, we camped on this tributary, locally called 'Sideways' Creek. After the radio sked with Sachs Harbour, the countershaft was dismantled and a new shim installed. The left countershaft bearing had broken for the third time.

25. On April 25, we left at 1020 hours, after a delay of one hour searching for a fur mitt lost the day before. 'Sideways' Creek was followed over the divide to the Kellett River. At the divide, observations of the topography and wildlife were limited by fog. It was high, hilly country. Near the Kellett River, a wide, flat windswept area was crossed. Travelling over the hard drifts, the motor toboggan pounded, but the broken bearing held together. At 1745 hours, we set up camp on the Kellett River. Sachs Harbour failed to call at the usual time; Aklavik was received clearly.

26. Next day, at 0845 hours, the Kellett River was followed. It is one of the large rivers of the island. With a chill wind blowing, we stopped briefly for lunch. A staple lunch consisted of: tea, two pilot biscuits, a tin of sardines and a bar of chocolate. Sardines can be thawed out in a pocket close to the body; thawing the contents of the tin on a primus stove, usually resulted in burning them. After tea, we continued down the river following the portage to Sachs Harbour. On the portage, the countershaft bearing broke into pieces. Leaving the equipment near the Kellett River, we walked to the settlement in one hour and fifteen minutes. The following day the motor toboggan was hauled by dogs to the settlement.

From April 27 to 30, the equipment and supplies were sorted for a trip to the Adam River while we waited for spare parts. Two aircraft arrived, one chartered from Aklavik and the other Wardair's 'Otter'. On April 28, Don Violette, pilot of the Aklavik Flying Service, landed and returned to Aklavik with a trapper. Since he expected to return to Sachs Harbour he kindly took the worn countershaft to Aklavik and arranged to have it welded. The party on the 'Otter' consisted of four persons who tested the soil conditions at the proposed building sites. On May 1, fox specimens were cleaned and labelled. At 1730 hours, Don Violette landed with mail and the repaired shaft. The following day, the shaft was installed. The fractures were attributed to insufficient lubrication, as the thick cup-grease used became stiff in low temperatures. To remedy this, holes were bored in the steel housing. At each warm-up, heat was directed on the housing and warm oil was poured into it. With these practices, broken bearings should be prevented.

27. At 1500 hours, on May 2 we set out for Sea Otter Harbour, following the same route as previously, and with a dog team to transport part of the load. Our eyes became strained and tired from travelling over the tundra in overcast conditions. On one occasion both dog team and motor toboggan altered course to avoid a 20-foot snowdrift which, as we approached it, was found only 10 inches in height. Under overcast conditions, objects appeared further away than they were. At 1845 hours, about 18 miles from Sachs Harbour, camp was set up on the Kellett River. Aklavik was the only station received on the radio. No call was received from Sachs Harbour.

28. At 0930 hours, on May 3, we continued up the Kellett River to the portage to "Sideways" Creek. It was a clear day and the area through which we travelled on April 25 could be observed. From the Kellett River to the divide separating the drainages between Egg River and the Kellett River, a rise of 260 feet was measured by means of an altimeter. The valley was hemmed in by high, irregular gravel ridges with long slopes. The snow was hard and had not commenced to melt. Camp was set up at 1745 hours. My wrist watch stopped and was set by guess. The failure of radio communication that evening was probably the result of the incorrect time.

29. From 1945 hours on May 4, the tributary of Egg River was followed. Because of the hard snow drifts, travelling was slow. A yearling female caribou was collected. A photograph of the motor toboggan on the Egg River is shown in Figure 9. In the afternoon, the Egg River was followed to within two miles of our first camp site. Nothing was received on the radio.

30. On May 5, we travelled down the Egg River, across Big River, and overland to Sea Otter Harbour. The only person at

Sea Otter was Pat Keevik, who had returned from Holman Island about nine days previously. He had been seriously ill with the flu but had improved sufficiently to walk about. As a precaution, penicillin and sulpha were administered. After an hour's trying, a time check on the radio was secured and my watch was found to be two hours fast. Our travelling time that day was from 1000 to 1940 hours, with a 60 minute stop.

At night, F. Carpenter, P. Sydney, and Cst. Alexander arrived at Sea Otter. They planned to remain and take Keevik to Sachs Harbour on May 7.

31. At 0830 hours on May 6 we left Sea Otter, Sam driving the motor toboggan and I the dogs. A brief stop was made to cache the caribou and wolf specimens on the schooner 'Fox', and get six gallons of gasoline. The coast was followed towards Storkerson Bay. The overcast, foggy weather hampered observation and reduced visibility. We suffered acute eye strain, headache, and snowblindness. Travelling overland to Storkerson Bay, the direction was lost so that we travelled farther west than necessary. This area was not as productive as the Egg River area. The ridges, gravel in composition, were poorly vegetated and almost bare.

Exhausted and tired from travelling, we camped at 1700 hours. Radio reception was good, but XJD-58 was unable to receive us on 4270 mg.

32. We started on May 7, at 1100 hours. Reaching the south end of Storkerson Bay, we travelled northwest across to the north side of the bay. The rough ice was then about five miles offshore. We stopped briefly at a campsite formerly used by Sam's father, and then followed a creek for a few miles and travelled overland eight miles in a northeast direction. We camped at 1845 hours, about 16 miles from the Adam River. The temperature dropped to  $-32.5^{\circ}$  F in the evening at 2300 hours. At 2330 hours, the sun was just above the horizon.

North of Storkerson Bay, the topography was flat with a few low ridges. Conditions were about two to three weeks later there than at Sachs Harbour. Aklavik Signals were heard on 335. The signal from Sachs Harbour was too weak to receive. On 4270 mg., Fort Rae was heard calling Yellowknife.

33. At 1030 hours on May 8, we left for the Adam River. A small bay was crossed to Jim Wilke's tent frame. Old ice was piled up along the shore (Fig. 10) but we travelled on what appeared to be a wide beach. It would be a strenuous task to get over the rough ice to open water, if it was necessary to hunt hauled-up seals. The land was flat with low ridges running in an east-west direction. Long, hard-packed snow drifts formed in this open country made travelling slow. We reached the Adam River, shown in Figure 11 about 1400 hours. The three poison stations were found. Three wolves were taken (Fig. 12). We camped on the coast, south of Adam River, at 1745 hours, after travelling a total of six hours. Radio reception was poor, probably because of atmospheric conditions. Aklavik was received weakly, and XJD-58 was not heard. At 2200 hours, E-3 on the East Branch was heard communicating with Aklavik.

34. The weather on May 9 was clear, bright and sunny with a north wind. Sunglasses had little effect in reducing the

brilliant reflection off the snow. Less eye strain was suffered than in overcast weather with a slight ground drift. Our faces were burnt from the wind and sun. After being severely sunburned two days before, the effect of the cold wind and strong sunlight was painful. We travelled from 0930 to 1800 hours, reaching the south side of Storkerson Bay. On the radio, Aklavik and Sachs Harbour were received.

35. On May 10, we travelled from Storkerson Bay to Sea Otter Harbour in  $9\frac{1}{2}$  hours, from 0930 to 1920 hours. The overcast cleared about noon and travelling and visibility improved. Sea Otter was deserted, when we arrived; The trappers had moved to Sachs Harbour because of the lack of driftwood at Sea Otter. Sachs Harbour is warmer and sunnier than Sea Otter, and other trappers were camped at Sachs Harbour. At sked time, radio reception was poor and no stations were received. At 2000 hours, a sked between Aklavik, the Reindeer Station, and E-3 was heard clearly.

We remained at Sea Otter for two days to overhaul the toboggan, complete an oil change, and skin a wolf, two foxes and four caribou heads. Nine foxes were hung in the tent to thaw. Skinning the wolves and foxes taken during the poison control work reduced the weight of our loads. Aklavik and XUD-58 were heard on the evening sked on May 12.

36. On May 13, at 1000 hours, we started with heavily loaded toboggans. From Sea Otter, we crossed to Big River and travelled eight miles up this river. A layer of frost on the surface of the packed snow added a heavy drag to the loaded toboggan and sled. Radio reception was good; both Aklavik and Sachs Harbour were received.

37. On May 14, at 0930 hours, we continued up Big River, travelled eight miles northeast of the river to the end of the line of poison baits and returned to our camp at 1740 hours. The snow had commenced to melt along the river bank but not inland.

38. On May 15, the temperature rose and the snow became soft and wet. The sled having steel runners, slipped along with less friction than the oak toboggan. The change from winter to spring overnight was surprising. The specimens began to thaw, and it was necessary to skin one fox and gut two wolves before departing. At 1215 hours, we travelled down Big River and up Egg River. We camped on the east side of Egg River at 1700 hours, earlier than usual, so that a wolf could be skinned. The sked with Sachs Harbour was not maintained. A three-way sked between Aklavik, Reindeer and E-3 was heard.

39. May 16 was another warm, sunny day. We travelled up the Egg River from 1000 hours to 1315 hours, stopping on the way to skin a wolf. Two wolves were skinned in the evening, after we camped at 1915 hours. The sun was still above the horizon at 2330 hours. Although unconfirmed, the commencement of the midnight sun in this latitude is considered to be May 14, about 10 days earlier than in Aklavik. Aklavik Signals was received on the radio but Sachs Harbour failed to call.

40. On May 17, we travelled from "Sideways" Creek, across the Kellett River, to the Sachs River, in about  $8\frac{1}{2}$  hours (1115 to 2030 hours). The snow was rapidly disappearing in the warm



sun and wind. In places, bare ground was encountered on "Sideways" Creek, which was difficult to cross with the motor toboggan. Instead of travelling in a straight line, it was necessary to follow the meandering creek. Water had collected in a creek which we crossed near the Kellett River. After stopping for 45 minutes, at 1530 hours, we crossed the Kellett River and travelled overland to the Sachs River.

The area between the two rivers was covered with snow except for the ridge along the Sachs River. We walked to a high part of this ridge facing a wind averaging from 30 to 40 m.p.h. It was necessary to lean into the wind to keep balance. We were undecided whether to continue along the ridge or descend to the river. The slope was long and steep but not dangerous for dogs or the motor toboggan. We decided to descend because the ridge offered no shelter against the wind; as it was necessary to cook the dog pot in the open, shelter was required. Travelling down the slope, it was difficult to brake the speed of the toboggan to avoid running over the wheel dog.

The snow had melted along the side of the ridge and runoff water had collected on the river, which was wide in places, with a current. The depth of water on the ice averaged about eight inches. We crossed and recrossed the river, before finding a dry camp site on a sandy point. The ground had thawed sufficiently so that the pegs could be driven eight inches into the sand. The wind went down for a period and the dog pot was boiled outside. Shortly afterwards, the wind rose again to about 20 or 30 m.p.h.

41. On May 18, the last wolf was skinned and examined. We walked about the sand flat to make bird observations. That day we experienced the shortest but hardest day of travel. At 1300 hours, we started but encountered soft, wet snow undermined with water in which both the dogs and the machine became stuck and had to be relayed out, a gruelling task for the dogs and us. We climbed a high bank in order to choose the best route and decided to cross to the north side of the river and follow it, taking the shortest route, because the supply of food and gasoline were low. Continuing, it was necessary to relay the two toboggans with the dogs across a long, bare gravel bar, and drive the motor toboggan across it, as there was no alternative route.

The motor toboggan was driven ahead pulling a loaded toboggan. I followed behind with the dogs pulling a loaded sled. In places, it was necessary to push the sled through wet snow and water above the knees. Along the river bank, the deep snowdrifts would not support our weight and we sank to our hips. The dogs could barely pull the sled over these drifts, and the motor toboggan became stuck if allowed to stall.

At 1600 hours, it began to rain heavily and we camped to try to keep our equipment dry and dry our clothes. We had no butter, jam, milk, bacon, or tobacco - only a little meat, tea, and oatmeal. The dogs had been rationed for two days and were becoming very thin. To feed them, we scraped the meat off caribou skulls, divided one yearling caribou ham, and added one ptarmigan. Divided among seven dogs this was only a mouthful. The Sachs River had grown wider and swifter than the day before. When the rain stopped, little snow remained on the land. We decided to leave the tow toboggan loaded with the heavy items to be picked up later with dogs from Sachs Harbour. The load on the sled was reduced and the motor toboggan was driven without

a load. Because of the rain, radio communication was not maintained.

42. Starting at 1115 hours, another wet, strenuous day, May 19, was spent pushing our way to Sachs Harbour in the face of strong winds, rain, and snow. Travelling conditions were more difficult as a result of the heavy rainfall. The gravel bars were bare, soft, and wet, making it almost impossible to cross with the toboggan and the dogs. Along the steep banks, the deep snow was soft and wet and the sled sank down about a foot. Pushing the toboggan, I sank into the snow past my hips.

We had expected travelling conditions to improve farther down the river but instead they were becoming worse. From the tops of high hills, we had tried to choose a better route along the river, or try to find a way to the coast. So far, it had been necessary to follow the river, because a large sand deposit on the south bank had barred our way across.

When we had followed the north side of the river as far as we could, we crossed the south bank. The dogs pulling the sled were driven through 10 inches of water over the ice. The sled was unloaded and driven back and used to transport the motor toboggan across. Since it was impossible to follow the river, we took to higher ground on the south side. Travelling conditions were better on the land than along the river, except that the lakes were covered with water and wet snow. Near the bay of the Sachs River, the track of the motor toboggan came off, and was repaired. About 100 yards farther on it slipped off again. We were then about four miles from the settlement. Being cold and wet, we decided to continue on foot behind the sled, leaving the toboggan to be brought in later with dogs.

After descending to the bay, we travelled on the ice to Sachs Harbour, arriving at the settlement at 2030 hours.

From May 20 to 27, the field equipment was cleaned and fox specimens examined. More than 300 foxes were measured, weighed, and sexed. Preparations were made for a trip along the west coast to observe the seal population.

43. On May 28, at 1130 hours, Cst. Alexander, Sam Lennie and I, left Sachs Harbour with two dog teams. Opposite Sachs Harbour, near a small island, a large deep pool of water had collected. Water collects in this part of the inlet earlier than elsewhere. Open cracks in the ice were encountered but could be crossed without difficulty. Along the coast as far as the "Sand Hills" the ice was smooth. In this area, the shallowness of the water obstructs the old ice being blown ashore during the September storms. A few miles offshore, there was some rough ice which we avoided as much as possible. No seals were seen until 1400 hours. Between then and 1845 hours, 15 ringed seals were seen, and one was shot by Sam for dog food. At 1845 hours, we set up our camp on a gravel beach at the 'Climb', 20 miles from Sachs Harbour. In the evening, we walked to a lake near 'Fish' Lake. The ground was bare except for snow drifts along the banks of lakes, or on the slopes of ridges. The vegetation was becoming green. A dwarf willow and a decumbent willow were in bloom. The purple saxifrage was almost in bloom.

44. On May 29, it was clear and sunny, ideal for seal hunting. At 1000 hours, we departed, travelling along the smooth ice offshore, but soon encountered rough ice. Open leads were numerous and wide. In some places, it was necessary to throw the lead dog across a lead, or attach a rope to its collar and pull it across. Without assistance, it could not climb up on the ice on the opposite side. Between 1000 and 2040 hours, 15 seals were seen. Camp was established on a sandy beach on the coast. The height of the cliff behind the camp was 250 feet, determined from an altimeter. Little vegetation was found at the top of the cliff. Looking over the ice, large pools of water and open leads were seen towards the Masik River. From 2245 to 2315 hours, the number of hauled-up seals in sight varied from five to eight.

45. On May 30, the weather was colder and overcast with variable winds. From the high cliff behind the tent, 11 seals were seen, using the 20x telescope. At 1000 hours, we left this camp site, about 28 miles from Sachs Harbour, and travelled over the ice to the seals a few miles offshore. A stalk of three seals failed when the noise made by jet aircraft frightened them. A total of 27 seals were seen before camp was made at 1920 hours.

Throughout that day, we had travelled through rough ice and crossed wide leads. Near the shore, a wide strip of water which we crossed at the narrowest point found without getting wet, had formed from land runoff. Algae were seen in the water of these leads. From our camp near the Masik River, we climbed a 310-foot hill to census the seal population. The hill formed part of a gravel ridge which supported little vegetation. The ground was bare except for snow above the base and in the gullies. Using the 20X telescope, 97 ringed and three bearded seals were counted at 2300 hours. The wide open patch of water, apparent the day before, had been reduced by ice floes and now appeared as a narrow strip about eight to ten miles offshore. There were large pools of water on the ice. This water would drain into the leads in the next few days.

46. On May 31, the weather was clear and sunny with a cold east wind. Before departing for the Masik River, the position of the seals were noted from the hill. From 1030 hours, to 1700 hours, we hunted seals on the ice towards the Masik River. At the mouth of the river, two former Eskimo settlements were found, one on the north side of the river and the other on the south side farther upstream. Eskimos had trapped from the settlement on the north side in 1935 and from the one on the south side in 1938.

47. On June 1, the dogs were rested. With this opportunity, Sam and I decided to walk overland from the mouth of the river to the ridge on the north side of the river. At a large creek flowing into the Masik River, the height of the ridge was measured at 460 feet. The top of the ridge on the opposite side of the creek was higher. The creek was rocky, shallow, and swift. At the base of the ridge, large pools of runoff water had collected. From the top the view of the Masik River Valley and the coast was exquisite. It appeared that the course of the river had changed a number of times near its mouth.

Eskimos had formerly camped on this creek. Old rings of stone, and bones of caribou and musk-oxen were found. The vegetation was becoming green in the Masik River Valley. Clumps of purple saxifrage, mushrooms, and flies were seen. The

contrast was striking between the flowering plants on land and the wide expanse of solid ice off the coast.

48. At 1945 hours on June 2, we commenced the return journey to Sachs Harbour. Near the wide leads, the surface water had drained. In other places, where leads had not formed, deep pools of water and wet snow were encountered. In the space of a few days the width of the leads had increased and finding narrow, safe crossing places took extra time and travelling. Cst. Alexander joined a party of two Eskimos hunting seals in the area, but Sam and I continued along the shoreline.

The coastal cliffs were conglomerate in composition, with large boulders protruding at the surface. Streams flowing down the cliff face had eroded deep gullies. Avalanches of gravel and boulders, caused by water seepage, rolled to the bottom of the cliffs with thunderous roars. After travelling until 1900 hours we stopped 28 miles from Sachs Harbour and established our camp on a gravel beach. Purple saxifrage and an unidentified purple flower were found in bloom at the top of the cliff.

49. At 1000 hours the following day, we set out along the coast. Rough ice and water were encountered until we reached the "Climb". Travelling was slow and dangerous because of wide, open patches of water at the bases of blocks of rough ice. Care had to be exercised to avoid stepping into holes beneath the snow. Only a narrow slit on the surface of the snow reveals the presence of one of these cracks.

At the "Climb", about 20 miles from Sachs Harbour, the structure of the cliffs changed from conglomerate to sand. The height of the cliffs was about 40 feet, becoming less northward. At the "Climb", four Eskimos with dogteams were departing for Sachs Harbour. Their sleds heavily loaded with seals. After tea, Sam and I walked inland about two miles to remove a poison control station, returned to the coast, and continued on the ice towards Sachs Harbour, camping at 1700 hours. The coast at this place was low and sandy. Driftwood could be found along the beach.

50. On June 4, a strong, cold east wind with snowflurries was blowing. In such weather seals found on the ice were wary and difficult to approach within shooting range. Another disadvantage of cold weather was the formation of thin sheets of ice on the water and a crust on the snow. Already, two dogs were suffering from cut and worn paws. Shoes made from seal skin were tied on the feet of the leader. The other dog uttered loud cries with each step. Since we were about 15 miles from Sachs Harbour, it was decided to destroy this dog. It would take about six weeks to heal the paws and by that time spring travelling would be over.

After travelling through large pools of water flooding the estuary of the Sachs River, we arrived at Sachs Harbour. At an open lead, near the shore, a few Eskimos were jigging. One tomcod had been caught.

On June 5, we remained at Sachs Harbour, cleaning the guns and cameras and preparing for a trip to Cape Kellett.

51. At 1130 hours on June 6, we set out following the coast towards Cape Kellett. Travelling conditions on the ice were excellent to a few miles beyond Mary Sachs, where the creek was high and flowing into the sea. This place was named after the wrecked ship 'Mary Sachs' of the Steffanson expedition. Pieces of rusty iron from the ship can be found strewn along the beach. The sod walls about a foot in height of four former dwellings, and one tin house remain. Musk-ox heads and seal and whale bones were found.

We left Mary Sachs and continued along the coast, looking for fossil wood. None was found in clay deposits superimposed with gravel (Fig. 14). The gravel layer was cut by deep gullies caused by a slumping. The clay was in four layers, a narrow red layer at the bottom, and above that a wider yellowish layer, a reddish-brown layer and an orange-coloured layer. The layers had been faulted and bent. Towards Cape Kellett, the cliffs were composed of coarse gravel, which contained fossil wood. Four samples were collected for Mr. T.H. Manning, at various sites along the cliff face. The fourth from strata 100 feet above sea level on a cliff 150 feet in height. From the top of this cliff to the top of the plateau was another 200 feet.

Descending the cliff, we continued on the ice. Rough ice was encountered, which required strenuous efforts to help the dogs pull the sled. At 1915 hours, we camped on a gravel beach, near an old Eskimo settlement at Cape Kellett. Seven rectangular, low sod walls, reinforced with whalebone ribs, represented seven Eskimo sod houses (Fig. 15). Three of the dwellings had been excavated in 1953 and 1954 by Mr. Manning. In the evening, I walked inland about three miles looking for dens. About one mile inland another small sod-whalebone type of dwelling was found.

52. On June 7, the weather was overcast with snowflurries and a strong northwest wind. Conditions were unsuitable for seal hunting, and it was decided to spend the day walking inland. Leaving camp at 1015 hours, we walked overland towards the Kellett River flats. Walking conditions were good on the dry ridges but wet and muddy on the low, flat ground and slopes. Vegetation was luxurious along a creek but sparse on the dry ridges. Polygons were vegetated along the edges only.

53. On June 8, we travelled seven hours from 1035 to 1330 hours and 1400 to 1800 hours. The patch of open water to the west of the Cape had become blocked with ice. We crossed the narrow gravel spit at Cape Kellett near its base in three stages by pushing and driving the dogs over the bare gravel. From the shore to about four miles out, the ice was smooth. Rough ice could be seen at that distance. At Blue Fox, on the north side near the mouth of the Kellett River ice had piled up against the shore. At this point there is an unoccupied, tin-constructed house, built by Fred Wilkie. Water from the Kellett River had flooded the ice there in places. At 1800 hours, we camped on a gravel beach beyond Blue Fox.

54. On June 9, we decided to return to Cape Kellett rather than continue to the Lennie River, as our seal observations were completed, and the supply of dog food was insufficient to permit further travelling. We had been unsuccessful in supplementing it with seal meat. Over night, the ice as far as Cape Kellett had flooded with four to six inches of water. At Cape Kellett we made the arduous crossing over the gravel spit and camped at 1750 at the site occupied on the 7th.

55. On June 10, a warm, clear sunny day, we returned to Sachs Harbour, where we arrived at 1500 hours. Four trappers had set out early in the morning to search for two persons overdue on a sealing trip, and believed to have gone out with the ice. However, the four trappers returned later in the day, reporting that the ice had not moved and that the two missing persons were safe.

On June 11, the surface of the ice in the estuary of the Sachs River was flooded with water which came in overnight. The snow patches on the land and the ice were being melted by a warm wind. The colour of the ice was bluish. In a day, the ice rose and the surface water drained off, leaving the ice a whitish-gray colour.

From June 12 to 16, a large sample of foxes ~~was~~ measured, weighed, and examined for parasites and food analyses.

56. On June 17, Sam and I left Sachs Harbour at 1030 hours walking overland to the Kellett River. The weather was unsettled, with snowflurries and a strong west wind. The ridge north of the settlement offered good footing, but low areas were wet and muddy. The Kellett River was too high and swift to ford, although it had commenced to recede from the spring high-water level. Three plants were in bloom and two cocoons containing larvae with orange bristles were found.

57. In spite of cold weather with snowflurries and a strong west wind, we decided to start the overland walk to the Egg River. Two large dogs, chosen for their size and long legs to act as pack dogs, were loaded with equipment and clothing packed carefully so that sharp hard objects would not stick into their ribs. In loading dogs it is essential to load the side pouches of the pack equally and not to make the packs too heavy. A trained pack dog can easily carry 40 to 50 pounds. One of the dogs had been used for packing before but the other dog had not. After loading it stumbled and fell over with the load. The load was lightened by adding articles to our own heavy packs. After a few days, the dogs usually become accustomed to the packs.

At 1235 hours, we started walking from Sachs Harbour, leading the dogs to prevent them from running back. Walking conditions were heavy on the water-soaked gravel, and tiring on the hard-tufted clumps of Dryas. In places, we sank 10 inches into the mud. Our sleeping robes and skins in the dog-packs became soaked with water splashed by the dogs. We realized then that we should have packed our bedding ourselves; we had not done so because we had not realized that conditions would be so wet. By 1800 hours after making good progress, the mouth of the Kellett River was almost reached.

58. On June 20, the cold, overcast windy weather with snowflurries continued. We set out at 0915 hours. On approaching the coast, we encountered a wide stream, too deep to ford without getting the dog packs wet, and followed it to find a narrow crossing place. Almost opposite our starting point, a place was found which could be forded easily.

The lower, south side of the Kellett River was flat, with many small ponds and creeks. The vegetation consisted mainly of sphagnum moss, sedges, and grasses.

Upon reaching the coast late in the afternoon, a wide patch of water was found between the shore and the edge of the ice. To avoid unpacking the dogs and carrying the packs

through the water to the ice, we walked along the shore to search for a narrow place. None was found until 1730 hours, too late to start walking over the ice to Blue Fox. We decided to camp. Although it was cold, wet and windy in the tent, we could not use kerosene for heating as our supply was rationed for cooking only.

59. On June 21, at 0380 hours, we set out across the ice towards Blue Fox. The ice was solid, but flooded with water and intersected by wide leads. At 1300 hours, Blue Fox was reached, after an hour spent trying to get ashore. On a gravel beach, we collected snow from the tops of sheets of salt ice, to melt for making tea. We were fortunate in finding driftwood to build a large open fire to dry some of our clothes. The driftwood possibly originated from the Mackenzie River, because beaver cuttings were found near the Kellett River.

The land was bare except for small, sheltered patches of snow. It supported sparse vegetation, mainly willows, Dryas, and mosses.

60. On June 22 the weather became clear and warm. A crippled pack dog was examined; two large water blisters were found under its skin in the scapular and pelvis regions and it had weak and sore hind legs. Most of its load was divided between Sam, myself, and the other pack dog. Walking conditions on starting were fairly dry, except in low flat areas where feet sank about six inches into mud. The Lennie was narrow and shallow, and about two feet in depth. We waded through the cold ice water, relaying the packs to the opposite side. From the river, a long, wet, flat valley was ascended to a long gently-shaped ridge. On reaching the top of the ridge, we walked to a lake. The lake was covered with ice, except for a narrow strip of water along the shore. We camped there at 1730 hours.

61. On June 23, we walked from 0850 to 1845 hours, about eight hours, with brief resting periods. This long march was made to reach the cache on the Egg River as our supply of fuel and food was only enough for the day's travel. The creeks encountered that day were shallow. The ground had drained and dried on slopes, but the low-lying areas were soggy. Over most of the area were tufted clumps of Dryas or 'niggerheads', too small to bear the foot and spaced close and irregularly so that it is necessary to pick a way over them. Looking back towards the coast a wide valley could be seen between the Lennie River and "Sicsic" Hills (Fig. 17). The vegetation was still brownish in colour, not green. Small, fresh, green sprouts of grass were beginning to appear. The willows were in blossom but without leaves. The vegetation had a distinctly autumnal appearance. Patches of snow remained only in the gullies of ridges. The anchored ice on the bottom of the lake had not risen, so that small lakes appeared to be free of ice.

After crossing a series of ridges we reached the river near our cache at 1845 hours. The cache was located on the west bank, about six miles upstream from the mouth. Our camp site overlooked the Egg River and was in the middle of goose nesting area. In Figure 17, a view of the southeastern part of the nesting area is shown. The lower part of the nesting area is shown in Figure 18.

62. From June 23 to July 3, counts of snow geese, egg numbers, and brood sizes were made. In addition, Arctic fox activity, feeding habits, and moulting pattern were observed. Field work was uninterrupted by bad weather except for one day. The dogs were rested during this period and paid no attention to the geese. On June 27, we returned to the tent to find the two dogs had got loose, ripped a hole in the tent, and gorged themselves by eating most of our food and all the dog food. Three days on a diet of water cured their acute indigestion, and our depleted food supply was supplemented with ptarmigan, which were not very plentiful in the area. There were 30,000 to 40,000 snow geese, but it was not necessary to resort to killing breeding pairs. One gander collected for food proved to be thin, tasteless, and unpalatable. Observations on snow geese, foxes, and wolves are presented in other sections of this report.

63. On July 4, at 1100 hours we left Egg River with the two pack dogs, travelling southwest along a creek and then south. In Figure 19, a wet, peaty formation about two miles southwest of the Egg River is shown. We walked for six hours, over hummocky tufts of Dryas, to the Lennie River. In Figure 20, a typical scene between the Egg and Lennie Rivers is shown. Our camp was situated on the Lennie River at the place where the winter trail to Sea Otter Harbour crosses the river.

64. On July 5, we walked from 0950 to 1415 and from 1440 to 1810 hours, and reached the Kellett River. We camped about a mile below Easter Creek. Few observations were made on this walk. On the north side of the Kellett River, a large flock of moulting snow geese were seen. The presence of moulting geese delighted Sam; although he had planned to walk to De Salis Bay after we reached Sachs Harbour, he agreed to wait a few days, to assist with banding. He had proved to be a happy, steady companion with limitless energy,

65-7 On July 6, we walked to Sachs Harbour. For the first time, we were tormented by heat and mosquitoes. We were welcomed by the Eskimos and the police who were becoming concerned about us. After a few hours, we returned with two helpers to our camp on the Kellett River. The Eskimos rounded up a large flock of snow geese on the north side of the river. The method of tiring the geese by walking them back and forth over niggerhead proved arduous but successful; by running amongst the geese individuals were caught and banded. At 0530 hours, the last band, number 300, was used. After resting for a few hours, we walked back to Sachs Harbour.

68. On July 8, Sam left Sachs Harbour to travel to De Salis Bay. A considerable amount of work remained to be completed - scat and stomach analyses, packing equipment and specimens, etc. On July 12, this work was completed and an aircraft was requested, which did not arrive until July 23. The pilot was anxious to return immediately, and the equipment was loaded rapidly into the aircraft. At 2200 hours, we departed from Sachs Harbour and landed in Aklavik at 0115 hours.



MAMMALS

Arctic Fox.- Alopex lagopus innuitus (Merriam)

A major part of the biological investigation on Banks Island was devoted to a study of arctic foxes. Banks Island is superior to the Western Arctic mainland as a study area. The subjects discussed below include the following: size and weight of adult and juvenile foxes, life history, activity, movements, food habit studies, seasonal moults, handling of fur, and population dynamics.

(i) Adults Size and Weight

In Fig. 21, histograms of the total length of male and female foxes are shown. The distributions are normal. Frequency distributions of the tail and hind foot measurements of both sexes were also normal. Examination of the distribution failed to reveal the presence of juvenile foxes. It is unlikely that many juveniles would be included in the sample because the majority of the foxes had been trapped in February and March, although few were taken in January, April, and May. Foxes are considered mature at the onset of the breeding season in February. The frequency distributions of the weights of male and female foxes, shown in Fig. 22, were not bimodal but asymmetrical. Negative-skewed distributions occurred in both sexes. Animal weight distributions are commonly asymmetrical.

Since the sample can be considered homogeneous, statistical analyses of the body measurements and weights were determined, as listed in Table 1. For each measurement, the sample size, range, mean and standard error are given. The total length, tail length, and hindfoot length of the male foxes were found to be significantly larger than those of the females. The difference amounted to about 4 per cent in each case. A significant difference in the size of the ears was not found, but the samples were too small to support conclusive results. No obvious correlation was found between weight and length in male foxes. The range of weights for male and female foxes was from 4 to 11 lbs. and 3.5 to 8 lbs, respectively. The ranges of weights of 497 males and 547 females measured by Chichester (1908, vide Osgood et al 1915, p. 113) were from 5.5 to 20.25 lbs. and from 4.0 to 21.75 lbs. respectively.

The maximum weights obtained by Chichester were almost double those obtained on Banks Island. It is considered that the Banks Island sample was not truly representative of the population because foxes trapped in November and December were not included. Because of the availability of food, foxes would tend to be heavier in November than at the end of the trapping season.

Table 1. Body Measurements (mm) and Weights (lbs.) of Adult Male and Female Arctic Foxes.

	<u>MALE</u>				
	Total Length	Tail Length	Hindfoot	Ear	Weight
Sample	139	137	76	10	168
Range	(765 - 938)	(270 - 362)	(126 - 150)	(46 - 72)	(4 - 11)
Mean	843 - 2.63	308 - 1.47	140 - 0.71	56.0 - 1.95	5.76 - 0.10
<u>FEMALE</u>					
Sample	143	141	80	12	170
Range	(745 - 868)	(256 - 333)	(122 - 146)	(45 - 65)	(4 - 8)
Mean	810 - 2.21	298 - 1.43	134 - 0.60	56 - 1.72	4.98 - 0.07

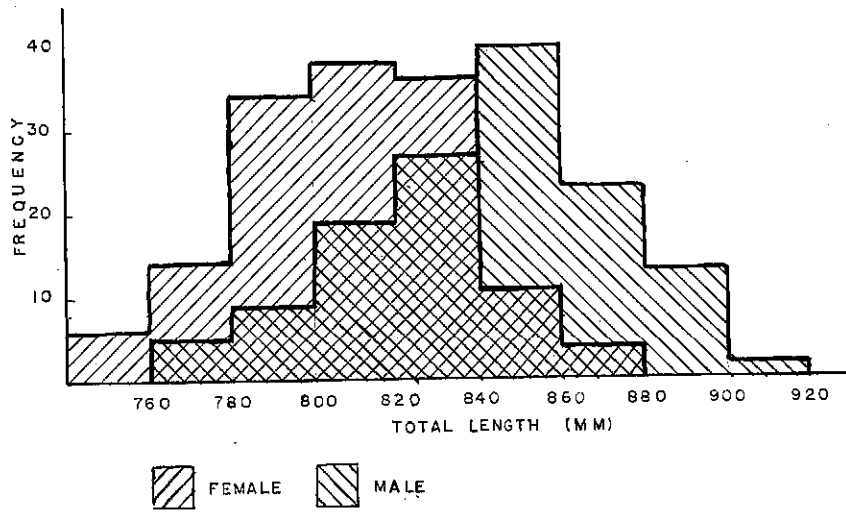


Fig. 21 Frequency distributions of the total length of male and female arctic foxes.

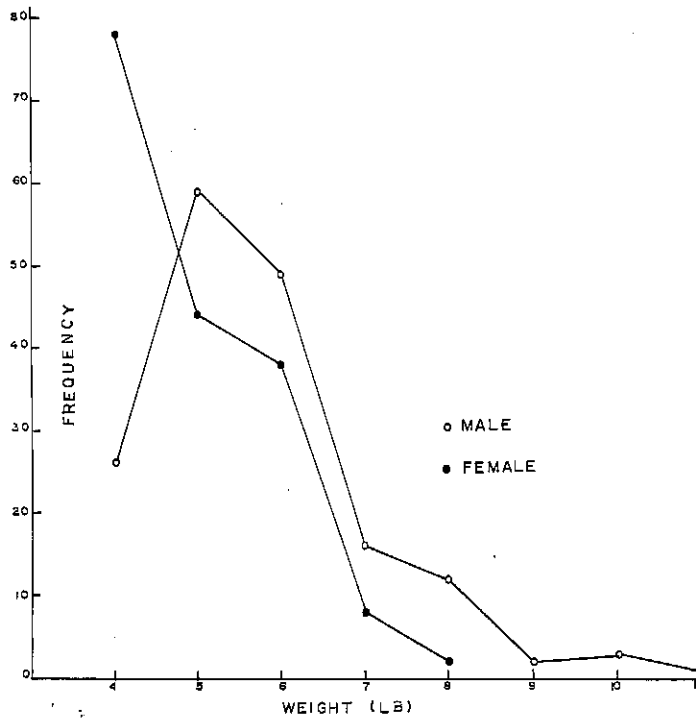


Fig. 22 Frequency distributions of the weights of male and female arctic foxes.

(ii) Juveniles

One juvenile fox was collected on July 5. Although a number of dens were found, no other live juvenile foxes were seen. The measurements of the female kit were: 508 mm., 94 mm., 42 mm., and 3.5 lbs. In order to illustrate the range of size and weight of kits in July, measurements taken on animals trapped in the Kendall Island area between July 6 and 15 will be used. The ranges in measurements of seven males were: 461 to 495 mm., 130 to 165 mm., 87 to 98 mm., 38 to 45 mm., and 2.0 to 3.0 lbs. For six females the ranges were as: 430 to 470 mm., 125 to 150 mm., 80 to 92 mm., 39 to 42 mm., and 1.5 to 2.5 lbs. Because of the paucity of data and the tendency for wide variation in the measurements of rapidly growing animals, statistical analyses were not attempted.

Life History

Birth.- Of 161 females trapped from January until mid-May, 142 were examined. None of these was pregnant. Nine uteri contained pigmented areas which were found to represent old placental sites (McEwen and Scott, in press). The gestation period is 52 to 53 days as considered by Larov (1932), Dubrovskii (1937, and Barabash-Nikiforov (1938). The kit taken on July 5 was believed to be about six weeks of age, as the young do not emerge from the den until about that age. Kits were first observed on the mainland on July 6, and the total of 13 between that date and July 15. On this evidence, the approximate dates of mating and parturition are in early April and from the latter part of May to early June, respectively. No implantations were found in the sample examined, but this may have been because so few of the specimens were taken after March 31.

Male Reproductive Development.- Testis measurements (mm.), length and diameter, were taken by means of calipers. The sample consisted of foxes trapped from January to May. The means of these measurements for each month have been plotted as shown in Fig. 23. Volumetric measurements were made of the testis size of 60 foxes trapped in January and February. Since it was not certain that the sample contained only foxes trapped during these months, it was decided not to use the measurements. In Fig. 23, it can be seen that a rapid growth in length and diameter occurred during February and March. By the end of March maximum growth was attained and a reduction in size then commenced. In interpreting these data, it should be borne in mind that the samples are small. Examination of male carcasses revealed a noticeable change in the breeding condition in March, including testis size and a strong odour.

Mating of foxes was not observed. The first set of paired tracks was observed on May 3, although possibly foxes had paired prior to this date.

Denning.- On March 22, the first occupied den was observed. On March 25 and again two days later, a fox was seen at the same den on the top of a gravel ridge. This was an old den, having been used for a number of years. Occupied dens were found on April 20 and 21. On May 5, two dens were found, of which only one appeared to be in use. From the observations, denning of breeding animals commenced about mid-March. Dens are occasionally used by foxes for shelter during the winter. Dens occupied by a breeding pair of foxes were distinguished from other dens by the amount of activity about the dens and the presence of foxes at the dens at different times.

Sex Ratio.- The sex ratio of 338 trapped foxes was about 1:1 (168:170). Sex classification of 130 pelts also revealed a 1:1 ratio (68:62). Only a limited number of pelts could be classified because the fur was baled for shipping to the trading posts at the earliest opportunity. From records kept by the trappers denoting the sex of foxes trapped on each visit on their traplines, it was hoped to show whether a seasonal sex difference existed. Because of the lack of co-operation on the part of the trappers and the difficulty of sexing frozen carcasses, the results obtained are not considered representative of the population. The ratios of males to females, based on trapping records for December, January, February and March were - 163:100 (52:32); 147:100 (153:104); 123:100 (75:61); and 111:100 (51:46). The wide variation of the monthly ratios would indicate that the samples were biased. Accurate records of the sex ratios of trapped foxes from March 24 to 29, indicated a 1:1 ratio (14:12).

Activity.- From March 22 to July 5, 64 fox observations were made. In 50 of these observations the animals were hunting for food. In the remaining 14 records, the foxes were returning to their dens, standing near the dens, or rolling on the ground. When alarmed, the foxes ran away, usually uttering high-pitched barks.

The daily times of observation for the months of April, May, June, and July were plotted in a frequency distribution graph (Fig. 24). The month of March was excluded because only two observations were made during eight days of that month. In 16 days of April, 8 observations were made. In 23 days in May, 6 observations were made. In 21 days of June, 41 observations were made, and in 9 days of July, 7 observations. The large number of observations made in June was not the result of an increase in the fox population, but of observations made in the Egg River district during studies on the snow goose nesting ground, which attracted many foxes.

More foxes were seen after 1800 hours in May and June than in April and this suggests that temperature may influence fox activity. April temperatures were lower and daylight shorter than in the later two months. However, insufficient temperature records were kept for interpreting this possible relationship. The increased amount of activity in June may also be related to the feeding of young or the caching of food. Observations were not made between 0100 to 0800 hours, but foxes are probably active during this period. They were found to be active at all other times of day and night. In June the period of maximum activity was from 0900 to 2200 hours.

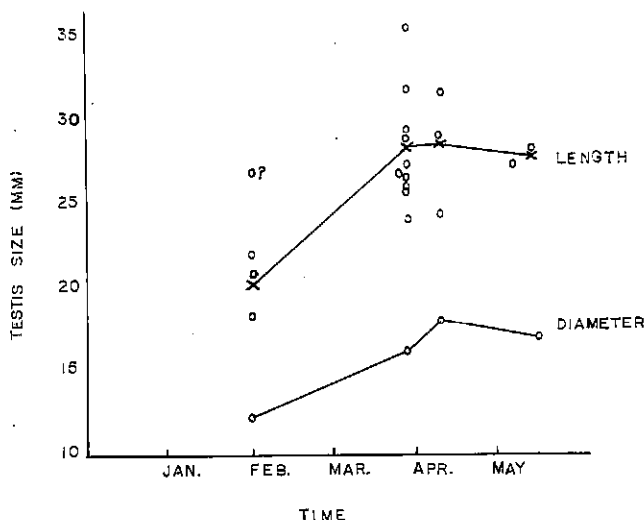


Fig. 23 Frequency distributions of the mean lengths and diameters of testes.

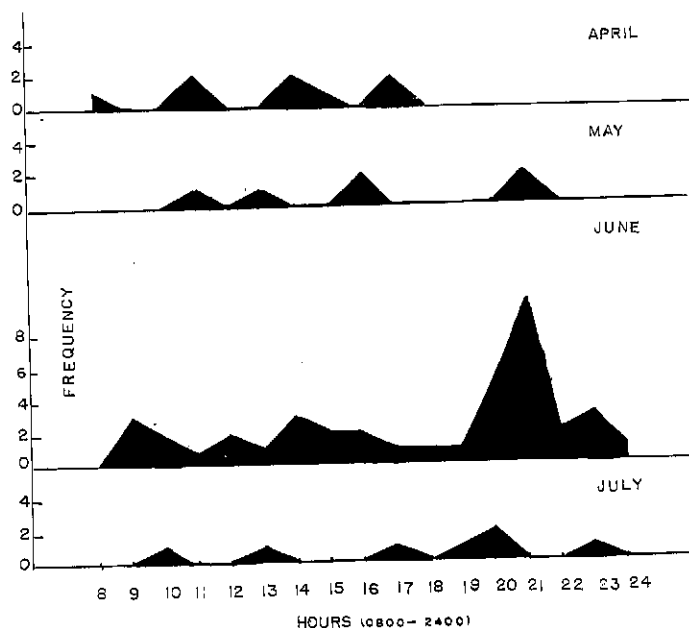


Fig. 24 Monthly frequency distributions of the observed times of fox activity.

Movements.- Larvov (1932) and Kirpichnikov (1937), considered that arctic foxes migrate seasonally. No evidence to support this conclusion was observed. One of the trappers reported that in February a large number of fresh fox tracks were observed on the ice near open water off Sea Otter Harbour. The direction of the tracks was from the north, continuing in a westerly direction. It was considered that a "run" of foxes had occurred. Trappers on Banks Island and on the mainland believe that runs of foxes from the sea ice to the land occur in late March. During a trip on a trapline from Sea Otter Harbour to Storkerson Bay, from March 25 to 27, observations were recorded to determine whether this belief had any basis. It was difficult to determine from the tracks observed whether a number of foxes had travelled from the ice to the land, or whether the tracks were made in local travelling. Evidence supporting the supposition that a run had occurred was that a large number of foxes were found alive in the traps. Low temperatures had prevailed prior to the observations and trapped foxes could not have survived for a long period in the traps. Also, some of the foxes had yellow blubber stains on the fur around their mouths, indicating that seal meat had been consumed. Since stains on the white fur are difficult to erase, it is not possible to say whether the foxes had recently travelled from the sea ice, or had been on the land even for months. The belief that "runs" of foxes occur at certain times of the year is widely prevalent among the trappers and perhaps deserves some credence until more evidence is available.

Food Habit Studies.— The winter diet of foxes was found to consist mainly of the following four items: lemming, arctic fox, caribou and ptarmigan. The percentage occurrences of food items, based on analyses of the stomach, intestinal and scat contents, are listed in Table 3. In addition to the four main items, traces of seal, polar bear, bird, vegetation, cloth and gravel remains were found. The last two items were likely swallowed accidentally. In two fox stomachs, large amounts of vegetation, resembling the contents of a caribou stomach, and Miracle Dog Food were found. Although a large number of foxes had yellow blubber stains around the mouth, remains of seals in the stomachs were rarely found. Blubber stains on the fur remain for a long time, so that the seal meat could have been digested prior to the examination. From December until March, seals are less available than in October and November. Since the seals remain in the hard, snow-covered chambers over the breathing holes and polar bears are relatively inactive, it is thought that there would be few seal carcasses from December until March for the foxes to scavenge upon, except in areas of open water. After the seals begin to sleep in the sun on top of the ice, which they do from late March until July, the percentage of seal remains in fox stomachs could be expected to increase. The identification of digested seal remains in fox stomachs is difficult, because seal hairs are rarely found. In feeding on a seal carcass, polar bears eat the blubber and hair and leave the meat only. Although it is commonly recorded that foxes follow polar bears to feed upon the remains of seals left by the bears, this conclusion seems to rest upon the coincidence that the tracks of these animals are often seen together. The higher percentage occurrence of fox remains in the intestines than in the stomach contents is unexplained. This may have been caused by the accidental swallowing of their own fur by the foxes.

Table 2. Number of Occurrences and Percentage Occurrences of Food Items in 322 Stomach, 322 Intestinal and 221 Scat Analyses.

Item	Stomach		Intestinal		Scat	
	No. of Occurrences	%	No. of Occurrences	%	No. of Occurrences	%
Lemming	31	9.04	62	18.9	177	80.0
Arctic Fox	17	4.96	48	14.5	5	2.2
Caribou	17	4.96	14	4.2	22	10.0
Ptarmigan	5	1.46	7	2.1	6	2.7
Vegetation	5	1.46	4	2.1	4	1.8
Oily Matter	1	0.29	--	--	--	--
Polar Bear	1	0.29	--	--	--	--
Seal	1	0.29	2	0.6	--	--
Snowy Owl	1	0.29	--	--	--	--
Sand	1	0.29	2	0.6	1	0.5
Cloth, String	2	0.58	2	0.6	--	--
Bird (Brant)	--	--	--	--	5	2.3
Eider Duck egg frag.	--	--	1	0.3	--	--
Unid.	--	--	3	0.9	1	0.5
Empty	261	76.09	185	56.1	--	--
	343	100.00	330	100.0	221	100.0

Animal remains eaten by foxes included: arctic hare, skinned wolf carcass, common eider duck, willow ptarmigan, and snowy owl (one in each case). Along the coast, ptarmigan seek shelter amongst the blocks of rough ice. The tracks of foxes were found commonly there and it appeared that they had been hunting ptarmigan. On the land, foxes sometimes followed for a short distance the tracks of caribou and ptarmigan. During March, April, and May, a number of lemming nests, restricted mainly to river banks and flats, were found, which had been dug up by foxes. To be able to locate the nests, foxes must possess an acute sense of smell or hearing. A lemming nest, dug up by a fox, is shown in Fig. 25.

During the summer, one of the main food items of foxes is considered to be birds and their eggs and young. The summer food habits of foxes may vary in different years and areas. The food habits of the foxes examined may have been influenced by a scarcity of lemmings and by the fact that the foxes were on the snow goose nesting area. The density of lemmings on the nesting area was greater than on other observed areas on the island, yet the foxes showed a preference for snow goose eggs and young rather than lemmings. Foxes ate the contents of snow goose eggs and cached a large number of eggs. The carcasses of 27 adult snow geese which died from natural causes were also eaten by foxes.

Snow goose eggs, stolen from a nest and eaten by a fox, are shown in Fig. 26. Fox predation on the nesting grounds will be discussed fully in the section on snow geese. Foxes robbed other birds' nests, including a king eider nest near Sachs Harbour.

Some snow goose eggs, taken by foxes, were cached. In doing this, the fox carried a single egg, with the ends protruding from the sides of its mouth, a short distance from the nest, and buried it in the ground. Usually, the fox enlarged a crevice with its fore feet, deposited the egg in the depression, and covered it with loose soil. The fox pushed the soil over the egg with its nose, as a dog does in burying a bone. The eggs were cached singly, not in large numbers together. Sometimes, the fox would dig up the egg and recache it. It would be interesting to know what percentage of cached eggs are recovered by foxes later in the year. It is believed that foxes are able to find cached eggs in the winter by the scent of urine. Foxes were observed urinating frequently on the nesting ground during the caching of eggs. Few eggshell fragments were found in fox stomach contents during the winter food habit study, part of which was conducted in the Egg River area. However, this did not necessarily indicate that few cached eggs are recovered.

It was found that 17 per cent (54 out of 322) foxes were excessively fat, having a thick layer of subcutaneous fat, large amounts of mesenteric fat, and the internal organs—heart, kidneys, and stomach enclosed in fat. This may have been the result of food abundance, or of differential assimilation of digested food. A similar observation was made by Pereleshin (1943), in a study of the winter food habits of foxes in the Jamal District. He dismissed the possibility of food abundance as a factor since foxes in the same area could be excessively fat or have no fat. This conclusion was supported by the evidence that in 1937-38, a year of low microtine numbers, a larger number of fat foxes were taken than in 1936-37, a year of high microtine numbers. In a vague manner, Pereleshin concluded that lack of fat in foxes was caused by disease and parasites, although supporting evidence was not given in the paper. On Banks Island, some of the fattest foxes were among the heaviest parasitized. No correlation between the degree of parasitism and the degree of fatness was apparent from the animals examined.

Seasonal Moults.- Arctic foxes moult twice annually. The white winter coat is shed in spring and replaced by a brownish-coloured summer fur. In early winter the summer pelage is replaced by the winter pelage. In this investigation, data were collected on the spring moult only. This moult extended generally from the first week in May until mid-July. A few foxes with incompleting spring moults were seen after mid-July. The stage of moult of animals observed in June and July ranged from just beginning to nearly completed. In spite of the individual variation, the general moult pattern was determined by comparing different individuals on different occasions. The first stage of the moult consisted of a darkening of the areas around the eyes, along the snout and lips, and on the posterior surface of the ears. About the same time the anterior surfaces of the fore and hind legs became brownish in colour. A brownish-coloured, mid-dorsal strip appeared along the full length of the back and tail. The outer surfaces of the legs and face became brownish in colour and the strip along the back and tail extended laterally. The last parts of the body to moult were the outer part of the tail, the sides of the body over the ribs, the neck and belly.

Foxes trapped up to the end of March were fully prime, with thick, white fur of excellent quality. Four foxes collected between March 31 and April 15, were prime. In May, foxes had commenced to moult. Two animals, a male and female, collected between May 7 and 11, had commenced to moult about the face and posterior surface of the ears. A female fox, taken on May 13, had moulted about the nose, the edge of the mouth, the posterior surface of the ears, and the anterior surfaces of the fore and hind legs. A few unprime areas were found on the flesh side of the pelt along the mid-dorsal part. A male fox, taken on May 11, was in a more advanced stage of moult than the others. It had moulted along the mid-dorsal part of the tail, with a narrow strip extending along the mid-dorsal part of the back to the shoulders; and also on the anterior surfaces of the fore and hind legs to the shoulders and pelvis respectively, and the lateral surfaces of the neck and about the face. Patches of summer fur of the previous year were found on the hindquarters.

From June 1 to June 23, six different foxes were observed. One of two foxes observed on June 6 was mainly in winter pelage and the other in advanced summer pelage. Two foxes seen on June 7 and 19 had moulted extensively; the mid-dorsal band had widened and extended laterally along the body. The other foxes had completed the moult except along the ventral surface of the tail, sides of body, neck and belly. From June 25 to July 3 observations were made in the Egg River area. Since foxes were seen daily individuals could not be distinguished. During this period, most of the foxes were in the advanced moulting stage having grown most of the summer pelage. One fox, observed on June 30, was mostly in winter pelage. By mid-July, the majority of foxes had completed the spring moult.

In a sample of foxes trapped from November 15 to January 48 pelts consisting of 22 males and 26 females were classified as "bluebacks". This term is applied to pelts which are not fully prime and have a bluish tinge along the back and flanks. Small dark unprimed areas were present on the flesh side of these pelts. Some foxes remain unprimed throughout the winter months. An unprimed fox in winter pelage was trapped on March 23. The causes of the failure of some foxes to become prime are not known. It is considered by Braestrup (1941), that temperature may be a factor. Instead of temperature, the controlling factor might be hormonal. Some of the pelts had tufts of summer fur on the hindquarters.



Nineteen of the foxes trapped in the 1954-55 season on the west coast (0.47 per cent) were blue foxes, a colour phase of the arctic fox. The number of blue foxes trapped on the east coast of Banks Island was not available to include with the number trapped on the west coast.

Handling of fur.- Fox pelts from Banks Island are considered superior in quality to those from the mainland. The mainland pelts are not handled as well or cleaned as thoroughly as those from Banks Island. At the completion of the trapping season, foxes are skinned and the skins stretched. After January, most of the trapped foxes are frozen solid so that it is necessary to store them until April or May to thaw them for skinning. Pelts with a layer of subcutaneous fat are scraped clean by the women, using an "ulu". Poorly scraped pelts become permanently stained from the fat. Grease and dirt are removed from the pelts by rubbing and brushing a mixture of cornmeal, flour, and gasoline into the fur. The pelts are hung on a line to bleach in the sun. The pelts are blown in wind, which removes the flour and cornmeal and makes the fur fluffy. Fur handled in this manner brings maximum prices on the fur market.

Population Dynamics.- Fluctuations in the fox population with peaks of abundance varying from three to five years have been shown, by analysis of fur returns, to occur in the tundra regions of Alaska, Canada, Greenland, and Russia. With only limited data, little can be concluded regarding the fluctuations in numbers of Arctic foxes on Banks Island, except that they do occur. The length of time between the peaks of abundance is not apparent from the trapping returns from 1951 to 1955. At least ten years' observations would be required to determine this feature.

The annual number of foxes trapped during the winters from 1951-52 through 1954-55 were: 2,657, 1,198, 1,274 and 5,700 respectively. The corresponding numbers of trappers were 9, 9, 10, and 20. In 1954-55, 9 of the 20 trappers trapped on the west coast. The number of foxes trapped in 1954-55 on the west coast was approximately 3,994. From 1951 to 1954, no trappers trapped on the east coast of the island. This largest number of foxes trapped on the west coast was in the 1954-55 season, although the number of trappers remained constant. It appeared that the fox population had reached a peak, or was still increasing. ~~However,~~ However, evidences supporting the supposition that a decline might occur were a die-off of collared lemmings in the autumn of 1954; an extremely large migration of snowy owls in 1954 with few seen in 1955; and an outbreak of rabies in the fox population in 1955. If the trapping success in 1955-56 is poor, then this supposition will be verified. Factors associated with a decline in the fox population such as scarcity of food, disease, parasites, and predation will be considered.

Food Scarcity.- Lemmings form one of the main food items of the fox diet. Attempts to correlate fluctuations in numbers of foxes and lemmings have been made by Braestrup (1941) and Elton (1942). One of the limiting factors of this correlation is the lack of accurate censuses of both populations. A general correlation was found to exist by Chitty and Chitty (1941), although in certain years the peaks were not in phase. Elton (1942), suggested that the lapse of time between the peaks of abundance of lemmings and foxes depends on whether the lemming 'crash' occurred in early or late winter.

On Banks Island, three lemming censuses were made, using a method recommended by Dr. Frank Pitelka, University of California (Berkeley). It is called a 20-minute-strip census and consists of 20 observations, each of one minute duration, separated by five paces. Following the period

of maximum run-off, the first census was made between the Sachs and Kellett Rivers, on July 17, 1955, from 1221 to 1241 hours. The area contained both wet and dry habitats, in a sand-gravel type of soil. No lemmings were observed, although a number of vacant burrows were seen. The weather conditions were unsettled, being cold and windy with snow flurries and brief sunny periods. The activity of lemmings could have been affected by the unfavourable weather conditions. Lemmings tend to be active during the warm, sunny part of the day.

The second census was made on July 3, from 1945 to 2005 hours, in the Egg River area. The habitat was wet. Vegetation grew on the sides of elevated polygons of peat (Fig. 27). Two adult Back's lemmings were counted. From trapping results, both Back's and collared lemmings were present. Back's lemmings were more abundant than collared lemmings. Lemmings were found to be more abundant in the Egg River area than in other parts of the island.

From 1415 to 1435 hours, on July 14, the third lemming census was made in the same area. Again, no lemmings were seen. From the field observations, it was concluded that lemmings were not abundant. The census method used on Banks Island was not considered useful in determining the relative abundance of lemmings.

A good indication of the lemming population is the number of tracks seen on the snow in April and May. Lemmings leave their burrows in the snow at that time and begin to travel on the snow surface. Although extensive travelling was done during these months, few tracks were seen. The trappers remarked that fewer lemming tracks were seen during May and June in 1955 than in 1954. A number of dead collared lemmings were found on the ground after the snow melted. The trappers said that this species was abundant in the summer of 1954 but began to die off in the autumn. The population of Back's lemmings did not decrease with that of the collared lemmings. In the winter food habit studies, the majority of lemming remains were identified as Back's lemmings. On Banks Island, the fox population did not decrease following the collared lemming die-off. The foxes apparently survived the critical period of limited food availability by supplementing their diet with caribou, trapped foxes, and ptarmigan.

Competition for food is not considered an important depressing factor on the fox population. Species which would qualify as competitors - weasel, coloured fox, rough-legged hawk, and snowy owl - are present in only small numbers. In certain years snowy owls may compete with foxes, but even in years of peak abundance, snowy owls are present only in the spring and summer months, a period which cannot be considered critical. Much less food is available for foxes from January to March than during the summer months.

Disease and Parasites.- In February, 1955, a disease presumed to be rabies occurred in the white fox and wolf populations. This supposition is supported by the fact that a dog which had been bitten by foxes died on March 26 from rabies. The disease was identified by Dr. R. Connell, Department of Agriculture, Lethbridge, Alberta. From January 1 to February 7, 1955, four animals, one wolf and three foxes, were considered to have rabies. Two of the foxes were shot, one 20 miles offshore and the other north of Sea Otter Harbour. This fox was found running around the snowhouse biting protruding objects and chewing traces of the dog harness. It was killed before it attacked the dogs. On February 24,

a dead fox was found lying beside a trapped fox. Two foxes killed on March 21 and 31 were attacking tethered dogs. The dogs killed the first of these and the trapper the other. About April 18, one of the dogs bitten by a fox on March 31, died with symptoms resembling rabies. Verification of this diagnosis was not possible. In April, only one fox with symptoms resembling rabies was reported. This animal was seen at Sachs Harbour, running amongst the houses and dogs. The following day the fox was found dead beside a dog. On the west coast of the island, two sled dogs, one wolf, and seven foxes were suspected of having rabies.

On the east coast, at De Salis Bay, five dogs, four pups and one adult, died in February, about 18 days after one of the pups was bitten by a 'crazy' fox. In the last stages of the disease the dogs refused food, became too weak to stand, were unable to bark, and had froth around the mouth. These symptoms are characteristic of rabies. No other cases of rabies were reported on the east coast.

From June 25 to July 7, five dead foxes were found. The cause of death was not ascertained because the carcasses were in an advanced stage of putrefaction. It was evident that none had been killed by wolves or other foxes. On June 25, about one mile southwest of Egg River, a female fox in early summer pelage was found a few yards from an unoccupied den. On June 28, on the west side of Egg River, about one to two miles inland, three dead foxes were found in an area of about one square mile. Two of the animals were in advanced summer pelage and one was in the early spring moult. Although a poison control programme had been conducted on the Egg River in April and early May, it seems unlikely that the animals had been poisoned. Also, it would seem highly improbable that the animals would travel away from the river about two miles to die in the same area. The baits were removed in early May. At this date, the spring moult was not as advanced as on some of the dead animals. There is a possibility that a skinned, gutted wolf carcass which was left on the Egg River in early May might have poisoned some of the foxes. The decomposed, intact carcass of a fox in early spring moult was found on July 7 on the south side of the Kellett River. Since a poison control programme had not been conducted in this area, the possibility of death having been caused by strychnine need not be considered. The fox population declined in 1955-56. This was evident from the low number of foxes trapped in that trapping season. Although the cause of death of the five foxes was not determined, it would appear that they all died as a result of natural mortality. Starvation did not appear probable because lemmings and snow geese were present in the Egg River area. Whatever the cause of the mortality, the die-off commenced about April.

The identification of parasites, collected from 388 animals, has not been received from the Institute of Parasitology, Macdonald College. The following parasites were found in a sample of foxes from Banks Island in 1953: Taenia crassiceps, Diphyllobothrium sp., Toxascaris leonina, Toxascaris sp., and Echinococcus sp.

Predation.- Wolves are considered the most important predator of foxes. Foxes had been found which had been killed and eaten by wolves. The number of foxes killed by wolves could not be determined. Coloured foxes, which prey on white foxes in other arctic areas, are rare on Banks Island, so that coloured fox predation on Banks Island is not important. Although arctic foxes feed upon other trapped foxes, it is not known whether they are cannibalistic upon other than trapped foxes.

Summary

1. The difference in the total length, tail length and hindfoot of male foxes compared with female foxes amounted to about four per cent. The weight of males was slightly greater than that of females.
2. The percentage of placental sites in a sample of 142 was 6.3
3. The growth of testis in males reached a peak in late March and then commenced to decline.
4. A 1:1 sex ratio was found to exist in the fox population.
5. The maximum period of activity in June was found to be from 1900 to 2200 hours.
6. The four main food items in the winter diet of foxes were lemming, arctic fox, caribou, and ptarmigan. In summer, foxes prey heavily upon birds and their eggs and young.
7. The spring moult extends from the first part of May until mid-July.
8. Foxes were abundant in 1954-55. In February, 1955, an outbreak of rabies occurred in the population.

Canis lupus bernardi Anderson. Banks Island Wolf.

From 1951 to 1955, a high population of wolves has been reported on Banks Island. The relative abundance of the species prior to this period could not be ascertained. The abundance of wolves has become a major problem to the trapping activities and large economic losses have been suffered by the trappers. Wolf predation on caribou and arctic foxes could be important, but little supporting data could be collected during the present field studies on this subject.

Seven wolves were seen during the field work. Two wolves were seen on April 24, 1955 on Egg River, two on April 9 near Ruddy Lake, one light-cream coloured wolf in the Egg River on June 24, 26 and 28. In late October, or November, 1954, Noah Elias saw a pack of nine wolves in the Sea Otter area. Angus Elias reported seeing a pack of 12 wolves in the Sea Otter Area. On the Kellett River, A. Carpenter saw a pack of 11 wolves. On the east coast, in the De Salis Bay area a pack of 11 and two packs of three wolves were seen by C. Grubin. From field observations, it appeared that wolves tended to remain, or persist in certain areas, such as: on the Sea Otter River, on Big River, inland from Big River, Egg River area, and Kellett River area. Sets of tracks, numbering seven and eight, were seen on the Egg River and north of Big River. These packs of wolves may have been following the major northward movement of caribou.

According to the trapper's observations, a pack of wolves, or a single wolf, remain in the area of their traplines throughout the trapping season. The wolves follow the trapline eating the trapped foxes, or tearing the animals apart, or pulling them out of the traps and leaving them untouched. If the trapped fox is not eaten, the legs may be torn off and large patches of fur torn off the sides of the body or back. Three foxes were found which had been carried by wolves away from the trapping station but left entire except for damage to the pelt. The wolves prefer living foxes to those dead in traps and fat to thin. It was observed on one occasion that a pack of four wolves had passed by a thin, living, trapped fox but had eaten other trapped foxes on the trapline. In considering that about 20 to 30 percent of the total number of foxes trapped may be damaged or eaten by wolves and that about 15 percent of the fox population is fat the belief of the trappers that the wolves take only the fat foxes is not entirely true. From observations the wolves do not seem to have discriminate tastes. It should be pointed out also, that foxes eat other trapped foxes. The total amount of damage and loss of fur is attributed to wolves, while a certain percentage is caused by foxes. An evaluation of these two sources of damage was not attempted in this report because discriminating data were not kept by the trappers.

In the 1951 and 1952 season, the number of foxes damaged or eaten by wolves was high but actual figures were not kept by the trappers. In the 1952-53 season, about 315 foxes were lost by eight of the ten trappers. The number lost by the two remaining trappers could not be obtained. At an average price of nine dollars per pelt, about 2835 dollars had been lost by the trappers. In the 1953-54 season, the damage caused by wolves was higher than the previous year. Some of the trappers lost 30 to 50 foxes, while one trapper reported that on one visit 50 foxes had been lost. The trappers estimated that about 20 to 30 percent of their total number of trapped foxes had been destroyed or damaged by wolves.

In order to obtain accurate figures on the wolf damage in the 1954-55 season, trappers were requested to record the number of foxes lost on each visit. The response to this request was weak, with only two trappers keeping a fairly complete record. The losses suffered by nine of the 18 trappers amounted to about 800 foxes, with individual losses ranging from 70 to 133 foxes. This estimate includes only one of the four trappers at De Salis Bay and none of the four at Jessop Bay. The estimated loss of all the trappers would be about 1,000 foxes. The individual fox catches on the east coast were less than on the west coast, and the number of foxes lost was less.

Since the average price per pelt varied from 10 to 20 dollars, it is difficult to assess the total economic loss. If the average price is considered about 13 dollars, the wolves caused about 13,000 dollars damage. Because of the numerous factors involved in an evaluation of wolf damage, such as the approximate estimate of individual losses, type and grade of fur lost, arriving at an estimated average price, the resultant estimated loss should be considered as an approximation, but not the actual loss.

In table 2, the monthly losses of one trapper have been analyzed.

Table 2. Monthly record of the number of foxes trapped and lost.

<u>Period</u>	<u>Trapped</u>	<u>Lost</u>	<u>Ratio</u>
Nov. 27 - 30	19	7	2.7:1
Dec. 3 - 30	67	11	6.0:1
Jan. 4 - 31	42	6	7.0:1
Feb. 6 - 28	67	32	2.0:1
Mar. 1 - 31	120	19	6.3:1

From November 27 to March 31, 19.2 percent of the total number of foxes trapped had been damaged by wolves ( $75/390 \times 100$ ). The ratio of the number trapped to lost varied from 7.0:1 in January, to 2.0:1 in February. The lowest ratios of trapped foxes occurred in November and February. The monthly ratios of foxes trapped to those lost by another trapper were, 1.3:1 in December, 10.3:1 in January, 1.5:1 in February and 3.4:1 in March. Greater numbers of foxes were lost in December and February than in January and March. In both analyses, high losses occurred in November or December and February. The ratios were not entirely comparable because the traplines were in different areas.

Other factors which may influence the ratios of trapped to lost foxes are the varying relative abundance of foxes and wolves in different areas, the period of time between visits on the traplines as heavy losses occur if traps are not attended frequently, the length of the trapline, whether the trapline is between other lines and whether the lines have been moved to other areas during the trapping season. Some of the trappers moved their traplines to other areas in order to reduce their losses. Most of the trappers set out short lines rather than long lines. When three trappers had lines in the same area, usually the trapper in the middle lost fewer foxes than the trappers on either side.

One phase of the investigation was devoted to wolf control studies. As the investigation commenced about two weeks before the termination of the trapping season, the assistance of the trappers on this project was very limited. The trappers forgot about the wolf problem at the end of the trapping season so that it was not possible to secure their assistance. It was necessary to limit the amount of time allotted to this part of the investigation. During the control programme, six wolves, four of which were males and two females, nine foxes, of which five were males and three females, one raven and one rough-legged hawk were poisoned. One fox was eaten.

The wolf control programme was conducted from Sea Otter Harbour from March 24 to May 16. On March 22 and 23, Sam and I travelled from Sachs Harbour to Sea Otter Harbour. On March 24, seven wolf baits, consisting of pieces of caribou meat containing strychnine pellets, were placed on 12 miles of a tributary of the sea Otter River, (Fig. 28).

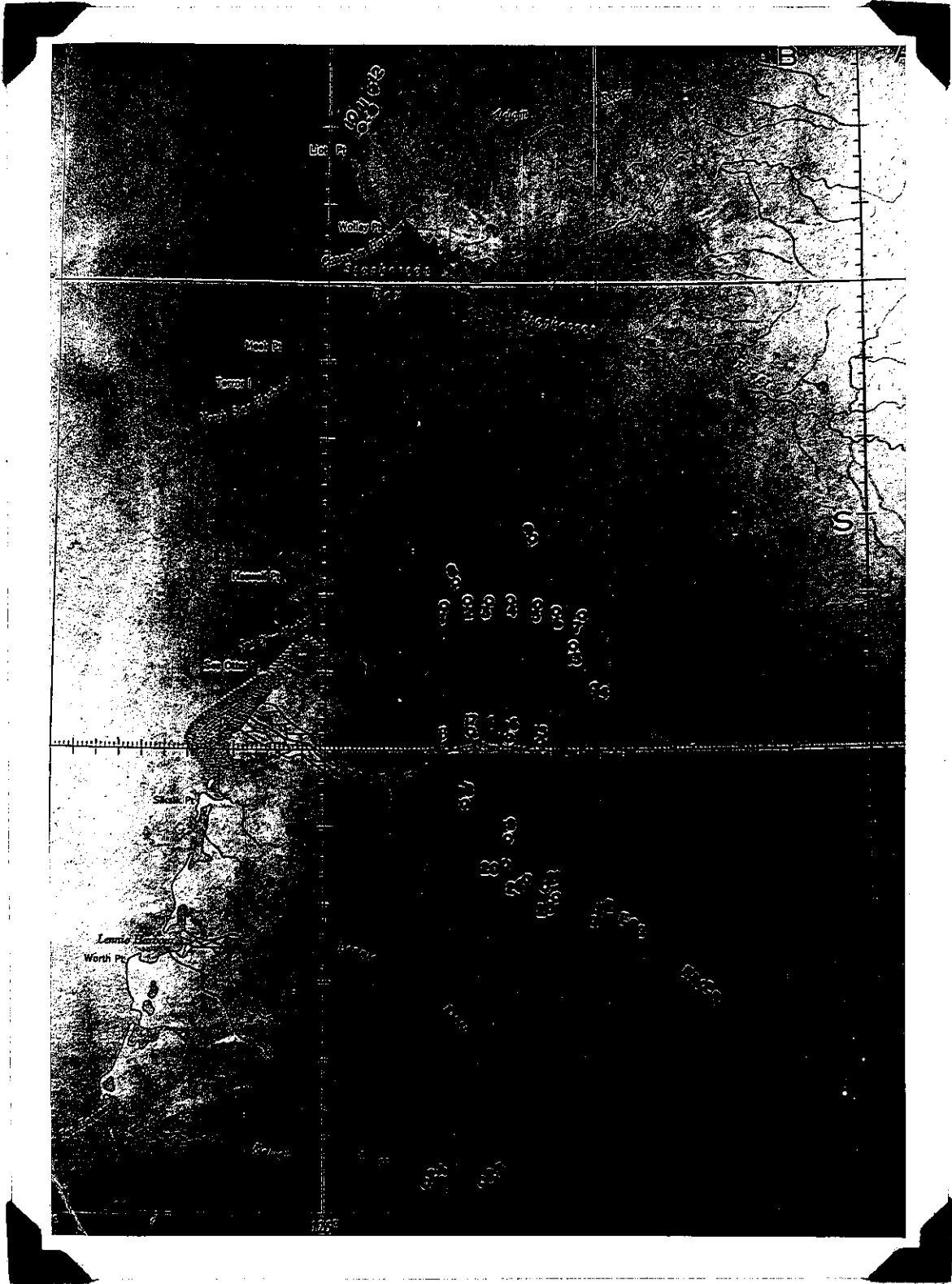


Fig. 28. Locations of poison control stations.

The baits were wired to a stick of wood which was pushed into the snow. A. Elias had a short trapline on this tributary. A number of foxes had been lost by him and two other trappers in the area. On our bait-setting trip the remains of ten trapped foxes which had been eaten by wolves were found. A fox which had been carried away from a trap by a wolf was found almost intact. Wolf tracks were found from the middle to the end of the creek. At two snowhouses, wolves had stopped and walked about them. They may have been attracted by the smell of skinned fox carcasses, or cached blubber and meat inside the snowhouse. The activity might also be the result of pure curiosity on the part of the wolf.

On March 25, two stations, eight and nine, were set out between Sea Otter and Storkerson Bay. Number eight consisted of an entire caribou carcass which had been found dead, and number nine of a caribou liver. At station nine, the tracks of four wolves were seen. The baits were set on N. Elias' trapline, who accompanied us. In 70 of his traps, 14 foxes had been trapped and five foxes lost. Four of the five foxes had been eaten by wolves and one had escaped with the trap. The following day, 22 foxes were trapped on another part of the line and four foxes had been eaten by wolves. Two foxes had escaped with the trap. From Storkerson Bay to Sea Otter, following the coast, seven foxes were trapped with no losses.

On March 25, two trappers, A. Elias and F. Sydney, went to visit their traplines north to the Adam River. Three baits were given to Elias to set out near Adam River (Stations 10, 11 and 12). The total number of foxes trapped by the trappers was 88 plus 16 which had been eaten by wolves. Near the Adam River, three wolves were seen, two grey and one red. One of the wolves was shot at but escaped. These wolves had started to follow the trapline from the direction of Adam River.

On March 29, stations one to seven were visited. The baits were intact, although at two stations the tracks of wolves and foxes were seen. The animals seemed to be suspicious of the baits.

From April 4 to 10, a trip was made to De Salis Bay and return to Sachs Harbour. No stations were established because it would not be possible to make a second trip in this area. Two wolves were seen near Raddi Lake and tracks were seen along the Masik River and near Raddi Lake. Wolves had destroyed a number of trapped foxes of the trappers on the east coast. C. Grubin claimed that he had lost over 100 foxes on his traplines on Big River and Nelson Head River. Later in the trapping season, he had moved part of his trapline from Big River to the Nelson Head River, to try to reduce his losses from wolves. On two visits to his line on Big River, he lost 53 foxes. After the first visit to his line along the coast and Nelson Head River, he lost 15 foxes and trapped 60. He reported that wolves not only bothered the traplines but were capable of attacking and killing other foxes. He had found five foxes which had been caught and eaten by wolves.

On March 29, stations eight and nine, were visited by N. Elias who reported that nothing had taken the baits. At station eight, a wolf had walked around the bait.

On April 17, stations one and eight were visited. At station one, an arctic fox was found 23 yards from the bait. The other bait was not touched. On April 19, stations two to seven were checked. At station two, a male arctic fox was found 37 yards from the bait. The fox had only chewed a small part of the bait around the edges. The baits at stations three and four were untouched. At station five, the bait had been eaten by a fox but the animal could not be found. The fox might have been poisoned and covered by drifting snow. Although it is difficult to pick out a dead white fox on the snow, a thorough search was made, without success. At station six, one male fox was found eight feet from the bait. The animal was still fairly soft and had been dead about three days. The bait at station seven had been taken away. Wolf tracks were seen at the station and presumably a wolf had pulled the bait, broke the wire and carried off the bait. No animals were found in the area. Stations one to six were removed and another bait was placed at station seven. From the head of this creek a line of stations was set out towards Big River. On April 19, stations 14 to 17 were established. One bait was set four miles north of Big River and three at the mouths of creeks along the river. On April 24, stations 18 to 22 were set out along Egg River. Station 19 consisted of a fresh caribou liver and a joint of meat. During the operation, two wolves were seen on the east side of the river. On April 26, two stations 23 and 24, were set out on the Kellett River.



On May 2, a complete check of the stations, shown in figure 1, was undertaken. On May 3, stations 23 and 24 were removed. Between the Kellett and Egg Rivers, the tracks of three wolves were seen. A wolf scat was examined and found to contain caribou hair and bones. On May 4, stations 19 to 22 were checked. The bait at station 22 had been chewed by a fox but the animal could not be found. No animals had approached station 21. A fox had walked about the bait at station 20. At station 19, a female wolf was found 75 yards from the bait. It had eaten a piece of liver before it had frozen. Near Egg River, the tracks of one fresh, three old, and seven fresh wolves were found. On May 5, nothing was found at station 18. One wolf track was seen near the mouth of Egg River.

On May 8, stations 10 to 12, near the Adam River, were visited. At station 10, two wolves, one grey and one red, were found. The grey wolf was buried under the snow so that only the tip of the ear remained uncovered. At station 11, a grey-coloured, female wolf was found about half a mile from the station. It had carried the bait to this site and eaten it. At station 12, a male and female arctic fox were found. Only the edges of the bait had been eaten by the animals. On May 9, the fresh track of a wolf was seen on the north side of Storkerson Bay. On May 10, three fresh tracks made by a single and a pair of animals were found on the Sea Otter River. On May 13, the two baits at station 17 were buried under a foot of hard-packed snow. One of the baits had been chewed by a fox. A fox which had died of poisoning was found on May 5, between Big and Sea Otter Rivers, about eight miles from this station. At first, it was considered that the fox might have died from rabies. An internal examination indicated that the animal had died from strychnine poisoning because of the characteristic dilation of the subcutaneous blood vessels and visceral blood vessels.

On May 14, stations 16 and 15, along Big River and 14, 13 and 7 north of Big River, were visited. At station 16, one raven and a fox tail were found. The fox fur was found about 70 yards from the bait. A male arctic fox was found between one-half to three-quarters of a mile from the station. The stomach contents consisted of fox fur, meat and bones, probably of the poisoned fox. At station 15, two grey male wolves were found. One was at the station and the other about 50 yards away. The bait had been completely eaten. At station 14, a female fox was found a few yards from the bait. It was unfrozen and had been dead a few days. At station seven, the bait was untouched. Between the two stations, the tracks of 12 wolves were found - one old track, a set of eight fresh tracks and a set of three old tracks.

On May 15, a rough-legged hawk was found at station 18 and nothing at stations 19 and 20. On May 16, stations 21, 22, 25 and 26 were checked but no animals had been taken. Stations 25 and 26 were set up in Egg River on May 4. All the stations had been removed except 9 which was south of Storkerson Bay. Returning from Storkerson Bay, this station was missed and it was not possible to travel back to the bait.

On May 28, a wolf bait, station 27, was placed about one mile inland from the 'Climb'; it was removed on June 3, untouched by any animals. Wolf tracks had been found along the west coast between Sachs Harbour and the Masik River. Two single tracks were found on the ice about three miles off the coast.

In Table 3, the weight (lb) and measurements (mm) of the six wolves are listed. The female wolf, number 88, taken on the Egg River on May 4, contained seven foeti which were near term. The sexes of the foeti were five males and two females. The female wolf, number 94, taken near the Adam River, possibly in early April, contained six small foeti. The sexes of the foeti were not determined.

Table 3. Weights (lb) and Measurements (MM) of six wolves and three foeti.

No.	Date	Area	Total Length	Tail Vertebrae	Hind Foot	Ear	lb. Weight	Sex
88	May 4	Egg R.	--	--	120	110	71	Female
92	Early April	Adam R.	1624	425	110	116	88	Male
93	" "	Adam R.	1500	395	117	114	84	Male
94	" "	Adam R.	1485	368	111	113	82	Female
111	May 7	Big R.	1515	420	122	--	92.5	Male
112	May 7	Big R.	1500	425	120	112	86	Male
Foetus of 88			128	32	18			Female
Foetus of 88			125	32	19			Male
Foetus of 88			125	32	19			Male

The heaviest wolf, weighing 92.5 lbs. was very fat. A layer of fat, about one-quarter inch thick, was found on the hindquarters. A thinner layer of fat covered the forequarters and along the ribs. The mesenteries were enlarged with fat. Fat was also found in the pelvic region and over the kidneys. The wolves taken at the Adam River were thin with few fat deposits.

The stomach and intestinal contents of one wolf contained caribou and fox fur, and caribou hair was found in two other wolves. Three of the stomachs were lost in the Sachs River. The parasites found in the intestines of these specimens have not yet been identified.

#### Discussion

The main reasons favouring a continued wolf control programme would be to try to reduce the wolf damage on traplines and to protect the caribou population against heavy predation. From the results of the control programme, it has been shown that the use of poison is an effective method to destroy wolves which prey upon trapped foxes. The methods of shooting and trapping used by the trappers were not successful. Poison stations set out on part of the trapline destroy wolves which are following the line. It is not necessary to set out stations along the whole of the trapline. Setting the baits at a distance from the trapline would be probably less effective than setting the baits near the trapping stations.

The frequency of poisoned foxes taken at the stations was higher than wolves. This result could be expected because foxes occur in larger numbers than wolves. As foxes are a valuable fur-bearer, methods to reduce the accidental poisoning of this species should be employed. The method of placing the strychnine pellets in the baits and the time of year the control is conducted might reduce the number of foxes poisoned. It was observed that foxes chew the edges of a frozen bait, while wolves devour the whole bait. If the pellets were placed about two inches from the edges of the baits, it is possible that some of the foxes might feed upon the baits without being poisoned.

A seasonal difference in the density of foxes usually occurs, so that the population will be higher in November and December than in March and April. Thus a greater number of foxes would be poisoned in the early part of the trapping season than at the end of the season. During November and December, the trappers have found that foxes are attracted to baits such as blubber, meat or viscera, but are not attracted in January and February. During the cold months of the trapping season, the trappers set urine baits beside the traps to trap foxes. If you waited until spring to poison wolves, they would be allowed to bother the traplines throughout most of the trapping season. Therefore, the optimum time to conduct a

control programme would be in November and December. April and May also were found to be good months to conduct a control programme. In January, February and part of March, the reduced amount of daylight and low temperatures would hinder such an operation.

If a person to supervise the operation was appointed, the assistance of the trappers could be procured. If the trappers were allowed to set poison stations on their traplines without supervision, the results and recording of reliable data might be misleading. Some of the trappers might be tempted to use the poison indiscriminately to kill foxes. The trappers could assist in the operation by reporting the location of wolves and checking the stations on their lines, reducing the amount of work and travel by the supervisor.

#### Recommendations

1. An organized and supervised wolf control campaign should be undertaken on Banks Island in areas where Eskimos trap.
2. Poisoned baits, preferably strychnine, should be set out along part of the individual traplines to destroy wolves which are following the lines. The bait stations should be near the lines.
3. Care should be taken to ensure that a minimum number of foxes are poisoned. This might be accomplished by placing strychnine pellets about two inches within the baits.
4. The best months to poison wolves are November and December. April and May also were found to be good months for a control programme.
5. Any poison operation on Banks Island should be closely supervised to obtain maximum efficiency and information, and to discourage possible attempts to poison foxes.

Peary's or Polar Caribou Rangifer pearyi Allen

Locally, the caribou on Banks Island are called "Banksland" caribou. Since the taxonomic status of this species is not clearly defined, the local name (instead of the term "polar") will be used hereafter. Some taxonomists consider the Banksland caribou a hybrid between the mainland form, Rangifer arcticus and the polar form, Rangifer pearyi. Anderson (1946) listed the range of the polar caribou as including, Ellesmere Island, Sverdrup Islands, and possibly the northern tip of Greenland. It was uncertain whether the caribou on Devon, Bathurst, Cornwallis, Melville and Prince of Wales Islands could be referred to this species. Taxonomic studies on the Banksland caribou are considered outside the scope of this paper.

The Banksland caribou are smaller in size than those of the mainland. Because of the paucity of body measurements, the measurements of five animals are listed in Table 4. The mainland form is heavier in weight than the Banksland form. This feature is evident when the weights of mainland caribou given by Banfield (1950) are compared with those of Banksland caribou. The range and average weight of four mainland yearlings was from 105 to 125 (113) pounds as compared with 61 and 81 pounds for Banksland caribou. The weight of four adult cows ranged from 130 to 165 pounds (149) as compared with 102 and 116 pounds. Eight adult bulls ranged in weight from 178 to 264 pounds (222). Although comparative data are not available, it is certain that the weights of adult bulls of Banks Island would be less than those of mainland bulls.

Table 4. Measurements in Millimetres and Weights in Pounds of Five Banksland Caribou

Date	Classification	Sex	TL	TV	HF	E	Wt.
Mar. 19	rising-yearling	M	1260	-	-	-	81
May 4	" "	F	1265	130	110	83	61
Mar. 19	adult	F	1480	-	-	-	116
Mar. 19	"	F	-	-	-	-	102
Apr. 24	young	M	1673	125	106	-	-

The colour of the winter pelage of Banksland caribou was found to be quite variable. The graduation ranged from almost pure white to bluish-white with a large, dark oval patch of brownish hair along the back. Only four white caribou were seen that resembled the polar caribou. The size and colour of the dorsal, dark patch varied in individual animals. No caribou were seen in winter pelage resembling that of the mainland caribou.

From March 16 to June 23, 302 caribou were counted. On March 16, 22 caribou were observed on an aerial survey from Sachs Harbour north to the Bernard River. In Fig. 1, the flight lines of this survey and other field trips are shown. Most of the caribou observed on the aerial survey were found between the Lennie and Big Rivers. No caribou were seen north of Storkerson Bay, except a wolf kill on the Bernard River. The largest group of caribou seen consisted of six animals; other groups ranged from one to four. These observations confirm the information supplied by the trappers that, unlike the mainland caribou, the Banksland caribou are not commonly found in large groups. Distinguishing the light-coloured caribou from the white background was difficult. Most of the caribou observed on the survey were feeding on the exposed slopes and ridges. It was considered that caribou on snow-covered flat land could be easily overlooked.

From March 19 to March 30, 72 caribou were seen. The areas in which the observations were made, shown in Fig. 1 were: 19 (6,3,4,6) on the north side of the Kellett River on March 19; five (2,2,1) between Sachs Harbour and the Lennie River on March 22; 14 (4,1,3,3,1,2) between the Lennie River and Sea Otter Harbour on March 23; seven (3,2,1,1) 25 miles northeast of Sea Otter Harbour on March 24; 13 (3,3,3,4) from Sea Otter to within eight miles of Storkerson Bay on March 25; one to the north side of Storkerson Bay on March 26; none within eight miles northeast of Storkerson Bay on March 26; one from Storkerson Bay to Sea Otter Harbour on March 27; four 25 miles northeast of Sea Otter Harbour; and eight (2,3,3,) from Sea Otter to Sachs Harbour on March 30.

From April 4 to 10, travelling from Sachs Harbour to De Salis Bay and return, 34 caribou were seen. On April 5, 11 (1,1,7,2) caribou were seen along the coast from "Fish" Lake to the Masik River. On April 10, 23(2,3,3,5,2,4,4) were seen from the Masik River to Sachs Harbour, mainly along the Sachs River.

From April 15 to April 26, 77 caribou were seen. The observations were made at the following times and places: one caribou between Sachs Harbour and the Lennie River on April 15; 14(1,3,4,5,1) between the Lennie River and Sea Otter Harbour on April 16; six (1,2,3) along the Sea Otter River on April 17; eight (3,5) along the Sea Otter River to within eight miles of Big River on April 19; three along Big River to the mouth of the Egg River on April 20; 17 (4,7,3,3) from Egg River to Sea Otter to Egg River on April 22 and 23; 18 (1,5,3,4,5) on 12 miles of Egg River on April 24; eight (2,3,3) from the Upper Egg River to the Kellett River on April 25; and two along the Kellett River to Sachs Harbour on April 26.

From May 2 to 19, 92 caribou were seen as follows: none from Sachs Harbour along the Kellett River on May 2; 26(3, 6,4,3,2,8) along four miles of the Kellett River and 12 miles northeast of the River on May 3; 26 (2,3,5,11,5,5) from the Upper Egg River to within six miles of the mouth on May 4; none from the Egg River to Sea Otter Harbour on May 5; two (1,1) from Sea Otter Harbour to Storkerson Bay on May 6; none from Storkerson Bay to 16 miles south of the Adam River on May 7; none to Adam River and return along eight miles of the coast on May 8; none from eight miles south of Adam River to south side of Storkerson Bay on May 9; four from Storkerson Bay to Sea Otter Harbour on May 10; 10 (2,8) from Sea Otter Harbour to point 20 miles from mouth of Big River on May 13; 12(4,2,6) four miles up Big River and 12 miles northeast on May 14; three to four miles down Big River and 10 miles up Egg River on May 15; none 16 miles up Egg River on May 16; nine (1,6,2) from 17 miles north of Kellett River to Sachs River on May 17. None on six miles of Sachs River on May 18; and none on 20 miles of Sachs River on May 19.

In June, five caribou were seen, two near the mouth of the Masik River on June 1, two near the Lennie River on June 19 and one north of the Lennie River on June 23. In June, observations were made on three field trips; from Sachs Harbour to the Masik River and return from May 28 to June 5; from Sachs Harbour to Worth Point on June 6 to 10 and from Sachs Harbour to the Egg River from June 19 to June 23. It is considered that caribou had migrated north of these areas.

The winter distribution of the caribou from mid-March to the first part of April consisted of scattered groups extending from Storkerson Bay south of the Masik River and eastward toward Jessop Bay. On April 6, no caribou were observed along the Masik River, or across the divide to De Salis Bay. In February, 1955, no caribou were seen along the

Masik River by Cst. Canam, on a patrol from the east coast to Sachs Harbour. In February, 1954, according to A. Carpenter, Caribou in considerable numbers occurred along the Masik River. It appears that the southern limit of the caribou winter range in 1955 was north of the southern limit of the previous year. On the west coast, the main part of the winter range extended from the Sea Otter River to the Sachs River. On the east coast, caribou moved north from the De Salis Bay area to the Jessop Bay area in early September. From De Salis Bay, it was necessary to travel to the headwaters of Big River, before caribou were contacted. Because of the lack of available information and the fact that there was little opportunity to travel on the east coast of the island, the description of the winter caribou distribution on the east coast is incomplete. The density of occurrence and the extent of the winter caribou range on the east coast was not determined.

### Spring Migration

The spring migration of caribou on the west coast consisted of a northward shift of small, scattered groups. No large groups, or caribou in long files were seen. Banfield's (1950) study of the barren-ground caribou (Rangifer arcticus arcticus), and personal observations of the spring migration of Stone's caribou (Rangifer arcticus stonei Allen), indicated that the mainland species commonly migrates in large groups, frequently in a long file formation. The absence of large groups of caribou is a noticeable difference between the mainland species and the Banksland species.

The rate of the migration in April was not apparent because the reduction in the number of animals on the wintering ground was gradual. During the first part of May, the largest movement of animals occurred near the headwaters of Egg River. The direction of this movement was westward and then northeast near the coast. At the same time, a wave of caribou crossed Big River, above the junction with the Egg River, travelling northeastward. On ten miles of Big River, small groups of caribou had crossed in various places. Reports from trappers indicated that groups of caribou had crossed Big River, at various places eastward. It is considered that the wave of caribou included animals from the interior and eastern section of the island, rather than those observed along the west coast in March and early April.

The number of caribou along the Kellett and Sachs Rivers remained almost unchanged from mid-March until the first part of April. On April 15, a greater number of caribou were found along the Lennie River than on previous observations. From April 7 to 20, an increased number of tracks, and caribou moving in a northward direction, were seen on Big River and the upper part of Egg River. It appeared that a small wave of caribou had moved northward, crossing the upper Egg and Big Rivers. The second wave of caribou, larger than the first one, occurred between May 2 and 5 on the upper Egg River. These animals were from the east rather than the west coast of the island. Between May 13 and 15 a greater number of caribou tracks were seen on Big River north of Egg River than along Egg River. By May 20, no caribou could be found in the Sachs Harbour area north of Sea Otter Harbour. Without an aircraft, it was not possible to determine the migration route or number of animals involved in the spring migration.

According to available information, the summer range of caribou occupies the northern part of the island. In

May, 1953, a considerable number of caribou were seen in the Castel Bay area by trappers. Because the northern part of the island is seldom visited by the trappers, only limited information of this region is available.

Caribou are seen travelling to the winter range in the Sea Otter area during the first part of October. In early October, 1952, B. Pokiak observed a large number of caribou, in small groups, travelling south past Sea Otter Harbour. He estimated that caribou occurred from the coast to 100 miles inland. In 1953 and 1954, the migration past Sea Otter was the same as in the previous year, with small groups of caribou, the largest numbering about 20, travelling south. In 1954 the migration was earlier and consisted of fewer animals than in 1953. In 1954, the caribou reached the Kellett and Egg Rivers about the end of October and Sachs Harbour on November 8. The first 12 caribou were shot at Sachs Harbour on November 8. The caribou continue south towards the Masik River. As the trappers are unacquainted with the area south of the Masik River, which is high and rugged, it is not known whether caribou cross the Masik to the hills south of the river, or travel eastward along the river.

The distribution and migration of caribou on the east coast of Banks Island is less well known than that of the west coast. Except for a brief period at De Salis Bay, most of the field studies were conducted on the west coast. The Eskimos who tend to occupy the west coast know little about the east coast. In 1954, there were three settlements on the east coast, one of which was visited. According to C. Grubin, at De Salis Bay, the caribou moved north from the De Salis Bay area after the first snowfall, which occurred in early September. He thought that they moved to the Jessop Bay area. Few caribou remained in the De Salis Bay area, while caribou remained throughout the winter in the Jessop Bay area. Trappers from De Salis Bay hunted caribou on the upper regions of Big River. It is not known whether the autumn migration on the east coast is actually north, opposite to the direction along the west coast. The location of the summer grounds of the caribou on the east coast remained unknown. It should be pointed out that, although supporting evidence is lacking, the caribou on the island should be considered as belonging to one group. Geographical isolation of groups should not occur, because the large rivers stretch almost from one side of the island to the other, and the northern part of the island is relatively flat. Additional aerial surveys are required to define accurately the summer and winter ranges and the migration routes of caribou on the island.

#### Mortality

From 1952 to 1955, a high winter mortality occurred on Banks Island during the period between late December and the end of February. Besides the reduced amount of daylight and intense cold, vegetation under the snow is unavailable. Although snow on both the level ground and hillsides is only about four to six inches deep, the crust is as hard as ice. It is considered that one of the factors causing mortality is the unavailability of food, resulting in malnutrition and in some cases death.

In 1952, a large number of caribou migrating along the west coast moved from the land to the sea. In October, off Sachs Harbour, Sea Otter Harbour and other places on the west coast, caribou were found on the ice. The caribou remained on the ice for a considerable period of time. It was considered

by the natives that few of the caribou returned to the land. In November and December, 1952, Banksland caribou were found at Holman Island, Cape Parry, Baillie Island, Cape Dalhousie, and possibly Herschel Island. It was the first time Banksland caribou had been seen on the mainland. Caribou migrated from Banks Island to the mainland on ice floes. The largest number of Banksland caribou were found on Baillie Island and Harrowby Bay. A large number of Banksland caribou travelled to the western coast of Victoria Island.

Following the unexplained migration, mortality on Banks Island occurred in January, 1953. Trappers found a large number of dead caribou. One trapper estimated a density of one dead caribou per mile from Sea Otter to Storkerson Bay. A few carcasses were also found north of Storkerson Bay. Thirty dead caribou were found in a small creek flowing into the Masik River. During the latter part of December and January, other trappers found dead caribou inland along the west coast. One of the dead caribou was examined by the writer, but the cause of death was not determined. This animal was thin and emaciated.

In January and February, 1954, only a few dead caribou were found by the trappers. The number was much less than in 1952-53.

During January and February, 1955, dead caribou were found in the Jessop Bay area, on the east coast and inland along the west coast. Besides dead animals, weak and emaciated animals were found by trappers. They reported that fawns were observed that were barely able to stand and were unable to run away when approached.

An estimate of the amount of winter mortality could not be determined. Five trappers found 15 dead caribou, which included one adult cow, five fawns and two young bulls. These animals were found in the Sea Otter and Egg River areas between late December and mid-March. The trappers reported that the animals were thin and emaciated. Some were found alive but in a weak, helpless state.

A yearling bull, destroyed by a trapper on March 20, was examined. This examination was hampered by the frozen state of the animal. It was thin and lacked internal fat deposits. The hide was as thin as paper and tore off in places when the hair was pulled. Without pathological evidence the cause of death cannot be stated with certainty. It appears that death resulted from a combination of cold and insufficient food.

An analogous situation occurs <sup>at AKLAVIK</sup> in the muskrat population in certain winters. A heavy winter kill in the population was observed in 1951-52. The ice in the lakes attained a greater depth than normal, limiting the availability of forage. Besides a low trapping success and dead animals, a large percentage of the pelts were "papery". Muskrats trapped in shallow lakes are usually thin, and have thin papery pelts. Pathological and physiological studies to determine the effects of prolonged low temperatures and limited forage conditions on these animals would be worthwhile.

In January and February, 1954, a number of reindeer, at the Reindeer Station, consisting of females and young age-classes, died. It was determined that death was the result of nutritional and vitamin deficiency. This condition was different from the one on Banks Island. In the reindeer the immediate cause of death was fractured spinal columns or legs. Dead Banksland caribou had no fractured bones.



On Banks Island, winter mortality occurred each year during the same period from late December until the end of February. Considering this, it would seem that death was not the result of an epidemic disease. Evidence indicates that nutrition is an important factor. A large proportion of the dead animals were adult cows, fawns, and yearlings. Adult bulls, two of which were examined on March 22, had a small amount of mesenteric fat and were in healthier condition than other age-classes. A gradual improvement in the cows and calves of the previous year was apparent in April and May. By this time, forage conditions had improved and weather conditions were less severe than in March. Lacking evidence, it is with reservations that mortality is considered to have resulted from starvation.

Two bulls and one female calf of the previous year were examined and were not found heavily parasitized. A few Cysticercus sp. were found in the skeletal muscles of the hind-legs of two animals. One of the bulls had two Cysticercus tenuicollis on the liver and 62 warble fly larvae (Oedemagena tarandi) on the dorsal part of the hide.

The low reproductive rate of the Banksland caribou may be due to nutritional deficiency and malnutrition. According to the trappers, little breeding took place in October, 1952, and few fawns were seen in 1953. A trapper reported finding one pregnant cow in an examination of 30 to 40 caribou. In March and April, 1955, of 18 adult cows which were classified, only three had fawns. In 1954-55, a poor fawn crop seemed evident. Among seven adult cows, two on March 19, and five on April 13, only one was pregnant. Although an estimate of the population is not available, it would appear that the annual recoupment would not equal the total of winter mortality and number killed for food. The effect of wolf predation on the population may be important. During the investigation, eight wolf kills were found.

Caribou meat forms the staple diet of the trappers on Banks Island. Arctic hare, snow goose, ptarmigan, seal meat, fish and a little canned meat supplement their diet. The hides of caribou are used for clothing, boots, and sleeping robes.

From the incomplete licence returns for 1951-52, 1952-53, and 1953-54, the total number of caribou reported were 167, 180 and 107, respectively. The number taken in 1954-55 was not available. Most of the caribou are killed in October and November, although caribou are hunted throughout the winter and spring. Carcasses are stored in ice cellars for use throughout the spring and summer. Usually, a few carcasses are stored for use after the trappers return in September, because few caribou are available until October.

Wasteful practices by the trappers were limited to the occasional feeding of caribou meat to dogs. In two instances, the meat in poorly constructed caches was eaten by foxes. The wasteful practices are not considered as deleterious to the species as hunting in April and May. In view of the extent of mortality in the caribou population, I would suggest that hunting should be prohibited in April and May.

Beaufort ringed seal - Phoca hispida beaufortiana Anderson.

According to Anderson (1946), this species is distributed from Alaska eastward to Coronation Gulf, including the Beaufort Sea. Seals from Herschel Island appear larger in size than those from Sachs Harbour.

On the west coast of Banks Island, the distribution of the ringed seal is continuous, but spotty. Large concentrations occur south of Cape Prince Alford, Sea Otter Harbour, Terry Island, and south of Sachs Harbour to the Masik River. On the east coast large numbers (of seals) are found at Nelson Head, De Salis Bay and Jessop Bay. Perhaps the largest numbers (of ringed seal) are found in the Prince of Wales Straits.

During the winter, ringed seals remained at the breathing holes. The number of seals at each breathing hole was usually one or two. When wide ice leads formed and surface water began to drain into the breathing holes the seals appeared to move to the leads. Near the edge of fast ice in the first part of June, a movement of small, brown seals, presumably immature animals lasted for a few days. In July, after the ice moved out, a few seals were found in the open water near floating pans of ice. In July and August, few seals were found in open water off the west coast, near Sachs Harbour.

Five main hunting methods are used--setting seal hooks, and shooting at the breathing holes, in open water at the edge of the fast ice, where the seals are hauled up, and from canoes in scattered floes. In February, a few Eskimos used the first method, a primitive one. The second method where the hunter stands beside the breathing hole waiting for the seal to surface is seldom used on Banks Island. Harpoons have been replaced by rifles to kill or stun the seal. The success of this method depends on the skill and experience of the hunter in firing the rifle at the proper angle. In late March and April, the Eskimos travelled to open water to hunt seals at the edge of the fast ice. In early May, hauled-up seals at the breathing holes and along open leads were hunted. Most of the hunters used telescopic mounts instead of open sights. White cloth parkas or blinds were worn in crawling up to hauled-up seals. In mid-June, the Eskimos travelled out to the young ice near the edge of the fast ice to hunt. The final seal hunting was conducted in July amongst scattered floes after the ice moved out. Few seals are taken from them until after freeze-up in October and November.

Two trips along the coast were made to observe the seal density and distribution. From May 28 to June 4, travelling by dog team, 183 ringed seals and three bearded seals were counted from Sachs Harbour to the mouth of the Masik River. The number of seals in the groups counted are listed in Table 5. On May 30, in addition to the number listed in Table 5, 97 ringed seals and 3 bearded seals were observed in the evening. A count was not taken on the return trip because a number of Eskimos were hunting in the area.

Table 5. Frequency of Numbers of seals in groups observed from May 28 to May 31.

Date	Number in Group								Total
	1	2	3	4	5	6	7	8	
May 28	7		1	1					14
May 29	13		1	1					20
May 30	4	2	2		1			1	27
May 31	4		3	1				1	25
Total	28	4	21	12	5			16	86

On the second trip, from Sachs Harbour to Blue Fox Harbour, from June 6 to June 10, only 12 seals were counted.

Larger numbers of seals might have been counted, if the observations had been made about a week later. Considering the hunting success and observations of the hunters, seals were present in large numbers from June 10 to June 20, along the west coast between Sachs Harbour and the Masik River. In 1954, the largest numbers of seals were seen between June 15 and 20. In that year Cst. Canam, R.C.M.P., Sachs Harbour counted 125 seals in an area 500 by 300 yards.

In 1955, the estimated number killed by eight trappers was 150 ringed seals and 8 bearded seals. The success of some of the hunts in that year is recorded in Table 6. The most successful hunt was that of June 20 when 27 ringed and 5 bearded seals were taken.

Table 6. Incomplete List of the Number of Seals Killed by Groups of Hunters.

Date	Number of hunters	Number of Ringed Seals Taken	Number Lost
March 31	2	0	
April 30	2	3	3
May 21	1	5	
May 24	2	7	
May 25	1	4	
May 27	2	2	2
June 1-3	5	25	
June 10	4	21	
June 20	2	27 and 5 bearded.	
July 10	2	3 bearded	

No information was obtained on the spring sealing activities on the east coast. Before freeze-up in October, 1954, 13 bearded and 6 ringed seals were taken at De Salis Bay. At Jessop Bay 10 seals were killed before freeze-up. Although seals were plentiful, the trappers were inexperienced and unacquainted with coastal sealing methods. At both locations, a large number of seals could be taken before freeze-up.

Seals are mainly used for dog food and to a lesser extent for human use and fuel. The skins of ringed seals taken in August and September are used for clothing and water boots. The Eskimos claim that skins of seals taken in the spring are unsuitable for clothing because of the scratches and holes. The skins of bearded seals are always saved and used for making boot soles. Unlike the Victoria Island Eskimos the Bankslanders seldom eat seal meat. A large part of the blubber is burned in stoves to supplement the supply of coal or driftwood, or wasted.

Bearded Seal - Erignathus barbatus barbatus (Erxleben)

Observations on this species have been included in the previous section. Bearded seals are much less common than ringed seals. An interesting characteristic of this species is that it appears on the ice earlier than the ringed seal.

White whale - Delphinapterus leucas (Pollas)

In June 1954, seven white whales were seen off Sachs Harbour. Returning to Aklavik from Sachs Harbour on July 23, I saw a school of nine between Cape Lambton and Cape Parry.

Bowhead whale - Balaena mysticetus Linnaeus

In 1954, 23 bowheads were seen by different persons -- one in June at open water, six at the latter part of July near Baillie Island, 10 in October near Booth Islands, and one near Cape Kellett.

On July 23, 1955, four bowheads were seen off Cape Lambton, on the chartered flight to Aklavik. On the flight to Sachs Harbour, the pilot reported seeing two near Cape Kellett.

The whaling equipment given to the Eskimos at Sachs Harbour had not been used. The harpoon gun remained uncrated. As bowheads frequent the edge of open water, there is little opportunity to use this whaling equipment. At Point Barrow, Eskimos hunt bowheads travelling through leads in the ice. Off the coast of Banks Island, the hunting conditions are not ideal.

Grizzly bear - Ursus richardsoni Swainson

In the winter of 1952, the skin of a grizzly bear shot by an Eskimo in the Masik River valley was examined. This is the only known record of this species on Banks Island.

Polar bear - Thalarctos maritimus maritimus (Phipps)

Polar bears are probably commoner in the Cape Lambton and Nelson Head area than at other places on the coast. In 1955, only three or four bears were killed off Sachs Harbour, compared to a total of 10 taken in the Nelson Head area. The skins are sold as souvenirs, \$50.00 each for large skins and \$30.00 for small ones.

Coloured fox - Vulpes fulva alascensis Merriam

Coloured foxes are occasionally trapped on Banks Island. Two were trapped in 1953-54, but none in 1952-53 or 1954-55. On June 7, 1955, a coloured fox was seen a few miles inland from Cape Kellett.

Arctic weasel - Mustela erminea arctica (Merriam)

On June 24, two female weasels were collected at an unoccupied fox den, about two miles southwest of the Egg River. On July 11, a male was collected at Sachs Harbour. Two other weasels were observed. About six weasels, in summer pelage, were killed in the meat cellar by the trappers at Sachs Harbour. Weasels appeared to be more abundant than in previous years.

Wolverine - Gulo l. luscus (Linnaeus)

In 1951-52, a few wolverine tracks were seen by the trappers.

Arctic hare - Lepus arcticus andersoni Nelson

The largest numbers of arctic hares were observed on the ridges of the Masik River valley. Hares were also seen along the west coast from the Masik River to Sachs Harbour, along the Sachs River, and east of Sea Otter Harbour.

On April 5, 21 hares (1, 4, 6 and 10) were seen along the coast near the Masik River. No hares were observed on the Masik River in an area reported to be overrun by them. On April 6, about 10 miles from the mouth of the Masik River about 130 hares were seen in three groups.

On April 10, two hares were seen on the Sachs River near the mouth. On the ridge behind Sachs Harbour, a hare was seen on April 27. A small number of hares remained on this slope throughout the summer and autumn. Seven hares were counted along the coast from Sachs Harbour to the Masik River from May 28 to June 4.

From 30 to 40 hares may be killed for human food in some years. In 1954-55, about 10 hares were taken. The fur is used for trim on mitts and clothing.

Back's Lemming - Lemmus t. trimucronatus (Richardson)

In 1954-55, Back's lemmings were more abundant than collared lemmings. Both species seemed to be scarce.

Collared Lemming - Dicrostonyx groenlandicus Kilangmuitak Anderson & Rand

According to trappers a die-off in the collared lemming population occurred in the autumn of 1954. On May and June 1955, a number of dead lemmings of this species were found.

Musk-ox - Ovibos moschatus wardi Lydekker

No musk-oxen were observed during the investigation. The distribution of the species is discontinuous. Records from different sources indicate that the species is found from the northwest part of the island south to the Masik River. In 1954, a herd of 30 were observed by personnel from a U. S. weather ship. Trappers reported seeing musk-oxen as follows: two along the Masik River in April, two at Sachs Harbour in June, and one at Storkerson Bay.

Skulls and old remains were found in most of the water courses such as: Storkerson, Sea Otter, Egg, Lennie, Kellett, Sachs and Masik Rivers.

Birds

No annotated list of bird species observed on Banks Island is included in this paper. Observations on the snow goose nesting area are described.

The first flock of snow geese was seen on the Sachs River on May 17. The number of arriving flocks increased daily until May 31, after which it diminished. The end of the spring migration was considered to be June 6.

The geese arrived along the west coast from Cape Kellett as far south as Cape Lambton. Some of the flocks arriving at

Cape Kellett probably departed from Baillie Island. Those arriving at Cape Kellett and flying north along the west coast appeared to have flown from the direction of Cape Parry.

A total of 19,882 were counted in the nesting area and an additional 8,000 geese were estimated. Three flocks of non-breeders were observed as follows - 100 at Cape Kellett, 3,000 to 4,000 along the Lennie River and 300 between the Lennie and Egg Rivers. The total number of geese on the island was estimated to be from 32,000 to 35,000.

From June 24 to July 3, data were collected on clutch size, hatching data, brood size and predation on the nesting area in the Egg River. The number of eggs varied from one to nine, with an average of four. On June 27, hatching commenced and was almost completed by July 2. Weather conditions were favourable during the hatching period so that mortality was low.

During the hatching period, the geese left the nesting area by travelling inland from both sides of the river. Those from the west side of the river travelled towards the Lennie River and those from the east side towards Big River. Large numbers of geese occupy the Big River flats during July and August.

On July 5, a flock of 4,000 geese were observed on the north bank of the Kellett River. Three hundred of these geese were banded on the following day.

About August 25, according to Sam Lennie, flocks of geese fly west from Cape Kellett over Booth and Baillie Islands, continuing towards Tuktuk.

Until recently, snow geese were hunted in the spring and their eggs collected for food. The practice of egg-robbing has been stopped. In 1955, the Eskimos were not permitted to hunt snow geese in the spring. One family would probably kill 50 to 70 geese for use during the summer and the following winter. Since snow geese form an important source of food during a critical period, I would strongly recommend that Eskimos should be allowed to take a limited number in the spring.

Economic Status of Banks Island Eskimos

The earliest occupation of Banks Island was possibly 500 years ago. Manning (personal communication, 1956) reported that the Thule houses on Banks Island were from 300 to 500 years old. Four Thule houses were shown on his map (Manning, 1953) at Cape Kellett, about 15 miles east of Sachs Harbour, south of the Nelson River, and about 15 miles east of De Salis Bay respectively. Collinson (1889) who visited Banks Island about 100 years ago, believed it was uninhabited at the time of his visit. Following the visits of the early explorers, Victoria Island Eskimos and whalers visited the island for brief periods.

In 1926, a group of trappers crossed from Tuk to Banks Island to trap foxes. Trappers continued to cross by schooner to Banks Island each year unless prevented by ice conditions. Their main camps were located at Sea Otter Harbour, Sachs Harbour and De Salis Bay. Camps recently used but presently unoccupied were found on the north side of Storkerson Bay, at Blue Fox Harbour, and at three sites near the mouth of the Masik River.

In 1951, following a few years absence from the island, Bankslanders at Tuk, were encouraged to return and continue their trapping activities. Local traders in Aklavik and Tuk, and the government Eskimo Loan Fund helped to finance this project. The trapping was successful until 1955-56, when there was a scarcity of foxes. In Table 7, the total earnings and financial assistance are listed. The 1951-52 loan does not include assistance given by traders.

Table 7. Trapping Success, Value of Furs Taken, and Loans to Trappers, from 1951-56.

Year	Number of Trappers	Number of Foxes Trapped	Value of Fur Sold	Amount Loaned
1951-52	9	2,657	\$15,000-20,000	\$1,035.00
1952-53	9	1,198	\$14,000	\$5,450.00
1953-54	10	1,274	\$12,000	Not available
1954-55	17	5,700	\$85,000	\$12,384.09
1955-56	6	1,000(approx.)	--	Not available

Food, coal, fuel oil, gasoline, coal-oil, and dog food are purchased on the mainland and transported by schooner to Banks Island. Individual food orders vary in cost from \$800.00 to \$1,500.00 depending on family size. At present, the trappers depend on white man's food except for meat. Caribou supplemented by hares, snow geese, seal, arctic char, and ptarmigan are eaten. At Cape Kellett, a collection of bones at a Thule site excavated by Manning, was classified as follows: ringed seal, bearded seal, bowhead whale, polar bear, arctic fox, caribou, musk-ox, and birds. The majority were those of seals and birds. At an old camp on the north side of the Masik River, bones of caribou and musk-oxen were found. The trend has been to depend less on natural sources of food and more on purchased supplies.

The results of the biological investigation indicated that additional families could be moved to Banks Island. Three possible sites are suggested; north side of Storkerson Bay, at De Salis Bay and at Jessop Bay. North of Storkerson Bay, ice conditions continue later in spring than at Sachs Harbour. In some years, the trappers might be delayed in returning to the mainland or prevented from doing so altogether.

In 1954-55, three camps located on the east coast, at Jessop Bay, at the Coalmine, and at De Salis Bay, were occupied by Delta Eskimos, Kogmulik, and Bankslanders, respectively. The Delta Eskimos fared badly, with poor success in trapping, hunting, and sealing because of their inexperience of the area and their coastal methods of hunting and sealing. On the east coast, climatic conditions are more severe than on the west coast. After the completion of the trapping season, three of the four trappers returned to the Delta, two by private charters and the third by a government aircraft from Holman Island. The cost of a private charter to Jessop Bay from Aklavik was \$700, perhaps more than the value of the fur trapped by an individual trapper. The three families of Victoria Island Eskimos were lazy, living under primitive conditions, and often on the verge of starvation. The trappers at De Salis Bay, who had previously trapped on Banks Island, were the most successful hunters. Thus, the choice of the kind of Eskimos to be rehabilitated is as important as the choice of the settlement. Coastal Eskimos who are seal hunters should make a good living on Banks Island. Fox trapping is the main occupation but the method of trapping could be learned from the other trappers.

It is questionable whether any permanent settlement of Eskimos can be made under present arrangements which permit them to return to the mainland in July. The annual return is necessary to purchase supplies and trapping equipment. Until the establishment of an R.C.M. Police detachment and a D.O.T. weather station, no one remained on the island from July until September or the first part of October. Under this arrangement only enough seals are taken in the spring for dog food needed immediately, and no provision is made for the following autumn and winter. If the Eskimos remained for the summer, coal from the east coast could be obtained for winter use.

If a small trading post were established, it might encourage the Eskimos to remain. It would be a risky proposition to establish a post as a co-operative or private enterprise, and it would be difficult to find a suitable operator; but if even only a few items were available, it would be unnecessary to make trips to Holman Island each spring for food, or to order supplies from Aklavik by aircraft. This would delay large expenditure for the trading post, which may not be advisable at the present time, since the trappers prefer to return to the mainland each year, and are able to get credit from the mainland traders. However, the ultimate aim should be to establish a well-equipped trading post.

In summary, it is believed that additional families could be relocated on Banks Island at Storkerson Bay, De Salis Bay or Jessop Bay. From the biological investigation it appears that the livelihood of the group would be most successful if more marine resources were utilized, and less caribou and other game.



Recommendations

1. An organized and supervised wolf control campaign should be undertaken on Banks Island in areas where Eskimos trap.
2. Poisoned baits, preferably strychnine, should be set out along part of the individual traplines to destroy wolves which are following the lines. The bait stations should be near the lines.
3. Care should be taken to ensure that a minimum number of foxes are poisoned. This might be accomplished by placing strychnine pellets about two inches within the baits.
4. The best months to poison wolves are November and December. April and May also were found to be good months for a control programme.
5. Any poison operation on Banks Island should be closely supervised to obtain maximum efficiency and information, and to discourage possible attempts to poison foxes.
6. Caribou hunting should be prohibited in April and May because of heavy winter mortality since 1951.
7. Additional Eskimo families could be rehabilitated on Banks Island at Storkerson Bay, De Salis Bay or Jessop Bay.
8. Coastal Eskimos should be chosen so that the marine resources would be utilized.

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Fig.2. Sachs Harbour, showing  
Carpenter's house (centre)  
and the ice-walled tent of  
B. Pokiak.

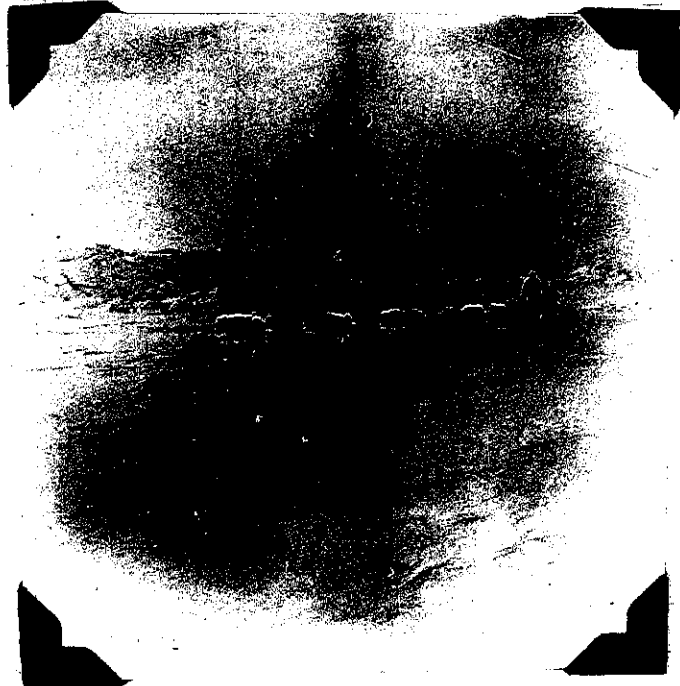


Fig. 3. Travelling by dogteam  
along a smooth patch of  
ice between the shore  
and grounded 'old' ice  
along the west coast.



Fig. 4. A gravel ridge on the  
north side of the Masik  
River, six miles from the  
mouth, measuring 460 feet.  
A large number of arctic  
hares occur on this ridge.

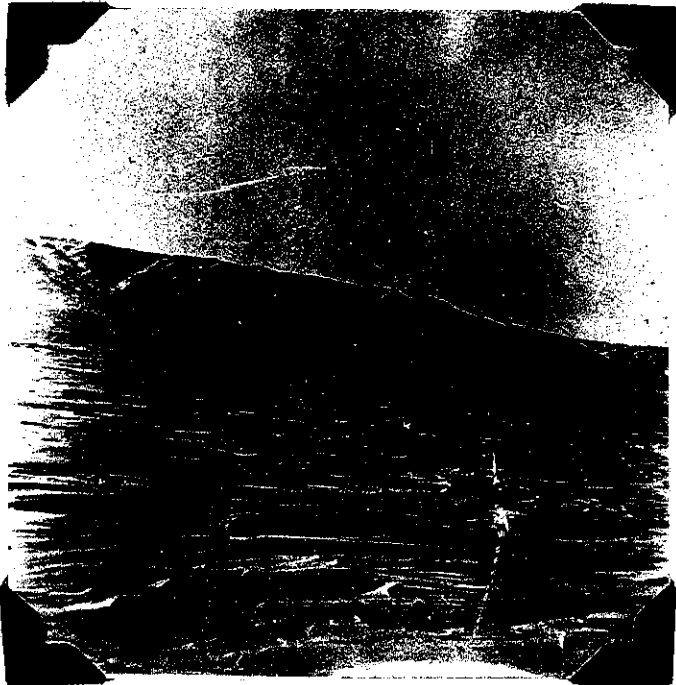


Fig. 5. North side of the Masik River, about 20 miles from the coast.

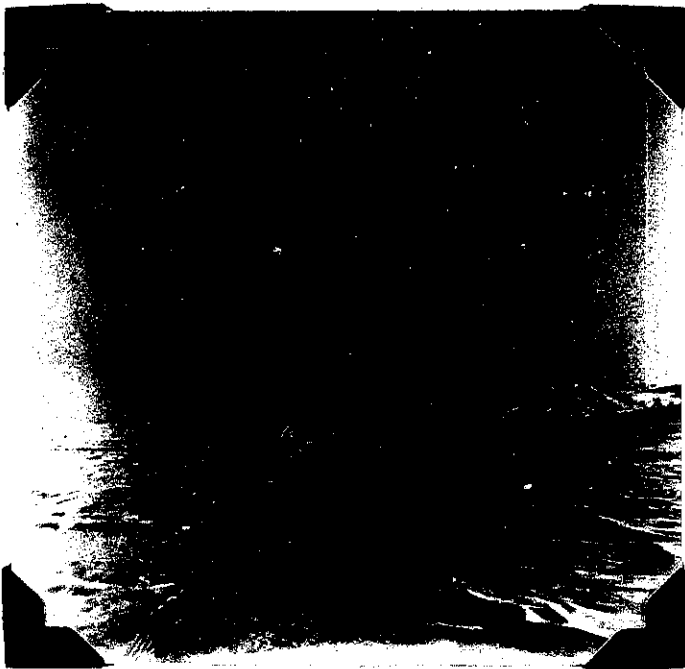


Fig. 6. Looking eastward along the Masik River.

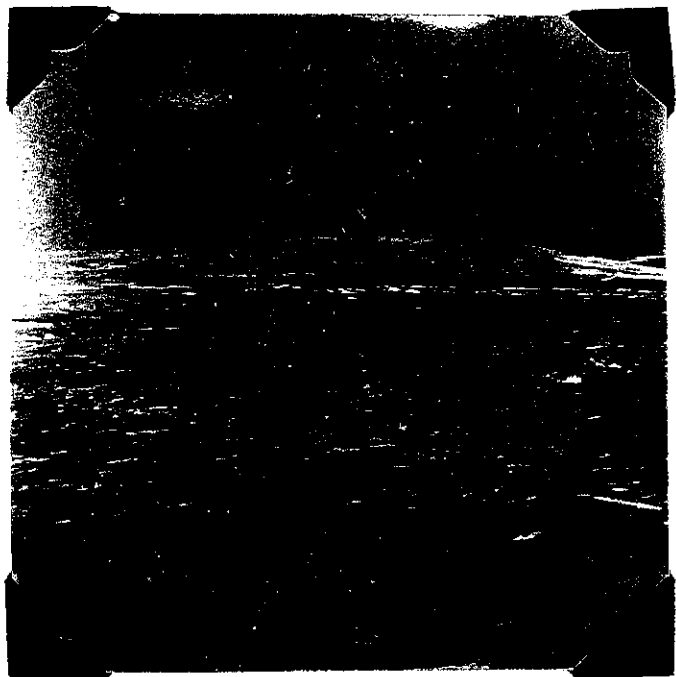


Fig. 7. North side of the Sachs River.

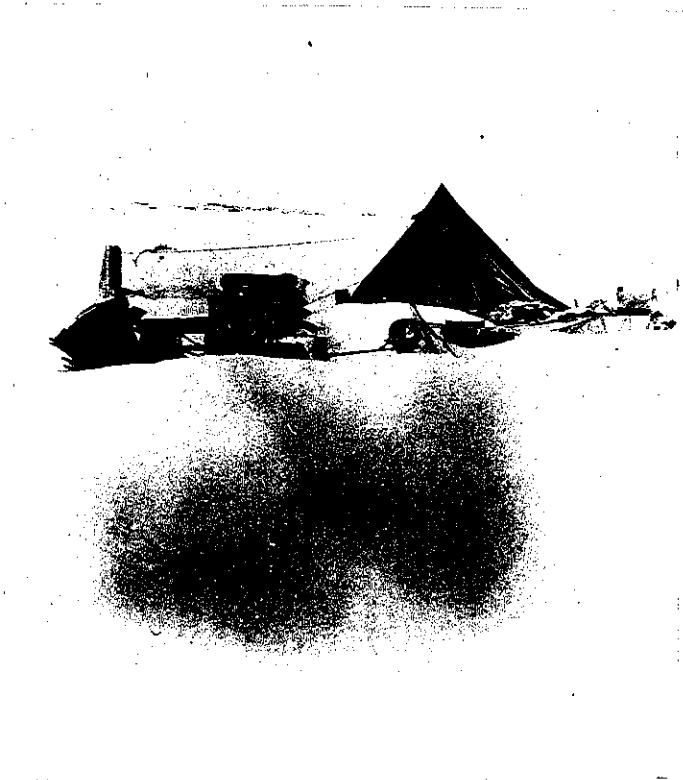


Fig. 8. Camp site on the Sea Otter River after a blizzard on April 18.



Fig. 9. Motor toboggan operated on the Egg River by the writer.



Fig. 10. Sam Lennie, guide, in front of a block of "old" ice.

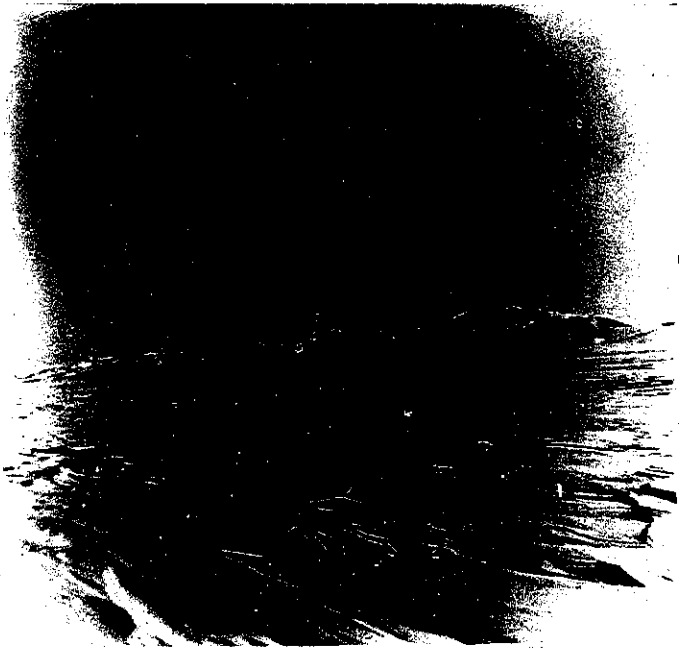


Fig. 11. The Adam River area.



Fig. 12. Three wolves poisoned near the Adam River.



Fig. 13. Early break-up conditions on the Sachs River.



Fig. 14. Eroded cliffs near  
Cape Kellett.



Fig. 15. Walls and depression of  
a sod-walled house at  
Cape Kellett.



Fig. 16. Near the headwaters of  
the Lennie River.



Fig. 17. The southeastern part of the snow goose nesting area on the Egg River.

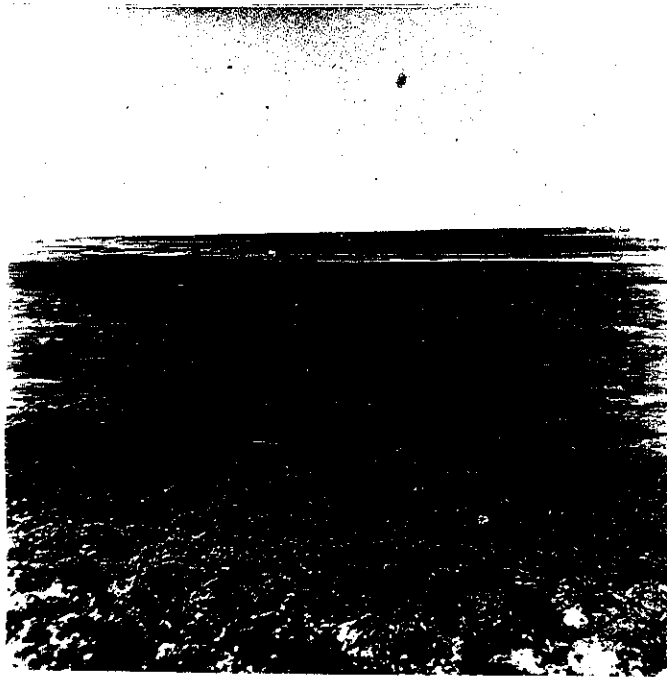


Fig. 18. The snow goose nesting area near the junction of the Egg and Big Rivers.

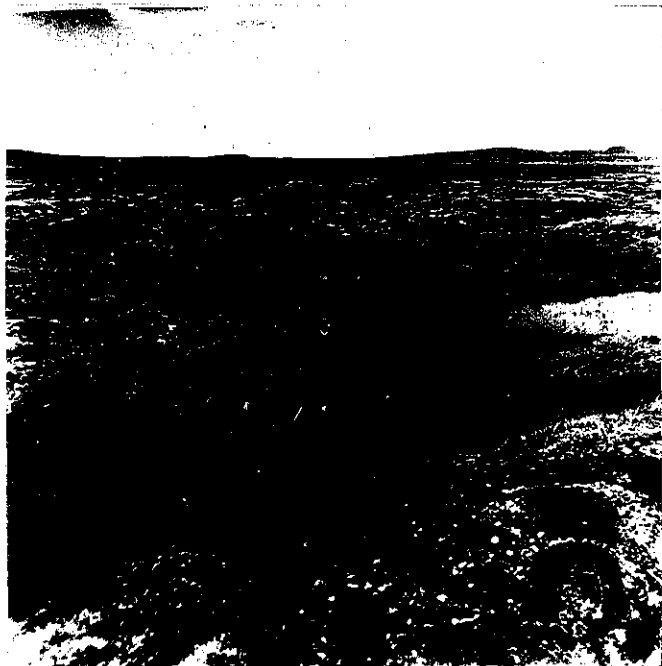


Fig. 19. Peaty deposits near Egg River.





Fig. 20. Flat, rolling topography  
between the Egg and Lennie  
Rivers, with characteristic  
tressocks of Dryas.



Fig. 25. A lemming nest dug up  
by a fox.



Fig. 26. The remains of snow goose  
eggs which have been robbed  
and eaten by a fox.

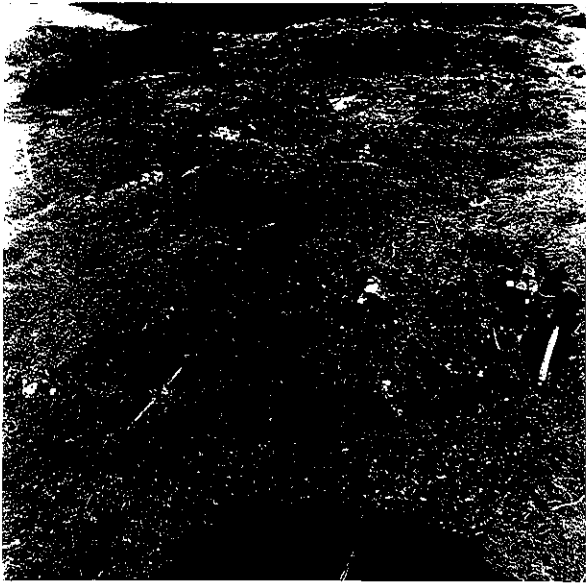


Fig. 27. The area on the Egg River,  
where the second lemming  
census was conducted.